OUTCOMES

of

CAESAREAN SECTION

Volume I of II

By

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Summary

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Caesarean section is one of the oldest operations in the history of surgery, however, until recent decades it was usually used as a last resort because of the high maternal mortality associated with its performance. As the safety of the operation improved, it has been used much more liberally in obstetric practice and in the last 20 years most countries have experienced a marked upward trend in caesarean deliveries. Concern has been expressed from both medical and lay people about the increased use of this intervention. Justification of the increase is usually made by linking caesarean section rates with perinatal mortality statistics, although most recent studies have failed to demonstrate a causal relationship between improved perinatal outcome and the increased use of caesarean section.

Many studies have been published on the determinants of the rise in caesarean section rates but comparatively few have addressed the physical, psychological and social consequences of the operation. This study was designed to further knowledge of the immediate, short-term and long-term effects of caesarean delivery for both the mother and her baby.

The general aims of the study were :

1. To describe the current practice with regard to caesarean section in a large university teaching hospital
2. To compare the characteristics of women delivered by caesarean section with those delivered vaginally using routinely available data (SMR_2)
3. To describe the immediate, short-term and long-term morbidity experienced by women delivered by this method
4. To compare the immediate, short-term and long-term morbidity experienced by women by the timing of caesarean section
5. To determine women's knowledge of the reasons for the performance of the operation
6. To compare the views of primigravidae delivered vaginally and by caesarean section of their experience on this occasion

In order to achieve these aims the study was designed in a number of sections. Firstly, a retrospective review was conducted of the obstetric case records and midwifery notes of all women delivered by caesarean section during 1984 (n=619). From this review it was possible to determine the indications for the performance of the operation and to examine the neonatal outcome. Any morbidity sustained in the operative or post-operative period was also recorded. The data was further analysed to test the hypothesis that the timing of caesarean section influences the development of subsequent morbidity for both the women and her infant. Comparisons were made between elective and emergency caesarean deliveries; sub-groups of women delivered by emergency caesarean section and finally between women delivered during the first stage of labour and those delivered during the course of the second stage.

In the second part, data was accessed from the Scottish Morbidity Record (SMR_2). This allowed the characteristics of women delivered vaginally in Glasgow Royal Maternity Hospital during the year of the study to be compared with those of the women delivered by caesarean section.

To determine the short-term morbidity associated with caesarean section, a postal questionnaire was sent three months after delivery to all women in the study population (except those who had experienced a perinatal loss or where the neonatal outcome was uncertain). This examined the health of women and their babies following discharge from hospital and described the reported morbidity. It also determined the women's knowledge of the reasons for the performance of the operation and described infant feeding practices.

In the final part a group of 50 primigravidae delivered unexpectedly by emergency caesarean section during labour were compared with a closely matched group who delivered vaginally. The specific objectives of this part of the study were to compare the immediate, short-term and long-term morbidity experienced by the women; to determine the women's views of their experience on this occasion and to discover the attitude of the women to future pregnancies. In

addition to the case note review and postal questionnaire, the women were interviewed in hospital on the 4th or 5th day after delivery and, where possible, again at home 6 months after the birth.

During 1984, 3952 women were delivered in Glasgow Royal Maternity Hospital resulting in the birth of 3994 infants. The caesarean section rate was 16%, with 619 women delivered by this method. The proportion of primigravidae and multigravidae in the study group did not differ from the hospital population, however, women delivered by caesarean section were significantly older and shorter. The mean gestation period at delivery was shorter for women delivered abdominally and a higher proportion delivered before 37 completed weeks of pregnancy (16.7% versus 6.4%). A higher proportion of infants delivered by section weighed less than 2500 grams at birth (17.4% versus 6.7%) and were more likely to require admission to the Special Baby Care Unit (21.0% versus 6.2%).

Elective surgery was performed in 220 (36%) cases and in the remaining 399 (64%), the operation was carried out as an emergency procedure. Regional anaesthesia was used in 74.5% of cases and general anaesthesia in 23.9%. In the remaining 1.6%, regional anaesthesia was subsequently combined with general anaesthesia because of an inadequate block. General anaesthesia was more frequently employed in emergency sections, usually when rapid delivery of the baby was required.

In 65% of the cases more than one indication for the performance of the operation was given in the case notes and it was apparent that these were not necessarily ordered in terms of priority. The causal model and decision rules devised by Anderson and Lomas was used to assign cases with multiple indications to a single diagnostic class. Ultimately four main indications - dystocia, breech presentation, previous caesarean delivery and fetal distress - were determined to be responsible for over 87% of the caesarean sections performed.

A wide variety of intra-operative morbidity was recorded in the study population. Serious intra-operative morbidity (major extensions of the uterine incision; operative injury to the urinary tract or an operative blood loss $\geqslant$ 1500 mls) occurred in 32 (5.2%) women, and in many of these cases multiple problems were apparent. Emergency caesarean delivery was found to be associated with a significant increase in extensions of the original uterine incision, bladder trauma, mean blood loss and requirement for intra-operative transfusion when compared with elective sections. When a period of labour had occurred before operative delivery the incidence of bladder trauma was increased and this was particularly marked in the group of women who were in the second stage of labour at the time of surgery.

Only 9.5% of the women had no recorded morbidity in the postnatal period and the most frequently occurring complication was the development of pyrexia in the postnatal period. Serious morbidity such as paralytic ileus, septicaemia, wound dehiscence and deep venous thrombosis occurred in small numbers of women. Twelve (2%) of the women required to return to theatre for further surgery in the postnatal period.

Infectious morbidity which might be directly attributable to the mode of delivery occurred in 21.7% of cases during the hospital stay and 26.7% of the women received antibiotic therapy. The most commonly encountered categories of infectious morbidity were urinary tract infection, wound infection, intra-uterine infection and chest infection and these were more frequently associated with emergency sections.

Seventy six percent of the study population returned completed postal questionnaires three months following delivery. The characteristics of those who did not respond were compared with the respondents and no significant differences were apparent between the groups.

Thirteen percent of those who replied either did not know or gave completely wrong explanations for the performance of the caesarean section and a further 14% were only partially right in their comprehension.

Three months after the birth, 35% of the women still did not feel back to normal and 28% felt less healthy than before the pregnancy. The most common complaints following delivery were wound pain, wound leakage, tiredness, backache, constipation, wind, depression and sleeping difficulties. In some women these had persisted since the delivery.

Although 43% of the respondents indicated that they had planned to breast feed before delivery, only 35% actually attempted to do so. One month after delivery only 19% were still breast feeding and by 3 months 9% were totally breast feeding and a further 2% were combining breast with bottle feeding.

Comparison of the 50 primigravidae delivered by section with the 50 delivered vaginally showed that women delivered by caesarean section had longer labours, developed more complications during the course of labour and required an increased number of obstetric interventions. The blood loss at delivery was also greater and 18% of women in the study group required blood transfusion compared with only 2% in the control group.

The mean length of stay in hospital after delivery was greater for women delivered by section as was the length of follow-up by the community midwives. Although the numbers who intended to breast feed in each group were similar, fewer of the women in the study group actually attempted to put the baby to the breast. The patterns of recorded morbidity were different in the two groups of women due to the different delivery methods. Most of the morbidity in the control group was related to perineal trauma sustained at delivery, whereas in the study group a wide variety of morbidity was documented. Much of this was infectious morbidity and this resulted in 19 (38%) of the women delivered by section being prescribed antibiotic therapy compared with

none in the control group. It was apparent that many of the problems the women complained of in the postnatal period were not recorded in either the medical or midwifery notes and this appeared to highlight a major deficiency in the assessment of the women by midwives in the postnatal period.

When the women were interviewed on the 4th or 5th postnatal day , women in the study group were more likely to complain that they didn't get enough rest in the postnatal ward and that it was more difficult for them to cope with the demands of looking after the baby because of the pain and other discomforts they were experiencing.

The response rate to the postal questionnaire was 91%. Three months after delivery 20% of women delivered by caesarean section either did not know or gave completely wrong explanations for the performance of the operation and a further 16% were only partially right in their comprehension. At this time 51% of the study group stated that they felt back to normal and 40% felt less healthy than before the pregnancy. The corresponding figures for the control group were 70% and 28%. Similar patterns of morbidity were apparent in the 2 groups of women, although more women in the control group had been prescribed medication by the GP (67% v 53%). Three months after delivery only 13% of infants delivered by caesarean section and 17% delivered vaginally were still being totally breast fed.

A semi-structured home interview was conducted 6 months after delivery and 84% of the study group and 88% of the control group were successfully contacted. At this time 38% of the women delivered by section did not feel back to normal health and a further 12% were still taking medication for problems experienced since delivery. In the group delivered vaginally, 30% still did not feel they were back to normal and a further 2 women said they were just back to normal having completed courses of anti-depressant therapy. The problems still being complained of ranged from tiredness and depression to backache and wound pain. In the majority of these cases multiple complaints were made.

The women were asked to rate their experiences of the labour and delivery on a scale and then encouraged to make further comments. The remarks made by the women reflect the different experiences during the intrapartum period. Many of the women were very positive about the care they received, however, a number of others were very unhappy about some of the events that occurred. At the end of the interview the women were also asked if they felt the hospital could have done anything to make things better for them in the antenatal and postnatal periods. Combining the comments from these areas the distinct themes that emerged were :

1. Lack of realistic preparation for labour, delivery and parenthood
2. Lack of support and conflicting advice from midwives, especially in the postnatal wards
3. Failure of communication between women and staff, and it was apparent that this occurred in all areas from antenatal care to the postnatal wards

The women in the study group took significantly longer than those in the control group to feel close to their infants and these differences persisted for several months after delivery.

Women delivered by caesarean section resumed intercourse sooner than those delivered vaginally and had fewer sexual problems after the birth. By the time of the home interview 4 women delivered vaginally had still not resumed intercourse compared with none of the women delivered by section.

Six months after the birth, 6 women in the study group were adamant they would never have another pregnancy and in 5 cases this was due to the experience on this occasion. A further 7 were unsure about another baby and 4 said this was mainly due to events this time. In the control group only two of those interviewed said they definitely would never have another pregnancy, but the reasons for this were unrelated to the experience of labour and delivery. A further 7 did not know if they would have another baby but in only one case was this related to the experience on this occasion.

Whilst the numbers in the study are relatively small and reflect the practice in only one hospital, the findings do identify several major areas of concern which warrant further study. There is at present insufficient knowledge of the efficacy, effectiveness and psychological impact of increasing caesarean section rates and comprehensive evaluative research is urgently needed to establish acceptable levels.

Introduction

Introduction

The incidence of caesarean section has risen steadily in most developed countries over the last decade. Professional and lay concern about the spiral in caesarean section rates has prompted national reviews in an effort to elicit the reasons for this upward trend [1 2]. The most dramatic increase in rates has occurred in the United States where caesarean births have more than quadrupled from 5.5% of all deliveries in 1970 [3] to 24.1 in 1986 [4]. Although the incidence of caesarean section is lower in Scotland than the USA, the upward trend in the rate is still marked from 4.2% in 1970 [5] to 13.6% in 1987 [6].

The reasons for the increased use of caesarean section are complex. Until recent decades caesarean section was usually used as a last resort because of the high maternal mortality and morbidity associated with the operation. The introduction of antibiotics and blood transfusions as well as markedly improved anaesthetic and surgical techniques overcame the problems of shock, sepsis and haemorrhage often associated with caesarean delivery. As the maternal mortality rate reduced, doctors began to focus their attention on reducing perinatal loss and eventually the joint effort of obstetricians and paediatricians concentrated on reducing perinatal morbidity as well. This effort to improve the outcome of pregnancy is evidenced in part by the rise in the number and availability of neonatal intensive care units and the growth in the new interest area of perinatal medicine which has resulted in changes in clinical management and a huge increase in ante and intrapartum fetal monitoring. The result of this has been rapidly improved survival rates and long term outcomes for both mothers and infants at risk.

This much improved infant survival, especially of low birthweight babies, reflects increased medical intervention including the use of caesarean section. However it is difficult to assess what contribution abdominal delivery has made to the falling perinatal mortality rate. The overall caesarean section rate is higher than can be accounted for by the frequency of

operative intervention in the low birthweight infant alone [7] and in fact the majority of sections are performed in infants of normal birthweights [5].

Although it is debatable whether there is a causal relationship, between the current improvement in perinatal outcome and the increased use of caesarean section - the fact that many people both within and outwith the obstetric profession assume that there is has probably influenced clinical decisions about the mode of delivery. It is interesting to note that whereas patterns of caesarean section rates differ both on national and international levels, it is clear that the decrease in perinatal mortality rates is universal. Illustrative of this is the situation in a regional hospital in Dublin [8] and in a whole country, the Netherlands [9] - where notwithstanding stable caesarean section rates the perinatal outcome has improved to the same degree as in countries where caesarean rates have increased.

Although caesarean delivery is now safer than it has ever been, it remains a major surgical procedure and therefore can never be an entirely safe alternative to vaginal delivery. The NIH Task force report [1] estimated that the maternal mortality associated with caesarean section was 4 times greater than that associated with vaginal delivery and maternal morbidity rates were also greatly increased when delivery was effected by the abdominal route. However definitions of morbidity lack uniformity and this in turn makes the classification of major and minor complications difficult, so any comparison of morbidity rates is of dubious value. Nevertheless there can be no doubt that morbidity is greater following caesarean delivery than after vaginal delivery.

During the same time period in which caesarean section rates have been rising, women's expectations about childbirth have also altered. Factors such as prepared childbirth, paternal participation in labour and delivery and emphasis on '*gentle birth*' and early parent-infant contact for bonding have all contributed to a revolution in attitudes for many parents today [1].

Research evidence regarding the psychological or emotional impact of abdominal delivery on the mother, father and the family unit is fragmentary and preliminary at best.

A number of negative responses to a caesarean delivery among women have been reported [10,11,12]. These responses include fear, disappointment, anger and lowered self esteem. In part these reactions may reflect the disparity between prior expectations of the birth and the actual experience, or they may represent a reaction to the presence of complications or a crisis which made the section necessary. Wenderlein and Wilhelm [13] also reported more difficulty in parent-infant bonding and curtailed wish for another pregnancy when delivery was by caesarean section.

Without doubt there is scope for further knowledge in this field which might go some way to improving the quality of caesarean childbirth for parents and also in preventing what Oakley [14] terms the *'psychosocial morbidity'* associated with the *'new obstetrics'*.

Chapter 1

Literature Review

Chapter 1 : Literature Review

1.1 : Historical Background

Interest in caesarean delivery is not confined to modern times, surgical delivery of the unborn child from its mother has been mentioned from antiquity onwards. Religious laws of Egypt in 3000 BC and of India in 1500 BC required abdominal delivery of the fetus from its dead mother. Mythology also has tales of caesarean delivery with the Greek god of sleep, Asclepius, supposedly having been delivered by this method when his father, Apollo, *'cut'* him from the dying Coronis. Mention of abdominal delivery is also made in the Talmud, a book of Jewish law dating from 400 AD, which states that a woman need not observe the usual days of purification following this type of delivery [15].

Roman history referred to abdominal delivery as *'a caeso matris utero'* in the century before the birth of Christ. Many erroneously believe that the term originated from Julius Caesar being born this way. This however is unlikely to be the case as it is known that Caesar's mother, Aurelia, lived for many years after his birth in 100 BC - and there are no records of maternal survival after surgical delivery at this time [1].

Another explanation as to the origin of the term is that the King of Rome, Numa Pompilius, codified Roman Law in 715 BC. Part of this Lex Regia, which became the Lex Caesarea under the rule of the emperors, made it mandatory that in the event of a pregnant woman dying the child must be removed from the uterus, even if there was no chance of its survival, so that it could be buried separately [16].

Pliny (28-70 AD) in Book VII of his 'Natural History' suggests that the term was derived from the Latin verb *'caedere'* which means *'to cut'* and therefore implies delivery by cutting. Children delivered from their dead mothers in this way were known as *'caesones'* [16].

King Robert II of Scotland was recorded as having been delivered abdominally in 1317. A passing hunter saw his mother, Marjorie Bruce, being thrown from her horse whilst out hunting and fracturing her neck in the process. The hunter bravely delivered Robert from the dying woman although he injured the infant's eye in the process. The resultant corneal and scleral scarring earned Robert the nickname *'King Bleary'*. The birth was commemorated in Renfrew by a wooden cross [15].

Jane Seymour, the 3rd wife of Henry VIII, may have been delivered of Henry's only legitimate son Edward VI, by section after two days of *'the most difficult labour'*. Her death twelve days after the birth on 24th October 1537 is believed to have been due to peritonitis following a caesarean section which was performed for political reasons to ensure a male heir to the throne [17].

The first record of maternal survival following caesarean section relates the tale of Jacob Nufer, a Swiss pig-gelder (pork butcher) who in 1500 performed the operation on his wife with a razor as she lay on the kitchen table. Not only is the woman reputed to have survived but she went on to deliver four more children vaginally. Some doubt as to the authenticity of this record has been cast as the account was not published until 1586 and is therefore based on the hearsay of three generations [16].

In the Middle Ages, Christianity influenced obstetric decision making. The Roman Catholic church encouraged the use of caesarean deliveries to offer the souls of unborn children the chance of salvation through baptism. At the same time it barred the use of abortion, craniotomy and fetal dismemberment as techniques to deliver the child in order to save the mother. Other church councils sanctioned the use of the operation on dead pregnant women principally in an attempt to save the child but also to allow baptism of the infant. The surgery was made mandatory by the church councils of Cologne (1280) (which also stated that the dead woman's mouth and vulva must be kept open so that the fetus in utero would not suffocate

whilst awaiting surgical delivery), Langres (1404) and Sens (1514). The senate of the Republic of Venice laid down severe penalties for any doctor who failed to make an attempt to save a child in this way (1608). During the Franciscan mission period (1769-1833) in the United States, the operation became the responsibility of the missionary priest who attended the dying mother. Priests were given details of the relevant maternal anatomy, actual procedure and instruments required to assist them in their task [1].

The obsession with baptism of infants was especially seen in France. Peu in his 'Practique des Accouchements' published in 1694, described in great detail how baptism was to be accomplished in operative deliveries. Radcliffe [18] paraphrases Peu's method for caesarean deliveries thus :

> *'He advises immediate opening of the abdomen as soon as the mother is assuredly dead and within the space of time taken to say one* 'Ave maria', *and as soon as the child is visible, pouring water over it and adding to the usual words of baptism,* 'si tu as vie.'

The first caesarean section in Great Britain on a living patient took place on 29th June 1737 and is described in Smellies 'Treatise on the Theory and Practice of Midwifery' [18]. The operation was carried out by an Edinburgh surgeon, Mr Smith, on a woman who was *'prodigiously deformed'*. Her pelvic deformity was due to a disease known at the time as *'malacosteon'* or *'mollites osseum'* which was due to calcium deficiency in pregnancy.The woman had been in labour for six days when Smith was called to see her. On examination he found the the space between the pubis and the sacrum was only 1.5 to 2 inches making delivery with a crochet impossible. In consultation with other doctors it was decided to carry out a caesarean section. Smith performed the surgery and delivered a stillborn child. The mother herself died 16 hours later.

In the same book Smellie describes the first maternal survival following caesarean delivery in the United Kingdom. The surgery was performed by an Irish midwife, Mary Donally, on Alice O'Neale, a farmer's wife, in 1738. Mrs O'Neale had been in labour for 12 days and several other midwives had attempted unsuccessfully to deliver her. Donally *'an illiterate woman but eminent among the common people for extracting dead births'*, was sent for. Using a razor she delivered the dead child and placenta. She then *'held the lips of the wound together with her hand till one went a mile and returned with silk and the common needles which tailors used'*. The wound was then sutured and dressed with egg-white. Mrs O'Neale survived and within a month was able to walk a mile although she subsequently developed a large ventral hernia.

Thomas Radford in his 'Observations on Caesarean Section' published in 1880 recorded 131 operations in Great Britain and Ireland between 1737 and 1878. Only 23 women survived making the maternal mortality 83%. No doubt due to the number of deaths associated with the operation, obstetricians were much opposed to its use and preferred to use it only as a last resort. Other forms of manipulative delivery were more often utilised [1]. These included :

1. *Podalic version and extraction (Pare)*
2. *Forceps delivery (Chamberlain)*
3. *Premature induction of labour for women with small pelvises*
4. *Fetal destruction (craniotomy)*

An indication of the prevailing conservative attitude in obstetrics is seen in the management of a royal delivery. In 1817 Sir Richard Croft attended the labour of Princess Charlotte, only daughter of the Prince Regent (later King George IV) and herself next in line to the throne. Her labour lasted for 52 hours and Croft was faced with the decision of intervening with a caesarean section or letting nature take her course. No doubt aware of the mortality associated with the former he chose the latter, and delivered Charlotte of a stillborn son. She, herself, retained the placenta and had to have it manually removed, leaving her so weakened that she died 6 hours later. Criticism of his handling of the case drove Sir Richard to commit suicide 3 months later. The course of history was changed by these events - with no direct heir to the throne, it led to

the eventual accession of Queen Victoria. It also marked a turning point in obstetrics away from non-intervention [15].

As in other parts of Britain, the obstetricians in Glasgow Maternity Hospital only considered caesarean section as a last resort. George Buchanan, the hospital's consulting surgeon, performed two sections in 1879 and 1881 which saved the two babies concerned but not their mothers. The cases prompted a discussion on 'The Contracted Pelvis' in 1881 which was chaired by Buchanan. The obstetricians involved failed to agree on the merits of caesarean section against craniotomy and the procedure was abandoned in the hospital [20].

Interest in the subject was revived by Dr J S Nairne in 1887. He presented a paper arguing that the mortality associated with caesarean section could be reduced if obstetricians actively sought solutions to the problems attached to the operation. He urged his colleagues to attempt surgery in preference to craniotomy or where attempts at delivery with long forceps had failed [20].

A year later on April 10th 1888, C.C. a 27 year old primigravida, was admitted to Glasgow Maternity Hospital. Murdoch Cameron in his paper published in the British Medical Journal of January 26th 1889 [21] described her as:

> *"a little woman (height 49 inches), somewhat delicate, and with the appearance of a patient deformed by rickets in a very marked degree"*

Cameron in consultation with Drs Sloan, Reid, Oliphant and Black agreed that the conjugate of the brim was not more than 1.5 inches and that caesarean section was the only solution. Cameron assisted by Reid went ahead and operated saving both the mother and child.

Further details of the celebrations following this first successful case of caesarean section in Glasgow are given in Dow's book 'The Rottenrow'[20]. He tells how Cameron's house surgeon

produced a bottle of champagne and invited Cameron, Miss Gordon (the matron) and the mother to join him in a toast to the baby's health. The mother was unimpressed with the unfamiliar taste of champagne and asked for some *'guid soor dook'* (buttermilk) instead.

The next two successful caesarean sections were also carried out on rachitic dwarfs by Cameron. On learning that one of the three was unmarried, Cameron promptly arranged the wedding with the other two patients as bridesmaids [20]. Their photograph is seen on the opposite page .

It was one of Cameron's pupils, John Martin Munro Kerr, who went on to popularise the lower segment approach for caesarean section. His contention was that the scar, particularly if transversely placed, would be stronger and therefore less likely to rupture in a subsequent pregnancy. Although Munro Kerr first used this approach in 1911, it wasn't until the 1940s that there was widespread acceptance of it as the superior method. The 9th edition of 'Munro Kerr's Operative Obstetrics' [22] describes the final acknowledgement of Munro Kerr's technique. It came at the 12th British Congress of Obstetrics and Gynaecology held in London in 1945. Several obstetricians had presented papers with convincing evidence of the reduction in maternal mortality related to caesarean section, but all failed to mention that one of the major factors associated with the fall was the adoption of the lower segment approach. When Munro Kerr was invited to the platform to comment, he acknowledged the speakers and surgeons whose work had been quoted and finally pointed out that for almost the first time ever the lower segment approach had been referred to in nothing but words of praise - at which point he broke off, threw his arms in the air and exclaimed :

"Alleluia! The strife is o'er, the battle done!"

In 1870, although more commonly employed, caesarean section was still associated with an appalling maternal mortality of 75%. Death was usually due to either shock, sepsis or haemorrhage or a combination of these factors.

Although the danger of infection was appreciated there remained the dilemma of how to control it. In an effort to overcome this an Italian obstetrician, Eduardo Porro in 1876 devised a new operative technique. This involved caesarean delivery followed by amputation of the uterus at the internal os together with the adnexa and marsupialization of the cervical stump into the lower end of the abdominal wound. This ensured that the focus of infection, the uterus, was removed and that any drainage was complete. It also meant that there was no opportunity for continued intra-peritoneal bleeding [1].

The Porro caesarean hysterectomy technique brought about a considerable reduction in maternal mortality through control of haemorrhage and a reduction in the risk of infection, but had however only a short period of popularity due to being superseded by the operations of Kehrer (1881) and Sanger (1882). Both advocated the new step of suturing the uterus in layers prior to wound closure. Before this uterine suturing was only performed to control bleeding vessels as it was generally believed that such sutures were superfluous and harmful [16].

These two operations together with other medical advances in anaesthesia and antisepsis reduced the maternal mortality associated with the operation to between 6 and 10%. If infection did develop however, the mortality rate remained high.

Johnson in his book 'A New System of Midwifery' (2nd edition) published in 1786, was the first person to suggest that the uterine incision should be made transversely in the lower segment. This stemmed from his observation of how little haemorrhage had occurred in two cases of ruptured uterus where the rupture had occurred in the region of the lower segment. The operation however was not carried out until 1882 by Kehrer. Benjamin Osiander (1805) also

devised a lower segment approach although he advocated a vertical incision. Kronig's technique (1912) developed peritoneal flaps although he still incised the lower segment vertically. This procedure was brought to the United States by Beck (1919) and popularised by De Lee (1925) [16].

Munro Kerr of Glasgow advocated the transverse incision and it remains today the most common and preferred method for caesarean section. This type of incision has the lowest incidence of haemorrhage at the time of operation and the lowest incidence of rupture in subsequent pregnancies. It is also thought that due to reperitonealization the incidence of intra-abdominal infections and development of adhesions is reduced. Today classical caesarean section, a vertical incision in the uterine corpus, is rarely performed due to its association with greater blood loss and an increased incidence of infection. The only indications for its performance are when the lower segment is not formed, as in delivery of a very preterm fetus; where there are problems related to the fetal position, such as an impacted shoulder presentation; in cases of cervical carcinoma; or where fibroid tumours obscure the lower segment.

1.2 : Trends in Rates

In recent years caesarean birth rates have risen around the world. There is, however, a wide variation in the rates both between countries and within different regions of the same country. Even within the same geographic area it has been noted that rates can also vary between hospitals and even among individual consultants who work in the same kind of unit [23]. This kind of variation suggests that either some countries are performing too many caesarean sections, or, conversely that some might not be performing enough.

The highest caesarean section rates in the world have been reported in Brazil [24]. Latin American countries do not publish national statistics on caesarean section rates, but in a study of 9 hospitals the overall rate was found to be 41.3%. This rate varied widely according to the

type of hospital and the payment status of the woman. Thus, 75% of private patients had caesarean sections compared to 42% of insured patients and 22% of indigents.

The next sharpest rise has occurred in the United States where the caesarean section rate has increased from 5.5% in 1970 [3] to 24.1% in 1986 [4]. Although regional rates vary widely [1] the upward trend is universal and not limited to any area of the country, hospital type or to specific demographic characteristics of the mother such as age, parity, marital status or race. So the rise reflects a basic change in obstetric practice over the past two decades, and concern for this prompted the National Institute of Child Health and Human Development to organize a Consensus Development Task Force to study the problem [1].

Although of developed countries the United States has experienced the sharpest increase in caesarean rates, other countries have also reported rising surgical delivery rates. The upward trend in caesarean section rates has occurred in Canada and throughout Europe despite the very different health care systems which operate within individual countries. There have been other general changes occurring in all the countries during the same time period that section rates have been rising. Most countries have experienced a fall in the overall birthrate from the 1960's onwards; women are having fewer children and the proportion of primigravidae in the obstetric population has increased [25]. There has also been a trend towards the use of obstetricians rather than general practitioners to supervise pregnancy and the majority of women now deliver their babies in hospital rather than at home. The amount of technology associated with modern obstetric practice has also greatly increased.

Successful pregnancy outcome continues to be measured in terms of the numbers of maternal and perinatal deaths which occur. Maternal deaths now occur so infrequently in developed countries that they are no longer a reliable indicator of the standard of obstetric practice. Thus, perinatal mortality statistics are used as the yardstick for the measurement of obstetric success.

This is not an optimal indicator but until perinatal and maternal morbidity can be defined and classified uniformally then it will continue to be used as the conventional measure.

In an attempt to obtain data on perinatal practices in countries of the WHO European Region a questionnaire was sent to a number of member states in 1980 [26]. Approximately half of the 13 countries that supplied national data claimed to have some sort of national registration; the remainder collected hospital reports or representative samples, and in one case, social security statistics that were incomplete. The survey highlighted the fact that there is relatively little factual information on the use of caesarean section and other operative delivery techniques at national levels in Europe. Regional data may not be representative of a country as a whole - estimates of caesarean section rates from three Italian regions ranged from 10 to 25%.

There was a wide variation in national caesarean section - from 3.6% in the Netherlands to 11.9% in Finland [26]. When the frequencies of operative vaginal deliveries were plotted against the frequencies of caesarean section, the wide scatter suggested that the increased use of caesarean section has not reduced the need for operative vaginal deliveries. The authors also studied perinatal mortality rates in relation to caesarean section rates and the weak negative correlation found, indicated that the frequency of surgical delivery did not contribute much to the variation in perinatal mortality rates between the 11 countries.

Notzon et al [27] examined caesarean section rates in 19 industrialized countries in Europe, North America and the Pacific. They found that despite the wide range of section rates, most of the countries had consistent increases over the past decade and that the annual rate of increase for all countries appeared to be converging. There were differences in the caesarean section rates for maternal age, parity and pregnancy complications which reflects the differences in obstetric practice between the countries (Figure 1.2).

In England and Wales the caesarean section rate has risen from 4.9% in 1970 to 10.6% in 1982 [2]. Concern about the rise in rates has been expressed from various sources. Chalmers and Richards [28] considered the rise as part of a general move towards greater intervention in obstetrics. Francome and Huntingford [29], examining why the USA had higher section rates than Great Britain, argued that the rise was due to non-medical factors. They cited that the way in which the medical profession was structured and the nature of society itself dominated the medical needs of individual women and their babies. They felt that many of the innovations in medical technology were used indiscriminantly without proper evaluation and so instead of improving diagnostic accuracy they led to more surgical intervention.

In Scotland the upward trend is even more marked with a rise from 4.2% in 1970 [5] to 13.6% in 1987 [6]. When caesarean section rates in Scotland were compared with those in the United States for 1982, Notzon et al [27] found that although the overall rate in Scotland was two thirds that of the United States (12.8% v 18.5%) the rate of repeat section in Scotland was greater than in the USA (43% v 35%) despite the lower rate of vaginal delivery after caesarean section in America (39% v 5%).

The rate does vary widely, however, between hospitals and even although there are some demographic differences in the hospital populations, they do not nearly account for the variations, which suggests that there must be marked differences in clinical practice. McIlwaine et al [5] found that in the 13 Scottish hospitals which deliver more than 2000 babies per year, the section rate varied between 8.7% and 17.4% in 1982.

The NIH Task Force Report [1] stated that :

> *The rising caesarean birth rate is a matter of concern. The consensus statement reflects the judgement that this trend of rising caesarean birth rates may be stopped and perhaps reversed, while continuing to make improvements in maternal and fetal outcome, the goal of clinical obstetrics today.*

The Report found that the majority of the rise in rates was found to be attributable to four main diagnostic categories - dystocia, repeat caesarean section, breech presentation and fetal distress.

Dystocia was responsible for 31% of all caesarean sections performed in the United States in 1978 and it contributed to 30% of the rise in rates between 1970 and 1978. The second most frequent indication for caesarean delivery was repeat section and this accounted for 25-30% of the rate increase. This proportion was expected to rise as the primary caesarean section rate continued to increase. Breech presentation and fetal distress were responsible for 12% and 5% of all sections respectively in 1978 and each contributed between 10 and 15% to the overall rise between 1970 and 1978. Thus, together these 4 diagnostic categories accounted for nearly 90% of the rate increase from 1970 to 1978.

The Task Force examined each of the four categories in turn and made specific recommendations for clinical practice to attempt to stem the rise in each.

Despite these recommendations the caesarean section rate has continued to increase in the United States from 14.7% in 1978 to 16.5% in 1980 [30] to 24.1% in 1986 [4].

Taffel et al [31] found that repeat caesarean delivery was the most important contributor to the increase in the overall rate from 1980 to 1985 and accounted for 48% of the rise. They also noted that the rate of vaginal delivery after caesarean section had only increased from 3.4% in 1980 to 6.6% in 1985. The rate of caesarean section for dystocia remained almost unchanged between 1980 and 1985 but because of the increase in the reported incidence of this complication (from 7.2% to 10.2%) it actually accounted for 29% of the rise in rates. The reported incidence of fetal distress more than tripled between 1980-85 (1.2% to 3.9%) although the rate of surgical delivery for this complication dropped by 27%, so overall the net contribution to the rise in rates was 16%. The incidence of breech presentation fell from 3.1% in

1980 to 2.9% in 1985, however, the caesarean section rate for this indication rose from 66.2% to 79.1% during the same time period so overall this category was responsible for 5% of the rise. Other complications accounted for the remaining 2% of the rate increase.

Gleicher [32] suggested that the Task Force Report had been a short term failure because it had failed to curb caesarean section rates since its publication. Philipson and Rosen [33] argued that this conclusion may have been premature as the rise in rates from 15% to 17.9% between 1978 and 1981 was less marked than the rise between 1965 and 1975. They felt that a relative plateau in the caesarean birth rate was near. The authors also suggested that as both hospitals individually implement the recommendations of the Task Force and obstetricians are educated on post-graduate training schemes, then this would hopefully be reflected in a trend towards decreasing caesarean section rates. The most recent figures published [4] would suggest that Gleicher may have been correct.

1.3 : Factors Influencing The Rise In Caesarean Section Rates

As stated in the introduction the reasons for the increased use of caesarean section are complex. During the same time period when caesarean section rates have been rising, other factors which may directly influence the decision to perform the operation have also altered. The specific obstetric factors will be considered in greater detail in subsequent sections but first it seems prudent to examine the more general background factors that have changed in order to assess their influence on current obstetric practice.

a. Demographic changes in the obstetric population

In many countries there have been demographic changes in the obstetric population and these may have influenced the caesarean section rate [34]. Generally there has been a marked fall in the total number of births. Women are having fewer children and begin childbearing at older ages [31] and this may increase pressure to ensure that those that they do have are

'undamaged'. One effect of the fall in the birth rate is an increase in the proportion of primigravidae in the obstetric population and it is generally recognised that the rate of primary section is highest in this group of women [34].

b. Fear of litigation

One factor which has been cited as a reason for the increase in caesarean section rates in the United States is the threat of malpractice suits [35]. In America a malpractice suit may be brought against an obstetrician for :

1. *negligent performance of a caesarean section*
2. *not performing a necessary caesarean section*
3. *performing an unnecessary caesarean section*

Jacobs [36] has shown that 90% of all obstetric malpractice suits in the USA fall into two categories : failure to perform a caesarean section and improper use of forceps during delivery. It may be that this fear of litigation by obstetricians has led to the practice of defensive medicine. Certainly the number of cases of litigation in the USA is increasing. In 1985 73% of obstetricians replying to an American College of Obstetrics and Gynaecology survey reported that one or more professional liability claims had been filed against them compared with 67% reported in a similar survey in 1983 [31]. However it is difficult to determine what proportion of the rise in rates is directly attributable to this factor. Of concern, however, in the UK is the fact that although there are nothing like the number of malpractice suits in America, almost 30% of the obstetricians who replied to the questionnaire of the Maternity Alliance listed defensive obstetrics as a factor responsible for the rise in caesarean section rates [2].

c. Economic factors

The NIH Task Force report [1] highlighted the fact that economic factors may influence the caesarean section rate in the USA. They noted that patients with medical insurance had higher section rates than those without insurance cover and that private hospitals had higher

rates than government hospitals. In this country an increasing caesarean section rate has implications for beds, facilities, manpower and training, however, NHS costing at present does not permit reasonable estimates of the cost of the operation.

d. Organisational factors

Other factors that may have influenced the rise in rates include centralisation of resources in specialist hospitals and the increasing number of obstetricians. The contribution of these factors to the rise in rates is difficult to assess. Differences exist in section rates amongst hospitals with comparable obstetric populations and also amongst consultants within individual hospitals. In the Maternity Alliance Survey [2] lack of experience of junior staff was mentioned as an important factor when dealing with difficult vaginal deliveries - resulting in a bias towards abdominal delivery.

e. Dystocia

Dystocia is the term most commonly used in the literature to encompass all those factors which cause labour to be prolonged. The term dystocia originates from the Greek **DYS** *'bad'* or *'abnormal'* and **TOKOS** *'labour'*. The causes of dystocia can be conveniently grouped by the mnemonic of the three *'p's'* : the passage, the passenger and the powers of labour. Thus included in this umbrella term are diagnoses such as cephalopelvic disproportion, fetal malpositions and malpresentations, failure to progress in either the first or second stage of labour, uterine hyper or hypotonia and cervical stenosis. In one study it was estimated that this broad category was the reason for caesarean section in 43% of all sections carried out in the United States [35].

True cephalopelvic disproportion is rare in Caucasian women and it seems unlikely with generally improved socio-economic standards, that the incidence of disproportion has changed markedly in the time period when section rates have risen. Rosenberg et al [37] did find that in their study population in Scotland that the number of sections performed for cephalopelvic

disproportion had increased from 0.5% of primigravidae in 1971 to 3.4% in 1981. However, they concluded that on the basis of the information that they had on maternal stature, they could find no explanation for the apparent increase in the incidence of disproportion. What is certain though, is that if true disproportion does exist as either an abnormality in the *'passage'* or the *'passenger'* then in most cases it cannot be altered once labour has started.

Failure to progress in labour is a much more difficult to define indication - though it is often given as the sole reason for caesarean section. It should be remembered that failure to progress is a descriptive term rather than a diagnosis. It may occur in the latent phase, the active phase of cervical dilatation or the active phase of descent - but certainly its correct diagnosis and therefore appropriate therapeutic remedy depends on the obstetricians understanding of normal labour progress. Failure to recognise the normal pattern of labour may lead to women being accused of *'failure to progress'* when they are merely in the latent phase of labour [38] - and caesarean section is unjustified in the latent phase unless some other indication aside from dystocia exists. Arrest in the active phase of labour may result from cephalopelvic disproportion or from inco-ordinate uterine activity.

Before a diagnosis of the former can be definitely made it is essential to ensure that uterine activity is adequate and if not augmentation with oxytocics should be undertaken. Unnecessary caesarean section may also be carried out if labour is terminated after some arbitrary time is set for the maximum length of the second stage of labour [39,40]. It is essential to differentiate between cephalopelvic disproportion and inadequate uterine activity. If disproportion is suspected then clinical assessment of the adequacy of the pelvis has been shown to be as good as X-ray pelvimetry [41]. If the disproportion is relative, ie due to a persistent occipito-posterior position or a deflexed head, then it may be possible to correct this either manually [42], instrumentally [39] or by changing the woman's position [43].

The graphic display of progress in labour using modified sigmoid curves where cervical dilatation is plotted against the length of time in labour [44,45,46] has contributed to the early identification of abnormal labour patterns and early intervention with amniotomy and oxytocics to correct them. This approach to labour called Active Management of Labour has been pioneered in Dublin [47] where in contrast with other centres there has been a comparable reduction in perinatal mortality rates without a corresponding rise in caesarean section rates [8]. The Dublin regime is aimed at the early detection and prompt treatment of dystocia by non-surgical means. The first step in management is to confirm or refute the presumptive diagnosis of labour to ensure that women in the latent phase of labour are not subjected to aggressive treatment. O'Driscoll et al [48] suggested that caesarean section rates could be significantly reduced if a similar approach to the management of labour was used in the United States.

Despite differences in the obstetric population and in labour ward practices (especially related to induction of labour and the use of epidural analgesia) compared with Dublin, Turner et al [49] showed that the introduction of the active management of labour to a London maternity unit was associated with a 4-5% reduction in the caesarean section rate for primigravidae without any evidence of an increase in perinatal mortality or morbidity.

Other measures which may be employed to reduce the incidence of dystocia include intra-uterine pressure recording for those women who fail to progress in the active phase of labour in order to assess true uterine activity and aid in the oxytocin administration. Electronic fetal monitoring and the use of fetal blood sampling techniques in order to assess fetal well-being obviate the need to arbitrarily terminate labour after a certain length of time.

Progress in labour may be expedited by changing the maternal position or by allowing her to ambulate [50,43]. If the cervix is unfavourable then local prostaglandins may be more beneficial than intravenous oxytocics [51].

Preparation for childbirth through antenatal classes has also been reported to be associated with a reduction in caesarean section rates for dystocia [52]. Crawford [53] has detailed the problems which may be associated with the administration of lumbar epidural anaesthesia - namely that an effective block may prolong the second stage of labour and delay rotation of the presenting part due to the sensory nerve block of the pelvic floor and the motor nerve block of the muscles of the lower abdomen and the pelvic floor. The end result of these problems is an increased instrumental delivery rate associated with epidural anaesthesia administration. Where women know antenatally that they will have continuous lumbar epidural anaesthesia then teaching them how to bear down effectively during the antenatal period reduces the need for second stage intervention.

In conclusion the relative efficacies of alternative therapies used to treat dystocia need to be further evaluated preferably by randomised controlled trials. It would appear from the literature that certain changes in clinical practice in this sphere could reduce section rates for dystocia without any detrimental effect on the neonatal outcome.

f. Previous caesarean section

The NIH Task Force Report [1] estimated that repeat caesarean section accounted for 27% of the overall rise in section rates between 1970 and 1978. One of the major recommendations of the NIH Task Force Report [1] was that provided the hospitals involved were equipped with appropriate facilities, services and staff for emergency caesarean delivery, a proper selection of cases should permit a safe trial of labour and vaginal delivery for women who have had a previous lower segment transverse incision. O'Driscoll and Foley [8] estimated that this change alone would reduce the overall section rate in the USA by 3%. Despite these recommendations Placek and Taffel [62] found that over 95% of women previously delivered by caesarean section were again delivered by this method during the period from 1980 to 1985. They concluded that the reason for the low rate of vaginal birth following abdominal delivery

was because of infrequent trials of labour rather than infrequent successes when trials are attempted.

Part of the reason for this type of policy in this group of women has been the adherence by American obstetricians in particular, to the archaic dictum of Edwin Craigin as if it was the conclusion of a recent collaborative study.The irony of the situation is that Craigin's statement was originally intended to restrain the use of caesarean section. In a presentation to the New York Medical Society in 1916 [54] he urged his peers to limit the use of caesarean section to only those cases where dystocia was due to a contracted pelvis or pelvic tumour because :

"the usual rule is, once a caesarean always a caesarean"

However, it should be noted that in 1916 the caesarean section rate was 1% of all deliveries and as Munro Kerr had yet to popularise the lower transverse approach, then the incisions were always of the classical variety. The fear was the danger of scar rupture in patients in whom vaginal delivery was attempted after a classical section - this risk was estimated by Dewhurst [55] in 1957 to be 9%.

With the widespread adoption of the lower segment approach the incidence of rupture in labour has decreased significantly and now ranges between 0.09% [56] and 0.6% [57]. The maternal mortality associated with this type of rupture is nil [58,59,60] and perinatal mortality is also low.

Justification for the present high rate of repeat section is based on firstly the difficulty in predicting the behaviour of the uterine scar in labour, and secondly, because an elective caesarean section in a properly prepared patient is safer than an emergency section. However, several studies from the USA and Europe suggest that in women with a single previous low

segment uterine incision, a trial of labour is effective and of low risk to both the mother and baby [58,8,60]. In Dublin two thirds of sections are followed by successful vaginal delivery [8] and more recently in California, Flamm et al [58] reported that with careful selection of patients, 74% achieved vaginal delivery following a trial of labour. From the UK, MacKenzie [61] reported on a series of 143 vaginal prostaglandin E_2 inductions in women with a previous caesarean section, where 108 (76%) of the women achieved vaginal delivery. Ninety five of the women also received oxytocin augmentation and no uterine ruptures or other serious complications were noticed.

Gleicher [32] noted that many institutions in the United States had failed to act on the Task Force's recommendations and many still had repeat section rates of around 100%. Philipson and Rosen [33] felt that this would change as resident education programmes taught the idea of vaginal birth after caesarean section, however, in 1986 only 8.5% of women previously delivered abdominally in the United States had a subsequent vaginal delivery [4].

To assess the relative risks of elective repeat caesarean section versus a trial of labour, further prospective randomised controlled trials are required. The data available suggests that with careful selection and monitoring of women with previous section then the outcome of pregnancy for both mother and baby is at least as favourable as with elective repeat section.

g. Breech presentation

It has long been recognised that irrespective of the mode of delivery, breech presentation in the fetus is associated with higher levels of perinatal mortality and morbidity. Studies by Rovinsky et al [63] and Brenner et al [64] have shown that the incidence of congenital malformations is significantly higher in infants presenting by the breech than in those with cephalic presentations and that these abnormalities are an important cause of increased perinatal mortality. Other factors associated with breech presentation which increase the

risk for the fetus include low birthweight, prematurity and hypoxia leading to intra-uterine death [65].

If vaginal breech delivery is attempted then specific hazards may be encountered during the delivery which increase the risk for the fetus - successively larger diameters must pass through the maternal pelvis, the increased risk of prolapse of the umbilical cord and some degree of cord compression is inevitable. There is also usually much more obstetric manipulation involved in the delivery. The relative importance of these factors will vary according to the type of breech presentation, fetal weight and the size of the maternal pelvis. Types of morbidity which may be encountered in vaginal breech delivery include fractures, brachial plexus damage and other neurological abnormalities. However, Hytten [66] and Duignan [65] have presented convincing evidence that fetuses presenting by the breech may already have a neurological deficit and that this might explain why the vertex position was not assumed in the first place. Pre-existing brain damage in the breech infant may erroneously be attributed to the method of delivery and may explain the high rate of handicap in breech babies delivered by caesarean section [67].

Several retrospective studies have shown that there is a higher overall perinatal mortality and morbidity rate when vaginal breech delivery is compared with cephalic delivery [63,64]. In an effort to minimise the birth trauma and asphyxia associated with vaginal breech delivery, combined with the fact that caesarean section is now safer than ever before, many obstetricians have resorted to far more liberal use of abdominal delivery when the fetus presents by the breech. In the NIH Task Force Report [1] it was noted that there was a continuing trend towards delivery by caesarean section of infants presenting by the breech and that this was one of the four major factors responsible for the rapid increase in section rates. The proportion of breech presentations delivered by caesarean section nationally, rose from 11.6% in 1970 to 60.1% in 1978 and this accounted for approximately 10-15% of the rise in section rates during those years.

This upward trend has continued and Placek et al [4] reported that in 1986 82.3% of breech presentations were delivered by caesarean section. In the UK there has also been a large increase in the rate of abdominal breech delivery from 10% in 1971 [22] to 75.8% in England and Wales and 67.3% in Scotland in 1982 [27].

A review by Thiery and Derom [7] highlighted the fact that the proportion of breech fetuses delivered abdominally varies considerably on both an international and intranational basis. They concluded that this was disturbing as it indicated that local management policies in breech presentation were increasingly being influenced by factors other than obstetrical ones.

Studies which have produced evidence on the higher mortality [63,64] and the increase in long-term neurological deficits [68,69] for breech as compared to vertex delivery have largely used retrospective data. Such reports have inherent study design problems including the fact that the reasons for the chosen mode of delivery are non-randomised.

In the mature fetus presenting by the breech by careful selection of cases and the use of caesarean section in 58% of women, Lyons and Papsin [70] achieved a corrected perinatal mortality rate of zero for 213 breech deliveries of infants weighing over 2500g. Comparing perinatal morbidity the rate in vaginal breech delivery (6.7%) was higher than for those infants delivered by caesarean section (0.8%). Conversely maternal morbidity was 7.9% in the vaginal group compared to 23.4% in the caesarean group. Another study by Collea et al [71] reported similar results from a prospective randomised trial of women in labour at term with a frank breech presentation. The vaginal delivery rate was 29% with one perinatal death due to a lethal congenital abnormality. The maternal morbidity rates following caesarean section were significantly higher (49.3%) than after vaginal delivery (7%).

In the low birth weight categories an unfavourable outcome of pregnancy may be due to many factors other than the mode of delivery. In addition there is an increased incidence of breech presentation in this group which makes analysis and interpretation of studies difficult. The preterm fetus presenting by the breech is exposed to the same hazards as the term breech in vaginal delivery. However, the small fetus is more vulnerable to :

1. *traumatic birth injuries from head entrapment related to incomplete cervical dilatation with a relatively large aftercoming head*
2. *brain injury from either trauma or asphyxia (eg intraventricular haemorrhage)*
3. *dangers of cord prolapse*

In order to avoid these complications several authors have suggested that caesarean delivery should be the method of choice in this group of infants [68,72]. Other investigators have found no significant difference in the neonatal outcome related to the mode of delivery [73,74]. No prospective randomised controlled trials have been reported in the literature comparing vaginal versus abdominal delivery in the breech presentation fetus weighing less than 2500g. Overall most reviews of breech delivery suggest that caesarean section may be associated with less risk to the preterm fetus weighing between 1000 and 1500 grams but the evidence to date is not conclusive [75,76].

Evaluation of the outcome in breech presentation is complex. Irrespective of the mode of delivery, breech presentation is associated with an increase in both perinatal mortality and morbidity when compared with cephalic presentation. Consideration must be given to fetal size, fetal maturity, the presence of congenital malformations, type of breech presentation and pelvic size when deciding the optimum mode of delivery for the fetus presenting by the breech. It must also be remembered that maternal mortality and morbidity is increased if delivery is effected by the abdominal route.

If cases are selected for vaginal delivery the best indicator for success appears to be systematic assessment of pelvic measurements by X-ray pelvimetry [71,70]. Ultrasound cephalometry is an unreliable indicator due to the peculiar shape (mainly dolichocephaly) of at least 33% of breech heads [77]. The NIH Task Force Report [1] accepted the principle of selection of cases for vaginal delivery and concluded :

> *"Vaginal delivery of the term breech should remain an acceptable obstetrical choice for delivery when the following conditions are present :*
>
> 1. *anticipated fetal weight of less than 8lb.*
> 2. *normal pelvic dimensions and architecture*
> 3. *frank breech presentation without an hyperextended head*
> 4. *delivery to be conducted by a physician experienced in vaginal breech delivery "*

The recommendations that vaginal breech delivery was a feasible alternative to caesarean section, provided that certain criteria related to fetal size and position were met, seem largely to have been ignored [4]. The morbidity and mortality associated with breech presentation continue to be debated and until this is resolved it is likely that a large proportion of fetuses presenting by the breech will continue to be delivered abdominally [33].

h. Fetal Distress

Although intrapartum asphyxia is recognised as a cause of perinatal mortality and morbidity, the exact magnitude of the problem is not certain. The NIH Task Force Report on Antenatal Diagnosis [78] estimated that intrapartum events were responsible for 30% of stillbirths and early neonatal deaths, 20-40% of cerebral palsy and approximately 10% of severe mental retardation. However, more recent research [195] suggests that the importance of perinatal factors in the causation of cerebral palsy and other neuro-developmental disability has been overestimated. Over the past 20 years there has been a huge increase in intapartum fetal surveillance with the aim of reducing the effects of intrapartum asphyxia. Despite the fact that

the actual size of these problems is difficult to assess, there is potential for the recognition of abnormal intrapartum events in an effort to prevent fetal death and damage.

Pregnancy and especially labour and delivery represent potentially stressful events for the fetus. A basic premise of fetal monitoring is that if the fetus suffers an interruption to its oxygen supply then it will demonstrate certain identifiable heart rate changes prior to irreversible damage happening. So if the distress is recognised and the appropriate treatment is instituted then the damage may be avoided.

These heart rate changes may be noticed by employing continuous electronic fetal heart rate monitoring. Fetal heart rate changes which occur during labour may indicate that the fetus is compromised. The most common changes seen are an alteration in the fetal heart rate baseline and differences in the heart rate pattern. However, these are only indicative of potential danger - actual hypoxia can only be diagnosed if changes in the acid-base balance of the fetus by scalp blood sampling are detected. Klein [79] stated that :

> *"Fetal distress is an accepted indication for caesarean section.The problem is to define fetal distress and to identify the fetus at risk of ante and intrapartum distress, the reason for the distress and measures for detection and modification of the distress."*

The widespread adoption of continuous electronic fetal monitoring in labour has contributed to the increase in caesarean section rates for *fetal distress* [78] and Rosen [1] estimated that sections performed for this indication had contributed to between 10 and 15% of the rise in rates in the USA.

Several studies have shown that electronic fetal monitoring is an effective screening technique for detecting the fetus which is already asphyxiated or at risk of developing intrapartum hypoxia [80,81]. The criteria which are important in determining the effectiveness of

a screening test are firstly that it should have a high sensitivity ie. all affected fetuses should have an abnormal test so that no cases of distress go undetected. The second criteria is that the predictive value of a normal test must be high ie. a normal heart rate pattern signifies a well oxygenated fetus with a high degree of accuracy. Lieberman [82] estimated that if the rate of intrapartum hypoxia was 20 per 1000 and assuming a sensitivity of 80% and a specificity of 90% then the predictive value of a normal test in electronic fetal monitoring was in excess of 99%.

If electronic fetal monitoring is used to diagnose rather than screen for fetal distress then the predictive value of an abnormal test becomes the most important factor so that *'normals'* are not subjected to inappropriate interventions. Using the same figures as before, the predictive value of an abnormal test is only 14%. This value is directly influenced by the prevalence of fetal distress in the population being studied. So if the prevalence of fetal distress is 3% [1] then the positive predictive value of the test is 19.8%.

Therefore, if electronic fetal monitoring is used as a screening technique then the obstetrician can be fairly confident that if the fetal heart rate tracing displays a normal baseline with good variability then the fetus in utero is healthy. However, an abnormal fetal heart rate pattern does not necessarily mean that the fetus is distressed. If the tracing is abnormal or suspicious then other methods such as fetal blood sampling should be employed to define the fetal condition more clearly.

Several authors [83,84] have shown that fetal blood pH estimation enhances the specificity of the diagnosis of fetal hypoxia and others [85] have reported a reduction in the numbers of caesarean sections performed for this indication when fetal blood sampling programmes were initiated. In contrast however, Zalar and Quilligan [86] found no alteration in the incidence of caesarean section performed for fetal distress despite the institution of a programme of continuous fetal monitoring and fetal blood sampling.

The widespread use of continuous fetal monitoring in labour has preceded its objective evaluation. The data available suggests that even when monitoring is used in conjunction with fetal blood pH estimation, it is not accurate enough to detect all cases of fetal hypoxia. The fetal condition in utero may be altered by insults such as physical trauma, drugs administered to the mother or the presence of an intra-uterine infection, which may not be reflected in the fetal heart rate pattern or scalp pH.

On occasion fetal hypoxia demands immediate operative delivery but in many cases if fetal asphyxia is detected then it may be possible to remedy the situation by correcting the cause of the hypoxia. Such measures include changing the maternal position, discontinuation of oxytocin, correction of hypotension, administration of oxygen and intravenous hydration. If techniques such as these are employed then their success may be evaluated by ongoing monitoring of the fetal heart rate pattern and fetal blood pH. Operative intervention by caesarean section is only justified for fetal distress when all possible corrective measures have been attempted [38].

More sophisticated techniques may enhance the precision of fetal heart rate monitoring. Sawyers [87] has suggested that interpretation of tracings by microcomputer may improve their diagnostic value. Fetal monitoring on its own is not as accurate in predicting fetal distress as it is in predicting fetal well-being. One of the Task Force's recommendations was that the accuracy of the diagnosis of fetal distress could be improved by using fetal monitoring in conjunction with fetal blood sampling techniques. Although pH estimation of a fetal scalp sample is being used more frequently, it is likely that until better fetal surveillance with less confusing information is available, then the number of sections performed for this indication is unlikely to diminish [33].

i. Low Birth Weight Infants

During the same time period when caesarean section rates have risen, interest in perinatal and neonatal medicine has also grown. Developments in these areas have meant that increasing numbers of very low birth weight babies are now surviving. Over the last decade the optimal delivery method for babies in this category has been argued. Several studies [88,89] have reported an improvement in the long term outcome for preterm infants after abdominal delivery, and these have served as a basis for the more liberal attitude to caesarean section in preterm deliveries.

The most common neurological complication seen in preterm infants is intraventricular haemorrhage. The actual aetiology of intraventricular haemorrhage is uncertain but the lesion appears to be a non-specific response to cerebral injury. This injury may occur during delivery, usually as a result of trauma to the fetal head at birth. The literature relating to the effect of the delivery method on the incidence of intraventricular haemorrhage is inconclusive. Certainly several authors [90,91,92] have suggested that the mode of delivery may be of significance in the pathogenesis of intraventricular haemorrhage in preterm infants although other factors such as asphyxia, immaturity and the presence of respiratory distress syndrome are probably more important.

It may be that timely abdominal delivery can reduce the risk of trauma at delivery. The soft skull of the preterm infant offers less resistance to compression and excessive moulding of the cranial bones and this may lead to subsequent haemorrhage [93,94]. If the membranes are ruptured, as is often the case in preterm labour then the effect of uterine contractions on the fetal head is even greater because of the lack of protection from the bag of forewaters [95]. The frequency of intrapartum asphyxia is high in preterm vaginal deliveries [96] and potential asphyxial damage may be reduced by caesarean delivery. Also the timing of caesarean delivery can be planned so that all necessary personnel and resources are available when delivery occurs.

However several disadvantages of abdominal delivery for both the mother and her infant have also been described. Infants delivered by caesarean section have lower catecholamine levels than those delivered vaginally [97]. Catecholamines improve aeration of the lungs by aiding liquid absorption and they also increase cardiac performance. An increased incidence of respiratory distress syndrome has also been reported in infants delivered by caesarean section [98]. The preterm infant has a limited ability to detoxify drugs and during abdominal delivery will be exposed to various anaesthetic and analgesic agents, some of which have potential side effects. Lastly whatever benefits caesarean section may offer to the baby, it will always increase the risk to the mother. An increased incidence in intraoperative complications in women delivered before 33 weeks gestation has been reported [99] and also an increased risk for the development of endometritis [100], a long term complication of which may be the development of secondary infertility.

The optimal mode of delivery for the preterm infant is complex and will only ever be answered by a prospective randomised trial. Design of such a trial will inevitably be complicated by changes in obstetric and neonatal management which in themselves influence survival rates. Other considerations such as the presence of pregnancy complications, fetal presentation and the progress of labour will all influence the decision regarding the mode of delivery for preterm infants.

j. Multiple Pregnancy

Hibbard [101] and Petitti et al [102] noted that there was an increase in the incidence of caesarean section in multiple pregnancy. With the increased safety of the operation, some obstetricians have favoured a more liberal approach to abdominal delivery in an effort to reduce the risk to the second twin in a multiple birth. This risk is due to the increased amount of obstetrical intervention often required and also the risk of hypoxia after the first twin is delivered. Compared with singleton births, twins have a six times greater neonatal

mortality rate - however, this may be due more to the association of multiple pregnancy with low birth weight and preterm delivery, rather than the actual intrapartum events [103].

If the second twin presents by the breech then several authors [103,104] have shown that delivery by caesarean section improves the outcome of pregnancy. If, however, the second twin presents by the vertex then delivery by caesarean section did not significantly affect the neonatal mortality. Controversy still exists as to the best method of delivery for twin breech presentations, especially in the low birth weight categories. Until properly controlled randomised studies are undertaken, this is likely to remain the case.

k. Maternal Indications

There are numerous situations where caesarean section is chosen as the most appropriate method of delivery eg in types of placenta praevia, cases of placental abruption or where certain fetal malpresentations exist. In these obstetric situations caesarean section may be unavoidable. Similarly pre-existing medical disease such as diabetes mellitus and chronic renal disease, or diseases associated with pregnancy such as pregnancy induced hypertension or eclampsia may necessitate timely delivery for either the sake of the mother or her baby or both. It is not within the scope of this literature review to examine each of these situations on an individual basis - they are perhaps best discussed in an obstetric textbook. Although the number of indications is large, they represent a small number of actual cases. By and large the number of such cases has remained fairly constant and they rank far behind indications such as dystocia, repeat caesarean section, breech presentation and fetal distress in their contribution to the rapid rise in caesarean section rates [7].

1.4 : Risks associated with Caesarean Section

Although caesarean delivery is now safer than it has ever been, it remains a major surgical procedure and therefore, can never be an entirely safe alternative to vaginal delivery. This section considers the risks of the operation for both the mother and the fetus.

a. Maternal Risks

Until recent years because of the high maternal mortality and morbidity associated with caesarean section, the operation was usually used as a last resort. In 1870 the maternal mortality associated with caesarean section was around 75%, with death most commonly due to either shock, sepsis, or haemorrhage, or a combination of these factors. The introduction of antibiotics and blood transfusions as well as markedly improved surgical and anaesthetic techniques dramatically reduced maternal mortality after abdominal delivery.

Without doubt these advances have improved the safety of caesarean section, but it remains a major surgical procedure and therefore can never be considered as a safe alternative to vaginal delivery. Mortality after abdominal delivery is not necessarily directly attributable to the operation itself. Women delivered by caesarean section often have specific risk factors as well as the hazards inherent in surgery and anaesthesia, which makes comparison of the relative risk between caesarean section and vaginal delivery difficult. Other factors which complicate estimation of the risk of mortality and morbidity after caesarean section include the demographic characteristics of the obstetric population, the skill and experience of both the surgeon and the anaesthetist and the quality of care available after the operation. Conversely, failure to perform a necessary caesarean may increase the risk for the mother.

Maternal Mortality

There has been a dramatic decline in maternal mortality over the last 50 years, making it a rare event in developed countries. Data from the USA shows that maternal mortality fell from a level of 582.1 per 100,000 births in 1935 to 9.9 per 100,000 in 1978 [1]. In England and Wales, Francome and Carson [23], showed that mortality rates had fallen from 22 per 100,000 in 1963 to 10 per 100,000 births in 1978. The most recent Scottish report on Maternal Mortality [162] recorded a decline in maternal mortality from 24.5 per 100,000 births in 1966 to 13.4 in 1985.

Examination and comparison of maternal mortality by delivery method is difficult mainly because of the small number of fatalities which now occur. This makes calculation of maternal mortality rates potentially subject to large sampling errors. Rosen [1] also highlighted the fact that records may be either inaccurate or incomplete in their recording of the mode of delivery and that maternal deaths are seriously underreported, especially for deaths occurring in the late puerperium. Yet another problem is that caesarean section is often performed for reasons that in themselves represent a threat to the woman's life - so it is vital to distinguish between death due to the operative procedure and death due to the condition itself. Finally, the level of medical care and expertise as well as the demographic features of the obstetric population being studied will influence the reported mortality rates.

Several studies estimating maternal mortality associated with caesarean section have been published in the USA. Overall estimates of mortality range from 0 to 105 per 100,000 caesarean sections, with deaths directly attributable to the operation ranging from 0 to 59 per 100,000. The common causes of death following caesarean section vary between the studies [105,106,107].

The largest study was reported by Petitti et al [108] on data collected from hospitals which contribute to the Professional Activities Survey in the USA. Examination of the record for the years 1970, 1974 and 1978 showed that during the 8 year period the maternal mortality rate for vaginal delivery had declined from 20.4 to 9.8 per 100,000 deliveries. Mortality from caesarean section also decreased from 113.8 to 40.9 per 100,000 caesarean deliveries. The relative risk of maternal death after caesarean section compared with vaginal delivery fell from 5.5 in 1970 to 4.2 in 1978. The actual causes of death were not reported in this study.

The 3 yearly reports on Confidential Enquiries into Maternal Deaths in England and Wales [109, 110], show that the death rate per 1000 sections fell from 1.01 in 1970-72 to 0.37 in 1982-84, despite the overall increase in the number of caesarean sections being performed. The risk of death associated with emergency caesarean delivery was more than four times that of elective surgery.

The leading cause of death in the last report amongst direct deaths associated with caesarean section was pulmonary embolism with hypertensive disease, anaesthetic accidents and other direct causes contributing in approximately equal proportions to the remainder [110]. Of concern in these reports is the number of cases where the obstetric and anaesthetic care was judged to be substandard - and the last report [110] specifically mentioned that *"junior medical staff continue to be expected to carry too great a responsibility in the labour ward and consultants need to be prepared to come in earlier to see difficult cases"*.

In common with other forms of abdominal surgery, the leading causes of death after caesarean section continue to be pulmonary embolism, anaesthesia, haemorrhage and to a lesser extent sepsis. Some maternal mortality following abdominal delivery, however, is related to maternal illness rather than the operation itself. In addition caesarean delivery is unavoidable in some maternal conditions and fetal and placental positions, which in themselves would be fatal if intervention was not initiated. After consideration of the methodological difficulties involved in estimating the relative risk of caesarean versus vaginal delivery, Petitti et al [108] concluded that the risk of in-hospital death was not less than 2 nor more than 4 times higher in caesarean section.

Maternal Morbidity

Caesarean section is a major operative procedure and consequently many complications are encountered that are never seen in vaginal deliveries. The list of possible problems is long and includes injuries to the ureters, bladder and bowel; injuries to the blood

vessels; and lacerations of the cervix, vagina and broad ligaments. In addition the risk of haemorrhage, pulmonary embolism, paralytic ileus and various types of infection is increased following abdominal delivery. Haemorrhage or infection may necessitate hysterectomy and post-caesarean pelvic infection may compromise future fertility. Other long-term effects which may arise include the development of adhesions which can involve the uterus, bowel and bladder. These may in themselves cause problems at a future date eg a resulting intestinal obstruction, or, their presence may make a subsequent caesarean section difficult to perform. Another sequelae may be a defective uterine scar which is more liable to rupture in another pregnancy [1].

No large scale systematic studies to determine the actual incidence of such complications following caesarean section have been carried out. Most studies of morbidity have been reported from single institutions and because of the diffuse nature and classification of morbidity, the interpretation of such studies is difficult.

There is a wide variation in reported morbidity rates following caesarean delivery. Lowe et al [111] from the 1974 Professional Activities Survey in the USA recorded selected puerperal and post-operative complications in only 4.2% of caesarean deliveries - almost 75% of which were puerperal sepsis and post-operative wound infection. Similarly Aard and Saed [112] found that 12% of their study population experienced morbidity in the postnatal period. In contrast in a retrospective analysis Jones [113] reported a complication rate of 33% following section and Hibbard [101] found the rate was approximately 50% in each of 4 time periods between 1948 and 1974.

Table 1.4a, reproduced from Petitti [114], summarises the reported complications for both primary and repeat sections in studies that have been published between 1976 and 1984. Although other studies have been published during the same time period, comparisons cannot be made due to differences in the populations being studied. Such differences involved the

inclusion or exclusion of patients at high risk of developing puerperal infection or where prophylactic antibiotics had been administered. It is apparent from the data in the table that the most common type of infectious morbidity seen in the studies was endometritis which developed in 6-10% of patients. The rates of urinary tract infection and wound infection were lower and there was a substantial variation in the percentage seen between the studies. The number of women requiring blood transfusion made it the second most common complication of abdominal delivery, although there was a marked difference in figures between studies. Other non-infectious complications associated with caesarean section had a low incidence in all the studies reported.

Most authors [115,116] agree that women who undergo an elective caesarean section as opposed to an emergency operation have a reduced risk of developing infectious complications in the post operative period. The variation in rates may differ by as much as a factor of 5 [115]. Other factors such as the duration of labour, length of membrane rupture, number of vaginal examinations, anaemia and obesity have been cited in the literature as possible risk factors in the development of puerperal infection [115,117,118,119,120].

The design of such studies varies considerably and few have attempted to define the independent effects of highly intercorrelated factors on the risk of developing infection. For example, length of labour, duration of membrane rupture and number of vaginal examinations are all closely interrelated. Such inter-relationships must be carefully considered if an attempt is made to delineate the association of one factor with the risk of infection independently of the association of another.

D'Angelo and Sokol [120], using discriminant analysis, found that the most significant factor related to the development of postpartum morbidity following caesarean delivery was the length of labour. Using similar statistical techniques, the same results were confirmed by

Gibbs [119]. Where a combination of risk factors exists then Nielsen and Hokegard [115] found that the complication rate was greater, in some cases as much as 91%.

Several authors have suggested that if women are identified as being at high risk for the development of postpartum infection then they may benefit from prophylactic antibiotic administration [115,121]. This prophylaxis cannot replace standard infection control methods such as hand washing and good aseptic technique.

In a review of the current literature, Gibbs [122] concluded that prophylactic antibiotics should be restricted to women at moderate to high risk of post-operative infection and that when utilised, a short course intravenous regimen of no more than 3 doses should be used. He also stated that administration should be delayed until after clamping of the umbilical cord to avoid fetal consequences. As an alternative to prophylaxis, early treatment of clinically evident infection might be considered because of the excellent cure rates achieved with modern drug regimens.

b. Perinatal Risks

Advances in medical care such as the introduction of antibiotics and blood transfusions; better control of maternal disease and improved anaesthetic and surgical techniques have all made maternal mortality from caesarean section a rare occurrence. With the increased safety of the operation obstetricians began to focus their attention on improving the outcome of pregnancy for the fetus as well. Throughout the 1960s and 1970s there was a decline in the overall birth rate and with couples having fewer children, even greater attention was paid to the achievement of a favourable pregnancy outcome.

As perinatal morbidity is difficult to determine [123], perinatal mortality rates have continued to be used as the measure against which obstetric success is gauged. Until

classification and definitions of morbidity are made uniform, this rather crude yardstick will continue to be used as an indicator of the success of pregnancy outcome.

Perinatal Mortality

Certainly during the same time period that caesarean section rates have risen, there has been a concomitant decline in perinatal mortality. Few would doubt that there are occasions when timely performance of a caesarean section has been vital to infant survival, however, it is debatable whether there is a causal relationship between the current improvement in perinatal outcome and the increased use of caesarean section.

Many other changes have also occurred during this time period which have influenced pregnancy outcome for both the mother and her infant. Factors such as general improvements in health; advances in antenatal diagnosis and treatment; increased use of ante and intrapartum fetal monitoring to detect fetuses at risk and the wider availability of neonatal intensive care facilities have all contributed - although the exact contribution of each is difficult to assess.

Certainly the scope of neonatal care has increased remarkably and neonatal units can now achieve survival rates of approximately 90% for birthweights of 1000-1500 grams; 70-80% for 750-1000 grams and 30-40% for 500-750 grams [75]. In these very low birthweight categories, several authors [88,89] have suggested that the prognosis is improved if delivery is by caesarean section. Combined with the increased safety of the operation these reports served as the basis for a changing attitude in favour of more active obstetric management in preterm delivery. Obstetricians increasingly have favoured abdominal delivery in very low birthweight infants in an effort to ensure that they are in optimal condition at delivery.

Evidence to support the claims that caesarean section is the best way to deliver these infants is lacking. Crowley and Hawkins [76] in a review of various studies of preterm breech delivery

found that caesarean section did appear to provide an advantage to infants weighing between 1000 and 1500 grams, however, in infants between 1500 and 2500 grams survival rates were not affected by the mode of delivery. In vertex presentations, Rosen and Chik [124] evaluating the value of caesarean section in the delivery of preterm infants, were unable to demonstrate any significant differences in perinatal mortality related to the mode of delivery. These findings were confirmed by Westgren et al [125] who could not find any difference in outcome in a matched controlled study of uncomplicated preterm delivery.

In any case it must be remembered that the overwhelming majority of caesarean sections are carried out in infants in normal birthweight categories. In Scotland in 1982, 89% of all caesarean deliveries were carried out after 37 weeks gestation [5].

In a review of studies related to caesarean section, Thiery and Derom [9] found that as in other parts of the world, caesarean section rates had increased in most European countries. The rates and rate increases varied widely both between and within countries, however, there was also a general phenomenon of steadily decreasing perinatal mortality rates during the same time period. O'Driscoll and Foley [8] reported a reduction in the perinatal mortality rate from 42.1 to 16.8 in the 15 year period between 1965 and 1980 - although the caesarean section rate remained stable at 4-5% for the study duration.

Bergsjo et al [26] analysed the correlation between perinatal mortality and caesarean section rates in 11 European countries in the same year and found that the incidence of caesarean section did not contribute significantly to the difference in perinatal mortality rates between the countries assessed.

The relationship between trends in caesarean section rates and perinatal mortality rates is not consistent on an international or intranational basis. This suggests that perinatal mortality is more closely related to factors such as the incidence of preterm delivery; the

demographic features of the obstetric population; and the level and availability of obstetric and neonatal care.

Perinatal morbidity

The risk of obstetric trauma is much smaller for infants delivered by caesarean section than for those delivered vaginally, but abdominal delivery cannot totally eliminate this hazard. Direct fetal injuries such as scalpel lacerations, fractures and brachial plexus paralysis have been recorded, although the incidence is low [126].

Gluck [127] pointed out that one hazard of caesarean section was iatrogenic respiratory distress syndrome in the neonate, caused by premature delivery of an immature fetus. The numbers of elective repeat caesarean sections are increasing and unless careful assessment is made of fetal age and maturity this may continue to be a problem. Assessment of maturity may be achieved by clinical examinations, ultrasonography or by biochemical analysis of amniotic fluid to determine fetal lung maturity.

Bloxsom [128] was the first to document the association between respiratory distress syndrome and caesarean section and since then the complication has been ascribed to intrapartum asphyxia, iatrogenic prematurity and the operation itself. Respiratory distress syndrome occurs mainly in infants of less than 36 weeks gestation and manifests as tachypnoea, sternal recession, grunting, flaring of the nasal alae and cyanosis. X-ray examination usually shows bilateral hypoexpansion of the lung and *'ground glass'* mottling. It is well documented that it occurs in infants with an alveolar surfactant deficiency. This may occur because they are preterm or it may be lost after existing in normal concentrations due to fetal or neonatal asphyxia. The presence of surfactant can be predicted by estimation of the lecithin-sphingomyelin ratio.

Retrospective studies [129,130] have shown that independent of maternal complications, caesarean section appears to be associated with an increased incidence of respiratory distress syndrome at all gestational ages. Fredrick and Butler [131] in data gathered from the 1958 British Perinatal Mortality Survey showed that the incidence of respiratory distress syndrome was 4 times greater in infants born by elective rather than emergency caesarean section and this in turn was higher than for those delivered vaginally.

Any drugs given to the mother during the administration of regional or general anaesthesia may cross the placental barrier and directly affect the fetus or newborn infant. A further hazard may be the indirect effects of anaesthetic induced alterations in maternal physiology such as hypotension. Separation of direct and indirect effects may be difficult or impossible.

c. Anaesthesia for caesarean section

When considering the risks and benefits of caesarean section, the role of anaesthesia must be taken into account as it is a prominent and largely avoidable cause of mortality and morbidity encountered in operative delivery. The methods of anaesthesia employed for caesarean section have undergone radical changes over the past 20 years. Prior to 1970 general anaesthesia was the most common technique employed. In 1971 the American College of Obstetricians and Gynaecologists conducted a survey which showed that 32% of sections were carried out under general anaesthesia, 53% under spinal anaesthesia and 3% under epidural block. By 1981, however, the percentage performed under epidural block had increased to 21%, with spinal anaesthesia accounting for 35% and general anaesthesia 41% [132]. Chamberlain and Morgan [133] also commented that the use of epidural block for caesarean section was increasing in the UK.

Many factors are responsible for this increase. The widespread use of regional anaesthesia has occurred in parallel with an increase in the knowledge related to the effects of anaesthetic drugs and techniques on maternal physiology, fetal well-being and neonatal

outcome. At the same time obstetric anaesthesia has been recognised as a sub-specialty of anaesthetics and this has resulted in training programmes to ensure that anaesthetists working in obstetric units have received adequate instruction. A more liberal attitude to the involvement of the woman's partner in the delivery experience has allowed the presence of fathers in the operating theatre, thus making it mandatory for the woman to be conscious.

1.5 : Psycho-social Morbidity

Most research related to the outcome of caesarean section has focused on assessment of the maternal and perinatal mortality and morbidity associated with the operation. However, childbirth is a social and personal experience as well as a medical event and for most women a satisfactory pregnancy outcome involves delivery of a healthy baby and a good childbirth experience. Few women today view pregnancy and delivery as a series of biological events over which they have no control, and, increasingly consumers are demanding a more humanistic approach to obstetric care and a greater share of responsibility in decision making related to the care that they receive.

This increase in interest in the quality of childbirth can be seen in the amount of attention paid to pregnancy and delivery in the lay press and also in the realisation by professionals of the importance of the delivery experience and early parent-infant bonding in establishing the family unit. The work of Klaus et al [134] and Kennel et al[135] among others has indicated that early prolonged separation of the mother and her baby hampers the attachment process and may play a part in later parenting difficulties. Many hospitals have responded to these demands by abandoning routine procedures such as perineal shaving if there is no justification for them in clinical practice, allowing women to adopt the positions they desire for labour and delivery and encouraging prepared childbirth with active partner involvement.

Pregnancy, childbirth and parenthood require massive physiological and psychological adjustments on the part of the woman. Even under normal circumstances the transition to motherhood may be problematical especially if the woman's prior expectations of her delivery do not meet up with the reality. Oakley [136] found that the most normal of births can involve elements of loss for the mother - loss of self-confidence, loss of body image, loss of previous employment and so on. She states that:

> *"Childbirth is a life event with considerable loss and uncertain gain. The response is liable to be hopelessness and the extent of this is determined in large part by the extent to which people feel able to take control over their own lives."*

In addition to these *'normal'* stressors, the woman who has had a caesarean section has to cope with the physical and psychological impact of anaesthesia and major surgery, which may have occurred on top of a long and exhausting labour.

Oakley [14] commented on the difference in the way that caesarean section is conceptualised from other types of abdominal surgery. The term section is used as opposed to surgery or operation and this is associated with a difference in the way in which the effects of caesarean section and other surgical procedures are seen. A common generally accepted consequence of major surgery is depression, yet, the same assumption is not made about caesarean section. Similarly, many of the general after effects of surgery are applicable to caesarean section. These may include a temporary response of emotional relief and elation from having recovered from the anaesthetic, worry about the mutilating effects of the surgery and an extended period of physical and psychological discomfort [137]. In addition, the woman who has experienced caesarean delivery is often expected to cope with the demands of her new baby and this may involve activities that are normally forbidden to patients that have undergone abdominal surgery.

During the same period that parents' expectations of childbirth have altered, there has been a steady rise in the caesarean section rate - especially in the numbers of primary emergency sections being performed. Few women unless alerted by obstetricians or by their previous obstetric history, seriously consider the possibility of a caesarean section being necessary. As women have become increasingly actively involved in their pregnancies by reading more about childbirth and attending antenatal preparation classes, their expectations are channelled towards a natural outcome of labour, where the mother is in control throughout and experiences a sense of fulfilment at the time of birth. The inevitable corollary to this is a parallel increase in disappointment if the birth events do not go as planned [138].

To date very little research has been carried out that has attempted to evaluate the psychosocial effects of caesarean delivery. This may be because until recently both parents and professionals accepted that caesarean section was only carried out as a life saving procedure. There would be little value in asking people if they wanted such an operation or not, or, how they felt about it if they felt it was employed to save either their own or their baby's life. In such a situation the implication of any distaste admitted for caesarean delivery could amount to a preference for death or injury.

The emotional responses to caesarean section will depend on many factors - including the maternal personality, the amount of preparation received before delivery, prior expectations of childbirth, past childbirth experiences, the type of caesarean section (emergency or elective) and the type of anaesthesia employed.

Most of the studies which have examined parental responses to caesarean section have come from North America and are primarily descriptive in nature. By and large, they are confined to middle-class, caucasian families who were self-selected from caesarean support groups and involve small study numbers. These self-help groups offer psychological and

social support for women who have experienced caesarean delivery and their numbers have grown rapidly in the USA and to a lesser extent the United Kingdom. One interesting aspect of these groups is that they have voiced little criticism about the rising caesarean section rates, which implies that the recipients of such surgery tend to view it as being *'necessary'*.

One of the first studies to comment on mothers' views of caesarean delivery was reported by Affonso and Stichler [139]. This was a pilot study involving 105 women who were interviewed between the second and fourth post-operative days. 92% of the women reported feelings of fear, anxiety and concern for themselves, the baby and the surgery immediately prior to delivery; 52% reported dissatisfaction, anger or depression and 30% expressed feelings of relief that the labour was going to be terminated. In the survey 41% of the mothers expressed a need for reassurance, verbal communication or for touch prior to anaesthesia and explanations from professionals were the most commonly reported help in the preparation for section.

Another descriptive study was reported from Canada by Erb et al [140]. Women of mixed parity were self-selected through a media campaign and completed an open-ended questionnaire concerning their delivery experience. Of those women who had a primary caesarean section, 93% expressed feelings of joy and relief alongside feelings of disappointment (68%), frustration (41%), failure (25%), guilt (20%) and anger (20%). These negative feelings were less pronounced if the women had previously experienced caesarean delivery.

Various other authors have also reported similar negative responses to caesarean delivery. Studies by Cranley et al [10], Marut and Mercer [12] and Trowell [141] have suggested that feelings of guilt, failure, disappointment and anger are common among women delivered by section - a sense of failure at not being able to deliver the baby normally; a sense of guilt at

putting the baby in danger and depriving her partner of the shared experience of birth and a sense of anger and disappointment at having been deprived of a normal birth herself.

From the published evidence available there appear to be several factors which to a limited extent may moderate some of these negative feelings. Among them, the most significant appear to be : the preparation for caesarean section; the type of anaesthesia employed and the presence of the father at delivery.

The studies by Cranley et al [10] and Marut and Mercer [12] both showed that women who experienced emergency caesarean sections had less positive perceptions of the delivery method than those delivered either vaginally or by elective caesarean section. If the caesarean section is planned then the woman may prepare herself by reading about what to expect, discussing it with professionals and friends and making preparations at home for her absence. Obviously having a number of weeks or days to come to terms with a planned procedure is very different to being faced with a rapid and stressful decision being made after a long and exhausting labour. In Affonso and Stichler's study [139], 41% of the women interviewed had two hours or less to prepare themselves for surgery. They felt that this short time was insufficient for the women to grasp the significance of all the events occurring and to rally their resources to cope with the situation.

As it is impossible to predict all those women who may require caesarean section prior to the onset of labour, it is difficult to decide when information about caesarean section should be given. Antenatal preparation classes play an important role in preparing women for pregnancy, delivery and parenthood. Unfortunately in attempting to instil a positive attitude in the minds of women, the topic of caesarean section is often downplayed or even ignored. Cohen [142] and Enkin [143] both felt that information about caesarean delivery should be given to all parents, irrespective of whether or not a section was actually planned.

Another factor which may modify women's perceptions of their delivery experience is the type of anaesthesia employed for the operation. Available evidence suggests that women who have regional anaesthesia and are therefore able to remain conscious throughout, feel more in control of their situation and benefit from early parent-infant contact [10,12]. If general anaesthesia is used then it produces a gap in the woman's recollections and occasionally she may find it difficult to identify the infant as her own [144]. However, not all women can be given the choice or indeed want to be awake during surgery. If it is possible then women should have some choice in the type of anaesthesia used [142,143].

The last major factor which appears to influence the psychosocial outcome of caesarean delivery is the presence of the father in the operating theatre. Various authors have shown that when partners were present, women expressed greater satisfaction with their delivery experience [10,12,140]. Fears about the adverse effects of the father's presence during surgery - such as the potential for increased infection, fathers fainting, lack of space and increased malpractice suits have never been proved. The Committee on Obstetrics - Maternal and Fetal Medicine of the American College of Obstetricians and Gynaecologists stated that :

> *"The Committee cannot perceive strong medical indications or contraindications to the presence of fathers in the operating suite ..... the presence of the father or other support person may be psychologically helpful to the mother."*

Certainly today both in the UK and the USA, a large number of hospitals allow fathers to be present in the operating theatre for delivery.

Klaus and Kennel [145] showed that early mother-infant contact especially during the first hour following delivery, is important for bonding and other studies suggest that such early contact also influences the way in which mothers interact with their infants throughout the first year of life [134,135,146]. If regional anaesthesia is used, then the woman will be able, under normal circumstances to enjoy seeing and holding her baby from the time that it is born and share this

experience with her partner. However, the woman delivered under general anaesthesia will have to wait until the effects of the anaesthetic have worn off before such contact can be enjoyed.

Marut and Mercer [12] noted that in women delivered under general anaesthesia this bonding process was delayed and that in general caesarean mothers comments about their infants reflected hostility whereas vaginally delivered women's remarks primarily reflected concern.

Trowell [141] looked at the possible effects of emergency caesarean section on the mother-child relationship in primigravidae. Her study group was comprised of 16 women delivered by emergency caesarean section under general anaesthesia and her control group consisted of 18 women who had completely uncomplicated vaginal deliveries. The women were followed up at one month and one year after delivery. At the one month stage, the group delivered by caesarean section showed less eye to eye contact with their babies than the control group and they were less relaxed when bathing the baby. More of the study group recollected the birth as a bad experience and expressed worry about their capacity to care for their babies. By one year the caesarean group expressed more dissatisfaction and resentment at the demands made on them and felt that they had experienced more difficulties and problems during the year. They also responded more slowly than the control mothers in response to their child crying.

Clearly further research is needed in this field as it is difficult to assess the effects of caesarean delivery on the mother-infant relationship from the data already available. Most of the studies probably have a marked bias because of the sampling techniques employed and in any case due to the differences in the health care systems between the USA and UK would not necessarily be relevant in this country. Robson and Kumar [147] showed that maternal affection may be lacking after any form of delivery and that this has been considered as a normal and even necessary variant. Stichler and Affonso [148] pointed out that the experiences which may

facilitate bonding, such as early infant contact and rooming-in may be denied to women delivered by section. Unless there is a clear indication for observation in a special baby care unit, the routine admission of babies delivered by section to such units seems unnecessary. Early mother-infant contact might also be aided by allowing the woman to breast feed if she wishes as soon as the operation is over.

Summary

Caesarean section is one of the oldest operations in the history of surgery, however, until recent decades it was usually used as a last resort because of the high maternal mortality associated with its performance. Over the past 20 years caesarean section has been used much more liberally in obstetric practice for the reasons outlined in the literature review. Many studies have been published on the determinants of the increasing rate but comparatively few have addressed the clinical, psychological and social consequences for mothers and babies.

To evaluate pregnancy outcome or any aspect of obstetric care, a number of measures may be used : mortality statistics, morbidity rates and the psychosocial outcome. The last measure could be said to encompass the various dimensions of the woman's mental, emotional and social state [14]. Until recently the usual measure used by obstetricians and epidemiologists has been maternal and perinatal mortality statistics - no doubt because death is easy to measure and questions of happiness or satisfaction with the management of birth become irrelevant. However, childbirth is a personal and social experience as well as an obstetric event and increasingly emphasis is being placed on all aspects of evaluation so that the psychological, social and economic factors associated with a procedure become as important dimensions as the clinical criteria.

To date no research has simultaneously examined the clinical indications, morbidity and women's views of caesarean section. This study was therefore designed to provide further knowledge of the immediate, short-term and long-term consequences of caesarean delivery for both the mother and her infant.

Chapter 2

Aims and Methodology

Chapter 2 : Aims and Methodology

The current study was designed to provide further knowledge of the immediate, short-term and long-term consequences of caesarean section for both the mother and her infant.

The general aims of the study were to :

1. *Describe the current practice with regard to caesarean section in a large university teaching hospital*
2. *Compare the characteristics of women delivered by caesarean section with those delivered vaginally using SMR2 data*
3. *Describe the immediate, short-term and long-term morbidity experienced by women delivered by caesarean section*
4. *Compare the immediate, short-term and long-term morbidity experienced by women by the timing of caesarean section*
5. *Determine women's knowledge of the reasons for the performance of the operation*
6. *Compare the views of women delivered vaginally and by caesarean section of their experience on this occasion*

In order to achieve these aims the study was designed in a number of parts and each of these will be considered in turn.

2.1 : Analysis of SMR_2 Data for 1984 deliveries

The specific objective of this part of the study was to test the hypothesis that the characteristics of women and their infants delivered by caesarean section differ significantly when compared with those of women delivered vaginally.

In order to compare these characteristics to see if any such differences existed, it was necessary to access data from the Scottish Morbidity Record (SMR_2). This form was introduced in Scotland in 1969 and was designed to extract data from hospital maternity case records for computer storage and subsequent analysis.

Although completion of the SMR_2 is not a statutory requirement, in Glasgow Royal Maternity Hospital approximately 99% of deliveries have an SMR_2 filed. All admissions during pregnancy collect a completed SMR_2 on discharge, however, only one form per pregnancy contains details of the delivery and it was this form which was extracted from the computer file for the purposes of the study. Data for SMR_2 is coded according to the date of discharge from hospital rather than from the actual date of delivery so slight discrepancies arose in the actual number of women delivered by caesarean section during the study period.

The specific variables which were used to test this hypothesis were :

Maternal
age
height
marital status
social class
number of antenatal admissions
induction of labour
gestation at delivery
length of postnatal stay

Infant
birthweight
infant outcome
5 minute Apgar score
admissions to SCBU

Primigravidae and multigravidae were considered separately in the analysis to enhance the relevance of the results obtained. The data was coded and analysed using the Statistical Package for the Social Sciences (SPSSx). Details of the statistical tests employed are given in section 2.7.

2.2 : Retrospective Case Record Review

The second part of the study was a retrospective analysis of the obstetric case records and midwifery notes of all women delivered by caesarean section in Glasgow Royal Maternity Hospital during 1984.

The objectives of this part of the study were :

1. *To describe the characteristics of those women delivered by caesarean section*
2. *To determine the indications for the performance of the operation*

3. *To assess the operative and immediate post-operative morbidity associated with caesarean section*
4. *To examine the characteristics and outcome of infants delivered by this method*
5. *To describe the experiences of those women subsequently delivered by emergency caesarean section during the course of labour*
6. *To compare the operative and immediate post-operative morbidity of women delivered by caesarean section by the timing of the operation*

In 1984, 3952 women were delivered in Glasgow Royal Maternity Hospital resulting in the birth of 3994 infants. Forty of the pregnancies were multiple (38 twin, 2 triplet) and the perinatal loss was 47 infants, which gave a perinatal mortality rate of 11.7 per 1000. Sixteen percent of women (619 cases) were delivered by caesarean section and all of these women were included in this part of the study.

A computer compatible data collection form was designed and subsequently amended slightly following a pilot study of 50 women; the proforma in its final form is shown in Appendix 1. The information that was collected included maternal demographic characteristics; details of the past obstetric history including the main indication for previous caesarean deliveries and the results of any postnatal pelvimetry; relevant past medical history and details of the current pregnancy. Operative data recorded included the reasons documented in the obstetric case notes for the performance of the operation; the mode of anaesthesia; the type of incision and the blood loss. Any operative complications including intra-operative blood transfusion were also noted. Morbidity which developed in the postnatal period was noted as well as variables such as length of stay in hospital; type of infant feeding and the reported results of any postnatal pelvimetry. The neonatal outcome was documented and included information such as the one and five minute Apgar scores; resuscitation methods employed; birthweight and discharge of the infant from theatre. If the woman experienced labour prior to delivery by caesarean section data relevant to the labour was collected. This data included the mode of labour onset, details of labour acceleration, duration of the first and second (if applicable) stages and information about any complications which developed during the intrapartum period.

All of the data was obtained directly from the obstetric case record (including the partogram and intrapartum cardiotocograph) and midwifery notes using all available information in order to minimise possible error and achieve consistency of interpretation of the facts.

For variables such as past medical history, antenatal complications, postnatal complications and reasons for caesarean section a list of categories was drawn up and given coding numbers. For each woman in the study population all the available information was examined and the details recorded at the appropriate point in the data collection form and then given the appropriate coding number. The coding information for these variables is included in Appendix 1.

Up to a total of three reasons for the performance of the caesarean section may be recorded on the operation notes. As stated above these were recorded and coded according to the prearranged schedule. Where more than one indication was recorded, the indications were not necessarily ordered in terms of priority. Therefore in order to assess the main reason for the performance of the operation where more than one was listed, the causal model and decision rules devised by Anderson and Lomas [153] was used. Further details of this model are given in Chapter 4.4 where the results are presented.

All of the coded information was entered on the University of Glasgow ICL 3980 computer and the data analysed using the Statistical Package for the Social Sciences (SPSSx).

2.3 : Sub-groups of Study Population

After the preliminary exploration of the data, further analysis was carried out on a number of sub-groups of the study population to see if the characteristics of women and their infants differed. The division of the study population into the various sub-groups is shown diagrammatically in Figure 2a.

The first comparison made was between

1. Women delivered by elective caesarean section (n=220)
2. Women delivered by emergency caesarean section (n=399)

The specific variables which were used to test this hypothesis were :

Maternal	**Infant**
Parity	Gestation at delivery
Number of caesarean sections	Sex
Number of perinatal deaths	Birthweight
Age	1 and 5 minute Apgar scores
Height	Resuscitation
Marital status	Admission to SCBU
Social class	Birth injury
Admission to hospital	Infant feeding
Length of postnatal stay	

In addition a number of variables related to the operative data were also considered. These included :

Operative
Month of caesarean section
Day of caesarean section
Time of surgery
Status of surgeon performing the operation
Type of anaesthesia employed
Indication for the performance of the caesarean section

The results of this analysis are presented in Chapter 5.1.

The next stage of the analysis examined the characteristics of women delivered by emergency caesarean section (n=399). From within this group, four distinct categories of emergency delivery emerged :

1. **Group A** was comprised of 42 women who were delivered by emergency caesarean section before the onset of labour.

2. **Group B** consisted of 109 women who were actually in labour at the time of caesarean section but were taken to theatre on admission to labour ward and therefore no labour data was available in the obstetric case notes or midwifery kardex for review. Forty eight (44%) of the women in this group were booked for elective delivery but went into labour before the scheduled date of surgery.

3. **Group C** contained 129 women with a labour duration of less than 12 hours

4. **Group D** comprised the 119 women delivered after a duration of labour which was equal to or greater than 12 hours

The variables used to test the hypothesis that differences exist in the characteristics of women between the four groups of emergency caesarean section were the same as those previously used for comparison of elective and emergency deliveries and the results are presented in Chapter 5.2.

The final comparison made was between :

1. Women delivered during the course of the first stage of labour (n=194)
2. Women delivered during the second stage of labour (n=54)

Again the same variables were used to test the hypothesis and the results are presented in Chapter 5.3.

2.4 : Analysis of Morbidity Data

Further analysis of the data was carried out to test the hypothesis that the timing of caesarean section influences the development of subsequent morbidity for both the woman and her infant.

Baseline data was obtained for the whole study population related to the operative and postoperative morbidity sustained and then comparisons were made between the subgroups of the study population as described in the previous section.

The specific variables which were used to test this hypothesis were :

Operative complications	**Post-operative complications**
Type of incision	Wound infection
Extension of incision	Intra-uterine infection
Anaesthetic difficulties	Urinary tract infection
Bladder trauma	Chest infection
Blood loss	Pyrexia > 38^0 Centigrade
Blood loss $\geq$ 500 mls	Urinary catheterisation
Intra-operative blood transfusion	Postnatal blood transfusion

The results of this part of the analysis are presented in Chapters 6 and 7.

2.5 : Postal Questionnaire

In order to document the short-term morbidity following caesarean section all women in the study group were sent a postal questionnaire three months after delivery. A total of 588 questionnaires were sent - 31 women were excluded either because they had experienced a perinatal loss or where the neonatal outcome was uncertain (cases of severe prematurity or fetal abnormality).

The objectives of this part of the study were :

1. *To examine the health of women after discharge from hospital and to describe the reported morbidity*
2. *To determine the womens' knowledge of the reasons for the performance of the caesarean section*
3. *To examine the health of infants since discharge from hospital*
4. *To describe infant feeding practices*

The women's study number from the first part of the study was used on the postal questionnaire in order to allow cross-referencing of the study numbers thus enabling non-respondents to be identified so that their characteristics could be examined to see if they differed materially from those who did respond.

The postal questionnaire was designed and amended slightly after a pilot study of the same women used for part 1. A copy of the actual questionnaire is contained in Appendix 2 along with the coding definitions used. The covering letter sent with the questionnaire stated that this was a study of the health of women and their babies three months after delivery and did not specify that only women delivered by caesarean section were being sent the form. Therefore the first question on the form asked what type of delivery the woman had and if it was anything other than spontaneous, why the operative delivery was necessary. Other questions asked if the woman had experienced wound pain or wound leakage after discharge from hospital and if so how long this had lasted for. The women were then asked if they had experienced any of a variety of listed problems since the delivery of the baby and if so at what stage either in hospital,

up to 4 weeks, up to 8 weeks or up to 12 weeks post-delivery. Provision was also made for complaints other than those listed to be recorded in a similar fashion. Any medications prescribed by the General Practitioner were also recorded. Other questions enquired if the woman now felt back to her normal self since the birth and if not to specify why. General states of happiness and healthiness at the time of filling in the form were also recorded. The last section of the questionnaire was concerned with infant health and feeding practices since hospital discharge. The women were also asked how they had planned to feed their babies before the birth and if this method was not the actual method employed they were asked to specify why. The women were also invited to make any comments they wished at the end of the form.

When the postal questionnaire was returned the answers were coded and recorded on a computer compatible format. The coding of answers was carried out by 2 examiners independently to ensure the validity of the coding. This was particularly important in the second question on the questionnaire where women were asked why their baby was delivered by caesarean section. The answer stated was compared with the reasons recorded in the obstetric case record and coded as being right, partially right, wrong, do not know or not stated. In the event there was no disagreement between the two examiners when the results of the independent coding were compared.

If women failed to reply within 3 weeks of the initial mailing then a second questionnaire was sent. The response to the initial mailing was 71% and after the follow-up of non-respondents, eventually a total of 444 replies were received, giving an overall response rate of 76%. As before the coded data was transferred to the University of Glasgow ICL 3980 and analysed using the Statistical Package for the Social Sciences (SPSSx).

2.6 : Study Control Group

The final part of the study compared a group of primigravidae delivered by emergency caesarean section with a closely matched group of primigravidae delivered vaginally.

Specific objectives of this part were to assess the effect of the delivery method on :

1. *The immediate, short-term and long-term morbidity experienced by the women*
2. *Women's views of the experience of labour and delivery on this occasion*
3. *The attitude of the women to future pregnancies*

A sub-group of 50 primigravidae who had unexpected caesarean sections during labour were selected from the main study population. Criteria for entry into this part of the study were that the women must be :

1. Primigravidae
2. Height greater than 152 cm
3. No major obstetric complications or risk factors
4. Age less than 35 years
5. Gestation between 37 and 42 weeks
6. Delivered by emergency caesarean section during labour
7. Giving informed consent to participation in the study

The 50 women were matched with a group of 50 primigravidae delivered vaginally. The control group were selected from the labour ward delivery register. The first woman delivered after a subject had entered into the study group and who met the same entry criteria as outlined above, except that vaginal delivery had occurred, was approached and asked to participate in the study.

Data for the study was collected from four sources :

1. The obstetric case record and midwifery notes
2. A structured hospital interview conducted on the 4th or 5th postnatal day
3. A postal questionnaire sent out 3 months following delivery
4. A semi-structured home interview conducted at 6 months

The first of these instruments was described in section 2.2 - although the proforma was altered slightly for women in the control group in order to obtain data relevant to the mode of delivery (Appendix 3). The postal questionnaire was also sent to all of the women three months after delivery and this achieved a response rate of 91%.

In addition the 100 women were interviewed in hospital by the researcher on the 4th or 5th postnatal day using a semi-structured questionnaire (Appendix 3). Where appropriate women in both groups were asked the same questions, however, again the questionnaire differed slightly for both the study and control groups to account for the differing delivery experiences of the women.

The data obtained from the hospital interview provided information on :

1. *Sources of information about pregnancy, labour and delivery*
2. *The women's feelings about the labour and delivery experience on this occasion*
3. *Problems experienced since delivery*
4. *Infant feeding practices*

The semi-structured format allowed the data to be coded and analysed by computer. As before when coding of an *'open'* response was required this was done independently by 2 people to ensure validity.

Permission was also sought at the time of recruitment into the study to contact the women at home 6 months after delivery in order to conduct a home interview. The purpose of this home interview was to allow a comparison of the women delivered by caesarean section with those delivered vaginally with regard to :

1. *Long term morbidity associated with the method of delivery*
2. *Women's views of their labour and delivery experience*
3. *Their views on future pregnancies*
4. *Sexual difficulties since delivery*
5. *Infant health and feeding practices since discharge*

A semi-structured format was used for the interview and a copy of the schedule and coding form is included in Appendix 3. All interviews were conducted by the researcher. The first part of the schedule asks general questions about the woman's health and any problems still being experienced since the birth of the baby. The second section examines the health of the baby and infant feeding and then goes on to enquire how long it took before the woman felt close to the infant and how enjoyable she found looking after the baby after coming home from hospital and again at the time of the interview. The third section asked the woman to reflect back on her experience of firstly labour and then delivery and allowed her to comment freely. These comments were analysed after the interview and categorised into similar sections. More detailed explanation is given in Chapter 10 where the results are presented.

As can be seen in the interview schedule rating techniques were used in several sections. This method is simple to operate in the field, demands little effort from the respondent and is more sensitive and informative than straight yes/no answers. A rating scale is however a single item and may be unreliable [149]. On each occasion when rating techniques were employed the women interviewed were encouraged to expand on their answer.

The last part of the interview explored some of the more sensitive issues and women were asked at what stage they had resumed intercourse and if any sexual difficulties had been encountered since delivery. They were also asked if the arrival of the baby had made any difference to the relationship with their partner and if so in what way. Another question asked if they planned a second baby and if so how long they intended to wait before embarking on another pregnancy. Finally the women were invited to state if the hospital could have done anything to improve their experience in the ante / intra / post natal periods.

2.7 : Statistical Methods Used in the Analysis

The Statistical Package for the Social Sciences (SPSSx) was used to analyse the data. This package allows any necessary recoding, transformation and exclusion of cases during the data analysis. After the data was coded and entered in to the computer, basic descriptive statistics were calculated for all of the variables and either histograms or barcharts were requested to check that the data were approximately normally distributed. When continuous variables (e.g height, age, birthweight) were compared between two groups, the two sample t-test was applied [158]. The default output from the independent t-test procedure in SPSSx displays the means, standard deviations, standard errors and counts of valid cases for each group. In addition, the degrees of freedom are given and two t-values - one based on the *pooled variance estimate* and one based on the *separate variance estimate* with the two-tailed probabilities for each. A variance ratio (*F* test) with its probability value is also given. This test compares the variances of the two samples to determine whether these variances are significantly different. If the *F* value was significant (i.e. less than 0.05) then the t-value calculated from the *separate variance estimate* and probability was used and if the *F* value was not significant then the *pooled variance estimate* and probability was applied [159]. When continuous variables were compared between two groups then the 95% confidence interval for the difference between the two population means was also calculated [160].

To compare the group means of continuous variables within the four groups of women delivered by caesarean section, the SPSSx procedure ONEWAY (analysis of variance) was used. One-way analysis of variance is an extension of the two sample t-test and allows simulataneous comparison of more than two population means [158]. In analysis of variance, the observed variability in the sample is subdivided into two components - variability of observations within a group about the group mean (*within-groups sum of squares*) and variability of the group means (*between-groups sum of squares*). From these two figures the F statistic is calculated as follows :

$$F = \frac{\text{Between Groups Mean Square}}{\text{Within Groups Mean Square}}$$

The observed significance level is than obtained by comparing the calculated F to values of the F distribution with $k-1$ (k is the number of groups) and $N-k$ (N is the number of cases in the entire sample) degrees of freedom. A significant F statistic only indicates that the population means are probably unequal and does not pinpoint where the differences are. Therefore *multiple comparison tests* are used to determine which population means are different from each other. In the present study *Scheffe's* method was used for pairwise comparison of the means and the level of significance employed was 0.05 [158].

For categorical variables the Chi-squared (X^2) test for independent samples was used in the analysis. The conventional criterion for the test to be valid is that at least 80% of the expected frequencies exceed 5 and that all the expected frequencies exceed 1 [161]. If this condition was not met, then categories within the tables were combined to raise the expected values before the test statistic was applied. Where appropriate this is indicated in both the text and tables.

2.8 : Limitations of the Study

The major limitation of the review of the obstetric case record and midwifery notes was that it was dependent on the accuracy and completeness of the information contained within the sources used. The emphasis of the present study was to examine the outcomes of caesarean delivery and, especially with regard to the recording of postnatal complications, it was apparent that a large number of medical and midwifery staff were responsible for entering information into the case notes and problem-orientated midwifery record. As discussed in the literature review, definitions of morbidity lack uniformity and it was not possible to check the validity and reliability of the information recorded. Therefore in the examination of morbidity data it was decided to limit the analysis to those variables which could be uniformly defined.

2.9 : Definition of Terms

A number of terms are used throughout the thesis which require further definition :

Elective caesarean section

A planned operation with no evidence of labour or membrane rupture present.

Emergency caesarean section

An emergency operation with evidence of labour and/or membrane rupture or, in the absence of these two criteria, where the interval between the decision to perform the caesarean section and the actual surgery was less than 8 hours (e.g. fetal distress, antepartum haemorrhage).

Recorded indications for caesarean section

The indications actually cited by the obstetrician on the operation notes for the performance of the operation.

Dystocia

Before the application of the causal model and decision rules devised by Anderson and Lomas to assign deliveries which utilised multiple indications to a single diagnostic class, any cases with recorded indications for caesarean delivery of cephalopelvic disproportion, failed trial of forceps, failure to progress in either the first or second stages of labour or failed induction of labour were recoded and assigned to the diagnostic class of dystocia.

Postnatal pelvimetry result

The comment recorded on the report form by the consultant radiologist responsible for examination of the X-ray pelvimetry film. This either stated that the pelvis was apparently normal, that one or more of the pelvic dimensions appeared to be contracted or that there was doubt as to the adequacy of the pelvis.

Primary postpartum haemorrhage

Blood loss $\geqslant$ 500 mls occurring within the 24 hours following delivery.

Pyrexia

A recorded maternal temperature of > 38^0 Centigrade of more than 24 hours duration, excluding the first 24 post-operative hours.

Infection

Confirmed infection was only recorded when a positive bacteriological culture from an appropriate specimen was obtained.

Urinary catheter

A self-retaining Foley bladder catheter left in-situ following delivery.

Chapter 3

Comparison of Hospital Population

Chapter 3 : Comparison of Hospital Population

Glasgow Royal Maternity Hospital is a large university teaching hospital which serves the population of the East End of Glasgow. The hospital also acts as a high risk referral centre for the West of Scotland and houses a regional neonatal intensive care unit. The Greater Glasgow Health Board serves a population of one million and in 1984 its five maternity hospitals delivered 14936 women. Each hospital provides a service primarily for its own catchment area but cross boundary flow does exist. The city has a high level of unemployment and areas of marked social deprivation and such problems are particularly marked in the Eastern district where a high proportion of the population are in the lower social classes. As stated in the methodology, the study population was all those women delivered by caesarean section during 1984. In order to compare the characteristics of the study population with those of the general hospital population for 1984 it was necessary to access data from the Scottish Morbidity Record (SMR_2).

The SMR_2 was introduced in Scotland in 1969 and was designed to extract data from hospital maternity case records for computer storage and subsequent analysis. It has seven major sections [150] :

1. *General identification and personal data*
2. *Past obstetric history*
3. *General details of the current pregnancy, including provision for recording details of an abortion*
4. *Maternal discharge data*
5. *Record of the labour with its outcome*
6. *Minimal details of the care required by the infant , including provision for recording the cause of perinatal death*
7. *Diagnostic data about the mother*

An SMR_2 form is completed on discharge for all admissions to Scottish maternity hospitals. Only one form per pregnancy contains details of the delivery, and it was this form which was selected from the computer file for this study. Although completion of the SMR_2 is not a statutory requirement, in Glasgow Royal Maternity Hospital approximately 99% of

deliveries will have an SMR_2 filed. Correctness when completing the SMR_2 depends on factors such as the accuracy with which the variables can be defined by clinical staff; the ease with which information can be extracted from the case notes; the quality of the original clinical notes and the training of the staff within the Records Department who complete the form.

According to the available SMR_2 information, 3952 women were confined in Glasgow Royal Maternity Hospital during 1984 resulting in the birth of 3994 infants. Forty of the pregnancies were multiple (38 twin and two triplet) and the perinatal loss for 1984 was 47 infants, which gave a perinatal death rate of 11.7 per 1000.

Of those women delivered in the hospital, 1757 (44.5%) were primigravidae and 2195 (55.5%) were multigravidae. In this latter group 346 women had previously experienced delivery by caesarean section.

The mode of delivery was recorded on the SMR_2 for all of the infants except the two triplet pregnancies and can be seen in Table 3a. The overall percentages of spontaneous vertex, forceps, breech and caesarean section deliveries were 67, 16, 1 and 16 respectively. There were significant differences in these rates for primigravidae and multigravidae as can be seen in the same table, with more primigravidae than multigravidae requiring operative vaginal delivery ($p < 0.001$).

Of those women previously delivered by caesarean section (n=346), 204 (59%) were again delivered by the same method. One hundred (29%) achieved a spontaneous vertex delivery, 41 (12%) were delivered by forceps and one woman had a breech extraction.

A number of maternal and infant variables were extracted from the SMR_2 data tape for Glasgow Royal Maternity Hospital in 1984 and examined to see if any statistically significant differences

existed between women delivered by caesarean section and those delivered vaginally and it is these results that are presented in this chapter. In the analysis primigravidae and multigravidae were considered separately to enhance the relevance of the data obtained.

3.1 : Maternal Demographic Characteristics

The mean age of both primigravidae ($p < 0.0005$) and multigravidae ($p < 0.0005$) delivered by caesarean section was significantly greater than for those delivered vaginally. This resulted in different distributions of primigravidae in the various age-group categories with an increased proportion of those delivered by caesarean section aged 35 years or over and similarly a smaller proportion aged under 18 years ($p < 0.01$). These results are shown in Table 3.1a.

When the mean height was examined again both primigravidae ($p < 0.0005$) and multigravidae ($p < 0.0005$) delivered by caesarean section were significantly shorter than women delivered vaginally. A significantly greater proportion of both primigravidae ($p < 0.001$) and multigravidae ($p < 0.001$) in the caesarean group were less than 155 centimetres tall (Table 3.1b).

Tables 3.1c and 3.1d show some of the other demographic characteristics of the women confined during 1984. A significantly higher proportion of primigravidae delivered by section were married at the time of delivery when compared with those delivered vaginally ($p < 0.001$), however, the mean age of the women in this group was also significantly greater and this may have been the reason for this variation between the two groups. One factor which should be mentioned is that of those primigravidae delivered in Glasgow Royal Maternity Hospital, 28% were single. This proportion of unmarried primigravidae was the highest of all the Glasgow Maternity Hospitals in 1984 (GGHB Maternity Statistics, 1984).

With SMR_2 data, social class is derived by coding the occupation of the husband (or the woman herself in the case of the unmarried) and these occupations are subsequently grouped into the

five social classes with an extra category for *other* or not known. Coding of occupation to obtain social class groupings is difficult due to lack of precise detail related to occupation and often if stated as *unemployed*, then there is no information about the last occupation [150]. Although the accuracy of this data is limited because of the large proportion of women in the category of *other / not known*, there was a significantly greater proportion of both primigravidae ($p < 0.001$) and multigravidae ($p < 0.025$) delivered by caesarean in social classes I, II and III when compared with those delivered vaginally.

Of those multigravidae delivered by caesarean section, 204 had previously been delivered by this method. In this group of women 138 (41%) had a history of one caesarean, 61 (18%) had two previous sections, 4 (1.2%) had had three and one woman had been delivered abdominally on four occasions. In the group of multigravidae delivered vaginally, 142 women had a past history of caesarean section (Table 3.1e) and in this pregnancy 100 delivered spontaneously, 41 women were delivered by obstetric forceps and one woman had a breech extraction.

Table 3.1f shows the number of multigravidae in the hospital population with a past history of perinatal death and it can be seen that a significantly higher proportion of the group eventually delivered by caesarean section had experienced a previous perinatal loss ($p < 0.001$).

3.2 : Data Related to Pregnancy

Amongst the primigravidae, a higher proportion of women in the caesarean group (47.3% versus 38.9%) were admitted to hospital on at least one occasion during the antenatal period ($p < 0.01$). However, when the actual number of admissions was examined (Table 3.2a) there were no significant differences between the groups of women for this variable.

A significantly higher proportion of multigravidae delivered vaginally had labour induced ($p < 0.001$) although no apparent difference for this variable was detected amongst primigravidae

(Table 3.2b). The overall rate of induction for primigravidae was higher than that for multigravidae.

For the hospital population overall, 3636 women (92%) delivered their infants at term and the remaining 8% delivered before 37 completed weeks of pregnancy. There were, however, significant differences between the parity and delivery groups as shown in Table 3.2c. The mean gestation period for both primigravidae ($p < 0.0005$) and multigravidae ($p < 0.0005$) delivered by caesarean was significantly shorter than for those women delivered vaginally and a significantly greater proportion of the infants delivered by section were at less than 37 weeks completed gestation at the time of delivery ($p < 0.001$).

3.3 : Comparison of Infant Characteristics

The mean birthweights of the infants is shown in Table 3.3a , with the ranges and standard deviations. No significant difference was detected between the groups of primigravidae but the mean birthweight of infants delivered vaginally to multigravidae was significantly greater than for those delivered by caesarean section ($p < 0.0005$). A significantly greater proportion of infants delivered by caesarean section in both parity groups weighed less than 2500 grams at birth ($p < 0.001$) as can be seen in the same table.

Table 3.3b shows the number of singleton infants whose birthweights fell below the 10th centile or above the 90th centile for their gestational age. These values were obtained from the centile values of birthweight for gestational age in Scottish infants [151] and were controlled for the sex of the infant. Of those singleton infants delivered to primigravidae a significantly greater proportion of both male ($p < 0.001$) and female ($p < 0.05$) infants had birthweights above the 90th percentile for gestational age.

Table 3.3c shows the infant outcome after delivery and no significant differences were apparent between comparable groups. The overall perinatal mortality rate for Glasgow Royal Maternity

Hospital in 1984 was 11.7 per 1000. The rate associated with vaginal deliveries was 11.6 per 1000 compared with 12.9 per 1000 for caesarean sections.

A significantly higher proportion of the infants born to primigravidae by caesarean section had an Apgar score of less than 7 at 5 minutes ($p < 0.005$) and infants born by section were more likely to require admission to the Special Care Baby Unit - $p < 0.001$ (Tables 3.3d and 3.3e).

3.4 : Length of Postnatal Stay

As might be expected caesarean delivery also resulted in a significantly longer stay in hospital for women delivered by this method. In primigravidae the mean postnatal stay was increased by 2.88 days ($p < 0.0005$) and in multigravidae by 3.92 days ($p < 0.0005$) as shown in Table 3.4a.

Summary

In testing the hypothesis that the characteristics of women delivered by caesarean section differ from those of women delivered vaginally, it was found that both primigravidae and multigravidae in the former group were older, shorter and a higher proportion were less than 155 centimetres tall.

A higher proportion of primigravidae in the caesarean group were married at the time of delivery and although the accuracy of the data related to social class was limited, more women delivered by section belonged to social classes I, II and III.

Of the 346 multigravidae in the hospital population with a past history of caesarean delivery, 204 (60%) were again delivered by the same method.

The mean gestation period at delivery was shorter for women delivered by caesarean section and a higher proportion delivered before 37 completed weeks of pregnancy (16.7% versus 6.4%).

The perinatal mortality rate for vaginal deliveries was 11.6 per 1000 compared with 12.9% for the caesarean group.

A higher proportion of infants delivered by section weighed less than 2500 grams at birth (17.4% versus 6.7%) and a greater proportion weighed more than the 90th centile for gestational age (15.5% versus 10.0%). Infants in this group were also more likely to require admission to SCBU (21.0 versus 6.2%).

Caesarean delivery also resulted in a longer postnatal stay in hospital. For primigravidae the average length of stay was increased by 2.88 days and for multigravidae by 3.92 days.

Chapter 4

General Overview of Study Results

Chapter 4 : General Overview of Study Results

In 1984, 619 women were delivered by caesarean section in Glasgow Royal Maternity Hospital resulting in the birth of 635 infants. This figure differed from the SMR_2 data which showed that 604 women were delivered by caesarean section. This, however, is probably related to the fact that SMR_2 data is coded according to the date of discharge from hospital rather than from the actual date of delivery. As might be expected the data collected from the obstetric case notes for the purposes of the study was more complete than that obtained from the SMR_2 tape and therefore all results now presented are those obtained specifically for the study.

Of the 619 women in the study population, 274 (44%) were primigravidae and 345 (56%) were multigravidae so the proportions of each did not differ significantly from that of the general hospital population. Of the multigravidae, 220 women (64%) had previously delivered by caesarean section. Table 4a shows the distribution of marital status, social class and race for the study population. No significant differences were found between the two groups of multigravidae in the study population for these variables.

Table 4b shows the age and height distribution for the study population. The only significant difference found between the two groups of multigravidae was that a higher proportion of those with a past history of caesarean delivery were less than 155 centimetres ($p < 0.05$).

4.1 : Medical and Obstetric History

The relevant past medical history of the women in the study population was recorded and coded according to a prearranged schedule. The main categories of history recorded are shown in Table 4.1a. The most common category recorded was that of short stature i.e. height less than 155 centimetres. In total 159 women (25.7%) met this definition of short stature, compared with only 15.6% of women delivered vaginally in the general hospital population for 1984.

Seventy five women (12.1%) had a past history of either renal disease, renal abnormality or recurrent urinary tract infection prior to the onset of pregnancy.

A total of 46 women (7.5%) had a history of previous psychiatric illness including puerperal psychosis. Three of these women were alcohol abusers and a further 2 were intravenous drug misusers.

Seven women in the study population had experienced more than two spontaneous or therapeutic abortions and 10 of the women had had one or more perinatal deaths.

Fourteen (2.3%) of the women had experienced previous gynaecological surgery other than caesarean section. The surgical procedures carried out on women in this group ranged from pelvic floor repairs to myomectomy and cervical surgery. Another 9 women (1.5%) had other gynaecological disease or a known abnormality of the reproductive tract.

Small numbers of women had other relevant past medical history recorded which may have influenced the decision to perform a caesarean section eg diabetes mellitus (7 women), cardiac disease (9 women), rhesus iso-immunisation (4 women).

Any problems which developed during the antenatal period were also recorded and coded, as were any admissions to hospital during this time. Table 4.1b shows the number of admissions to hospital for the total study population and then the number of admissions by parity. It was interesting to note that multigravidae previously delivered by caesarean section had the fewest number of antenatal admissions ($p < 0.025$).

Common antenatal problems which occurred in the study population are shown in Table 4.1c. As expected a wide variety of other problems were experienced by small numbers of women. These ranged from problems arising from the past medical history eg cardiac disease, diabetes

mellitus to those directly related to the pregnancy itself eg polyhydramnios, intra-uterine growth retardation, intra-uterine infection. For a few women the antenatal period was complicated by conditions unrelated to either of these 2 categories eg cholecystitis which resulted in a cholecystectomy, appendicitis resulting in an appendicectomy and pancreatitis.

4.2 : History of Previous Caesarean Delivery

Two hundred and twenty of the multigravidae had previously experienced delivery by caesarean section. In this group 155 (70%) women had had 1 previous section, 60 (27%) had had 2 previous sections, 4 (2%) had 3 sections and 1 woman had an history of 4 previous abdominal deliveries. The reasons for the previous caesarean sections were recorded and coded.

Table 4.2a shows the main reasons for the first caesarean section taking place as recorded in the obstetric case-notes. The most common indication was that of cephalopelvic disproportion (35.5%) followed by failure to progress in labour (18.6%). If these 2 categories are combined then 54.1% of previous first caesarean sections were performed for dystocia. Fetal distress accounted for 17.3% of first sections and fetal malpresentations for 11.8%. In this latter category the majority were due to breech presentation of the fetus. A variety of other indications were also recorded and these accounted for 16.8% of first caesarean deliveries. The reasons given in this category included multiple pregnancy, severe pregnancy induced hypertension, placenta praevia, cord prolapse and rhesus iso-immunisation.

In the 60 women who had previously experienced 2 caesarean deliveries then the most common indications for the performance of the second section were previous caesarean delivery or cephalopelvic disproportion. These 2 categories accounted for 83.3% of repeat abdominal deliveries. In the 5 women with three or more previous caesarean sections then the 2 categories mentioned previously were documented in all cases as the reason for the third operation.

Irrespective of the indication for the performance of a caesarean section in Glasgow Royal Maternity Hospital, if a woman has experienced two or more abdominal deliveries then a repeat section would be considered mandatory in a subsequent pregnancy. Therefore, further analysis of the data was restricted to those women who had previously experienced only 1 previous caesarean section (n=155).

In this group of women a trial of labour would not have normally been considered appropriate if the indication for the first section met with one of the following criteria :

1. Cephalopelvic disproportion with contracted pelvimetry
2. Cephalopelvic disproportion with doubtful pelvimetry
3. Failed trial of forceps delivery
4. Other indication with contracted pelvimetry

or that the woman had an :

5. History of uterine surgery in addition to caesarean section
6. History of cervical/uterine abnormality

Of the 155 women, 72 (46.5%) had either been previously sectioned for one of the first 4 indications or met with one of the other two criteria. Elective sections were planned for 66 of the women and 6 were allowed a trial of labour. All six women were reported as having one or more contracted pelvic dimensions radiologically by a consultant radiologist. In one case the patient was extremely keen to be allowed a trial of labour despite the fact that the previous section had been carried out for cephalopelvic disproportion and she was only 140 centimetres tall. The consultant agreed to allow a short trial of labour which eventually lasted for 4 hours before caesarean section was again performed for cephalopelvic disproportion. In another case which involved a woman of 145 centimetres with a pelvic bispinous diameter of 8.8 centimetres who had been sectioned previously for cephalopelvic disproportion - the pregnancy on this occasion was multiple and premature labour had repeatedly threatened. The consultant in charge of the case had left specific written instructions in the case notes that if labour became established then caesarean section was to be carried out immediately. The woman did start in labour and the

on-call registrar decided to allow a trial of vaginal delivery. The labour lasted for 6 hours before signs of cephalopelvic disproportion became apparent and abdominal delivery was carried out.

In the 6 women allowed a trial of labour, the mean length of labour was 6.6 hours (SD 2.8, range 4-11 hours) and cephalopelvic disproportion was mentioned as one of the indications for delivery in all cases.

Of the remaining 83 women with a past history of one caesarean section, where trial of labour might have been considered, in only 33 cases was this permitted. In 2 women cervical priming with Prostaglandin E_2 failed to *'ripen'* the cervix prior to induction of labour and both women were re-sectioned before the onset of labour. In a further case marked fetal distress became apparent on the cardiotocograph after cervical priming and again the decision was taken to re-section before the onset of true labour.

Therefore in total 30 women actually experienced labour prior to the repeat section being carried out. The mean height of the 30 women was 160.6 centimetres (SD 4.8, range 151-170 cm) and only 3 women were less than 155 cm tall. In total 53% of the labours were induced and the average gestation period was 39.5 weeks. The mean length of the first stage of labour was 9.9 hours (SD 3.7, range 4-20 hours). Seven women reached the second stage of labour and in these women the mean duration of this stage was 170 minutes (SD 84, range 54-309 minutes).

In two cases, women went into labour with an undiagnosed breech presentation. In one, the diagnosis was made half way through labour and a decision was made to deliver immediately by caesarean section. In the other, labour was induced with vaginal Prostaglandin E_2 pessaries and despite repeated vaginal examinations, the breech presentation was only diagnosed at full dilatation of the cervical os when the breech was at the level of the ischial spines. The registrar decided to deliver by section, an extremely difficult operative delivery ensued, where the patient

sustained an 8 centimetre bladder tear which required to be repaired by an urologist. The blood loss was large (1750 mls) and blood transfusion was required.

Eighteen (60%) of the remaining 28 women were subsequently sectioned due to the past history of caesarean delivery. Seven (23.3%) for cephalopelvic disproportion (including 2 failed trial of forceps deliveries), 2 (6.7%) for uterine rupture and in one case the indication recorded was fetal distress (Table 4.2b).

The mean birthweight of infants born to the women was 3605 grams (SD 623, range 2520-5450 grams) and 8 of the babies weighed more than 4000 grams at birth.

Thus 50 women with an history of one previous caesarean delivery for a non-recurring reason were not considered suitable for a trial of labour. All of the pregnancies were at term (i.e. greater than 37 weeks) at the time of delivery and the mean height of the women was 160 centimetres (SD 7.3, range 145-174 centimetres). Table 4.3c documents the indication recorded on the operation notes for the performance of the abdominal delivery on this occasion and it can be seen that in 25 cases the decision to section appears to have been made on the past history of caesarean section alone.

From the available SMR_2 data for Glasgow Royal Maternity Hospital in 1984 (Chapter 3), 346 women in the general hospital population had previously been delivered by caesarean section and 142 (41%) achieved vaginal delivery. Of those women who were allowed a trial of labour (142 + 36 from the study population, n=178) then 79.8% actually achieved the objective.

4.3 : Operative Data

Although the overall rate of caesarean section in Glasgow Royal Maternity Hospital was 16% in 1984, the proportion of women delivered by this method varied when broken down by months of the year, although this did not reach statistical significance. Thus, as can be seen in Table 4.3a,

10.4% of all births were by caesarean section in February compared with 19.1% in December. The same table also shows the percentage incidence of normal, forceps and breech deliveries for each month of 1984.

Table 4.3b shows the type of caesarean section crosstabulated by parity. Three hundred and ninety nine (64.5%) of the operations were primary caesarean sections and the remaining 220 (35.5%) were repeat sections. Of the primigravidae in the study population (n=274), for 67 women (25%) the decision to deliver by caesarean section was taken prior to the onset of labour. The most common reason for this decision being made was the presence of a breech or other fetal malpresentation. A further 17 (6%) primigravidae had an emergency caesarean section performed before the onset of labour either due to concern for the maternal or fetal condition.

Of the multigravidae in the study population with no previous history of caesarean delivery (n=125), 34 (28%) women were scheduled to have elective operations performed and 18 (14%) women had an emergency section before the onset of labour. As with the primigravidae the most common reason for elective caesarean delivery was fetal malpresentation.

In contrast, of those multigravidae previously delivered by caesarean section (n=220), the decision for a planned repeat caesarean section was made prior to the onset of labour in 168 (76%) cases. A further 7 women (3%) in this group were delivered as an emergency prior to the onset of labour.

Of the 619 caesarean sections carried out in 1984, 97 (15.7%) were performed by consultant obstetricians, 36 (5.8%) by senior registrars and 486 (78.5%) by junior obstetricians.

Tables 4.3c, 4.3d and 4.3e show the status of the surgeon performing the section crosstabulated by the month of year, day of week and time of operation respectively. Significant differences were found between the grades of obstetricians for all of these variables. It was not clear why

consultant obstetricians performed more operations in certain months of the year ($p < 0.005$), as the months when this occurred did not coincide with either the change-over of junior staff or an excess of elective sections. Obstetricians of consultant and senior registrar status performed fewer operations on Saturdays and Sundays ($p < 0.001$) and consultants operated more frequently between the hours of 08.01 and 16.00 hours ($p < 0.001$), both of which are probably related to the fact that senior obstetricians carried out more elective surgery than registrars (see Chapter 5).

Regarding anaesthesia for surgery, analysis of the data showed that 148 (23.9%) sections were carried out under general anaesthesia, 461 (74.5%) under regional anaesthesia and in 10 (1.6%) cases regional anaesthesia was subsequently combined with general anaesthesia when it became apparent during surgery that the regional block was inadequate. In the majority of cases, general anaesthesia appeared only to be employed where it was thought necessary to effect rapid delivery of the baby e.g. in cases of severe fetal distress, cord prolapse, placental abruption and severe pregnancy induced hypertension.

The mean blood loss sustained at operation was 487 mls (SD 491, range 75 - 6500 mls). Seventy two (11.7%) women were sterilised at the time of operation, 108 (17.5%) had a sub-rectus drain inserted at the end of the procedure and 98 (15.8%) were left with an indwelling urinary catheter at the end of surgery.

4.4 : Indications for Caesarean Section

Up to a total of three reasons for the performance of a caesarean section may be recorded on the hospital operation notes. These were noted on the data form and coded according to a prearranged schedule. In the study population one reason was recorded in 216 (34.9%) cases, two reasons were specified in 263 (42.5%) of cases and in the remaining 140 cases (22.6%) the maximum number of three indications was documented.

Where more than one indication was recorded, the reasons were not necessarily recorded in terms of priority. Therefore, in order to compare the indications for caesarean delivery in each category it was decided to apply the causal model and decision rules devised by Anderson and Lomas [153], in consultation with obstetricians, to assign multiple indications to a single diagnostic class. This model was used to analyse caesarean deliveries in Ontario for the period 1979 to 1980 and was subsequently adopted by Taffel et al [31] in the analysis of United States data for 1980-85.

Using the model in cases of multiple indications, assigns deliveries in which one of the diagnoses was previous caesarean delivery to the category *previous caesarean section*; cases having a diagnosis of breech presentation with either fetal distress, dystocia or both are assigned to the category *breech* (recognising breech presentation as a cause of both dystocia and fetal distress); cases with both the diagnosis of dystocia and fetal distress are assigned to *dystocia* (recognising dystocia as a cause of fetal distress); cases with a diagnosis of fetal distress are then assigned to the category of *fetal distress* only when none of the other three categories appear in the notes; cases with none of the above four indications are assigned to the category of *other*.

It must be stressed that this model does not take into account the validity of the indications actually cited on this occasion and is therefore dependent on the accuracy of data contained within the clinical case record.

Using the above model, for the whole study population the most common single indication for caesarean delivery was that of previous caesarean delivery (209 cases - 33.8%). The next most common diagnostic category was dystocia which included diagnoses of cephalopelvic disproportion, failure to progress in labour, failed trial of forceps delivery and failed induction of labour (142 cases - 22.9%). Breech presentation of the fetus accounted for 127 cases (20.5%) and fetal distress for 63 (10.2%). The remaining 78 cases (12.6%) were classed as *other* and

included indications such as severe pregnancy induced hypertension, eclamptic fits, placenta praevia, fetal malpresentations other than breech etc.

When the main reason for the performance of caesarean section was broken down by parity (Table 4.4a), then distinct differences were apparent in the order of priority. In primigravidae the most common indication was dystocia (43.8%), followed by breech presentation (28.4%), fetal distress (13.9%) and other indications (13.9%). In multigravidae with no previous history of caesarean delivery the most common reason was breech presentation (36.8%) followed by fetal distress (18.4%), dystocia (15.2%) and other indications accounted for the remaining 29.6% of the sections performed in this group. In contrast, in the last group of multigravidae with a past history of caesarean section the most common indication for the operation on this occasion was a history of previous caesarean section (95.0%), breech presentations (1.4%), fetal distress (0.8%) and other indications were responsible for the remaining 1.4%.

As stated previously up to three possible indications for the performance of the operation could be recorded on the operation sheet and therefore it should be noted that although, for example, fetal distress was the main indication for section in 13.9% of primigravidae, it was in fact mentioned as part of the reason for the operation in 29.9% of this group. Similarly, dystocia was the main indication for 43.8% of primigravidae, although overall it was mentioned in 62.0% of the cases. Table 4.4b shows the frequencies of the most common indications mentioned for both the total study population and the different parity groups.

4.5 : Postnatal Data

The mean length of stay in hospital after delivery was 8.2 days, however, the range and standard deviations were large (1-93 days, 4.8 days). The 10th and 90th centile values for this variable were 6 and 10 days respectively which gives a better indication of the spread.

As can be seen in Table 4.5a, 93% of the women remained in hospital for 10 days or less following caesarean delivery. Care after this time was undertaken by the community midwives and women were usually followed up at home until the 14th postnatal day. The nature and duration of postnatal problems experienced by the women in the study population are discussed in Chapter 7.

In total 223 (36%) women attempted to breast feed after delivery. As can be seen from Table 4.5b the percentage of primigravidae who attempted this method of feeding was significantly higher than in multigravidae ($p < 0.01$). Data was also obtained on the number of women still breast feeding at the time of discharge from hospital (Table 4.5c). On leaving hospital the number of women still breast feeding was reduced to 159 (26%) and this reduction was most marked amongst the primigravidae.

After caesarean delivery postnatal X-ray pelvimetry was carried out on 237 women from the study population. Of those women examined 210 (77%) were primigravidae. The reported results of the radiological examination stated that 134 women (56%) had apparently normal pelvic dimensions and architecture, in 85 women (36%) one or more of the pelvic diameters appeared to be contracted and in the remaining 18 women (8%) there was doubt on the X-ray as to the adequacy of the pelvic size.

All women in Glasgow Royal Maternity Hospital have a venous sample of blood taken off on the third postnatal day for haemoglobin estimation. In the study population the mean haemoglobin level at this time was 11.5g with a range of 6.1-15.4g and a standard deviation of 1.44.

4.6 : Neonatal Data

Of the 619 women in the study population, 16 had multiple pregnancies so in total 635 infants were delivered by caesarean section. Of these pregnancies 97 (16%) were delivered before 37

completed weeks of gestation (106 infants) and the remainder delivered at term. The mean gestation period was 38.3 weeks (range 27-42 weeks).

Three infants were stillborn, in two cases the fetal heart was thought to be present before delivery was effected by the abdominal route and in the other, the woman had had two previous caesarean deliveries which necessitated a further operative delivery. No major fetal abnormalities were found at post-mortem in these infants and in all cases death was attributable to intra-uterine asphyxia.

One hundred and nine infants (17%) had Apgar scores of less than 7 at one minute and in 15 (2%) cases the Apgar score remained below 7 at five minutes. One hundred and twenty eight (20%) of the babies required active resuscitation i.e. other than 2^{o} oro-pharyngeal suction and the resuscitative requirements are shown in Table 4.6a. It was thought necessary to admit 127 infants (20%) to the Special Care Baby Unit - the remainder either went straight to the ward nursery from theatre or after a short period of observation in SCBU (Table 4.6b). The main reason for admission was prematurity (57%) and the other indications are documented in Table 4.6c.

The mean birth weight of the 635 infants was 3168 grams (range 750-5600, SD 742) with the 10th and 90th centiles falling at 2108 and 4020 grams respectively.

Utilising the Centile Values of Birthweight for Gestational Age in Scottish Singleton Infants [151] for the 603 singleton infants in the study, 49 infants (8%) had birthweights below the 10th centile and 91 infants (15%) had birthweights greater than the 90th centile. This data can be seen in Table 4.6d where results are also given when birthweight was controlled for the sex of the infant.

In addition to the three stillbirths previously described, a further 7 infants died in the first week after birth, giving a perinatal mortality rate of 15.7 per 1000. This figure differed considerably from the rate of 12.9 per 1000 obtained from analysis of SMR_2 data. One other infant died in the post-neonatal period. Six of the deaths were associated with a lethal fetal abnormality and the remaining two were due to respiratory distress syndrome and sepsis/intra-ventricular haemorrhage (Table 4.6e).

In total 36 (5.7%) infants had some type of fetal abnormality although there was obviously a marked difference in the severity of these (Table 4.6f).

Sixteen infants (2.5%) sustained some form of birth injury. Eight of these cases were associated with accidental damage with a scalpel causing a laceration. Another 7 babies suffered bruising or developed a cephalhaematoma and one infant had a facial palsy which was still present 6 months after delivery at the time of home interview (Table 4.6g).

Summary

The study population was comprised of the 619 women delivered by caesarean section in GRMH during 1984. Sixteen of the women had multiple pregnancies so a total of 635 infants were born by section. Two hundred and seventy four of the women (44%) were primigravidae and the remaining 345 (56%) were multigravidae. In this latter group 220 women had previously been delivered by caesarean section.

Of the 220 repeat sections, 155 (70%) occurred in multigravidae with a past history of one caesarean delivery. In this group of 155 women, only 36 were allowed a trial of labour before eventual surgical delivery. In a further three women cervical priming was carried out but in two cases this failed to *'ripen'* the cervix and in the remaining case marked fetal distress became apparent soon after the procedure and all of the women were re-sectioned before the onset of labour.

Elective caesarean delivery was planned for 269 women, although in 49 cases the onset of labour occurred before the scheduled date of surgery and the operation was therefore classified as an emergency procedure. Of the 399 primary caesarean sections, 81 (20.3%) were classed as elective deliveries and 318 (79.7%) were emergency operations. In contrast of the 220 repeat sections, 139 (63.2%) were planned sections and 81 (36.8%) were emergency procedures.

Examination of the status of the obstetrician performing the operation revealed that 97 (15.7%) caesarean sections were carried out by consultants, 36 (5.8%) by senior registrars and 486 (78.5%) by registrars. Senior obstetricians (i.e. of consultant or senior registrar status) performed fewer operations at weekends and operated more frequently between the hours of 08.01 and 16.00 hours.

Regional anaesthesia was used in 74.5% of cases and general anaesthesia in 23.9%. In the remaining 1.6% regional anaesthesia was subsequently combined with general anaesthesia because of an inadequate block.

In only 216 (34.9%) cases was a single indication recorded for the performance of caesarean section. Therefore, the causal model and decision rules devised by Anderson and Lomas [153] was used to assign cases with multiple recorded indications to a single diagnostic class. Using this model the most common indication for the performance of the operation was previous caesarean section (33.8%). Dystocia accounted for 22.9%, breech presentation for 20.5%, fetal distress 20.5% and *other* indications (such as placenta praevia, eclampsia, severe pregnancy induced hypertension) accounted for the remaining 12.6%. When the main indication for the performance of the operation was crosstabulated by parity, then distinct differences were apparent in the order of priority of these categories.

The mean length of stay in hospital after delivery was 8.2 days. Thirty six percent of the women attempted breast feeding after delivery but by the time of discharge 64 women had discontinued this method leaving only 26% still breast feeding.

Postnatal X-ray pelvimetry was carried out on 237 women (210 primigravidae) and the radiologist's report stated that 56% of those examined had apparently normal pelvic dimensions, in 36% one or more of the pelvic diameters appeared to be contracted and in the remaining 8% there was doubt as to the adequacy of the pelvic size.

Sixteen women had multiple pregnancies so in total 635 infants were delivered by caesarean section. Sixteen percent of the pregnancies were delivered before 37 completed weeks of pregnancy (106 infants), 20% of the infants required active resuscitation and 20% were admitted to the Special Care Baby Unit.

Three infants were stillborn and a further 7 died in the neonatal period giving a perinatal mortality rate of 15.7 per 1000. One other infant died in the post-neonatal period. Sixteen infants (2.5%) sustained some form of birth injury, including 8 cases of accidental laceration by a scalpel at the time of surgery.

Chapter 5

Analysis of Sub-groups of Study Population

Chapter 5 : Analysis of Sub-Groups of Study Population

After the preliminary analysis of data obtained from the case-note review was carried out, the data was further explored to examine the characteristics within the various sub-groups of women delivered by caesarean section. The three major comparisons made were :

a. Women delivered by elective and emergency caesarean section
b. Women delivered by emergency caesarean section
c. Women delivered by emergency caesarean section during the course of the first stage of labour and those delivered during second stage

The findings of these analyses are presented in the three sections of the chapter.

5.1 : Elective versus Emergency Caesarean Sections

The variables used to test the hypothesis that the characteristics of women and their infants delivered by elective and emergency caesarean section differ significantly are stated in Chapter 2.3 of the Aims and Methodology. Of the 619 women in the study population, 220 (35.5%) were delivered by elective caesarean section and 399 (64.5%) were classed as emergency caesarean deliveries.

Maternal Characteristics

One of the most striking differences between the two groups was the parity distribution (Table 5.1a). Of the women in the elective group 54 (24.5%) were primigravidae compared with 220 (55.1%) of the women in the emergency group and this was statistically significant ($p < 0.001$).

Of the 166 multigravidae delivered by elective section, 139 women (83.7%) had previously experienced caesarean delivery compared with 81 (45.2%) in the emergency group ($p < 0.001$). Table 5.1b shows the actual number of previous caesarean deliveries crosstabulated by the type of caesarean section.

Table 5.1c shows the number of multigravidae in each group who had experienced previous perinatal loss and a significant difference was found between the groups ($p < 0.05$) with a higher proportion of women in the emergency group (14.5%) than in the elective group (7.2%) presenting with a history of perinatal loss.

The mean age of women in the elective group was significantly greater (27.65 versus 26.32 years) than that in the emergency group ($p < 0.002$; 95% confidence interval 0.48 to 2.18) as shown in Table 5.1d. When age was controlled for the effect of parity, however, no significant differences were found between comparable groups. No significant differences were found between the groups in the proportion of women < 18 years of age or > 35 years as shown in the same table.

No significant differences were found for either comparison of height or the proportion of women less than 155 centimetres between the groups as demonstrated in Table 5.1e.

Examination of marital status (Table 5.1f) revealed that more women in the elective group were married at the time of delivery than in the emergency group (93.6% versus 86.2%) and this reached statistical significance ($p < 0.005$). When marital status was controlled for parity no significant differences were apparent between equivalent groups. The distribution of social class is shown in Table 5.1g and no significant differences were found between the groups.

Eighty six women (39.1%) in the elective group were admitted to hospital during the antenatal period compared with 201 (50.4%) of those in the emergency group ($p < 0.01$). The actual number of admissions to hospital for women in the emergency group was also significantly greater ($p < 0.005$) as shown in Table 5.1h.

Operative Data

Tables 5.1i through 5.1k show the crosstabulation of elective and emergency sections by the month of the year, day of the week and time of operation respectively. The two types of caesarean delivery were equally distributed throughout the year, however, fewer elective sections were performed on Saturdays and Sundays ($p < 0.001$). In common with most hospitals, in Glasgow Royal Maternity Hospital where possible, elective sections are scheduled for weekdays when all back-up services are fully functional which may explain the difference between the groups. Analysis of the type of caesarean section by time of day it was performed revealed that almost 51% of the operations took place between 08.01 - 16.00 hours, however, marked differences were apparent between the groups with 98.2% of elective sections compared with 24.8% of emergency sections carried out during this time period ($p < 0.001$).

When the status of the surgeon performing the operation was analysed (Table 5.1l), again a significant difference was found between the groups, with 86.5% of emergency operations performed by junior obstetricians compared with 64% of the elective group ($p < 0.001$). More women in the emergency group were delivered under general anaesthesia (31.6% versus 10.0% ; $p < 0.001$ - Table 5.1m), but as stated in Chapter 4.3 this only appeared to be employed when rapid delivery of the infant was required.

Indications for Caesarean Section

Applying the same diagnostic model [153] as described in Chapter 4.4 for deliveries with multiple indications, in the group of 220 women delivered by elective caesarean section, two categories - previous caesarean section and breech presentation - accounted for 90.9% of the deliveries (Table 5.1n). However, in the emergency group, the most common indication was dystocia (35.6%) followed by previous caesarean section (17.8%), breech presentation (16.3%), fetal distress (15.5%) and other indications accounted for the remaining 14.8%. The wide range of indications which fell into the category of *other* is shown in Table 5.1o.

In only 84 (38.2%) of the elective cases and 132 (33.1%) of the emergency deliveries was a single indication for the performance of the operation given on the operation notes and Table 5.1p shows the frequencies of the most common indications mentioned for the two groups.

Postnatal Data

Emergency caesarean delivery was not found to be associated with a significant increase in the mean length of postnatal stay in hospital (Table 5.1q). No significant differences were found in the proportion of women who initiated breast feeding and those who were still feeding by this method at the time of hospital discharge between the groups (Table 5.1r).

Neonatal Data

Four of the pregnancies in the elective group were multiple resulting in the birth of 224 infants. Twelve such births occurred in the emergency group so a total of 411 infants were delivered to the 399 women. The three stillbirths all occurred in women delivered by emergency section.

Table 5.1s shows the mean gestation period at delivery and the number of pregnancies terminated before 37 completed weeks of gestation for the two groups of women. The mean gestation period was greater in the elective group ($p < 0.001$; 95% confidence interval 0.149 to 1.01 weeks) and the proportion of women delivering before 37 weeks gestation was significantly smaller - 1.8% in the elective group versus 23.6% in the emergency group ($p < 0.001$).

An interesting difference arose when the sex of the infants born to the women in the two groups was compared (Table 5.1t). Fewer male infants were born to women in the elective group and this reached statistical significance ($p < 0.005$).

Infants born to women in the elective group were significantly heavier than those born in the emergency group ($p < 0.0001$; 95% confidence interval 70.7 to 308 grams) and a higher proportion of the infants in the emergency group weighed less than 2500 grams at birth ($p <$

0.001; Table 5.1u). Utilising the Centile Values of Birthweight for Gestational Age in Scottish Singleton Infants [151] for the 603 singleton infants in the study (Table 5.1v), it was found that a higher proportion of infants in the emergency group (10.3%) had birthweights below the 10th percentile for gestational age when compared with elective sections (4.2%) and this reached statistical significance ($p < 0.025$).

Table 5.1w shows the number of infants in each group with Apgar scores of less than 7 at one and five minutes after delivery. In both instances a significantly higher proportion of infants born after emergency caesarean section had low Apgar scores (i.e. less than 7) although this was most marked in the 1 minute score. The incidence of low Apgar scores was reflected in the number of infants who required active resuscitation (i.e. other than 2^o suction) in the emergency group which was significantly greater (27.5% versus 6.7%) than in the elective group ($p < 0.001$). These results are shown in Table 5.1x.

The number of infants admitted to the Special Baby Care Unit is shown in Table 5.1y. The length of stay in the unit was recoded into those of less than 48 hours duration and those lasting for equal to or longer than 48 hours. Again a significant difference arose between the infants in the two groups ($p < 0.001$) with more infants in the emergency group requiring admission to the unit and a higher proportion of them staying for longer than 48 hours.

The last variable which was examined was the incidence of birth injury in the infants and as shown in Table 5.1z, although a higher proportion of infants born after emergency caesarean section sustained some form of birth injury (3.2% versus 1.3%), this did not reach statistical significance.

5.2 : Emergency Caesarean Sections

As previously described in Chapter 2.3 (Aims and Methodology), four distinct categories of emergency caesarean delivery emerged from the 399 women delivered by this method. Group A

was comprised of the 42 women who were delivered as an emergency before the onset of labour; Group B consisted of 109 women who were actually in labour at the time of caesarean section but were taken to theatre on admission to labour ward and therefore no labour data was available in the case notes or midwifery record for review; Group C was the 129 women delivered by emergency caesarean section with a labour duration of less than 12 hours and Group D comprised the 119 women delivered after a duration of labour which was equal to or greater than 12 hours.

As in the previous section a number of variables were examined to see if any statistically significant differences were apparent between the four groups.

Maternal Characteristics

The parity distribution within the groups was significantly different ($p < 0.001$) as shown in Table 5.2a. The proportion of primigravidae and multigravidae within Group A was approximately similar to the distribution of parity within the whole study population, however in Group B there was an excess of multigravidae and in Groups C and D an excess of primigravidae, which was most marked in the latter group.

One way analysis of variance showed no significant difference in the mean age or height of women in the four groups and as shown in Tables 5.2b and 5.2c, no differences were detected in the proportion of women < 18 years or $\geqslant 35$ years or less than 155 centimetres between the groups.

Examination of marital status (Table 5.2d) revealed no differences between the groups, however, Table 5.2e shows that there did appear to be a difference ($p < 0.025$) in the distribution of social class. As stated previously the accuracy of this data is limited due to the large number of women in the category of *other / not known*, so it is probably unwise to take this finding as being of real significance.

Crosstabulation of admission to hospital by the groups of emergency caesarean section (Table 5.2f), showed that more women in Group A (83.3%) were admitted to hospital during the antenatal period than expected and conversely fewer than expected in Group D (37.8%) were admitted. This finding reached statistical significance ($p < 0.001$). The actual number of admissions to hospital also differed significantly between the groups ($p < 0.001$) as shown in the same table.

Operative Data

No significant differences were found between the groups when variables such as the month of the year, day of the week and time of operation were examined (Tables 5.2g to 5.2i).

Examination of the status of the surgeon revealed that a significantly greater proportion of the women delivered before the onset of labour (Group A, n=42) were delivered by either consultants or senior registrars ($p < 0.001$) than in the other three groups (Table 5.2j).

The type of anaesthesia employed for surgery differed between the groups (Table 5.2k) with general anaesthesia used in 24 (57.1%) of the cases in Group A compared with only 14 (11.8%) cases in Group D ($p < 0.001$).

Indications for Caesarean Section

When the main indication for caesarean section was broken down by the four groups of emergency caesarean delivery significant differences were apparent (Table 5.2l). In Group A (emergency before the onset of labour), 59.5% of the sections fell into the category of *other* and a further 21.4% were performed for fetal distress which was apparent before the onset of labour. In Group B (emergency on admission to labour ward), the most common indication was breech presentation (40.4%), followed by previous caesarean section (30.5%) and *other* indications (21.1%). In this group 48 (44%) of the women were booked for elective delivery but went into labour before the scheduled date of surgery. In the remaining 61 (56%) women, it was apparent

that often no decision had been made about the method of delivery before the onset of labour, even if the woman had a history of previous caesarean delivery or that breech presentation of the fetus had been diagnosed in the antenatal period and that the decision to section was made when the woman presented in labour.

When a duration of labour was recorded before caesarean section (Groups C and D), a different pattern of indications was seen. When the length of labour was less than 12 hours (Group C), then the most common indications were dystocia (33.3%) and fetal distress (31.0%). However, in Group D (labour duration $\geqslant$12 hours), dystocia accounted for 81.5% of the deliveries.

Table 5.2m shows the indications assigned to the category of *other* for the groups. In only 19.0% of cases in Group A, 29.4% in Group B, 38.0% in Group C and 36.1% in Group D was a single indication for the performance of the operation given. Table 5.2n shows the frequencies of the most commonly cited indications in the operation notes for the four groups.

Postnatal Data

No significant difference was found in the duration of postnatal stay when a one way analysis of variance was carried out between the groups (Table 5.2o) and although the proportion of women who initiated breast feeding and who were still feeding by this method at the time of hospital discharge varied, this did not reach statistical significance (Table 5.2p).

Neonatal Data

As before, the four groups of women delivered by emergency caesarean section were compared on the same variables for infant characteristics as described in the preceding section to see if any statistically significant differences occurred between the groups.

One of the most striking differences between the groups was the mean gestation period at delivery (Table 5.2q). In Group A (emergency - no labour) and Group B (emergency on

admission to labour ward) the mean gestation in both instances was less than 37 weeks compared with mean gestations of more than 39 weeks in Groups C and D (women experiencing labour before delivery). One way analysis of variance gave an F value of 78.45 which was highly significant ($p < 0.0001$). Scheffe's test detected a difference at the 0.05 level between Group A and Groups B, C and D; and Group B and Groups C and D. No difference was found using this test between Groups C and D. This was also reflected in the significant differences in the proportion of infants born before 37 completed weeks of gestation between the groups ($p < 0.001$) - so that in Group A 78.6% of infants met with this criteria compared with only 2.5% of those in Group D.

When the proportion of male and female infants born to the groups of women delivered by emergency caesarean section were examined no statistically significant differences were found (Table 5.2r).

The mean birthweight of infants differed significantly between the groups when a one way analysis of variance was carried out ($p < 0.0001$) and Scheffe's test detected significant differences at the 0.05 level between Groups A and Groups B, C and D; Group B and Groups C and D; and Group C and Group D. As seen in Table 5.2s, the mean birthweight of infants born to women in the four groups increased from Group A to Group D while the proportion of infants weighing less than or equal to 2500 grams significantly decreased ($p < 0.001$).

Table 5.2t shows the centile values of birthweight for gestational age controlled for the sex of the infant in singleton infants. A lower proportion of infants in Group D had birthweights below the 10th percentile and a higher proportion of infants with birthweights > 90th percentile compared with the other three groups ($p < 0.001$).

Significant differences were detected between the groups when the proportion of infants with Apgar scores of less than 7 at one and five minutes were examined (Table 5.2u). In Group A

48.8% of the infants had Apgar scores of less than 7 at one minute compared with only 14.2% of those in Group D ($p < 0.001$). These differences persisted at the 5 minute Apgar score with 14.0% of infants in Group A having scores of less than 7 compared with none of those in Group D ($p < 0.001$).

The incidence of low Apgar scores was reflected in the number of infants who required active resuscitation at delivery in the groups (Table 5.2v). Over half of the infants (51.2%) in Group A required active resuscitation (other than 2^0 suction) compared with only 18.3% of those in Group D ($p < 0.001$).

A significantly greater proportion of the infants born to women in Groups A and B were admitted to the Special Baby Care Unit when compared with those in Groups C and D ($p < 0.001$) and more remained in the unit for a period of more than 48 hours (Table 5.2w).

The incidence of birth injury in infants born after a labour duration of $\geqslant 12$ hours (7.5%) was higher than in any of the other three groups and this reached statistical significance ($p < 0.025$ - Table 5.2x).

5.3 : Caesarean Sections during the Course of Labour versus Second Stage Sections

Maternal Characteristics

Tables 5.3a through to Table 5.3g show the same variables as previously described compared for the 194 women who experienced a recorded duration of labour with the 54 women who were sectioned during the second stage of labour. No statistically significant differences were found between the groups on any of the comparisons which were made.

Operative Data

No significant difference in the proportion of sections carried out by consultants, senior registrars and registrars was apparent (Table 5.3h), however, only 5 (9.3%) of the second stage sections were carried out by obstetricians of consultant or senior registrar status and this is worthy of attention when data related to operative morbidity (Chapter 6) is considered in this group.

A higher proportion of women in the second stage group were delivered under regional anaesthesia when compared with all labour sections (81.5% versus 71.1%) but this did not reach statistical significance (Table 5.3i).

Indications for Caesarean Section

Table 5.3j shows the main indication for caesarean delivery assigned by the use of the Anderson and Lomas model [153]. All but one of the women delivered during the course of the second stage had cephalopelvic disproportion mentioned as one of the reasons for abdominal delivery. The hierarchical assignment of categories, however, meant that only 41 (77.3%) women with this recorded indication were ascribed to the category of dystocia.

Postnatal Data

Tables 5.3k and 5.3l show the length of postnatal stay and the method of feeding for women in the two groups and no differences were detected.

Neonatal Data

Tables 5.3m through 5.3t show the comparison of the two groups on the various infant characteristics selected for study.

The mean birthweight of infants in the second stage group was significantly greater than those in the labour group ($p < 0.01$; 95% confidence interval 35.5 to 435 grams - Table 5.3o). A

difference also occurred when the proportion of infants weighing less than 2500 grams was compared between the groups ($p < 0.025$) with no infants in the second stage group in this category. When the centile values of birthweight for gestational age [151] were examined, a higher proportion of infants delivered during second stage had birthweights > 90th percentile (25.9% versus 18.8%) although this did not reach statistical significance (Table 5.3p).

Although no difference was apparent when the actual numbers of infants admitted to SCBU was examined, more infants in the labour group required a longer stay in the unit (i.e. > 48 hours) and this reached statistical significance ($p < 0.001$ - Table 5.3s).

Thirteen percent of infants in the second stage group sustained some form of birth injury compared with only 2.6% of those in the labour group ($p < 0.005$ - Table 5.3t). The injuries to the seven infants in the second stage group included three scalpel lacerations, two cases of severe bruising, one facial palsy and one cephalhaematoma.

Summary

After the preliminary analysis of the data was carried out, further analysis was undertaken to compare the characteristics of women and their infants within a number of subgroups of the study population. Three major comparisons were made :

a. Women delivered by elective and emergency caesarean section
b. Women delivered by emergency caesarean section
c. Women delivered by emergency caesarean section during the course of the first stage of labour and those delivered during second stage

Elective versus Emergency caesarean sections

The parity distribution between the two groups differed significantly. Only 54 women (24.5%) in the elective group were primigravidae compared with 220 (55.1%) of those in the emergency

group. This resulted in differences in the maternal characteristics between the two groups. Fewer women in the elective group required admission to hospital during the antenatal period.

Elective deliveries occurred more commonly between Monday and Friday and over 98% were performed between 08.01 and 16.00 hours. Thirty six percent of elective operations were performed by senior obstetricians compared with 13.5% of emergency cases and more women in the latter group were delivered under general anaesthesia (31.6% versus 10.0%).

Over 90% of the operations in the elective group were performed for previous caesarean section or breech presentation when the Anderson and Lomas [153] model was applied. In contrast in emergency caesarean deliveries dystocia accounted for 35.6%, previous caesarean section for 17.8%, breech presentation 16.8%, fetal distress 15.5% and *other* indications 14.8%.

The mean gestation period at delivery was greater in the elective group and a smaller proportion of infants were delivered before 37 completed weeks of pregnancy (1.8% versus 23.6%).

Infants born to women by elective section were heavier and fewer weighed less than 2500 grams at birth. A higher proportion of infants in the emergency group had Apgar scores of less than 7 at one and five minutes, required active resuscitation and admission to the Special Care Baby Unit.

Emergency caesarean section

Within the 399 women delivered by emergency caesarean section, 4 subgroups were considered.

Group A

was comprised of 42 women delivered as an emergency before the onset of labour. Of these women, 83.3% were admitted to hospital during the antenatal period. Almost 36% of the operations were performed by senior obstetricians and 59.5% were carried out under general

anaesthesia. When the indications for the performance of the operation were considered 21.4% were carried out for fetal distress and 59.5% for *other* indications such as placenta praevia, severe pregnancy induced hypertension, eclampsia, intra-uterine growth retardation etc.

The mean gestation period for infants born to women in this group was 34.3 weeks and 78.6% were born before 37 weeks gestation. Over 58% weighed less than 2500 grams, 51.2% required active resuscitation and 72.1% were admitted to SCBU.

Group B

consisted of 109 women who were actually in labour at the time of caesarean delivery but were taken to theatre on admission to labour ward and therefore no labour data was available for review. Elective delivery had been planned for 48 (44%) women in this group but the onset of labour occurred before the scheduled date of surgery. Sixty seven percent of the women were multigravidae. The most common indication for the performance of the operation was breech presentation (40.4%) followed by previous caesarean section (30.5%) and *other* indications 21.1%.

The mean gestation period at delivery was 36.3 weeks and 41.3% of the pregnancies ended before 37 completed weeks. Forty percent of the infants born to women in this group weighed less than 2500 grams and 39.1% required to be admitted to SCBU.

Group C

contained 129 women with a recorded labour duration of less than 12 hours. Almost 56% of the women were primigravidae and 89% of the operations were performed by registrars. Two categories accounted for over 64% of the operations, namely dystocia (33.3%) and fetal distress (31.0%) with only 10 (7.8%) carried out for *other* indications (usually fetal malpresentation or cord prolapse).

Only 10% of pregnancies ended before 37 weeks gestation, 26.9% of the infants required active resuscitation and 21.5% were admitted to SCBU.

Group D

was comprised of 119 women with a recorded labour duration of equal to or greater than 12 hours. Almost 80% of the women in this group were primigravidae and 81.5% of the operations were performed for dystocia. Junior obstetricians performed 91.6% of the caesarean sections.

Only 3 (2.5%) pregnancies ended before 37 weeks gestation. The proportion of infants born to women in this group who required active resuscitation (18.3%) and admission to SCBU (6.6%) was less than in the other three groups, but this was not statistically significant. The incidence of birth injury (7.5%) was higher than in any of the other groups.

Labour sections versus second stage sections

The final comparison made was those women delivered by emergency caesarean section during the course of the first stage of labour (n=194) and those delivered during the second stage (n=54).

The only variables where a statistically significant difference was found between the two groups of women were infant birthweight and birth injury. Infants born in the second stage group were heavier than those in the labour group and a higher proportion sustained some form of birth injury (13% versus 2.6%).

Chapter 6

Operative Complications

Chapter 6 : Operative Complications

This chapter describes the operative morbidity sustained by women in the study population. As described in the methodology, baseline data is given for each variable for the whole study population and then comparisons are made between elective and emergency caesarean sections; between the four groups of emergency caesarean sections and finally between labour sections and those carried out during the second stage of labour. The specific variables which were considered included the type of uterine incision; extensions of the uterine incision; anaesthetic difficulties; bladder trauma; blood loss; blood loss $\geqslant$500mls; intraoperative blood transfusion and other operative problems documented on the operation notes.

6.1 : Uterine Incision

Transverse lower segment uterine incisions were performed in 607 (98%) cases. Seven women (1%) had vertical incisions in the upper uterine segment - classical caesarean section - and the remaining five women (1%) had inverted *'T'* incisions. No statistically significant difference was found between elective and emergency caesarean sections with regard to the type of incision (Table 6.1a), however within the latter group, women in Group A (emergency - before the onset of labour) and Group B (emergency - on admission to labour ward) experienced significantly more incisions other than transverse ($p < 0.05$) than the women in Groups C and D (Table 6.1b). No difference was found between women delivered by caesarean section during the course of labour and women delivered during the second stage of labour for this variable (Table 6.1b).

Crosstabulation of the type of uterine incision by the status of the operator i.e. consultant, senior registrar and registrar, revealed that of the operations performed by consultants 5.2% involved incisions other than transverse lower segment compared with 2.8% of those performed by senior registrars and 1.4% by registrars. These results, however, did not reach statistical significance.

Classical Incisions

Of those women who experienced classical incisions, six delivered before 37 completed weeks of gestation and the remaining patient although at term was delivered of a severely growth-retarded infant.

As recorded on the operation notes, the main reason for the performance of a classical incision was absence or poor formation of the lower uterine segment (6 cases) and transverse lie of the fetus (1 case). In four of the cases other factors (presence of a cervical fibroid, couvelaire uterus, Grade IV Placenta Praevia, abnormal fetal lie) which influenced the placement of the incision were also mentioned.

Although 4 of the women who experienced classical incision were multigravidae, only one of them had previously been delivered by caesarean section.

Five of the women experienced a blood loss of more than 500 mls during the operation and all required intra-operative blood transfusion.

Inverted *'T'* Incisions

Five women required an inverted *'T'* incision to effect delivery - 2 primigravidae and 3 multigravidae.

Four of these cases were associated with fetal malpresentation (3 breech, 1 transverse) and one with failure to progress in labour. Senior obstetricians were involved in three cases - although it was unclear from the notes whether they were in fact present when the *'T'* incision was actually made or whether they were called after the event. The remainder were effected by registrars.

Of these women, five had blood losses greater than 500 mls at delivery and three required blood transfusion. Two cases were further complicated by tearing of the urinary bladder which necessitated repair by urologists.

6.2 : Extension of the Uterine Incision

Forty six (7.5%) of the 612 women who had lower segment uterine incisions were noted to have extensions of the original incision after delivery. Table 6.2a shows the types of incision extensions recorded. Included in the surgical extensions (n=7) are the five cases where an inverted *'T'* incision was performed. The most common extension was a tear to one of the uterine angles (56%). In one case of a tear to the cervix, it was discovered postoperatively that the injury had been self-inflicted with a knitting needle prior to delivery. In four of these cases (8.7%) the surgery was performed by an obstetrician of consultant status, in two (4.4%) by senior registrars and in the remaining 40 cases (86.9%) registrars carried out the operation. These results, however, did not reach statistical significance when the number of operations carried out by each group of surgeons was taken into account (X^2 3.33, df 2, NS).

Blood loss of greater than 500 mls was recorded in 32 of these women (78%) and in 14 cases it was necessary to initiate an intra-operative transfusion.

The five cases where a *'T'* incision was performed were excluded from the next part of the analysis since they were considered separately in the preceding section. Extensions of the uterine incision were more commonly seen in emergency caesarean sections than in elective sections (Table 6.2b) and this reached statistical significance ($p < 0.001$). Furthermore, all of the extensions in the elective group were of a relatively minor nature (i.e tear to one or other of the uterine angles), whereas in the emergency group both minor and major tears were seen. All of the 16 major tears (i.e. involving both uterine angles, the upper uterine segment, cervix and vagina) occurred in women delivered by emergency section. No statistically significant differences were found for this variable within the groups of women delivered by emergency

caesarean section (Table 6.2c), however, it should be noted that all but one of the major tears occurred in Groups C and D. One woman in Group A sustained a tear to the cervix, but this was self-inflicted. When the caesarean section was carried out after the onset of second stage a significant increase in extensions of the uterine incision was apparent ($p < 0.025$) compared with other sections carried out during the course of labour. Of the 11 women (20.4%) in the second stage group, six experienced minor tears and the remaining five had major extensions (involving both uterine angles n=2, to the upper uterine segment n=2, to the vagina n=1).

6.3 : Anaesthetic Difficulties

Anaesthetic difficulties were recorded in 61 (10%) of the cases (Table 6.3a). The majority of the problems were related to failure of regional anaesthesia which necessitated delivery under general anaesthesia. In 39 women attempts to induce spinal or epidural anaesthesia failed completely and in a further 5 women, only a partial anaesthetic block was obtained. Another 7 women were found to have an inadequate regional block during the actual operation, which required induction of general anaesthesia to allow completion of the surgery.

Other problems related to regional anaesthesia which were mentioned included spinal tap (3) and severe pain on insertion of the epidural cannula (1). Severe intra-operative hypotension developed in one patient related to the administration of spinal anaesthesia.

In two women difficulties arose when intubation was attempted - although no other apparent ill-effects were related to this. One woman was noted to have aspirated gastric contents at induction of anaesthesia and was prescribed antibiotic prophylaxis and physiotherapy postoperatively. Her postnatal recovery was uncomplicated.

Table 6.3b shows the number and percentages of women in the elective and emergency groups where some type of anaesthetic difficulty was recorded in the operation notes and as can be seen no significant differences were apparent between the groups. Similarly when the four groups of

emergency caesarean deliveries were compared (Table 6.3c), although there appeared to be fewer problems in Groups B and D, this did not reach statistical significance. The percentage of women in the labour and second stage groups who experienced anaesthetic difficulties was exactly the same, as shown in the same table.

6.4 : Bladder Trauma

Thirty-three women (5.3%) sustained some form of bladder trauma during the intrapartum period (Table 6.4a). Four developed haematuria prior to caesarean section being carried out and this may have been related to trauma occurring as a result of catheterisation during labour.

Of the remaining 29 cases, four sustained accidental bladder tears, one had marked bleeding from the bladder base, one had the bladder inadvertently sutured to the uterus and the remaining 23 were noted to have haematuria of unknown aetiology at the end of the surgical procedure. As before a crosstabulation of this variable was carried out with the status of surgeon performing the operation. It was found that consultants were involved in 9.1% of cases, senior registrars in 3.0% and registrars in the remaining 87.9%, however, no significant difference was actually apparent when the number of operations performed by each group of surgeons was taken into account (X^2 1.81, df 2, NS).

All but one of the 33 who sustained intrapartum bladder trauma had a self-retaining urinary catheter left in at the end of the operation for varying lengths of time. In the one remaining case the bladder tear was so severe that ureteric catheterisation was performed by the urologist and these were left in place for 14 days.

A significant difference in the incidence of bladder trauma was apparent when the elective and emergency groups were compared (Table 6.4b) with more women in the latter group sustaining some form of bladder trauma ($p < 0.05$). Furthermore, in the elective group in all six cases, haematuria was the documented problem for this variable compared with the emergency group

where 21 women were noted to have haematuria at the end of the procedure and a further 6 women sustained more severe trauma (bladder tear n=4, bleeding from the bladder base n=1, bladder sutured to the uterus n=1). Comparison of the four groups of emergency caesarean sections (Table 6.4c) showed that women in Groups C and D experienced more bladder trauma than those in Groups A and B ($p < 0.001$) and that all the cases of severe trauma occurred in the former two groups. Almost 26% of women delivered during the course of second stage sustained bladder trauma compared with 7.7% of those in the labour group ($p < 0.001$). Of the 14 women in the second stage group, haematuria was present at the end of surgery in 11 cases and of the remaining three cases - two involved tearing of the urinary bladder and in one the bladder was sutured to the uterus.

6.5 : Blood Loss

Table 6.5a shows the mean blood loss sustained at operation with the range and standard deviation for elective and emergency caesarean sections. Women delivered by emergency section sustained a significantly higher mean blood loss ($p < 0.001$; 95% confidence interval 109 to 256 mls). When the four groups of emergency caesarean deliveries were compared (Table 6.5b), there was considerable variation in the mean blood loss sustained. The standard deviations, however, were large and one-way analysis of variance gave an F value of 2.78 (df 3) which showed a significant difference at the 0.05 level. Scheffe's test did not detect any significant differences between the group means at the 0.05 level. Table 6.5c shows the mean blood loss sustained in the labour group and second stage group. The mean blood loss was greater in the latter group but the standard deviations were large and although the application of the two-sample T test did not detect a significant difference between the groups (T 1.60, NS), the 95% confidence interval 62.3 to 439, although wide, does not contain zero, which suggests that there was greater blood loss in the second stage group.

Blood Loss of $\geqslant$ 500 mls

Primary postpartum haemorrhage was defined as a blood loss greater than or equal to 500 mls occurring within 24 hours of delivery. According to the operative notes 210 women (34%) delivered by caesarean section sustained a blood loss greater than 500 mls and of these women, in 55 cases the blood loss was greater than 1000 mls.

Blood loss of $\geqslant$ 500 mls occurred more commonly in women delivered by emergency caesarean section ($p < 0.001$) and within this group, was seen more frequently in Groups C and D than in A and B ($p < 0.01$). Although a higher proportion of women in the second stage group sustained a blood loss $\geqslant$ 500 mls when compared with other women in labour (57.4% versus 47.9%), this did not reach statistical significance. These results are presented in Tables 6.5a, 6.5b and 6.5c.

Intra-operative Blood Transfusion

Blood transfusion was initiated in theatre for 71 (11.5%) women. Five women who required transfusion actually had an estimated blood loss of less than 500 mls intra-operatively, but were thought clinically to be suffering from hypovolaemia.

Thirteen cases of blood transfusion were associated with elective caesarean delivery and the remaining 58 cases occurred where the section was carried out as an emergency procedure (Table 6.5d). This finding was statistically significant ($p < 0.001$), but is perhaps not particularly surprising in view of the fact that as shown in the preceding two sections, women delivered by emergency section had a higher mean blood loss and a higher proportion sustained a blood loss of more than 500 mls. Comparison of the emergency groups (Table 6.5e) showed that women in Group A (23.8%) were more likely to receive an intra-operative transfusion, although interestingly, in Groups C and D a higher proportion of women actually sustained a blood loss of $\geqslant$ 500 mls (Table 6.5b). No significant differences were apparent between labour sections and second stage sections for this variable.

The number of units transfused is shown in Table 6.5f and Table 6.5g highlights other relevant details of those women who were transfused and which might have accounted for the increased blood loss sustained (e.g. type of anaesthesia employed, type of uterine incision, extension of uterine incision and the presence of bladder trauma).

6.6 : Other Operative Problems

A variety of other intra-operative problems were also recorded in the case notes and these can be seen in Table 6.6a. Four women were noted to have varying degrees of undiagnosed placenta praevia and seven had evidence of uterine rupture. The degree of rupture ranged from *'windowing'* of a previous scar (n=5) to complete breakdown of the previous uterine incision (n=2). Six women had either removal of an ovarian cyst or uterine fibroid and three had repair of an incisional hernia. Evidence of placental separation by the presence of retro-placental clot was noted in 8 cases.

One woman was given a general anaesthetic for delivery due to failure to progress with a breech presentation but when vaginal examination was then performed the cervical os was found to be fully dilated. The anaesthetic was reversed in an attempt to allow vaginal delivery to proceed, but during the delivery marked fetal distress ensued and it was decided to again induce anaesthesia and proceed with caesarean delivery.

Summary

Twelve (2%) women in the study population had incisions other than low transverse. In 7 cases classical incisions were performed and in the remaining 5 inverted *'T'* incisions were made. Blood loss of greater than 500 mls was recorded in 10 of these women and intra-operative blood transfusion was initiated in 8 cases. A further 41 women (6.8%) had extensions or tears of the original uterine incision and in 16 cases the extension involved both uterine angles, the upper uterine segment, cervix or vagina.

Anaesthetic difficulties were recorded in 61 (10%) cases and the most commonly occurring problems were failure to induce regional anaesthesia or failure to obtain an adequate block. In 7 women (1%) this necessitated induction of general anaesthesia during the performance of the operation.

Blood loss of greater than or equal to 500 mls occurred in 34% of women delivered by section and 71 (11.5%) women received an intra-operative blood transfusion.

A wide variety of other intra-operative morbidity was recorded in small numbers of women and this ranged from bladder tearing to difficult delivery of the baby, problems achieving adequate haemostasis and difficult uterine repair.

In two women with a past history of caesarean section (0.6%) rupture of the uterine scar occurred during the course of labour and a further 5 were noticed to have *'windowing'* of the scar at delivery.

Elective versus Emergency Caesarean Sections

In testing the hypothesis that emergency caesarean section is associated with an increased operative morbidity when compared with elective caesarean delivery, it was found that women in the former group were more likely to sustain extensions of the uterine incision and bladder trauma. Furthermore emergency delivery was associated with an increased mean blood loss, increased incidence of blood loss $\geq$ 500 mls and subsequently an increased requirement for intra-operative blood transfusion.

Emergency Caesarean Delivery

Within the groups of emergency caesarean section it was found that when caesarean delivery was carried out as an emergency before the onset of labour (Group A) and at the onset of labour (Group B), this was associated with an increase in incisions other than transverse lower uterine

segment and specifically in Group A an increase in intra-operative blood transfusion. When a period of labour was allowed before operative delivery (Groups C and D) this was associated with an increase in bladder trauma and an increased incidence of blood loss $\geq$ 500 mls.

Labour Sections versus Second Stage sections

When the second stage of labour had commenced before the caesarean section was carried out, this was found to be associated with an increase in extensions of the original uterine incision, bladder trauma and the mean blood loss sustained at delivery when compared with other caesarean sections performed during the course of the first stage of labour.

Chapter 7

Post-operative Morbidity

Chapter 7 : Post-operative Morbidity

For each woman in the study population any complications which occurred during the postnatal stay in hospital and were recorded in the medical case notes or nursing kardex, were noted and coded according to a prearranged schedule. Allowance was made for up to a total of seven problems to be recorded in this manner. The average length of stay in hospital following caesarean delivery in Glasgow Royal Maternity Hospital is 8 days, after which time the women are normally attended by the community midwives until the 14th postnatal day. As further problems, especially related to the development of infectious morbidity, may occur after discharge from hospital, it was felt that examination of the nursing notes over this period might yield further relevant data. Accordingly provision was made for up to a further three problems occurring during this time to be recorded. In the event it was possible to obtain information on 493 (80%) of the women in the study group up until the 14th postnatal day. In the remaining 126 cases (20%), community midwifery care was undertaken outwith the hospital catchment area and the midwifery kardex was not available for examination.

As described in the methodology, baseline data is given for each variable for the whole study population and then comparisons are made between elective and emergency caesarean sections; between the four groups of emergency caesarean sections and finally between labour sections and those carried out during the second stage of labour. The specific variables which were considered in this section with regard to statistically significant differences in the development of postnatal morbidity included : febrile morbidity; postnatal blood transfusion; the prescription of antibiotic therapy; urinary catheterisation; wound infection; urinary tract infection; intra-uterine infection and chest infection.

7.1 : Recorded hospital morbidity

Table 7.1a shows the actual number of problems experienced by women in the study population during their hospital stay and Table 7.1b shows the number of problems crosstabulated by the

type of caesarean section. Only 59 (9.5%) of the women had no recorded postnatal complications during this time, with 302 (49%) of women sustaining three or more problems. Women delivered by emergency caesarean section experienced more problems than those delivered by elective section ($p < 0.05$). Grouping of the number of problems revealed that 77% of women delivered by elective section had three or fewer recorded problems and the remaining 23% had four or more problems. In contrast in those women delivered by emergency caesarean section 65% had three or fewer problems and 35% had 4 or more. This finding was significant (X^2 9.06, df 1, $p < 0.005$). Examination of the actual number of problems by the group of caesarean delivery (Table 7.1c) showed no significant differences between the groups, however, when further collapsed to the number of women with three or fewer problems and those with four or more problems, a significant difference was apparent. The proportion of women in Group A who experienced four or more problems (54.8%) was higher than the other groups (X^2 13.41, df 3, $p < 0.005$) and contrasted with 23.9% of women in Group B.

Table 7.1d shows the most commonly recorded complications in decreasing order of frequency. More serious complications such as paralytic ileus, septicaemia, wound dehiscence, deep venous thrombosis etc occurred in small numbers of women and are shown in Table 7.2a. Greater consideration to the different types of morbidity is given in subsequent sections.

The most frequently encountered complication was the development of pyrexia following delivery and this was recorded in 357 (58%) of the cases. Pyrexia, for the purpose of the study, was defined as a temperature of greater than 38° Centigrade of more than 24 hours duration - excluding the first 24 postoperative hours.

The development of pyrexia as previously defined, occurred more frequently in women delivered by emergency caesarean section than in those delivered electively and this reached statistical significance ($p < 0.001$), as shown in Table 7.1e. When the groups of emergency caesarean deliveries were examined, women in Groups A (emergency - no labour) and B

(emergency on admission to Labour Ward) had less recorded febrile morbidity than those in Groups C and D where a period of labour occurred before delivery (Table 7.1f) and this finding reached statistical significance ($p < 0.025$). No differences were apparent for this variable between those women who delivered in the second stage of labour and those who laboured (Table 7.1f).

Twenty one women (3.4%) required blood transfusion in the postnatal period. In 6 of these cases, intra-operative transfusion had also been given, but the post-transfusion haemoglobin level had remained below 9g so further transfusion was thought necessary. In the remaining 15 women - in one case the haemoglobin level was 8.2g prior to delivery so although the actual operative blood loss was only 200 mls the consultant in charge decided to transfuse. In another woman the antenatal haemoglobin level was 10.0g, the operative blood loss was recorded as 150 mls and the 3rd day haemoglobin was 12.6g. There was no record of postpartum haemorrhage in either the obstetric case record or midwifery notes and it was unclear why this transfusion was prescribed. The other 13 women in this group all had 3rd day haemoglobin levels of less than 9g. A further 11 women in the study population also had Hb levels < 9g (in three of these < 8g) but no transfusion was prescribed in these cases.

Again for this variable a statistically significant difference was apparent between elective and emergency deliveries with women in the latter group requiring more blood transfusions in the postnatal period ($p < 0.05$). Examination of the groups of emergency caesarean sections revealed that more women in Group A required transfusion than in the other three groups ($p < 0.001$). Both these results are presented in Tables 7.1e and 7.1f.

In total 165 (26.7%) of the women were prescribed antibiotic therapy during the postnatal stay in hospital. The reasons for the prescription of antibiotic therapy are shown in Table 7.1g and it should be noted that in some cases there was more than one indication given for such prescription. Only two women in the study population were prescribed prophylactic antibiotic

therapy at the time of caesarean section. Both were delivered by emergency section and had labours of 13 and 17 hours duration respectively.

The prescription of antibiotic therapy occurred more commonly in emergency sections ($p < 0.001$) where 130 (32.6%) women were given such treatment compared with only 35 (15.9%) of the elective group (Table 7.1e). No differences were apparent within the subgroups of emergency sections (Table 7.1f).

Other drug therapy was prescribed for 43 (7%) of the study population during the postnatal stay in hospital. The types of therapy prescribed are shown in Table 7.1h some women were receiving such therapy prior to delivery and some required more than 1 type of medication during this time. No significant differences were seen between the groups for this variable.

Twenty nine (4.7%) of the women were readmitted to hospital after discharge home. In 6 cases this was to allow the women to care for their infants prior to discharge from the paediatric unit and for the remaining 23, the reasons for readmission are shown in Table 7.1i. Again there were no significant differences seen between, or within, the groups of caesarean section for this variable.

At the end of surgery 98 (15.8%) of the women in the study group had an indwelling urinary catheter left in situ. As shown in Table 7.1j only 15 (6.8%) of women in the elective group compared with 83 (20.8%) delivered by emergency section had a urinary catheter placed ($p < 0.001$) and when this was the case, women in the latter group had the catheter in situ for a longer period of time. Examination of this variable within the groups of women delivered by emergency section (Table 7.1k) showed significant differences between the groups with women in Group A (emergency - no labour) and Group D (labour $\geq$ 12 hours) more frequently having an indwelling urinary catheter left in situ. In the former group, the catheter was more often left to monitor the urinary output because of concern for the maternal condition, whereas in the latter

group the decision to leave the catheter in place was usually as a result of the presence of haematuria or other recorded bladder trauma at delivery. The highest incidence of urinary catheterisation was found in the comparison of women who were sectioned in the second stage of labour (Group E) when compared with all other women sectioned during the course of labour (Table 7.1k). Twenty four (44.5%) in the former group were left with a self-retaining catheter at the end of surgery compared with 36 (18.6%) in the latter ($p < 0.001$).

7.2 : Serious postnatal morbidity

The various types of serious morbidity which developed after surgery are discussed in this section. The numbers of women who experienced serious problems were too small to allow meaningful comparisons to be made between or within groups and therefore where appropriate individual cases will be mentioned to give a clearer indication of why such morbidity may have developed in the light of the patient's history. Twelve (1.9%) of the women in the study population were returned to theatre for further surgery postoperatively and all of these cases will be mentioned in this section.

a : Laparotomy

Six women had laparotomies at varying periods of time after the initial caesarean section. In two cases, the formation of a wound haematoma was apparent shortly after surgery and both were returned to theatre for evacuation of the haematoma and ligation of bleeding vessels. Both of these cases occurred after repeat elective procedures.

Another case involved a 29 year old para 0+0 delivered by caesarean section at 40 weeks gestation for fetal distress and failure to progress in labour. The intraoperative blood loss was greater than 6000 mls due to uterine atony and multiple blood transfusion was required. Within a few hours of the initial operative procedure further severe postpartum haemorrhage occurred which did not respond to oxytocin therapy and the woman was transferred back to theatre for a laparotomy and further blood transfusion. Subsequent follow-up by the Department of

Haematology at Glasgow Royal Infirmary failed to discover any obvious reason for the massive haemorrhage sustained at delivery. Three months after the birth when the postal questionnaire was returned, this lady complained of extreme tiredness and depression.

The fourth case occurred in a 27 year old para 0+0 delivered by emergency caesarean section for acute fetal distress at 40 weeks gestation. Frank haematuria was present at the end of the operative procedure and the wound drain was palpable in the retrovesical pouch. The consultant was called and an immediate laparotomy performed. A tear extending to the cervix was discovered and there was profuse bleeding from the bladder base. The tear was repaired and haemostasis secured before closure. The blood loss was greater than 2500 mls and the woman required transfusion with 4 units of blood and 4 units of plasma. Three months after delivery this woman complained of abdominal pain which was worse on passing urine.

Case 5 was a 22 year old para 0+0 delivered at 41 weeks due to profound fetal bradycardia after artificial rupture of the membranes. This lady developed an intra-uterine infection and wound infection following delivery for which antibiotic therapy was prescribed. Despite such treatment marked pyrexia accompanied by general malaise persisted and she returned to theatre for laparotomy on the 15th postnatal day. A sub-phrenic abscess was found and drained and the woman was eventually discharged home on the 30th postnatal day. In the returned postal questionnaire, this woman complained of excessive weight loss (2 stones from pre-pregnancy weight) and weakness three months after delivery.

In the final case a 22 year old para 0+0 presented at 36 weeks gestation with an acute onset of abdominal pain. Blood was sent for haematological investigations and the membranes were artificially ruptured to exclude a diagnosis of placental abruption. The serum amylase was found to be 9500 iu and caesarean section was performed because of acute pancreatitis. A large amount of brown fluid was found in the peritoneal cavity during surgery but the operation otherwise was uneventful. Arterial blood gases postoperatively showed poor gaseous exchange

and the woman was transferred to the Intensive Care Unit at Glasgow Royal Infirmary where artificial ventilation was instituted. An extremely difficult postoperative course then ensued which involved a return to theatre for further surgery on three occasions. On the 18th postnatal day, cholecystectomy and removal of a pancreatic pseudocyst was performed, on the 51st day a pancreatic abscess was drained and finally on the 55th day splenectomy, pancreatectomy and further abscess drainage occurred. The woman was eventually discharged home on the 65th postnatal day.

b : Wound Dehiscence

Complete wound dehiscence occurred in four cases and resuturing under general anaesthesia was performed in theatre. In a further 3 instances partial dehiscence occurred and resuturing was performed under local anaesthesia.

Two of the four cases of complete wound dehiscence occurred in primigravidae delivered by emergency caesarean section after relatively short labours with no documented operative morbidity. Both women had a wound haematoma present and subsequently developed positive cultures from wound swabs.

The third case happened in a 24 year old Asian primigravida with a 3 year history of systemic lupus erythematosus. During the course of the pregnancy this woman developed progressive renal failure, anaemia and eventually left ventricular failure - the baby was also thought to have severe intra-uterine growth retardation. Due to the rapidly deteriorating maternal condition, a decision was made to deliver electively at 28 weeks gestation. In the absence of a lower uterine segment, classical caesarean section was performed and a live female infant weighing 840 grams was delivered. Postoperatively, the woman went into complete renal failure and required haemodialysis at Glasgow Royal Infirmary. Anaemia was treated by multiple blood transfusions and complete wound dehiscence occurred on 3 occasions. She was eventually discharged home

from hospital on the 93rd postnatal day and haemodialysis was continued after this time on an out-patient basis. The baby was discharged from the paediatric unit 115 days after birth.

The final case of wound dehiscence occurred in a 24 year old para 2+1. This woman had a history of 2 previous preterm deliveries and in this pregnancy had a cervical suture in situ. She was transferred to Glasgow Royal Maternity Hospital because of recurrent episodes of preterm labour which had been treated with B sympathomimetic therapy. A significant antepartum haemorrhage occurred at 29 weeks gestation and it was decided to effect delivery by caesarean section in view of this. At the time of operation a large cervical tear with bladder involvement was discovered and extensive repair was required. It was subsequently discovered that this injury had been self-inflicted with a knitting needle. The presence of a wound infection was recorded postoperatively in the medical case notes.

c : Postpartum Haemorrhage

Eight women had secondary postpartum haemorrhage which occurred more than 24 hours after delivery. In 6 cases intravenous oxytocin therapy was administered with the desired effect and in the remaining 2 cases women were returned to theatre for evacuation of retained products of conception. In two of the women, intra-uterine infection was confirmed and in one other case the presence of such infection was suspected.

d : Other Morbidity

Other recorded morbidity in this category included development of a paralytic ileus (4 cases) all of which resolved spontaneously within 72 hours and deep venous thrombosis (1) / phlebitis of the leg (1) both of which were treated with anti-coagulant therapy. Headaches associated with the administration of spinal anaesthesia developed in 25 women, 15 of whom were subsequently given a *'blood patch'*.

Two other cases of severe morbidity warrant special mention in this section. The first involved a 30 year old para 0+0 delivered by emergency caesarean section at 41 weeks gestation for failure to progress in labour. Due to difficulty in delivering the fetal head, an inverted *'T'* incision was performed and a large bladder tear occurred. The bladder repair was carried out by an urologist and ureteric catheters inserted. The woman subsequently developed a vesico-utero fistula and urinary incontinence.

In the second case, a 32 year old primigravida was delivered by elective caesarean section for a breech presentation of the fetus. The woman complained of severe pain during the insertion of the epidural cannula and in the postnatal period complained of pain in her right foot, leg paraesthesia and decreased hip flexion. The neurology report showed a significant abnormality at the S1 segmental level on the right side. On the returned postal questionnaire, the woman complained of a dropped foot and no feeling in her right leg. This case was the subject of subsequent litigation proceedings.

7.3 : Infectious Morbidity

Confirmed infection was only recorded when a positive bacteriological culture from an appropriate specimen was obtained. During the postnatal stay in hospital 141 (22.8%) of the study population developed some form of infectious morbidity. By the time of discharge from the care of community midwives this figure had risen to 183 (29.6%) cases. This latter figure is likely to be an underestimation of infectious morbidity as it does not take into account the 126 cases lost to follow-up after hospital discharge.

For the purpose of the study, it was necessary to divide infectious morbidity into that which might be directly attributable to the operation and other infections which were apparently unrelated. In the former category six major types were considered - wound infection, intra-uterine infection, urinary tract infection, chest infection, septicaemia and abscess formation. Infectious morbidity considered separately included breast infection, flu, ear

infection and abscess formation unrelated to the method of delivery. In the event, this latter category only accounted for 7 of the cases of infectious morbidity recorded.

Examination of the 134 (21.7%) cases where infection may have been directly attributable to the method of delivery, revealed that in 17 cases two types of infectious morbidity were recorded, in 4 cases three types and one woman had positive cultures in four of the categories. The majority of infection occurred after the performance of an emergency operation (98 cases, 73%) with only 36 cases (27%) arising after elective surgery (X^2 5.62, df 1, $p < 0.025$).

Within the four groups of emergency caesarean delivery 11 (26.2%) women in Group A, 28 (25.7%) in Group B, 35 (27.1%) in Group C and 24 (20.2%) developed infectious morbidity (X^2 1.83, df 3, NS). Comparison of labour sections with those carried out after commencement of the second stage revealed that 47 (24.2%) women in the former group developed infection compared with 12 (22.2%) in the latter (X^2 0.09, df 1, NS).

The most common type of infection occurring in hospital was infection of the urinary tract. Sixty five women (10.5%) had positive urine cultures in the postnatal period and 20 of these women had a urinary catheter in situ for a variable period of time postoperatively. Twenty four of the cases were associated with elective procedures and the remaining 41 occurred after emergency caesarean sections. By the time of discharge from the care of the community midwives a further 9 women (1.5%) had developed urinary tract infection (Tables 7.3a and 7.3b).

Wound infections were recorded in 42 cases (7%) and 33 of these occurred after emergency operations. This type of infection was often accompanied by other wound problems such as leakage (24), wound erythema (8), wound haematoma (4) and bruising (2). By the time of community discharge this figure had risen to 79 cases (12.8%).

Of the 27 instances of intra-uterine infection only 3 arose after elective procedures. Three women had secondary postpartum haemorrhage and two had subsequent evacuation of retained products of conception. A further 6 women developed this type of infection after discharge from hospital. Over 50% of the cases of chest infection developed in women delivered under general anaesthesia and 21 of the operations were carried out as emergency procedures.

When the various types of infectious morbidity were cross-tabulated by the type of caesarean section, it was found that women delivered by emergency caesarean section experienced more wound infections ($p < 0.05$), intra-uterine infections ($p < 0.01$) and chest infections ($p < 0.01$) than women delivered by elective procedures (Table 7.3c). No difference was apparent in the incidence of urinary tract infection between the groups. Within the groups of emergency caesarean delivery (Table 7.3d), the only statistically significant finding was the increased incidence of chest infection in women in Group B (emergency section on admission to Labour Ward) where 11 (10.1%) women developed a chest infection in the postnatal period ($p < 0.025$).

Summary

Only 9.5% of the study population had no recorded complications in either the medical or midwifery notes during the postnatal period. A wide variety of morbidity was experienced by the women and the most frequently recorded complication was the development of pyrexia following delivery. This occurred more commonly in emergency caesarean delivery, particularly when a period of labour had been recorded.

Serious morbidity such as paralytic ileus, septicaemia, wound dehiscence and deep venous thrombosis occurred in small numbers of women. Twelve (2%) of the women required to return to theatre for further surgery in the postnatal period.

Infectious morbidity which might be directly attributable to the mode of delivery occurred in 21.7% of cases during the hospital stay and 26.7% of the women received antibiotic therapy.

The most commonly encountered categories of infectious morbidity were urinary tract infection, wound infection, intra-uterine infection and chest infection and these, with the exception of infection of the urinary tract, were more frequently associated with emergency sections.

Twenty one women (3.4%) required blood transfusion in the postnatal period. In 6 women intra-operative transfusion had been given but the haemoglobin level had remained below 9g so further transfusion was prescribed. Thirteen of the remaining 15 women had 3rd day haemoglobin levels below 9g. A further 11 women in the study group also had Hb levels of less than 9g (in 4 instances below 8g) but no blood replacement was ordered in these cases.

Elective versus Emergency Caesarean Delivery

In testing the hypothesis that emergency caesarean delivery is associated with an increased incidence of postnatal morbidity when compared with elective caesarean section, it was found that in the former group women experienced a greater number of postnatal problems, an increased incidence of febrile morbidity, more blood transfusions in the postnatal period and a higher proportion had a urinary catheter left in situ after surgery. The incidence of wound infection, intra-uterine infection and chest infection was higher in the emergency group and this resulted in an increased proportion of the women requiring antibiotic therapy in the postnatal period.

Emergency Caesarean Delivery

A similar comparison to that mentioned above was carried out within the groups of emergency caesarean delivery. This showed that where the section was carried out as an emergency before the onset of labour (Group A), women were more likely to require blood transfusion in the postnatal period. Women in Group A and Group D (labour duration $\geqslant$ 12 hours) had an increased incidence of urinary catheters left in situ after surgery. Febrile morbidity was more common in Groups C and D where a period of labour had occurred before operative delivery.

Labour Sections versus Second Stage Sections

When the caesarean section was performed after the onset of the second stage of labour, women were more likely to have a urinary catheter left in situ after surgery than women sectioned during the first stage of labour.

Chapter 8

Short-term Morbidity

Chapter 8 : Short-term Morbidity

A postal questionnaire was sent to 588 of the women in the study group three months after delivery in an effort to determine the short-term morbidity associated with the operation. Postal questionnaires were not sent to 31 women who had experienced perinatal loss or where the neonatal outcome was uncertain (cases of severe prematurity or gross fetal abnormality).

Of the 588 questionnaires sent, 14 (2.4%) were returned by the Post Office and 444 forms were returned completed giving an overall response rate of 76%. The response rates of women who had elective caesarean sections were compared with those who had emergency operations and no significant differences were apparent (Table 8a). Similarly, the four groups of emergency sections were compared, as were the labour sections with second stage sections, and again no statistically significant differences were seen in the response rates between the groups (Table 8b).

This chapter describes firstly the morbidity as reported by those who replied; medications received since discharge from hospital; infant health since delivery and infant feeding practices and then describes the characteristics of the non-respondents in comparison with the study population as a whole. As in other chapters, baseline data is given for the whole population and then comparisons are made, where appropriate, between and within the defined groups of caesarean section.

8.1 : Respondents

The respondents were asked why their baby was delivered by caesarean section and the reason documented on the postal questionnaire was then compared with the reasons for the operation that had been written on the case notes. Answers were coded as being right, partially

right, wrong, do not know or not stated. The coding of answers was carried out by two examiners independently to ensure the validity of the coding.

The majority of the respondents, 326 women (73%), stated the reason for caesarean section correctly and a further 62 women (14%) were partially right in their comprehension of why the caesarean section was necessary. Of the remaining respondents, 21 women gave completely wrong explanations for their section and a further 14 (3%) stated that they did not know why they had to have an abdominal delivery. Twenty-one women (5%) failed to respond to this question (Table 8.1a). No differences were apparent for this variable between primigravidae, multigravidae and multigravidae previously delivered by caesarean section.

When the answers of the elective and emergency groups were compared (Table 8.1b), it was found that more women in the former group stated the reason for the caesarean section being carried out (81.7% versus 68.6%) and this was significant ($p < 0.025$). Comparison of the four groups of emergency caesarean deliveries revealed that more women in Group A (88.5%) gave the correct reason for the performance of the operation but this did not reach statistical significance. No differences were found for this variable between labour and second stage sections (Table 8.1c).

The women were also asked if they felt fully recovered since the delivery and 290 (65%) stated that they were with the remaining 154 women (35%) feeling that they were not.

No statistically significant differences were found between either elective and emergency caesarean deliveries or the groups of emergency sections in response to this question (Tables 8.1d and 8.1e).

Another question enquired if the women felt happier, less happy or unchanged since the birth of their babies and 274 (62%) responded positively, 31 (7%) felt they were less happy

and the remaining 136 women (30%) felt they were unchanged. This was the only variable where there was a significant difference between the two parity groups with 160 (79.2%) of the primigravidae stating that they were happier since delivery compared with 114 (47.1%) of the multigravidae (X^2 50.51, df 1, $p < 0.001$).

Examination of elective and emergency deliveries showed no difference in the women's response to this question (Table 8.1f), but within the four groups of emergency caesarean sections (Table 8.1g), 78.7% of Group D stated they were happier since the birth of their baby compared with only 50.7% of those in Group B ($p < 0.01$). When this variable was controlled for parity, no difference was found between comparable groups. No difference was found between labour and second stage sections in the women's response to this question.

In response to a question enquiring specifically about their state of health since delivery, 256 women (58%) felt that their general health was unchanged, 123 (28%) felt less healthy and 46 (10%) felt their health had improved. Nineteen women (4%) failed to respond to this question.

Tables 8.1h and 8.1i show the responses to this question crosstabulated by elective / emergency delivery, the four groups of emergency sections and labour versus second stage sections. No statistically significant differences were found between any of the groups.

8.2 : Wound Pain and Wound Leakage

Specific questions in the postal questionnaire attempted to elicit information about the numbers of women who experienced pain from their abdominal wound following discharge from hospital and the length of time that this lasted for. Out of the 444 women who responded, 184 (41%) stated that they had experienced wound pain after discharge. Tables 8.2a and 8.2b show the responses to this question for the different groups of caesarean delivery. No significant differences were seen between elective and emergency sections. Within the groups of

emergency operations only 34.8% of those in Group D experienced pain after discharge compared with 50.5% of those in Group C, but this was not actually significant. A significant difference did arise however when labour sections were compared with second stage sections. In the former group 47.9% of women complained of wound pain compared with only 23.7% in the latter ($p < 0.01$). No obvious explanation was found to account for this difference.

When wound pain was reported, the women were asked to state how long this lasted for. As shown in Table 8.2 c, for 57% of these women the discomfort was resolved within 4 weeks of discharge; in a further 18% within 8 weeks and for 6% within 12 weeks. However, 32 women (18%) were still complaining of pain more than 12 weeks after discharge from hospital.

A similar question was asked to determine how many women experienced leakage from their wound after discharge from hospital. In total 150 women (34%) had experienced leakage from their abdominal wound. No differences were found for this variable between and within the different groups of caesarean delivery (Tables 8.2d and 8.2e).

Where wound leakage did occur, in 84% of cases this had stopped within 4 weeks of hospital discharge. Another 11% experienced resolution of the problem within 8 weeks and by 12 weeks post delivery only 4% still had the problem of leakage from their abdominal wound (Table 8.2f).

8.3 : Morbidity Following Delivery

The women were asked if they had experienced any of the problems listed below since the delivery of their baby :

1. *Urinary tract infection*
2. *Wound infection*
3. *Breast infection*
4. *Backache*
5. *Wind*
6. *Constipation*
7. *Painful piles*

8. *Sleeping difficulty*
9. *Tiredness*
10. *Depression*

They were also asked at what stage they experienced them - either in hospital, up to 4 weeks, up to 8 weeks or up to 12 weeks post-delivery.

Table 8.3a shows the number and percentages of women in the sample who experienced the problems mentioned. The most common complaint was that of tiredness and 80% of the respondents had experienced this. Backache (55%), constipation (49%), wind (46%), depression (38%) and sleeping difficulties (36%) were also common complaints amongst the respondents.

An interesting difference arose when the data from the respondents in the postal questionnaire relating to the morbidity experienced in hospital was compared with the reported morbidity obtained from the medical case notes and the nursing kardex (Table 8.3b).

Categories in the medical/nursing notes were expanded to allow, for example, not only definite urinary tract infection but also suspected urinary tract infection to be included. However, even allowing for this there were major differences in what the women claim to have experienced and what was actually recorded in the notes.

Thus, while 32% of the respondents stated that they had sleeping difficulties in hospital - none were actually noted by the medical or midwifery staff as having this problem. Similarly, 62% of the women stated that they experienced tiredness in hospital and yet only 1 woman had this fact recorded in either the medical or nursing notes.

These major differences in reported and recorded morbidity would appear to highlight a large discrepancy in medical and nursing assessment of women in the postnatal period.

As stated previously the women were asked if they had experienced a variety of problems ranging from wound infection to depression since the delivery of the baby, and if so, at what stage they had occurred. Table 8.3c shows the number of women who experienced the stated problems at the defined intervals and Table 8.3d shows the number of times that each problem was mentioned by individual women. Combining the data in the two tables gives a better indication of the incidence of such morbidity. Thus although 66 (15%) of the respondents stated that they felt depressed at 12 weeks in only 33 (8%) of the cases had this persisted since delivery. Similarly 150 (34%) of the women complained of backache at 12 weeks and in 110 (25%) of cases this had been present since the baby was born.

Again no statistically significant differences were seen between and within the groups of caesarean delivery for any of these complaints.

Seventy six women complained of a variety of other problems which ranged from high blood pressure (2), leg pain (11), wound paraesthesia (7), irregular bleeding (4) to inability to lose the weight gained during the pregnancy. Two women had received surgical treatment since discharge, in one case to repair an incisional hernia and in the other to evacuate a pelvic haematoma.

The women were asked if they had received any medication from their GP since delivery, and if so, what was prescribed, what they were prescribed for and at what stage they had taken them. In total 52% of the respondents had received medication with 152 (34%) being prescribed one course of therapy, 58 (13%) two courses of treatment and the remaining 23 women (5%) had three.

The most common indication for the prescription of medication was the presence of infection and Table 8.3e shows the types and incidence of such morbidity. Antibiotic therapy was

prescribed for 114 (25.7%) of the women - in 86 cases on one occasion, in 23 on two occasions and 5 women had received 3 courses of such treatment since delivery.

Other reported illnesses for which medication was prescribed are shown in Table 8.3f and the most frequently prescribed groups of drugs in Table 8.3g. Cross checking of the prescribed therapy with the illness reported by the women did not reveal any apparent errors in reporting.

8.4 : Infant health since delivery

Twelve of the respondents had multiple pregnancies so data was collected for 456 infants. The women were firstly asked general questions on infant problems experienced since birth and they were then requested to list any illnesses and medications received by the baby. The most commonly reported baby problem was that of wind (48%) with 17% reporting feeding difficulties, 15% crying and 11% sleeping.

Illnesses were recorded for 217 infants with 117 (26%) having one episode of illness, 72 (16%) two episodes and 28 (6%) three. The most commonly occurring problems are shown in Table 8.4a. Ten (2.2%) of the infants had been hospitalised by the time of the postal questionnaire return for a wide variety of complaints such as meningitis (1), gastrointestinal obstruction (1), diarrhoea (1), convulsions (1), exploration of umbilicus (1), cyanotic attacks (2), rectal bleeding (1), failure to thrive (1) and pyloric stenosis (1).

Medication was prescribed for 211 infants and the drugs most commonly prescribed are shown in Table 8.4b.

8.5 : Infant feeding practice

Women were asked which way they intended to feed their baby prior to delivery. Of the respondents, 192 women (43%) indicated that they planned to breast feed with the remaining 252 women (57%) opting to bottle feed. There was a significant difference between

primigravidae and multigravidae in their feeding plan ($p < 0.001$), with 53% of primigravidae compared with only 36% of the multigravidae hoping to breast feed (Table 8.5a).

Tables 8.5b and 8.5c show the intended feeding plan of respondents in the emergency / elective groups and within the groups of emergency caesarean delivery. No significant differences were apparent between elective and emergency deliveries although within the emergency sections more women in Group D intended to breast feed than in Groups A, B and C ($p < 0.025$). This was found to be related to the increased number of primigravidae within this group.

The women were then asked how they had actually fed their babies since delivery, and overall 156 women (35%) attempted breast feeding. A significantly higher proportion ($p < 0.005$) of primigravidae (84 women - 42%) attempted breast feeding compared with multigravidae (72 women - 30%) as shown in Table 8.5d. No differences were seen between and within the groups for this variable (Tables 8.5e and 8.5f). Of the women who started breast feeding, 33 gave up within 1 week of delivery and a further 16 had discontinued by the end of the second week post-natally. By one month postpartum only 86 women (19%) were still breast feeding and by the end of the first three months 41 women (9%) were totally breast feeding and a further 10 (2%) were combining breast with bottle feeding. There were no significant differences between primigravidae and multigravidae in the numbers of women still successfully breast feeding after three months, however, by that time a larger number of primigravidae had discontinued (Table 8.5d).

Women who changed their mind regarding the method of feeding were asked to state why this had happened and Table 8.5g documents their stated reasons. Over 60% (22 women) stated that they were either too tired or too sore to attempt to breast feed. Table 8.5h shows the age at which breast feeding was discontinued and Table 8.4i documents the reasons given for altering the feeding method. More than half of the women who stopped breast feeding said that either they had no milk or that the baby was dissatisfied with the amount of breast

milk produced. A further 38 women stated that their reason for stopping was either due to maternal discomfort associated with the method, cracked nipples or on the advice of doctors because of medication they were receiving.

8.6 : Non-respondents

In total 130 women failed to respond to the questionnaire and this non-response was distributed evenly throughout the course of the year. The group was comprised of 54 (42%) primigravidae and 76 (58%) multigravidae and the proportions of each did not differ materially from either the total hospital population or the study population (44%, 56%).

Table 8.6a shows the distribution of marital status, social class and race for both the non-respondents and the total study population. A slightly higher proportion of the former group were single and the overall distribution of social class was lower, although in 50 cases the occupation was either recorded as housewife or out of work with no indication of previous employment status. There was no difference in the distribution of age and height in the 2 populations.

Variables such as the type of caesarean section, mode of anaesthesia employed and the main indication for the performance of the operation were also examined (Tables 8.6b, 8.6c, 8.6d) and again no statistically significant differences were apparent between the two groups of women.

The proportions of women delivered before 37 completed weeks of gestation and infants weighing less than 2500 grams at birth were similar. The only variable where a discernible difference was found, was the percentage of women in the group who failed to respond, who attempted to breast feed their infant. Twenty five percent of this group initiated breast feeding compared with 37% of the study population and on discharge from hospital the proportion of women still breast feeding was 17% and 26% respectively (Table 8.6e).

It can therefore be concluded that the non-respondents did not differ materially from those who did respond and that the results presented in 8.1 to 8.5 are likely to be representative of all women delivered by caesarean section.

Summary

Seventy six percent of the study population returned completed postal questionnaires three months following delivery. The characteristics of those who did not respond were compared with the respondents and no significant differences were apparent between the groups.

Thirteen percent of those who replied either did not know or gave completely wrong explanations for the performance of the caesarean section and a further 14% were only partially right in their comprehension.

Three months after the birth, 35% of the women still did not feel back to normal and 28% felt less healthy than before the pregnancy. The most common complaints following delivery were wound pain, wound leakage, tiredness, backache, constipation, wind, depression and sleeping difficulties. In some women these had persisted since the delivery.

Although 43% of the respondents indicated that they had planned to breast feed before delivery, only 35% actually attempted to do so. One month after delivery only 19% were still breast feeding and by 3 months 9% were totally breast feeding and a further 2% were combining breast with bottle feeding.

Elective versus Emergency Caesarean Sections

With regard to the short-term morbidity experienced after caesarean delivery between elective and emergency caesarean deliveries, no significant differences were seen between the groups. The only variable where a difference was noticed, was in the women's knowledge of the reason

for the performance of caesarean section. A higher proportion of women in the elective group stated the reason correctly (81.7% versus 68.6%).

Emergency Caesarean Sections

Comparison of the four groups of emergency caesarean delivery revealed that a higher proportion of women whose labour lasted ⩾12 hours (Group D) reported they felt happier since the birth of their baby when compared with the other three groups. A higher percentage of women in this group also intended to breast feed before delivery and actually did so when compared with the other groups. These findings were found to be related to the high proportion of primigravidae in this group (79.8%).

All Labour versus Second Stage Sections

The only significant finding between women delivered during the second stage of labour and other labour sections was that women in the former group reported less wound pain after discharge from hospital.

Chapter 9

Study / Control Group

Chapter 9 : Study / Control Group

From the main study group, a sub-group of 50 primigravidae who had unexpected caesarean sections in labour were selected for further study. These women were matched with a control group of 50 women delivered vaginally. The criteria for selection and the method of matching of controls are described in Chapter 2.6 of the Aims and Methodology.

9.1 : Overview of Results

Table 9.1a shows the marital status and distribution of social class for the two groups of women. Forty one (82%) women in both groups were married at the time of delivery and the remaining 9 women in each group were single. All of the women entered into this part of the study were Caucasian, to ensure that cultural and language differences did not influence the results of the research.

Table 9.1b shows the age and height distribution of both the study and control groups. There were no significant differences between the groups for these two variables.

Sixteen of the 100 women (study=9, control=7) had a past history of either spontaneous or therapeutic abortion. None of the women had any relevant medical history recorded in the case notes and although 68% of the study population and 66% of the control group had antenatal problems documented during the course of the pregnancy, these were of a relatively minor nature for example mild pregnancy induced hypertension, urinary tract infection, poor weight gain etc.

In all cases the onset of labour occurred after 37 completed weeks of pregnancy. The mean length of labour was greater for those women eventually delivered by caesarean section (12.3 hours v 11.4 hours) but this did not reach statistical significance (Table 9.1c). Fifteen of the women in the study group reached the second stage of labour before eventual abdominal

delivery. For these women the mean length of the second stage of labour was significantly greater than for the women delivered vaginally (205.5 minutes v 110.9 minutes, $p < 0.001$; 95% Confidence Interval 49.7 to 139 minutes).

Only 7 women (study=3, control=4) required no analgesia during the course of labour. In the study group 92% eventually had lumbar epidural analgesia (Table 9.1d) compared with only 62% of the women in the control group ($p < 0.001$). In the latter group when this variable was examined by the eventual mode of delivery then 23 of the 27 cases where forceps were employed had epidural analgesia compared with only 8 of the 23 spontaneous deliveries. This finding was highly significant (X^2 13.39, df 1; $p < 0.001$).

Table 9.1e shows the numbers of women who experienced various obstetric interventions or who developed complications during the course of labour. As expected those women eventually delivered by caesarean section had significantly more problems occurring and as a result required increased interventions. The two most common problems which occurred in the study group were evidence of cephalopelvic disproportion and slow progress in labour.

The mean blood loss in the study population was 665 ml (range 150-6000 ml, SD 832) compared with 293 ml (range 50-800 ml, SD 171). This was a significant difference (T 3.1, $p < 0.005$) as was the number of women in the study population who sustained a blood loss of more than 500 ml - 28 (56%) compared with only 8 (16%) of the control group (X^2 11.76, df 1; $p < 0.001$).

9.2 : Labour Outcome

a. Study Group

Of the 50 women in the study group, 14 (28%) were sectioned under general anaesthesia and the remaining 36 women (72%) had the operation performed under a regional block.

Only 12% of the operations were performed by obstetricians of consultant or senior registrar status, the majority (88%) were carried out by registrars. All of the women had incisions in the lower uterine segment, however, this had to be extended in one case and in a further three cases there was an extensive tear of the original incision (to both angles (2), to the cervix (1)).

The causal model and decision rules [153] to assign multiple indications for caesarean delivery to a single diagnostic category, as described in Chapter 4.4, was applied to the data. Using this model, the most common indication for the performance of the operation was that of dystocia. This category accounted for 39 (78%) of the sections performed in the study group. Breakdown of the 39 cases of dystocia revealed that 25 were for cephalopelvic disproportion (including 5 failed trial of forceps), 13 were for failure to progress in the first stage of labour and one was a failed induction of labour. The category of fetal distress accounted for 8 (16%) cases and the remaining three (6%) women were sectioned for *other indications* (fetal malpresentation=2, cord prolapse=1).

As in the main study population, up to a total of three reasons could be given on the operation notes for the performance of the abdominal delivery. Thus, although fetal distress was the main indication in 16% of cases, it was actually mentioned as one of the reasons in 38%. The respective frequencies of mentioned indications are also shown in Table 9.2a.

Two women experienced problems associated with the administration of the anaesthetic for the operation - in one case it was impossible to obtain an adequate regional block and therefore general anaesthesia was given and in the other severe hypotension associated with spinal anaesthesia was documented. In two women other surgery was performed at the time of caesarean section (ovarian cystectomy (1), myomectomy (1)). Haematuria was present in 7

cases after the completion of surgery, although this was noticed to be present in three women before the operation commenced.

b. Control Group

In the control group 23 (46%) of the women achieved spontaneous vaginal delivery and the remaining 27 (54%) required forceps delivery. Only one woman sustained no perineal damage at delivery, the remainder either had a perineal tear (8) or required an episiotomy (41).

9.3 : Postnatal Data

The mean length of stay in hospital after delivery was 8.6 days (range 6-30, SD 3.5) for the study group which was significantly greater than for the control group where the mean stay was 5.2 days (range 3-8, SD 0.9) - T 6.65; $p < 0.001$. By the 10th postnatal day, 12% of the women delivered by caesarean section were still hospitalised.

Thirty one (62%) women in the study group intended to breast feed before delivery compared with 34 (68%) in the control group (X^2 0.396, df 1; NS). After delivery 7 of the women delivered by caesarean section changed their mind about the feeding method because they were too sore to try and therefore only 24 (48%) women attempted to put the baby to the breast. The corresponding figure for the control group was 31 (62%) - X^2 1.980, df 1; NS.

By the time of discharge from hospital 16 (32%) women delivered by caesarean section were still breast feeding compared with 24 (48%) in the control group (X^2 2.667, df 1; NS). In the study group of the 8 women who actually started but then stopped breast feeding, the reasons given for changing the feeding method were - too tired (2), too sore (1), too *'doped up'* (1), baby wouldn't fix at the breast (4). When the 7 women who discontinued in the control group were asked their reason for doing so, three stated they were too tired, in three cases the baby

didn't fix at the breast and the remaining woman said it was more convenient to bottle feed.

Postnatal X-ray pelvimetry was carried out on 45 of the women in the study group and in 14 cases the report of the consultant radiologist stated that there was apparent contraction of one or more of the pelvic diameters, in 3 instances there was doubt as to the adequacy of the pelvis and in the remaining 28 women the pelvis was apparently normal.

There was no difference in the 3rd day haemoglobin level between women delivered by section and those delivered vaginally (10.9 v 10.9 grams), however by that time 9 women in the study group had received a blood transfusion compared with only 1 in the control group (X^2 7.11, df 1; $p < 0.01$).

9.4 : Neonatal Data

As entry to this part of the study was limited to those women delivering between 37 and 42 weeks gestation, all of the infants born were at term. The mean birthweight of infants born to women in the study group was significantly greater than that of the control group - $p < 0.001$ (Table 9.4a). Another factor of significant difference between the study and control groups was the number of male infants born in the former. Thirty five (70%) of the infants born to the study group were male compared with only 19 (38%) in the controls (X^2 10.30, df 1; $p < 0.005$).

Utilising the Centile Values of Birthweight for Gestational Age in Scottish Singleton Infants [151] revealed that 30% of the infants in the study group had birthweights greater than the 90th percentile compared with only 12% of the controls (X^2 4.882, df 1; $p < 0.05$). Table 9.4a shows this data and also shows the results when birthweight was controlled for the sex of the infant.

In the study population 26% of the infants required active resuscitation (i.e. other than 2° suction) compared with 16% of those in the control group (X^2 1.507, df 1; NS). A larger proportion of the infants born to women in the control group sustained some form of birth injury (16% v 8%), although this was not statistically significant (X^2 1.569, df 1; NS). All of these occurred in infants delivered by forceps and were of a relatively minor nature - facial bruising (7), cephalhaematoma (1). Two babies in the study group had a cephalhaematoma, one had facial bruising and another had a facial palsy.

9.5 : Postnatal Morbidity

The data form allowed up to 7 problems which occurred during the postnatal stay in hospital to be recorded and coded according to a prearranged schedule. Table 9.5a shows the number of complaints recorded on the form for women in both the study and control groups. As can be seen in the table, women delivered by emergency caesarean section experienced more complications than those women delivered vaginally. Twenty seven (54%) women in the study group experienced three or fewer problems compared with 45 (90%) in the control group (X^2 16.071, df 1; $p < 0.001$). The most common complication following delivery was the development of a pyrexia and 39 (78%) women in the study group and 26 (52%) in the control group experienced this ($p < 0.01$). Women in the study group also experienced a significantly higher incidence of urinary tract infection ($p < 0.005$); intra-uterine infection ($p < 0.05$) and were more likely to have a urinary catheter left in situ ($p < 0.001$) - Table 9.5b.

In the control group most of the recorded morbidity was directly related to perineal damage sustained at delivery eg bruising, pain, oedema. Three women in the control group developed a perineal infection during their hospital stay, although no antibiotic therapy was prescribed.

In the study group a wide variety of infectious morbidity arose following delivery and this resulted in 19 (38%) women being prescribed antibiotic therapy compared with no-one in the

control group (X^2 23.457, df 1; $p < 0.001$). The reasons for the antibiotic therapy are documented in Table 9.5c.

9.6 : Reported Morbidity at the Time of the Hospital Interview

A semi-structured hospital interview was conducted by the researcher between the 4th and 5th postnatal days and completed forms were analysed for the entire group of 100 women. During the course of the interview the women were asked if they had experienced a variety of problems since the birth of their baby (including information about wound / perineal pain) and which problems were still being experienced at the time of the interview. The morbidity reported by the women was then compared with that recorded in the obstetric case notes and midwifery kardex.

Wound and perineal pain

At the time of the hospital interview, 41 (82%) of the study group were experiencing pain from their abdominal wound and 5 (10%) stated this was there all the time, 27 (54%) felt it only on moving and 9 (18%) only on rising. The severity of the pain ranged from mild to very severe. In the control group, 44 (88%) women were experiencing perineal pain and in 13 (26%) cases this was present all the time, 18 (36%) women experienced pain only on moving and the remaining 13 (26%) women said they only felt pain on rising. Again the severity of the pain ranged from mild to very severe.

Although 41 women in the study group complained of wound pain, none of them was actually recorded as having this problem in the obstetric and midwifery notes. Similarly 44 women in the control group complained of perineal pain at the time of the hospital interview and only 14 were noted to have a painful perineum in the written records

Other morbidity experienced since delivery

Women delivered by caesarean section reported significantly more backache, headaches, wind, constipation and pain at the site of the intravenous infusion than those women delivered vaginally (Table 9.6a). The problems also lasted significantly longer in the study group (Table 9.6b). A marked discrepancy arose when this information was compared with the recorded morbidity in the obstetric case notes and the midwifery kardex. As can be seen in Table 9.6c, although 35 women in the study group had complained of backache since delivery only 4 had this fact recorded in the notes. Similarly, 16 women in the control group stated that they had experienced dysuria since delivery, but none of the women had this recorded.

Effect of experienced morbidity on infant care

When asked if any of the discomforts or pain experienced had made it difficult to care for the baby, 34 (68%) of the study group and 12 (24%) of the control group responded positively (X^2 19.485, df 1; $p < 0.001$). In the control group, 11 of the 12 women who experienced problems caring for their baby were delivered by forceps. In the majority of cases perineal or wound pain made it difficult to lift and handle the baby.

9.7 : Short-term Morbidity

The 100 women in the study and control groups were sent a postal questionnaire three months after delivery in an effort to determine the short-term morbidity associated with the method of delivery. Forty five women in the study group and 46 of the controls returned completed questionnaires giving an overall response rate of 91%. The following section describes the morbidity as reported by those who replied; medications received since discharge from hospital; infant health since delivery and infant feeding practices.

Comprehension of reasons for operative delivery

The women were asked what type of delivery they had had and, if they had a forceps delivery or a caesarean section, they were then asked why this was carried out. The reason documented on the postal questionnaire was compared with the reasons that had been written in the obstetric case notes. Answers were subsequently coded as being right, partially right, wrong, do not know or not stated. The coding of answers was carried out by two examiners independently to ensure the validity of the coding.

In the study group 29 (64%) of women stated the reason for caesarean section correctly and a further 7 women (16%) were partially right in their comprehension of why the caesarean section was necessary. Of the remaining respondents, 4 women gave completely wrong explanations for their section and a further 4 (9%) stated that they did not know why they had to have an abdominal delivery. One women (2%) failed to respond to this question. In the control group of the 25 respondents delivered by forceps, 20 (80%) knew why the delivery was carried out, a further 4 (16%) women were partially right and 1 woman was wrong in her answer (Table 9.7a).

General recovery

The women were also asked if they felt back to their normal selves since the delivery and although 32 (69%) of the control group responded positively, only 23 (51%) of the study group felt the same way (Table 9.7b). This did not, however, reach statistical significance.

State of happiness

Another question enquired if the women felt happier, less happy or unchanged since they had their babies and 76% in the study group compared with 72% of the controls responded positively, 9% in each group felt they were less happy and the remainder felt they were unchanged (Table 9.7b).

State of health

In response to a question enquiring specifically about their state of health since delivery, 51% of the study group felt that their general health was unchanged, 40% felt less healthy and 9% felt their health had improved. The corresponding figures for the control group were 61%, 28% and 11% respectively (Table 9.7b).

Wound pain

Specific questions in the postal questionnaire attempted to elicit information about the number of women who experienced discomfort from their abdominal or perineal wound following discharge and the length of time that this lasted for. As can be seen from Table 9.7c, in the control group 26 (57%) of the women experienced perineal pain after discharge from hospital although by 4 weeks this had ceased in 73% of the women and in the remainder it was gone by 8 weeks. In the study group 20 (44%) of the respondents experienced wound pain after discharge. For 55% of these women the discomfort had resolved within 4 weeks of discharge; a further 20% within 8 weeks and for 10% within 12 weeks. However, 3 women (15%) were still complaining of pain more than 12 weeks after discharge from hospital.

Wound leakage

A similar question was asked to determine how many women experienced leakage from their abdominal wound after discharge. A total of 22 women (49%) had problems with leakage, although for 77% this had stopped within 4 weeks of hospital discharge. Another 14% experienced resolution of the problem within 8 weeks and by 12 weeks post delivery only one woman still had the problem of leakage from her abdominal wound (Table 9.7d).

Morbidity since delivery

The women were asked if they had experienced any of the problems listed below since the delivery of their baby :

1. *Urinary tract infection*
2. *Wound infection*
3. *Breast infection*
4. *Backache*
5. *Wind*
6. *Constipation*
7. *Painful piles*
8. *Sleeping difficulty*
9. *Tiredness*
10. *Depression*

They were also asked at what stage they experienced them - either in hospital, up to 4 weeks, up to 8 weeks or up to 12 weeks post-delivery.

Table 9.7e shows the number and percentages of women in the sample who experienced the problems mentioned. The most common complaint in both groups was that of tiredness. In the study group, backache (72%), constipation (58%), wind (42%), depression (40%) and sleeping difficulties (40%) were also common complaints amongst the respondents. Similar patterns arose for the respondents in the control group. The only variables where a significant difference was found between the groups were that women in the study group reported a higher incidence of wound infection than the control group ($p < 0.01$), and a higher proportion of women in the control group experienced painful piles ($p < 0.05$) and breast infection/cracked nipples ($p < 0.05$).

Tables 9.7f and 9.7g show the number of women in the study and control groups who experienced the stated problems at the defined intervals and Tables 9.7h and 9.7i show the number of times each problem was mentioned by individual women. Combining the data in these four tables gives a better indication of the incidence of morbidity in the women. Therefore although 36% of the respondents in the study group complained of backache at 12 weeks in only 20% of women had this persisted since delivery. Similarly 9% of women in the control group complained of depression at 12 weeks and in 4% of the women this had persisted since delivery.

Table 9.7j shows the number of women in the study and control groups for whom the stated problems had persisted from the time of delivery until the return of the postal questionnaire and no significant differences were found between the groups.

Comparison of reported and recorded rates of morbidity experienced in hospital

An interesting difference arose when the data from the respondents to the postal questionnaire relating to the morbidity experienced in hospital was compared with the reported morbidity obtained from the medical case notes and the nursing kardex. (Table 9.7k).

Categories in the medical/nursing notes were expanded to allow, for example, not only definite urinary tract infection but also suspected urinary tract infection to be included. However, even allowing for this there were major differences in what the women claim to have experienced and what was actually recorded in the notes.

Thus, while 38% of the study and 37% of the control respondents stated that they had sleeping difficulties in hospital - none were actually noted by the medical or midwifery staff as having this problem. Similarly, 76% (study) and 67% (control) of the women stated that they experienced tiredness in hospital and yet none had this fact recorded in either the medical or nursing notes.

These major differences in reported and recorded morbidity would appear to highlight a large discrepancy in medical and nursing assessment of women in the post-natal period.

Medication since delivery

The women were asked if they had received any medication from their GP since delivery, and if so, what was prescribed, what they were prescribed for and at what stage they had taken them. In total 24 (53%) of the study respondents had received medication with 13 (29%) being prescribed one course of therapy, 8 (18%) two courses of treatment and the remaining 3 women

(7%) had three. In the control group 31 (67%) of the women had received medication from their GP and for 20 (43%) this happened on one occasion, for 7 (15%) on two occasions and for 4 women (9%) on three. No significant difference was detected between the groups for this variable (X^2 1.652, df 1; NS).

The most common indication for the prescription of medication was the presence of infection and Table 9.7l shows the types and incidence of such morbidity. Antibiotic therapy was prescribed for 12 (27%) of the women in the study group - in 8 cases on one occasion, in 3 on two occasions and 1 woman had received 3 courses of such treatment since delivery. In the control group 16 (35%) of the women had been treated by antibiotics with two women receiving such medication on two occasions and 1 woman on three. No significant difference was detected between the groups in the number of women prescribed antibiotic therapy (X^2 0.594, df 1; NS).

Other reported illnesses for which medication was prescribed are shown in Table 9.7m and the most frequently prescribed groups of drugs in Table 9.7n. Cross checking of the prescribed therapy with the illness reported by the women did not reveal any apparent errors in reporting. No significant differences were detected between the two groups of women for any of these variables.

Infant illnesses

The women were then asked general questions on infant problems experienced since birth and requested to list any illnesses and medications received by the baby. Overall, 48% of the respondents reported that the baby had a problem with wind, 17% reported feeding difficulties, 15% crying and 11% sleeping. No differences were seen between the infants in the study and control groups for these variables.

Illnesses were recorded for 21 (47%) infants in the study group and 13 (28%) in the control group (X^2 3.761, df 1; NS). Of the 21 infants in the study group, 7 (16%) had one episode of

illness, 12 (27%) two episodes and 2 (4%) three. The corresponding figures for the control group were 2 infants with 1 episode of illness, 9 infants had two and in the remaining two cases, three episodes were reported. The most commonly occurring problems are shown in Table 9.7o. Only one infant had been hospitalised by the time of the postal questionnaire return and this was for surgery for pyloric stenosis.

Medication was prescribed for 34 infants (21 study, 13 control) - X^2 3.761, df 1; NS) and the drugs most commonly prescribed are shown in Table 9.7p.

Infant feeding practices

Women were asked which way they intended to feed their baby prior to delivery (Table 9.7q). Of the respondents in the study group , 29 women (64%) indicated that they planned to breast feed with the remaining 16 women (36%) opting to bottle feed. In the control group similar proportions of women intended breast feeding (65%) and bottle feeding (35%) - NS.

The women were then asked how they had actually fed their babies since delivery, and 23 (49%) study group respondents and 26 (57%) in the control group attempted breast feeding (X^2 0.392, df 1; NS). Of these women, 14 gave up breast feeding within 1 week of delivery and a further 7 had discontinued by the end of the second week postnatally. By the end of the first three months 6 (13%) of the study group and 8 (17%) of the control group were totally breast feeding and a further one woman was combining breast with bottle feeding (Table 9.7r) - X^2 0.684, df 2; NS.

9.8 : Home Interview

Permission was sought to conduct an interview at home with all of the women in both the study and control groups 6 months after delivery. The interview was conducted by the researcher and subsequently 42 (84%) of the women in the study group and 44 (88%) of the controls were successfully contacted. Two women in the study group were completely lost to follow-up

after discharge from hospital, with both the postal questionnaire and request for permission to interview being returned by the Post Office. Both women had been delivered by emergency caesarean section under general anaesthesia for cephalopelvic disproportion (one failed forceps delivery) after labours lasting 15 and 17 hours respectively. Although contact at 6 months was not made, the remaining 6 women had all returned completed postal questionnaires 3 months following delivery. At that stage four of the women felt they had returned to normal health and in the other two cases one woman complained of recurrent chest infections and gastric upsets while the other stated that her abdominal wound was still swollen. All six women claimed to be happier within themselves since giving birth.

In the control group, of the six women lost to the 6 month follow-up, all had returned completed questionnaires at 3 months. Three of the women had spontaneous deliveries and three had been delivered by forceps. At that time only one of the 6 felt she was not back to normal health and stated that this was due to being tired and overweight and generally feeling less happy and less healthy than before the baby was born. The remaining 5 felt they were back to normal health although three were still troubled by painful piles, one by backache and one woman still felt slightly depressed at this time. Three of the five women felt generally happier since the birth.

In the following sections data obtained from the home interview relating to the women's health, resumption of sexual activity and sexual problems experienced as well as the women's attitude to future pregnancies is presented. Qualitative data obtained at this time on the women's experiences of antenatal, intrapartum and postnatal care is presented in the next chapter.

Health Score

In the first section of the interview the women were asked about their health and asked to rate on a scale of 1 *(not at all well)* to 5 *(very well)* how they were feeling at the time of the interview. The mean health score of women in the control group at 4.36 (range 2-5,SD 0.73)

was slightly higher than that of the study group at 4.07 (range 1-5,SD 1.15) but this did not reach statistical significance (T -1.33, NS).

General health since delivery

The next question enquired if the woman now felt as healthy as before the pregnancy and 16 (38%) women in the study group and 13 (30%) of the control group stated that they were not (X^2 0.703, df 1; NS). Of the 16 women in the study group, backache was the major problem present in 6 cases and tiredness in a further two. However, in the majority of cases women complained of multiple problems ranging from backache, wound pain, paraesthesia at the wound site to tiredness and depression. A further 5 (12%) women in the study group stated that they were back to normal health but still required medication for problems experienced since delivery - in three cases for backache and in two for depression. In the control group 13 (30%) women stated that they had not returned to normal health and the major problems complained of in this group were tiredness (6 cases), backache (2 cases) and again multiple problems (5 cases) which varied from alopecia, depression, tiredness, backache and weight gain/loss. Two women stated they were just back to normal having completed courses of treatment with anti-depressants and another now felt normal having been prescribed sleeping tablets by her GP which allowed her to get some rest at night.

Some women in both groups (study=16, control=19) had experienced a variety of illnesses since delivery for which they had been prescribed medication (X^2 0.230, df 1; NS). Several women in the control group had repeated perineal infections which required antibiotic therapy and in one woman the problem had been so severe that she had been unable to sit comfortably until 3 months after the birth. A further complication of persistent infection with candida albicans had ensued since. Another woman was waiting for an appointment to attend the gynaecology out-patient clinic because of delayed perineal healing which meant she had been unable to resume intercourse at the time of the interview.

Resumption of sexual activity

Table 9.8a shows the time at which intercourse was resumed in the 2 groups. A statistical difference arose between the populations ($p < 0.05$), with women in the study group generally resuming normal sexual relationships faster then the controls. However, when the table was further collapsed to show the number of women who had resumed intercourse by 2 months postnatally, although 29 (69%) of the study group had had intercourse compared with 22 (50%) of the controls, this was not statistically significant. At the time of the home interview 4 of the control group had still not had intercourse, although in one case this was due to a marital break-up.

Sexual problems since delivery

Twenty (45%) women in the control group had experienced sexual problems since delivery compared with 15 (36%) in the study group (Table 9.8b). When asked why these problems had arisen, 11 of the women in the control group stated that the main problem was due to perineal pain causing dyspareunia and a further 6 felt the problem was mainly due to disinterest. By 6 months six (14%) of the women delivered vaginally were still experiencing what they considered serious sexual difficulties (Table 9.8d) - one woman had severe dyspareunia and was awaiting an appointment at Glasgow Royal Infirmary, another who had not attempted intercourse felt she *"wasn't interested and frightened now too. I feel I should go and see a doctor about it"* (C17). A further two women were still experiencing pain on penetration and as a result didn't enjoy sex anymore - *"I just lie there and pray for it all to be over "* (C36) was the way one described her experiences. The remaining two women stated that they now had a total lack of interest. All 6 women said they enjoyed sexual intercourse before the baby's birth and felt that their problems were at least in part responsible for a deterioration in the relationship with their partner.

As expected in the study group in the main problems were caused by lack of interest due to tiredness rather than dyspareunia. However by 6 months only two (5%) women in the study

group felt they still had major sexual problems; one woman had only had intercourse once due to depression and a total lack of interest and the other stated that she now felt they had a serious problem again due to total lack of interest - "*it was bad before but it's even worse now*" (S29).

Future Pregnancies

Table 9.8c shows the stated intentions of women in both groups regarding future pregnancies. Two (4%) women in the control group were adamant that they would never have another baby. In one case the couple had only ever planned to have one baby and in the other this pregnancy wasn't planned and "*this experience confirmed all my worst fears about childbirth*" (C45). This woman interestingly said that she felt that all women should be delivered by elective caesarean section to stop them having to go through labour and delivery. A further 7 (16%) women were unsure about a second baby, though in only one instance was this related to problems experienced on this occasion (in the postnatal period rather than the labour and delivery). In the remainder it was due to either the financial implications of the new arrival or the change in life-style experienced since the birth.

In contrast 6 (14%) women in the study group said they would never have another baby - in 5 instances due to their labour and/or delivery experiences and one due to the tiredness and sleepless nights involved . A further 7 (17%) women stated that they didn't know if they would have another baby, and 4 said this was mainly due to their experiences. One other woman said that she could only now begin to think about another baby and that she couldn't have considered it before due to her labour experience rather than the delivery itself. In one case of *'don't know'*, after a particularly traumatic delivery due to haemorrhage which required multiple blood transfusions, the husband refused to consider another pregnancy although the woman herself seemed to think she might be prepared to try again in a few years time.

Summary

50 primigravidae of normal stature and with no major antenatal complications who were delivered by emergency caesarean section during the course of labour were compared with a group of 50 primigravidae delivered vaginally. The two groups of women were closely matched and all delivered between 37 and 42 weeks gestation. Women delivered by caesarean section had longer labours, developed more complications during the course of labour and required an increased number of obstetric interventions than women delivered vaginally. The blood loss at delivery was also greater and 18% of women in the study group required blood transfusion compared with only 2% in the control group.

The main indication for the performance of caesarean section in the study group was dystocia (78%), fetal distress accounted for 16% and other indications were mentioned in the remaining 6%. In the control group 46% of the women delivered spontaneously and 54% were delivered by forceps.

The mean length of stay in hospital after delivery was greater for women delivered by section as was the length of follow-up by the community midwives. Although the numbers who intended to breast feed in each group were similar, fewer of the women in the study group actually attempted to put the baby to the breast. Ninety percent of those delivered by caesarean section had postnatal radiological pelvic examination.

The mean birthweight of infants born to women in the study group was significantly greater and a larger proportion of the babies were male (70% v 38%) when compared with the controls. Even when birthweight was controlled for the sex of the infant, 30% of those babies born by section had birthweights greater than the 90th percentile compared with 12% of those delivered vaginally. A larger proportion of the study group infants required active resuscitation (26% v 16%) and more were admitted to the Paediatric Unit (8% v 4%). More infants in the control

group sustained some type of birth injury at delivery (16% v 8%) and all of the infants in the former group were delivered by forceps.

The patterns of recorded morbidity were different in the two groups of women due to the different delivery methods. Most of the morbidity in the control group was related to perineal trauma sustained at delivery, whereas in the study group a wide variety of morbidity was documented. Much of this was infectious morbidity and this resulted in 19 (38%) of the women delivered by section being prescribed antibiotic therapy compared with none in the control group. It was apparent that many of the problems the women complained of in the postnatal period were not recorded in either the medical or midwifery notes and this appeared to highlight a major deficiency in the assessment of the women by midwives in the postnatal period.

The response rate to the postal questionnaire was 91%. Three months after delivery 20% of women delivered by caesarean section either did not know or gave completely wrong explanations for the performance of the operation and a further 16% were only partially right in their comprehension. At this time 51% of the study group stated that they felt back to normal and 40% felt less healthy than before the pregnancy. The corresponding figures for the control group were 70% and 28%. Similar patterns of morbidity were apparent in the 2 groups of women, although more women in the control group had been prescribed medication by the GP (67% v 53%). Three months after delivery only 13% of infants delivered by caesarean section and 17% delivered vaginally were still being totally breast fed.

A semi-structured home interview was conducted 6 months after delivery and 84% of the study group and 88% of the control group were successfully contacted. At this time 38% of the women delivered by section did not feel back to normal health and a further 12% were still taking medication for problems experienced since delivery. In the group delivered vaginally, 30% still did not feel they were back to normal and a further 2 women said they were just back to normal having completed courses of anti-depressant therapy. The problems still being complained of

ranged from tiredness and depression to backache and wound pain. In the majority of these cases multiple complaints were made.

Women delivered by caesarean section resumed intercourse sooner than those delivered vaginally and had fewer sexual problems after the birth. By the time of the home interview 4 women delivered vaginally had still not resumed intercourse compared with none of the women delivered by section.

Six months after the birth, 6 women in the study group were adamant they would never have another pregnancy and in 5 cases this was due to the experience on this occasion. A further 7 were unsure about another baby and 4 said this was mainly due to events this time. In the control group only two of those interviewed said they definitely would never have another pregnancy, but the reasons for this were unrelated to the experience of labour and delivery. A further 7 did not know if they would have another baby but in only one case was this related to the experience on this occasion.

Chapter 10

Women's Experiences of Maternity Care

Chapter 10 : Study / Control Group
Women's Experiences of Maternity Care

In this chapter some of the qualitative data which was obtained from both the hospital and home interviews is presented. As discussed in the literature review, childbirth is a personal and social experience as well as an obstetric event and the study was designed to take account of women's views of their experience on this occasion.

10.1 : Hospital Interview

A structured hospital interview was conducted by the researcher between the 4th and 5th postnatal days and completed forms were analysed for the entire group of 100 women. A copy of the interview schedule is included in Appendix 2. This first section presents some of the results obtained from this source.

Sources of information about pregnancy and delivery

The first part of the questionnaire attempted to elicit where the women had received information about pregnancy and delivery. It was apparent that all of the women had gleaned information from a wide variety of sources such as friends, books, magazines etc. In both the study and control groups, 76% of the women had attended antenatal classes provided by the hospital. In addition to these classes 4 women (2 study, 2 control) had attended antenatal classes provided by the National Childbirth Trust.

Health during pregnancy

In the study group, 36 (72%) of the women stated that the pregnancy was planned compared with 37 (74%) in the control group (X^2 0.051, df 1; NS). In the former group 44 (88%) of the women said that they remained well throughout the course of the pregnancy compared with 45 (90%) of the controls (X^2 2.602, df 1; NS). One interesting finding was that only 12% of the

women in the study group considered during the pregnancy that they might eventually be delivered by caesarean section compared with 44% of the controls (X^2 8.745, df 1; $p < 0.005$). The reasons cited for considering this mode of delivery ranged from friends and relatives being delivered by this method to being told by staff during the pregnancy that either the baby was in a breech position, or that it was a big baby or that the placenta was low lying.

Experience of labour

The women were also asked what the labour was like and in the study group only 8 (16%) stated it was as they expected with 12 (24%) who found it better than expected and 30 (60%) worse than expected. The corresponding figures in the control group were 12 (24%) as expected, 16 (32%) better and 22 (44%) worse (X^2 2.602, df 1; NS). For those women who thought the labour was worse than expected, the most commonly mentioned reasons were either that the labour was longer than anticipated or that it was more painful.

Study Group : feelings on being told of caesarean delivery

In the study group only 10 (20%) of the women knew of the decision to deliver the baby by caesarean section for an hour or longer before going to theatre. In 30 (60%) cases the women had less than 30 minutes from being told of the decision until they were taken to theatre. For 24 (48%) women the overwhelming feeling on being told of the decision to section was that of relief that the labour was at last going to be terminated. A further 7 (14%) stated that by the time they were told they were so exhausted they didn't care what was going to happen, 13 (26%) were terrified at the thought of a surgical operation and the remaining 6 women were unhappy or disappointed at the thought of surgical delivery but accepted it for the sake of the baby.

In 27 (54%) cases, the women had suspected that the course of the labour was not progressing as it should - in the majority this was due to the lack of progress after vaginal

examinations or because they knew that signs of fetal distress had been detected by electronic fetal monitoring. One woman said that although no-one had told her that anything was amiss in labour, as soon as the resident came to take a sample of venous blood for cross-matching without explanation she suspected that the obstetrician planned to deliver her by section.

Eighteen (36%) of the women felt that the decision to deliver by section should have been taken sooner than it was, because lack of progress had been apparent for some time. Only one woman thought that the decision had been taken too quickly and that the trial of labour should have been longer.

In 32 (64%) of the deliveries the husband /partner was in theatre throughout the operation and where this was not the case the reason was generally that general anaesthesia was administered for the operation or that the partner did not wish to be present.

Control Group : experience of delivery

In the control group 23 (46%) women had spontaneous deliveries and 27 (54%) were delivered by forceps. In 8 (16%) cases, women stated that the delivery was as they expected, 21 (42%) thought it was better and 21 (42%) said it was worse. Where women thought it was better, the commonly mentioned reasons were that it was shorter (8) or that no pain was experienced due to an effective epidural block (12). One woman said that she was so doped with pethidine that she couldn't remember a thing about it and was quite happy that this was the case. The reasons commonly cited for the delivery being worse than expected were that it was harder work (9), more painful (8) and that the experience was unpleasant or traumatic (4). In 80% of cases in the control group the woman's husband or partner was present at the delivery.

Contact with infant after delivery

The women were asked when they first remembered seeing their baby after he/she was born (Table 10.1a) and although all of the control group saw their infant immediately at delivery, 15 (30%) of the group delivered by section did not ($p < 0.005$). The women were then asked when they first held their baby (Table 10.1b) and 90% of the control group were allowed to do so immediately compared with only 20% of the study group. By 6 hours after delivery 48 (96%) of the controls had held their infants compared with 22 (44%) of the study population ($p < 0.001$). The same differences arose when the women were asked when they first fed their baby (Table 10.1c). By 24 hours after birth, 41 (82%) of the women in the control group had fed compared with only 12 (24%) of the study group ($p < 0.001$).

Study Group : experience of Special Care Unit

During the study period women delivered by caesarean section in Glasgow Royal Maternity Hospital were admitted to a Special Care Unit for a variable period of time. This unit does not have nursery facilities and babies are therefore admitted to the ward nurseries and only brought up at feeding times. In the study group, 8 (16%) women would have preferred to go directly to a postnatal ward from theatre either because they did not like being separated from the baby or because they were bored in the unit. At the other end of the spectrum, 18 (36%) felt that they were not in the unit for long enough and were expected to do far too much for themselves in the postnatal wards. Overall 26 (52%) women appreciated admission to the Special Care Unit as they were tired and sore in the first 48 hours after surgery and it allowed them to rest. Seventeen women (34%) would have appreciated more time with the baby during the stay and 6 (12%) said they were unable to rest properly because they were so worried that something was wrong with their infant.

Care in the postnatal period

By the time the hospital interview was conducted, all the women in the study group had been discharged to the ordinary postnatal wards. One question in the schedule asked if the

woman got enough rest in the postnatal ward and only 28 (56%) of women in the study group said yes in comparison with 38 (76%) of the control group (X^2 4.456, df 1; $p < 0.05$). The reasons given for the lack of rest in the study group were the noise of babies (9), expected to do far too much by the staff (11) and that there were too many visits by medical / midwifery / physiotherapy staff (2). In the control group the reasons given were the same except for one woman who said that she didn't get enough rest because she had to help the women who had been delivered by caesarean section far too much ! In the study group, 13 (26%) of women would have appreciated being placed in a ward with other women delivered by caesarean section because they thought that the pace would have been slower and that staff would have been able to offer more help especially with baby care. Some women also felt it would be reassuring to see others in the same position as themselves.

Desire for further information

The final question asked if the women felt they required any more information about the labour and delivery before they went home. Only 9 (18%) of the control group compared with 24 (48%) in the study group felt they would (X^2 10.176, df 1; $p < 0.005$). In the study group 16 women wanted more information about the events which occurred during labour and 8 wanted to know more about how subsequent pregnancies would be managed.

10.2 : Home Interview

The home interview was conducted by the researcher 6 months after delivery and 42 women in the study group and 44 in the control group were successfully contacted. The data presented in this section includes many of the comments made by the women during the course of the interview.

Enjoyment of labour and delivery

The women were asked to rate the experience of labour and delivery separately on a scale ranging from 1 *(did not enjoy it at all)* to 5 *(enjoyed it very much)* points. The mean score for

women in the study group was 2.05 (range 1-5, SD 1.10). This was lower than the mean score in the control group at 2.47 (range 1-5, SD 1.27) but the difference did not reach a level of statistical significance (T -1.67, NS). For the experience of delivery the mean score of women in the study group at 2.79 (range 1-5, SD 1.27) was slightly higher than that of the control group at 2.63 (range 1-5, SD 1.39) but again this did not reach statistical significance (T 0.51, NS). Six of the women interviewed in the study group were delivered under general anaesthesia and therefore no score was recorded for this variable.

In order to get a more realistic view of the different labour and delivery experiences of the 2 groups of women it is necessary to examine the actual comments made by the women about their experience on this occasion.

Pain of labour and experience of analgesia

In the study group 39 (93%) of those interviewed mentioned the pain associated with labour. Although 3 women did not specifically mention the pain, all scored the experience of labour at the lowest point on the scale and stated that they had hated the whole experience. One of the women felt that the labour was " *the biggest disappointment and disaster in my life"* and when events had not gone as she anticipated felt *"very confused and bewildered at what followed"* (S26). Another felt she was a "*failure*" (S7) and the remaining woman "*didn't feel involved in the decisions that were being made about me*" (S9). Four women in the study group found it difficult to remember the pain and a further 2 stated that they did not experience much pain but recognised that this was probably due to the fact that the decision to intervene by caesarean section was taken fairly early on in the course of labour. Only one woman in this group felt that the pain of labour was easier than she expected, whereas 16 said that they were completely unprepared for the intensity of the pain experienced.

Thirteen women were satisfied with the level of analgesia obtained through epidural analgesia although a further 4 complained of poor pain relief with this method, usually as a result of a

unilateral block. All but 1 of the women who had been given pethidine stated that the pain relief from this method of analgesia was poor and that they did not like the side-effects associated with the administration of the drug and this is illustrated by the following comment " *the pethidine made me feel there sometimes and not at others - if I had known that I would have had the epidural sooner* " (S44).

In the control group 10 of the women interviewed felt that the pain of labour was easier than they had anticipated, although 4 said this was because they opted for epidural analgesia from the start of labour and the remaining 6 said the pain was bearable because it did not last for long due to the short duration of labour. As in the study group all but 2 of the women who received pethidine were unhappy with both the analgesic effect of the drug and the resulting side-effects such as drowsiness, disorientation and nausea. Although many of the women had not planned to have epidural analgesia before the onset of labour, 14 were eventually very happy with this method of pain relief. A further 7 felt that epidural analgesia gave partial but not complete relief of pain and some were unhappy that the cannula had to be resited several times. One woman commented that "*the epidural was dreadful; they took 3 attempts to site it which although not particularly sore was a horrible sensation. Once sited it only blocked one side which no-one had warned me might happen and I was frightened that something was wrong with me*" (C6) and another stated that she "*was given the epidural which worked initially but then the top-ups were ineffective. They later discovered that this was because the cannula had fallen out. The staff were unsympathetic until they realised this and I was eventually given pethidine and later a second epidural*" (C23).

Several women in both the study and control groups felt that the backache they were still experiencing at the time of the home interview was a direct result of epidural analgesia and in retrospect were unhappy with the method - "*I liked it (the epidural) at the time but now think it has caused all my backache and wouldn't have it again*" (C42).

Duration of labour

The length of labour was mentioned by 27 of the 42 women interviewed in the study group and all but 1 said that the labour was much longer than they had expected. Nine of these women went on to say that they felt the staff had waited too long before deciding to carry out the delivery by caesarean section. Most of the women who made this comment felt that the staff had known for some time that the labour would end with this type of operative intervention and is illustrated by the following typical comment - *"I was left for far too long, especially in the second stage of labour. I felt they knew I was going to have a section long before it was carried out. I heard 2 doctors discussing it as they walked away from the bed. I still feel angry about that"* (S6).

In the control group, 33 of the 44 interviewed mentioned the duration of labour and 18 of the women felt it was shorter than expected, 3 as expected and only 12 said it was longer than they anticipated. Of the 18 women who stated the duration was short, 6 mentioned the fact that although they knew the labour was long the time had passed by extremely quickly - *"the time seemed to fly by, I had no concept of time"* (C48).

Staff support in the intrapartum period

Some women mentioned the support given to them in the labour ward by both the midwives and obstetricians. In the control group, of the 28 women who made some comment about the labour ward staff, only 3 felt that the midwives could have been more supportive. One woman felt she was left on her own for *"long periods of time"*. She also commented that the pethidine had made her sleepy and that when she looked back *"there are blanks"* (C46) so the clarity of recall may have been unreliable. Another woman felt that when the midwives were there they were *"helpful"* although she *"felt ignored for part of the labour"* (C35).

In the study group, 32 women commented on the support given by staff and generally the comments were of a less positive nature. Twelve women were happy with the midwives and

doctors but a further 7 felt they should have been given more information about what was happening or that the staff could have been more sympathetic towards them - "*the staff were very helpful but I would have appreciated more information about how my labour was coming on*" (S7) or "*I felt the midwives were very supportive but I feel quite angry about the attitude of the doctors who were very secretive about what was happening*" (S9) or "*I was annoyed with the registrar who wanted the epidural to wear off so that I could push. He wasn't at all sympathetic, I couldn't cope with the pain and had to beg for them to top it up*" (S28).

Some of the women commented on the fact that although explanations may have been given by the staff, events happened too quickly and they were unable to take in information. Typical comments made by these women included " *the staff were very supportive but with so much happening I didn't really take much in*" (S5) or "*the support was good from the midwives and they explained what was happening, but ultimately it didn't resolve what I was feeling* (disappointment / confusion / bewilderment)" (S26) or "*the baby's heart was going off and I remember being pushed from side to side and then put on a trolley. I can't remember if anyone told me what was going to happen, it was all such a rush and I just wanted it over*" (S49).

A further 12 women were unhappy with the support given by the staff during labour and the reasons for this ranged from procedures which were carried out without consent - "*they kept on giving me jags to stop it (nausea), which didn't work and I didn't really want them, however they never really asked me*" (S10); not believing the women - "*they didn't give me any information and wouldn't admit to the fact that I was in labour*" (S29); to not allowing the women to participate in the decision making process - "*I didn't feel involved in decisions that were made about me*" (S9).

Other comments made by the women ranged from how they felt about the various procedures they were subjected to in the labour ward to their general recollections of the events that occurred during this time.

Women's reactions to vaginal examinations

Nine women in the control group and 3 women in the study group mentioned the pain associated with vaginal examinations. For one woman in the control group the first comment made regarding her experience of labour was "*the thing that stands out most is the discomfort of the internal examinations. I just got more and more frightened of them as the time went on*" (C20). She found that as the labour progressed she became obsessed thinking about the next one and "*kept on watching the clock to see when the next one was due*". Another woman stated that she felt the doctor "*was trying to get his hand through my mouth*" (C37). In the study group one woman "*hated all the internals which got worse as the labour went on*" (S37). This woman had no idea at the time of the home interview why her caesarean section had been carried out and was so frightened at the thought of a vaginal examination that she did not go back to the hospital for the 6 week post-natal examination.

Other comments related to the intrapartum period

Five women (3 control, 2 study) now felt that the whole of the labour and delivery experience was a blur with many gaps in their recall. Another two women stated that all they remember was being frightened by the whole affair - "*I lay in bed for most of the time and all I remember was being frightened*" (C6).

Small numbers of women complained about a wide variety of events that occurred during the course of labour. One woman said that "*although I knew of what procedures were involved, I didn't expect to feel so degraded by them all. It was as though someone had stripped me and made me walk down Sauchiehall Street*" (S3). Another felt that "*it could have been more private - people seemed to be walking in and out all of the time and sometimes when they did the internals the curtains were left half open*" (C35).

Others felt they had been worried about what would happen in labour and yet in the event their fears were unfounded - "*I had worried about the procedures such as breaking the waters,*

internals etc but in the event they weren't as bad as I expected" (C16) or "*the midwives were helpful and always maintained privacy when I was in labour - I had heard that sometimes you are made to feel like a lump of meat*" (C2).

Several women felt embarrassed looking back on what happened in labour, usually as a result of the way in which they had responded to the events that occurred - "*it's now embarrassing to think of the noise that I made laterally but at that point I thought that I was going to die*" (C23). Another woman, this time from the study group, did not return for her post-natal examination because she "*was scared to go back to the hospital as I thought it was my fault that I had the caesarean section because I was crying and was sick through the labour - I thought the doctor might give me a row or would say something about how I behaved*" (S10).

Study Group : women's reactions to news of caesarean section

When actually told that the delivery would be by caesarean section the majority of women in the study group said they experienced a mixture of emotions such as relief, fear, confusion and disappointment. Many women said they were so exhausted by that time that they no longer cared what happened - "*at the point when they told me it would be by section I was past caring and just wanted it to be over and done with*" (S14) or "*it (the labour) just kept on and on and latterly I was completely exhausted. I was quite grateful when they told me it would be by caesarean section*" (S29).

Fourteen of the women mentioned feeling frightened at the thought of an operative delivery. In some cases the fear was mainly for the baby - "*I was very frightened about whether the baby would be alright, I didn't care so much about myself*" (S5); in some cases for self "*I was very frightened at that point and thought that I was going to die*" (S45); but in the majority of cases the fear was of a more generalised nature - "*I was terrified of the caesarean section probably because I didn't know anything about it and I didn't know what would happen - they just suddenly said she would have to be born that way*" (S19).

Four women felt disappointment when told of the decision and said this was because they had never considered that the delivery would be anything other than spontaneous - *"I felt disappointed that I wouldn't have it the normal way, before I went into labour I never even thought it would happen any other way"* (S16).

Several women felt that events happened too quickly for them and as a result they felt quite detached from all that was going on - *"I don't remember feeling frightened for me or the baby, I just didn't feel anything"* (S24).

Study Group : women's experience of theatre

Although 34 of those interviewed were delivered under regional analgesia, 6 women found it difficult to recall the events in theatre at the time of the home interview. In some cases this difficulty extended into the days following delivery - *"the only bit I remember is being wheeled into theatre and seeing that light overhead. It was the only time that I opened my eyes but I quickly shut them again. Then I heard it was a boy and he was OK. It didn't mean much to me. I went through the next few days in a haze"* (S24).

Twelve of the women found the experience of theatre frightening. One mentioned that she could *"still remember the smell of theatre at this date and sometimes find myself dreaming about it"* (S7). In the remaining 22 cases, 13 of the women said that the relief that the labour was to be terminated overcame any fear of the operative procedure - *"I was relieved that the end was in sight at last. By that time I was desperate to be out of the situation I was in - I wasn't frightened, I had forgotten the baby"* (S26). A further 5 women said they felt completely detached from all that was happening and did not remember any emotion at that time - *"I didn't feel frightened as I knew what a theatre was like, in fact I don't remember feeling much about anything"* (S8). One woman said she was *"happy to be awake and able to be part of the delivery and yet it wasn't an enjoyable experience"* (S11). In the remainder of cases the women said they were excited to know that the baby was about to be born - *"I was very excited that the baby was coming and*

very high the whole time in theatre until just after he was born" (S9) and "*I wasn't all that bothered about the theatre, my overwhelming feeling was that I was going to see my baby at last*" (S28).

Study Group : women's emotions at delivery

As the baby was actually born the women experienced a variety of emotions. For some it was excitement (n=11) - "*I was really excited and thrilled when they laid him down beside me*" (S34); for others relief (n=6) - "*I was so glad when she was finally born to know she was alright*" (S19) and for some (n=7) it was difficult to take in the fact that they actually had a baby - "*I didn't see the baby being born as they didn't take down the screen. When they eventually showed me the baby I felt it could have belonged to someone else*" (S33). Ten women made no comment as to their feelings at this time.

Study Group : other comments related to delivery experience

In 12 cases women complained that discomforts or pain they experienced during the actual operation marred the event. These discomforts ranged from nausea/vomiting (n=4), general discomfort on the operating table (n=3) and pain due to ineffective epidural block (n=4). In one case an ovarian cyst was discovered at the time of surgery and the woman had to wait for 20 minutes until a senior registrar arrived to complete the operation during which time she became very sore and had to be given papaveretum. She mentioned that her husband had been afraid to complain about the delay in case they threw him out of theatre.

Many of the women whose partners were present for the delivery commented on the fact that they appreciated that they were allowed to be there and that the experience would have been less positive if this was not the case. Several women also mentioned that they asked their partner about events for which they had poor recall - "*I find myself asking him about things I can't remember during the labour and delivery*" (S7).

Study Group : experience of women delivered under general anaesthesia

Although 8 of the women interviewed in the study group were delivered under general anaesthesia and therefore were unable to comment on how they felt just as the baby was born, other relevant statements were made about their experience. All of this group mentioned that they had difficulty recalling events immediately following delivery. The length of time that was 'blurred' or 'missing' ranged from a day to several days. Typical comments made by these women included - *"the next couple of days are a blur too, I just remember sleeping and wakening. Now people have told me things that happened but I can't remember them"* (S25) and *"the next 2-3 days are completely blank, apparently I didn't even want to see the baby. they took me up to the paediatric department but I hardly remember being there"* (S31). Two of the women said they had difficulty assimilating the fact that they had a baby during this time - *"when they brought me the baby I thought she was my sister when she was a baby. I found it difficult to believe she was mine"* (S3). One woman was very unhappy with the information given by the staff in the Special Care Unit and said *"when I asked the nurse what I'd had she just walked away - I had to phone home and reverse the charges to get details"* (S38).

Control Group : delivery experience

The delivery experiences of women in the control group were obviously different to those of women delivered by caesarean section. Of the 44 women interviewed in the control group, 20 delivered spontaneously and 24 were delivered by forceps. The mean length of the second stage of labour was significantly shorter for those who achieved spontaneous delivery at 85 minutes (range 5-216, SD 50) than for those delivered by forceps (mean 139 minutes, range 10-304, SD 76). This was probably related to the fact that only 7 women who had SVD's had regional analgesia compared with 20 in the latter group. When the duration of second stage was controlled for the mode of analgesia in spontaneous deliveries, the mean length for those with epidural analgesia was 117 minutes compared with 67 minutes for those without.

Control Group : spontaneous deliveries

Of the 20 women delivered spontaneously, 14 stated that they could push reasonably well and 8 went on to say that this was because they knew the end was in sight and they were able to summon reserves of energy. Six women felt it was difficult to push and all said this was because they were too tired by the time they reached the second stage of labour rather than lack of sensation due to an epidural block. Twelve of the women felt this part of the labour was hard and tiring due to the amount of effort they were required to put in. Some also felt a great deal of pain and other discomfort - "*the pushing was really hard and I found it terrible. I would rather forget it but I can't. The epidural had worn off and the contractions were really strong - I felt a wave of nausea with each one. They wouldn't top-up the epidural so that I could push. it lasted for 2 hours and was very tiring. They kept on saying it won't be long but it went on and on*" (C39). Another woman in this group thought "*the whole delivery was an absolute nightmare. The labour had gone on for so long that when it came to push I was absolutely exhausted and couldn't really be bothered. The only thing that kept me going was the sister*" (C13).

Control Group : forceps deliveries

Where delivery was effected by forceps as stated previously the mean duration of the second stage was significantly longer and 83% of the women had regional analgesia. Only 4 of the women in this group felt the pushing was relatively easy but qualified this by stating that this was because they didn't really have to do much. Of these women, one was operatively delivered because of a dural tap, 2 due to acute fetal distress and another because of maternal hypertension. the remaining 20 women all commented that they found the second stage to be long and arduous. Some reached this phase in a state of exhaustion after a long first stage - "*I felt I was able to push despite the epidural but I didn't have any strength left*" (C11) and others became so as this stage progressed - "*I found the pushing really hard work and eventually I got so tired I just wanted it to be over*" (C14). Two of the women had coped with other methods of pain relief in first stage but were eventually given epidural analgesia to facilitate operative delivery. One commented that - "*the pain was very bad - horrendous - and I got very tired and*

so did the baby so they said they would give me the epidural. I had no option in this and was frightened at the thought of getting this thing that might paralyse me - however I expect they knew best. The epidural didn't work properly and the forceps were the worst part of everything" (C22). Only one other woman complained of pain during the application of the forceps and this was related to the fact that there was no time available (acute fetal distress) to top-up the epidural prior to operative delivery.

Only one woman delivered by forceps expressed disappointment that intervention was necessary - "*I pushed for 3 hours and then they decided to put in an epidural and do a rotational forceps. I felt frustrated in the end that I ended up having to use everything that was going. I was also sad that my husband wasn't at the delivery because the forceps was carried out in theatre*" (C21). All of the other women when told of the operative delivery either expressed relief that the decision had been made - "*the pushing was hard work and I was quite happy to have forceps. I felt they knew best and was happy to let them do what they wanted*" (C30), "*I found the pushing really hard work and I was tired at that point and wanted it all over - I was quite happy when they told me it would be by forceps*" (C14); or said they were so tired that they didn't care what happened - "*I was really exhausted when it came to the second stage and yet they kept on wanting you to push. The midwife even told the doctor I was too tired, but I was made to do it for an hour. The doctor came in and said to my husband, not me, they would use forceps. I couldn't have cared less*" (C45).

Control Group : women's emotions at delivery

As in the study group when the baby was actually delivered the women in the control group experienced a variety of emotions which included excitement (n=14) - "*after she was born I felt really elated and I didn't even care about the sex*" (C16), "*I couldn't believe it when she was put on my tummy, I was so excited. I think it was the nicest thing that has ever happened to me*" (C26); relief (n=7) - "*what I remember most clearly was the immense relief when the baby was born - I was so glad that it was all over*" (C8); exhaustion (n=9) - "*I was really exhausted and*

couldn't focus on the baby. I thought she looked like a blob and I didn't feel she was mine at all" (C11); disappointment (n=1) - "*I was quite disappointed, I thought she looked disgusting and I had wanted a boy*" (C37) to little feeling at all - "*I expected it to be a great moment as she was born and yet at that point I couldn't have cared less. I didn't get holding her then and though now I wish I had at the time I couldn't be bothered*" (C20). Many of the women experienced a combination of these emotions - "*I remember being told to look at the head and all I could see was a bloody mess. She was put on my tummy and someone said it was a girl - I cried because I wanted to find out for myself. I felt a mixture of relief and happiness. I would like to have been more aware but I felt too zonked from the gas and air*" (C36).

Control Group : comments related to experiences following delivery

Suturing after delivery was mentioned by 25% of the women in the control group. Nine women found the insertion of sutures painful and a further 2 women mentioned that the actual suturing had taken an excessively long time. Other comments included the number of people present at the actual delivery - "*I was asked if I minded people at the delivery and I said no, but it was hard to make a decision and I didn't expect so many to be there - it was overwhelming*" (C21), "*a male student was allowed in for the delivery without my being asked and I objected to that - he even held my leg*" (C22). Comments related to the period immediately following delivery - "*I hated being left alone afterwards and wanted to be cleaned up*" (C22), "*I was left with my husband for ages. It's difficult to remember now but they seemed to forget about me and then they were shocked to discover that I still had to be stitched. I panicked at that point as I didn't realise I needed them. The stirrups were very uncomfortable and I found the stitching sore - I wish they had done them sooner*" (C32). One girl did not appreciate being mobilised soon after delivery - "*they made me walk from the labour ward to another room to get a wheel chair. I didn't like that and my new slippers were ruined by the blood*" (C46).

Relationship with infant

In the next part of the interview the women were then asked to rate baby contentment at the present time on a scale of 1 *(very discontented)* to 5 *(very contented).* No statistical difference was found between the two groups with the mean score in the study population being 4.71 (range 3-5,SD 0.55) and in the control with the mean score at 4.72 (range 1-5,SD 0.73) - T -0.09, NS. Rating techniques were also employed to ask how the women enjoyed caring for their babies when they first came home from hospital and again at the present time. Again the possible range of scores was from 1 *(did not enjoy it at all)* to 5 *(enjoyed it very much).* For the initial score, the mean of the study group was significantly lower than that in the control group (3.02 versus 3.59; T -2.05, $p < 0.05$), however, no statistically significant difference was apparent between the groups in the second score (4.73 versus 4.81, T -0.75, NS).

The women were then asked how long it took until they felt close to their infants and the results can be seen in Table 10.2a. Only 18 women in the study group stated that they felt close to the baby immediately compared with 28 in the control group ($p < 0.05$). By 1 month after delivery 24 women in the study group felt close to the baby compared with 38 in the control group ($p < 0.005$) and by 2 months following the birth there was still a significant statistical difference between the 2 groups with 30 of the study population and 41 of the controls feeling close to the baby ($p < 0.01$).

No statistical difference at any point was found in the control group between those women delivered by forceps and those delivered spontaneously.

Of the 15 women who took longer than 2 months to feel close to their infant only two did not see the baby at the time of delivery. However, contact with the infant in the 24 hours following delivery appeared to be limited in all cases (usually because of admission to the Special Care Baby Unit) and all but three of the women did not feed the baby until after this time.

Relationship with partner

The women were also asked if they felt that the arrival of the baby had made any difference to their relationship with their husband/partner . Of the 41 women in the study group to whom this applied, 27 stated that it had. In 16 relationships the baby had a positive effect on the relationship and women stated that it had sealed the family unit, brought them closer together etc. In 5 cases it had a negative effect due to causing more arguments, their partners feeling neglected by the attention given to the baby or not allowing any time together on their own. Six women felt that the change was partly positive and partly negative due to a mixture of the reasons cited above. The answers given by women in the control group in response to this question were largely similar with 26 women stating that the baby had had an effect on their relationship - though fewer replied that the effect was positive (12) and 7 felt a negative effect and 7 viewed the change as being mixed. Some of the problems experienced in partner relationships in the control group were related to sexual difficulties as described below.

Desired improvements in maternity care

The last question on the home interview schedule asked the women if the hospital could have done anything to improve the care given to them in the antenatal / intrapartum / postnatal periods.

Antenatal clinics

Twenty five women (8 study, 17 control) felt that something should be done to reduce the waiting time at the hospital antenatal clinics. Many stated that it was difficult for them to attend the hospital and that on arrival they were expected to wait for several hours to be eventually seen for a few minutes by a doctor. Several of the women suggested that the waiting would have been more bearable if the hospital had provided more chairs, a vending machine for tea and coffee, reading material etc. Another area of complaint was the lack of continuity in the antenatal care provided. Women said that they were seen by different staff each time they

attended the clinic which made it difficult to establish a relationship with the care giver in which they felt free to ask questions.

Antenatal classes

Antenatal classes were also criticised by 24 of the women (13 study, 11 control). The women felt that the teaching in these classes did not adequately prepare them for both the experience of labour and coping with the new arrival afterwards. Many women expected to cope with the pain of labour by utilising the breathing exercises and positions taught in the classes and were shocked by the intensity of the pain actually experienced. Others felt that the classes stressed options that would be available to them in the labour ward such as fetal scalp electrodes, ambulation, epidural analgesia etc did not exist in reality and some felt pressurised by the staff in the labour ward to have them. Women also felt that the classes did not prepare them for any deviations from the course of normal labour such as slow progress or operative delivery. Explanations of caesarean section at classes was limited to elective deliveries for breech presentation and no mention was made of emergency sections during the course of labour.

Women also complained that little attention was paid to the problems that might occur in the postnatal period. Several women said that the parentcraft sisters only stressed the positive aspects of breast feeding and failed to highlight the difficulties which may arise in establishing this method of feeding. In retrospect some felt that if these potential problems had been discussed beforehand, they might have been better able to cope with difficulties as they arose. Some of the other topics that women felt should have been included in the teaching were postnatal depression (as opposed to 3rd day 'blues'), support available in the community for mothers with new babies and how to cope with perineal pain and the aftermath of a caesarean section. One woman also mentioned that she had bled intermittently for several weeks following delivery and was terrified "*that my insides were coming out*" (C49), only to discover at the postnatal visit that this was a relatively common occurrence. A number of women felt that it

would be helpful to have discussions on the changes that occur in family relationships and life-style with the arrival of a new baby.

Care in the intrapartum period

Many of the criticisms of the care delivered in labour have been discussed earlier in this chapter, however, several other comments made by the women are relevant. Five women felt very strongly that there should have been more involvement of senior medical staff in the care they received in labour. Such criticism arose as a result of the women's perception of the failure of junior medical staff to make decisions about their management. A number of other women stated that the doctors in the labour ward should have communicated more closely with them about decisions that were being made regarding their care rather than leaving the midwives to convey information. Other concerns about intrapartum care included failure to allow the women choices in the care they received from interventions to being nursed in a single room.

Care in the postnatal period

The area women felt was most open to improvement was the care in the postnatal period. Some of the criticism was directed to the physical environment within the wards such as the lack of toilets, baths, single rooms etc. The majority of women were nursed in 'open' wards and 28 complained of the lack of rest and difficulties in sleeping created by this. Women found the noise of babies, staff conversation, televisions and lights being left on all contributed to their sleeping difficulties. Ten of the women in the study group felt that they should have been allowed to stay longer in the Special Care Unit before being discharged to the postnatal wards.

Over 25% of the women interviewed (15 study, 7 control) were critical of the support given to them by the midwives in the postnatal wards. Many of these women spoke of feeling abandoned in the wards and left to get on with things without support -*"I felt they expected you to do far too much in the postnatal wards. Although it was busy they just left you most of the time. There was lots I wanted to ask and I ended up weeping for most of the time"* (S13). Another woman found

the obstetric students on secondment from general training to be the most helpful and the midwives to be totally disinterested. All of the women delivered by caesarean section who made comment on postnatal care said they felt the midwives were unaware of the difficulties they had both physically and psychologically coping with the 'aftermath' of this method of delivery - *"the midwives forgot how the baby had been delivered and when I developed a temperature nobody seemed to bother - that wouldn't happen in a surgical ward"* (S3) and *"I felt the staff weren't very sympathetic to how I felt about my labour. One of the midwives was quite sharp and told me I should think myself lucky that I had a healthy baby. I seemed to spend most of the time weeping"* (S14).

Several women felt it would be helpful to have a special ward set aside for women delivered by caesarean section. This ward could be equipped with either beds that had adjustable height control or stools to help the women get in and out of bed. The existence of such a ward would help remind the staff that women delivered by this method might need more help with the physical aspects of baby care. Some women also felt that the mutual support afforded by this arrangement would be beneficial. Interestingly a number of women in the control group mentioned that they had to help women delivered by section in the wards because there were too few staff to attend to their needs.

Some women in both the study and control groups complained of the apparent lack of support for breast feeding in the wards. Advice was often conflicting and women were urged to give 'top-ups' to the babies. Unfortunately this often occurred when women felt at a low ebb and resulted in them discontinuing breast feeding.

Eight of the women in the study group felt that they were given little or no information about the events which occurred in labour and the management of future pregnancies by medical staff in the postnatal period. One complained that no-one had told her personally how her next baby would be delivered but that she had overheard the consultant say to a registrar that as it was a

failed forceps delivery she would have an elective section next time. Most of these women were still confused about why the caesarean section had been performed and how this would affect a future delivery.

10.3 : Longitudinal Analysis

A longitudinal analysis of all of the available data (case note review, hospital interview, postal questionnaire and home interview) for the study-control group was also undertaken. The starting point for this analysis was to select those women who scored lowest on the health rating scale at the time of the home interview and compare them with a similarly sized sample of women who scored 5, the highest possible score on the rating scale. Of the 86 women interviewed at this time, only six women rated the health score at one or two compared with 44 women who rated the score at 5. In order to obtain a sample of the same size, a computer generated random sample of six women was obtained.

The objective of this part of the analysis was to try and identify any common factors which might predict a poor maternal outcome, albeit in a tentative fashion, but which might direct further research in this area.

In the group with a poor health outcome, four women were delivered by caesarean section and of the remaining two, one woman delivered spontaneously and the other was delivered by forceps. In the high scoring group, three women were delivered by caesarean section, two spontaneously and one by forceps.

In all of the six cases of poor health outcome, the women complained of multiple problems still present and all were taking prescribed medication. Four of the women stated they remained depressed and in three cases antidepressant medication had been prescribed by the General Practitioner and in the fourth case sleeping tablets. Other complaints included tiredness (4), backache (3), wound pain (2) and alopecia (1).

In addition to the reported health problems, four of the women also stated they had sexual problems, in the main due to lack of interest. In two of these cases the women had only had intercourse on one occasion since delivery. In contrast in the group of women with a good health outcome, none reported any sexual problems and all had resumed intercourse within two months of delivery.

Demographic data

Four of the women in the poor outcome group were married at the time of delivery and two were single. The distribution of social class was II (1), III (1) IV (2) and in the remaining two cases the husband was out of work. In the group with a good health outcome, all of the women were married and the husbands were in full time employment. Two women belonged to social class II and four to social class III.

Hospital interview

Reviewing the information obtained from the hospital interview after delivery, few differences were apparent between the two groups of women. All of the women claimed to have kept well throughout the pregnancy and none had ever thought at any point that they might be delivered by section. Two women in the poor outcome group stated that the pregnancy was not planned compared with one in the good outcome group. The only variable where a marked difference was apparent was that only two women in the former group attended antenatal classes compared with five women in the latter.

Women's experience of labour and delivery

At the time of the hospital interview, three women in each group stated that labour was 'worse than expected', two said it was 'as expected' and one in each said it was 'better than expected'. By the time of the home interview when the women were asked to reflect back on their labour and delivery experiences, it was apparent that even with the passage of time most of the women still felt the same way. All but one of the women in the good outcome group made positive

comments about the support received from the labour ward staff and four of the six spontaneously mentioned how excited they were at the time of birth. In contrast in the poor outcome group, only one woman made positive comments about her labour and delivery experience and the remaining five were unhappy about a wide variety of events which occurred during this time. Two of the women in the latter group were sectioned under general anaesthesia and had poor recall of events in the 48 hours following delivery. All of the women in this group mentioned that they had difficulty assimilating the fact that they had actually had a baby and none felt excited at the time of birth.

Contact with infant following delivery

During the course of the hospital interview the women were asked about their contact with the infant following delivery. In the good outcome group, all of the women saw the baby at birth and four of the six were allowed to hold the infant at this time. There was considerable variation, however, in when the women first fed their infants. In the poor outcome group only four of the women saw the baby at the time of delivery and only one held the baby at this time. Four of the six did not have physical contact with their infant in the 24 hours following delivery and three waited longer than 48 hours before they first fed the baby.

Short-term morbidity

All 12 women returned completed postal questionnaires three months after delivery. At that time five women in the good outcome group felt fully recovered and all claimed to be happier since delivery. The six women reported few problems in the three months since the birth and all stated that their babies were healthy and had no problems with sleeping, feeding, wind or crying.

In contrast in the group with a poor health outcome only one woman felt fully recovered at three months postpartum and five said they were less healthy than before the pregnancy. Despite this four of the six women claimed to be happier since the birth. These women reported a wide variety of morbidity, which in many cases had persisted since delivery. Backache, tiredness,

sleeping difficulties and depression were mentioned in five of the cases. Four of the women also said that the baby had suffered from illness since discharge from hospital and all but one said that the infant still suffered from problems with feeding, sleeping crying or wind either alone or in combination.

Long-term outcome

The long term morbidity reported by the women in the poor health outcome group has already been discussed at the start of this section. Some other general comments made by the women at the time of the home interview are worthy of mention. It was apparent that in four of the six cases in this group, the women were very unhappy and confused about the events which had occurred during their hospital stay. Three of the women delivered by caesarean section had little idea of why caesarean delivery was necessary and were keen to find out why it was carried out and what the implications were for future deliveries. Another woman who delivered vaginally was extremely unhappy about the treatment her infant received in the postnatal ward for a 'sticky eye' and blamed the hospital staff for the fact that the baby now has a blocked duct which needs surgery. Three of the women in this group were unsure if they would have another baby and in each case stated this was as a result of their experiences on this occasion.

In the group with a good outcome only one woman was critical of the hospital staff and this was because she felt there was a lack of involvement of senior medical staff in her intrapartum care. Five of the women planned to have another baby in the future and in the one remaining case, the woman said she only ever planned to have one child.

General remarks

At the time of the home interview it was apparent that three of the women in the poor outcome group lived in poor housing conditions and had limited financial income. The remaining three women all complained of severe marital problems since the birth of their infants, in part at least due to the depression and tiredness experienced since delivery. Two of these women mentioned

that their General Practitioners had suggested psychiatric referral if their situation did not improve. In contrast all of the six women with good health outcomes had apparently supportive partners and none mentioned financial worries.

Summary

When the women were interviewed on the 4th or 5th postnatal day they were asked if the labour and delivery were as expected, better than expected or worse than expected. Sixty percent of the study group said the labour was worse than anticipated and 24% said it was better. The corresponding figures for the control group were 44% and 32% respectively. Fifty four percent of those eventually delivered by section said that they suspected the course of labour was not progressing as it should before they were actually told of the decision to take them to theatre and 36% felt that the decision should have been taken sooner. In 64% of the study group the partner was present in theatre for delivery compared with 80% of partners in the group delivered vaginally. Women delivered vaginally saw, held and fed their infants sooner than those delivered by caesarean section. Women in the study group were more likely to complain that they didn't get enough rest in the postnatal ward and that it was more difficult for them to cope with the demands of looking after the baby because of the pain and other discomforts they were experiencing. A higher proportion of the study group (48% v 18%) also said they would like more information about the events during the intrapartum period before discharge from hospital.

The women were asked to rate their experiences of the labour and delivery on a scale and then encouraged to make further comments. The remarks made by the women reflect the different experiences during the intrapartum period. Many of the women were very positive about the care they received, however, a number of others were very unhappy about some of the events that occurred. At the end of the interview the women were also asked if they felt the hospital could have done anything to make things better for them in the antenatal and postnatal periods. Combining the comments from these areas the distinct themes that emerged were :

1. Failures of communication between women and the staff; and it was apparent that this occurred in all areas from antenatal care to the postnatal wards
2. Lack of realistic preparation for labour, delivery and parenthood
3. Lack of support and conflicting advice from midwives, especially in the postnatal wards

Chapter 11

Discussion

Chapter 11 : Discussion

The incidence of caesarean section has risen steadily in most developed countries over the last two decades. In some locations the increase has been relatively modest whilst in others the rise has been so dramatic that it has been termed an epidemic [152]. During the same time period there has been a concomitant decline in perinatal mortality although it is difficult to assess the contribution of increased caesarean section rates to this.

In Scotland the caesarean section rate has risen from 4.2% in 1970 [5] to 13.6% in 1987 [6]. The rate does vary widely between hospitals and although there are demographic differences in the hospital populations they do not nearly account for the variation in rates, which suggests that there must be marked differences in clinical practice.

In Glasgow Royal Maternity Hospital the caesarean section rate has been consistently higher than the national rate and between 1973 and 1988 has ranged from 13.6% to 17.0% (GRMH statistics). In the past decade the caesarean rate has never fallen below 15%. Despite relatively stable section rates from 1978 onwards, the perinatal mortality rate has shown a continued downward trends. This certainly supports the hypothesis that perinatal mortality is linked to other factors as well as the rate of caesarean section. It was interesting to note that in 1983 when the lowest ever perinatal mortality rate was recorded in Rottenrow (7.6 per 1000), it coincided with the lowest incidence rates of both instrumental delivery (15.2%) and caesarean section (15%) for some years.

From SMR_2 data during the year of the study (1984), 3952 women were delivered in the hospital resulting in the birth of 3994 infants. The perinatal mortality rate was 11.7 per 1000, 8% of the infants were delivered before 37 weeks gestation and 8.4% weighed less than 2500 grams. Sixty seven percent of deliveries were spontaneous, 16% by forceps, 16% by caesarean section and 1% were breech deliveries.

The study population was comprised of the 619 women delivered by caesarean section during 1984. The proportion of primigravidae and multigravidae in this group did not differ materially from the general hospital population, although women delivered by section were older, shorter, a significantly greater proportion were less than 155 centimetres tall and a higher proportion of primigravidae were married. A higher proportion of the infants born by section were delivered before 37 weeks gestation (16.7% v 6.4%) and a higher proportion were admitted to the Paediatric Unit (21.0% v 6.2%). Comparison of birthweight revealed that a higher proportion of infants in the section group weighed less than 2500 grams at birth (17.4% vs 6.7%) and in singleton infants a higher proportion weighed more than the 90th percentile for gestational age (15.5% v 10.0%) when compared with those delivered vaginally.

A wide variety of antenatal problems was seen in the study population and this resulted in 41% of the women being admitted to hospital on at least one occasion during the course of pregnancy. The comparable figure for the hospital population was 34.6% and this difference is not particularly surprising since women delivered by caesarean section might be expected to have more antenatal complications than those delivered by other methods.

Increasingly it is recognised that audit should be an integral part of all medical practice. This is one of the seven key changes proposed in the recent government White Paper *'Working for Patients'* [163]. Audit of causes of death is relatively straightforward, however, the assessment and evaluation of clinical management policies is more complicated and requires valid and reliable methods of appropriate data collection, the results of which can be rapidly fed-back and logically interpreted by clinical staff.

With regard to caesarean section it was apparent in the present study that multiple indications for the performance of the operation were utilised in the majority of cases and that these were not necessarily ordered in terms of priority. Liberal use was also made of poorly defined terms

such as failure to progress in labour. This has important implications for attempts at perinatal audit, as the quality of the data collected will be dependent on the accuracy and completeness of the information contained in the clinical case notes.

Most of the published studies which have examined the determinants of the increasing caesarean section rate have originated from North America and one striking difference between these and the present study, is the ease with which a single indication for the performance of the operation was apparently extracted from the available information. Even when there was clinical evidence available to support diagnoses, it was often the combination of factors rather than a single indication which determined the decision to section, however, in order to make comparisons with other studies it was felt necessary to identify a single main indication for each of the 619 cases.

The causal model and decision rules devised by Anderson and Lomas [153], in consultation with obstetricians, was used to assign deliveries with multiple indications to a single diagnostic class. The model, however, does not take into account the validity of the indications actually cited and is therefore dependent on the accuracy of the data contained within the clinical case record.

The model assigns deliveries to a single class using a hierarchical order, namely previous caesarean section, breech presentation, dystocia, fetal distress and all other. One limitation of this type of model is that if, for example, a multigravidae had three indications recorded on the case record - Grade IV placenta praevia, transverse lie and previous caesarean section - for the performance of the operation, then previous caesarean delivery would be the indication selected irrespective of the fact that it may have been the least important clinically.

Four main indications - dystocia, breech presentation, previous caesarean delivery and fetal distress - were responsible for over 87% of the caesarean sections performed. The remaining operations were carried out for a wide variety of other indications. Distinct differences were

apparent between primigravidae, multigravidae and multigravidae previously delivered by caesarean section in the order of these common indications.

The most important determinant of the overall section rate is the number of primary caesarean deliveries and in the year of the study, 64.4% of all sections fell into this category. Repeat sections accounted for 35.6% of caesarean births which is similar to the the 34.6% reported in the USA [31] and 38.5% in Canada [153].

Medical Audit

In the NHS Review Working Paper No 6 on 'Medical Audit' [164], audit is defined as :

> *"the systematic, critical analysis of the quality of medical care, including the procedures used for diagnosis and treatment, the use of resources, and the resulting outcome and quality of life for the patient"*

As an example of the type of issues highlighted by audit, in analysing the procedures used in obstetric practice, one of the interesting findings in the present study was the number of women in whom postnatal X-ray pelvimetry was performed (n=237). The prognosis for a successful outcome of labour cannot be established on the basis of X-ray pelvimetry alone since several other factors may influence the result. Mengert [154] cited five criteria which must be considered :

1. *size and shape of the bony pelvis*
2. *size of the fetal head*
3. *force of the uterine contractions*
4. *mouldability of the fetal head*
5. *presentation and position of the fetus*

Postnatal X-ray pelvimetry can only reasonably attempt to establish the first of these criteria and seems of little value in the management of cases with suspected disproportion. Furthermore Barton et al [155] found that because of the lack of uniform indications for performing the procedure combined with the lack of uniform interpretations of the pelvic dimensions,

pelvimetry was associated with high false positive and false negative results. In their study 46% of women with inadequate pelvic dimensions achieved vaginal delivery and conversely 48% of women sectioned for cephalopelvic disproportion were found to have normal pelvic dimensions. Such findings have been confirmed by other studies [156,157] and most authors have concluded that because of the expense involved as well as the potential radiological hazards, X-Ray pelvimetry is not necessary in the great majority of cases. In the present study 11 women had two sets of pelvimetry results available for examination and in 6 of these the conclusions of the radiologist's report differed between the two.

The diagnosis of cephalopelvic disproportion can only be confirmed when the fetal head fails to descend despite effective uterine contractions otherwise it is only an assumption. Undue reliance on the single element represented by X-Ray pelvimetry may lead to unnecessary intervention. Of the 274 primigravidae in the present study 10 had pelvimetry performed in the antenatal period and a further 205 had postnatal pelvimetry. Five women had radiological examination performed in both the ante and postnatal periods and in three of these the results differed on the two occasions, with contracted pelvic dimensions subsequently found to be normal. Of the 215 cases where pelvimetry was performed 97 (45%) were thought to have contracted or doubtful pelvic dimensions (as reported by a consultant radiologist) which in the light of current hospital practice may lead to the performance of an elective caesarean section in a future pregnancy. This may be confirmed by the fact that of the 155 women with a history of one previous caesarean delivery, 83 had contracted or doubtful pelvimetry and all but 13 were electively re-sectioned.

Maternal Mortality

The maternal mortality rate has declined markedly in developed countries over the last 50 years and in Scotland during 1985 [162] only 6 women died as a direct result of pregnancy, labour or the puerperium (9 per 100,000). The last report on maternal deaths in Scotland from 1981 to 1985

[162] did not classify caesarean section as a cause of death but did examine the mode of delivery in relation to the diagnostic group in which the death occurred. During the years of the enquiry, caesarean section was the mode of delivery in 13 of the direct and indirect deaths and based on these figures the report estimated that the risk of death was one in 3000 operations. The risk of death associated with elective sections was considerable less than in emergency sections.

In the decade from 1979 to 1988, 39266 women were delivered in Glasgow Royal Maternity Hospital and caesarean section was performed on 6103 occasions. Two maternal deaths occurred during this period but neither of the deaths were associated with caesarean delivery.

Maternal Morbidity

Comparatively few studies have addressed the morbidity associated with caesarean delivery. Most studies have been reported from single institutions and because of the diffuse nature and classification of morbidity the interpretation of these studies is difficult.

Operative Morbidity

As caesarean section is a major operative procedure it is associated with injuries that do not occur in vaginal deliveries. Such injuries may include damage to the ureters, bladder and bowel; lacerations of the cervix, vagina and broad ligaments and injuries to the blood vessels. In addition, as with any major operation, the woman is also at increased risk from anaesthetic complications, haemorrhage, thrombo-embolic complications and paralytic ileus.

In reviewing the literature only one study was found which attempted to identify the intraoperative surgical complications associated with caesarean section [99]. In this Swedish study the authors reviewed the incidence of surgical morbidity in 1319 patients delivered by section over a three year period. The overall surgical complication rate was 11.6% (n=153) and of these 2.1% were classified as major and 9.5% were minor. Major complications (n=28) included injuries to the bladder, extensive lacerations of the uterus and genital tract and bowel damage.

Minor complications (n=125) included blood transfusion, minor extensions of the uterine incision and injuries to the infant without sequelae. In this study each complication was counted as a single entity, although presumably some women with major lacerations also required blood transfusion, so the actual number of patients who sustained surgical morbidity may have been over-estimated.

The incidence of surgical morbidity in the present study was considerably greater than that reported by Nielsen and Hokegard [99]. Classical incision of the uterus was performed in 1.1% versus 0.2% of women; lacerations of the cervix, vagina and upper uterine segment (including inverted '*T*' incisions) occurred in 2.4% versus 0.9% of cases - although the incidence of other uterine lacerations was lower 4.7% versus 6.8%. Accidental scalpel injury to the infant was also more common in the current series (1.3% versus 0.3%). The percentage of women in the Swedish study who sustained some form of operative injury to the urinary tract (0.2%) was similar to the 0.3% reported by both Eisenkop et al [165] and Evrard et al [166] (see Table 1.4a) and compared with 1% of women delivered by section in Glasgow Royal Maternity Hospital during 1984.

If serious operative morbidity is defined as major extensions of the original uterine incision (i.e. inverted '*T*' incisions; lacerations of the upper uterine segment, both uterine angles, the cervix and vagina) which might influence the management of future pregnancies; operative injury to the urinary tract or an operative blood loss of greater than or equal to 1500 mls - then 32 women (5.2%) in the present study met these criteria. However, in many of these cases multiple problems were apparent. Of the 21 cases involving major extensions of the uterine incision, three of the women also sustained bladder tears and a further five were noted to have haematuria at the end of surgery. Twelve of these women had blood losses in excess of 1000 mls ($4 \geqslant 1500$ mls) and 12 received a blood transfusion. A further three women sustained bladder trauma (tear=1, bladder sutured to uterus=1, bleeding from bladder base=1) and all had blood losses in excess of 1000 mls ($1 \geqslant 1500$ mls) and all were transfused. The remaining 8 women had

recorded operative blood losses of $\geqslant$ 1500 mls and all were given blood transfusions. All but three of the 32 cases occurred in emergency caesarean deliveries and within this latter group 26 were in Groups C and D, with 7 women in the second stage of labour (5 failed trial of forceps) at the time of surgery. Registrars performed 27 (84.4%) of the operations.

One striking difference found in this study was the number of women who received a blood transfusion when compared with other reports. Seventy one women (11.5%) were transfused in theatre and a further 21 transfusions (including 6 double transfusions) were given in the postnatal period. Thus in total 13.9% of the study population received a transfusion compared with the 1.2% reported by Nielsen and Hokegard [99], 3.5% described by Evrard and colleagues [166] and 6.3% by Amirikia et al [167] (see Table 1.4a).

In the current study women delivered by emergency caesarean section were found to have an increased incidence of intra-operative morbidity compared with those delivered electively. Emergency delivery was associated with a significant increase in extensions of the original uterine incision, bladder trauma, mean blood loss and requirement for intra-operative blood transfusion.

When a period of labour had occurred before operative delivery the incidence of bladder trauma was increased and this was particularly marked in the group of women who were in the second stage of labour at the time of surgery. These women were also more likely to sustain extensions of the uterine incision and an increased blood loss when compared with other sections carried out during the course of labour.

Further analysis of the data was undertaken to see if any of the operative complications occurred more frequently in women undergoing repeat caesarean section compared with primary deliveries. The incidence of blood loss $\geqslant$ 500 mls (39.8% versus 23.2%, X^2 17.57, $p < 0.001$) and blood transfusion (14.5% versus 5.9%, X^2 10.39,$p < 0.005$) was increased in the latter

group, although this difference disappeared when the variables were controlled for emergency and elective deliveries. Interestingly no difference was found between the two groups for either the incidence of severe bladder trauma (1^0 1.0% versus 2^0 0.9%, X^2 0.06, NS) or haematuria following surgery (1^0 4.5% versus 2^0 4.1%, X^2 0.01, NS). This finding was unexpected as scarring of the lower uterine segment with the subsequent development of utero-vesical adhesions might have been thought to predispose to this complication.

Examination of the status of the operator by the type of surgery revealed that of the 399 emergency caesarean deliveries, 7.5% were performed by consultants, 6% by senior registrars and 86.5% by registrars. In the group of women delivered in the second stage of labour, 3.7% were performed by consultants, 5.6% by senior registrars and 90.7% by registrars. Nielsen and Hokegard [99] found that there was a significant increase in the incidence of both minor and major complications associated with emergency caesarean sections when the operation was performed by junior staff. They concluded that caesarean section is a major operative procedure and especially when performed as an emergency required a surgeon of *'great skill'*. It may be that greater involvement of more experienced staff could have reduced the incidence of intra-operative complications seen in the present study.

Although large scale studies have not been carried out to determine the intra-operative morbidity associated with different surgical procedures, both the last report on maternal mortality in England and Wales [110] and the Report of a Confidential Enquiry into Perioperative Deaths [196] expressed concern at the number of deaths in which junior doctors were left to carry out operations for which they were not properly trained or suitably experienced. A specific recommendation of the Enquiry into Maternal Deaths [110] was that consultant obstetricians and anaesthetists need to be involved earlier in the management of women undergoing caesarean section than is often the case at present.

During 1984 nine consultants plus one clinical assistant performed 96 caesarean sections although the actual number of operations carried out by each ranged from one to 18. Of the four Senior Registrars the mean number of sections was 9 (range 1-17), whereas of the 11 registrars employed throughout the duration of the study the mean number of sections performed was 42 (range 29-57). Six other registrars who were present for variable lengths of time during the year performed the remaining 29 operations.

Post-operative Morbidity

Post-operative morbidity following caesarean delivery has not been studied as systematically as has the mortality associated with the operation. The criteria used to define morbidity vary widely between those studies which have been reported, which may in part account for the marked difference in the incidence of some of the complications.

In the present study only 59 (9.5%) women had no recorded problems in the postnatal period with 302 (49%) sustaining three or more. However, evidence of complications was recorded from both the obstetric case notes and the problem orientated midwifery record and other studies have only considered morbidity from the former source. Nine women (1.5%) experienced serious morbidity such as paralytic ileus, deep venous thrombosis and septicaemia and a further 12 women (2%) required to return to theatre for further surgery. The incidence of these conditions did not differ markedly from those reported in other studies [115,166,167].

The most common complication in the present series was the development of pyrexia and this was recorded in 357 (58%) cases. Although there may be dispute about the clinical significance of post-operative febrile morbidity [168], it occurred more frequently in women delivered by emergency caesarean section and the highest incidence was seen in the group of women who experienced a labour duration of $\geqslant$ 12 hours. At the end of surgery 98 (15.8%) of the women were left with an indwelling urinary catheter in situ and again this was more commonly seen in women delivered by emergency caesarean section. Within this group it was found that women

delivered as an emergency before the onset of labour and those with a labour duration of $\geqslant$12 hours were more likely to have a urinary catheter than those in the other two groups. In the former group, the catheter was more often left to monitor the urinary output because of concern for the maternal condition whereas in the latter group it was usually left because of the presence of haematuria or other bladder trauma. However, the highest incidence of indwelling bladder catheterisation following delivery was seen in women delivered after commencement of the second stage (44.5%). Interestingly though no difference was found in the incidence of urinary tract infection between or within the groups despite this.

Infectious Morbidity

The development of infection is an important complication following caesarean section. These infections may affect the pelvic organs, the surgical wound and the respiratory and urinary tracts [169]. The consequences for the woman may include immediate and chronic abdominal pain, the impairment of future fertility and, in severe cases, may even be life-threatening [170].

A number of studies have examined the incidence of infection following caesarean delivery, although estimates vary considerably between them probably due to the differences in the definition criteria used [168]. Because of the difficulties in collecting data from sources where a large number of people have been responsible for entering information, it was decided only to record infection when a positive bacteriological culture was obtained from an appropriate specimen. Six types of infection which might be directly attributable to the method of delivery were considered - urinary tract infection, wound infection, intra-uterine infection, chest infection, septicaemia and sub-phrenic abscess formation. Overall 134 women (21.7%) developed infection within these categories and in 22 cases more than one type was present. By the time of discharge from the care of the community midwives this figure had risen to 183 (29.6%) cases, which is likely to be an underestimation of infectious morbidity as it does not take into account the 126 cases lost to follow-up after discharge from hospital.

During the postnatal stay in hospital the most common type of infectious morbidity recorded was infection of the urinary tract (10.5%) followed by wound infection (7%), intra-uterine infection (4%) and chest infection (4%). Comparison of these rates with the seven studies shown in Table 1.4a (where prophylactic antibiotics were not used), revealed a higher incidence of urinary tract infection and wound infection and a lower incidence of endometritis. The incidence of different types of infectious morbidity recorded, however, varied widely between all of the studies. The average length of hospital stay in the USA following caesarean delivery is 5.0 days [4] and all the published studies have only considered morbidity during this time period. It may be that the rates of infectious morbidity seen in this study were increased only because of the length of follow-up undertaken and that such morbidity in the USA is under-reported. In the one large-scale study of wound infection carried out in England and Wales [171] the incidence of wound infection was 6.0%, although the rate varied between 0 and 20.5% in different hospitals.

The mean (SD) length of stay in hospital following caesarean delivery was 8.2 (4.8) days and for those women without febrile morbidity or infection it was 7.5 (1.9) days. When infection did develop the mean length of stay was 9.1 (3.8) days (T 4.82, $p < 0.0005$; 95% CI 1.10 to 2.26). The length of hospital stay was also compared for women who developed the various types of infection with those without febrile morbidity or infection and was found to be significantly increased in all cases - wound infection 11.1 (5.2) days (T 4.50, $p < 0.0005$; 95% CI 2.80 to 4.58); intra-uterine infection 10.7 (4.9) days (T 3.43, $p < 0.002$; 95% CI 2.34 to 4.24); urinary tract infection 8.3 (2.8) days (T 2.31, $p < 0.02$; 95% CI 0.26 to 1.42); chest infection 9.96 (5.16) days (T 2.31, $p < 0.03$; 95% CI 1.49 to 3.53).

The overall incidence of infection in the current study was found to be significantly increased when the caesarean was performed as an emergency procedure (24.6% versus 16.4%). Emergency sections were found to be associated with a significant increase in wound, chest and intra-uterine infections when compared with elective deliveries. No difference, however, was found in the incidence of urinary tract infection between the two groups. Within the four groups

of women delivered by emergency caesarean section, the only significant difference found was that women in Group B developed more chest infections. No obvious explanation for this variation was found as the use of general anaesthesia was not significantly higher in these women.

The incidence of infection between women undergoing primary caesarean section and those having a repeat delivery was also analysed. The incidence of wound infection (1^0 5.8% versus 2^0 8.6%, X^2 1.84; NS), intra-uterine infection (1^0 5.0% versus 2^0 3.2%, X^2 1.13; NS), chest infection (1^0 4.5% versus 2^0 2.3%, X^2 1.98; NS), urinary tract infection (1^0 9.3% versus 2^0 12.7%, X^2 1.45; NS) or febrile morbidity (1^0 59.6% versus 2^0 54.1%, X^2 1.79; NS) was not significantly increased between the groups.

Prophylactic Antibiotic Therapy

Interest in the reduction of maternal morbidity from infection by the administration of antibiotic prophylaxis has grown over the last 20 years. However, the evidence suggests that this has been adopted more frequently in North America [172] than in the United Kingdom [171]. In the study by Moir-Bussy et al [171] antibiotic prophylaxis was given to 8% of the study population but in the present study it was given to only two (0.3%) women. Both women were delivered by emergency caesarean sections after labours lasting 13 and 17 hours respectively. A further 27 (4.4%) women were commenced on antibiotic therapy at the time of surgery, but in all of these cases other risk factors for the development of infection or evidence of actual infection were already present (see Table 7.1g). During the postnatal stay in hospital a further 136 (22.0%) women were eventually prescribed antibiotic therapy either when infection actually developed or was suspected.

Enkin and his colleagues at the National Perinatal Epidemiology Unit in Oxford reviewed the results of 58 controlled trials (7777 patients) which compared routine antibiotic prophylaxis with either a placebo or no treatment on the incidence of infection following caesarean section

[168]. The results of this analysis showed that in both elective and emergency caesarean section the odds of serious infection (septicaemia, pelvic abscess, peritonitis and serious wound infection) were reduced by between 68 and 82% when antibiotic prophylaxis was administered. For wound infection the odds were reduced by between 57 and 72% and for endometritis by 71 and 78%. The odds of febrile morbidity was found to be reduced by a similar amount whether broad spectrum penicillins (OR 0.33; 95% CI 0.26 to 0.42) or cephalosporins (OR 0.31 95% CI 0.27 to 0.36) were used. Although the authors acknowledged that the risk of infection is higher following emergency section than in elective operations, the administration of prophylactic antibiotic therapy in the latter group appeared to achieve a reduction in the incidence of wound infection and endometritis of a similar magnitude.

The meta-analysis also included the results of a further 34 controlled trials where different regimens of prophylactic antibiotics were used. The authors concluded that with regard to the choice of antibiotic preparation, broad spectrum penicillins were as effective as the cephalosporins, that relatively short courses of antibiotics were less effective than long courses and that single dose regimens were less effective than those with multiple doses.

As discussed in the literature review (Chapter 1.4) a number of studies have investigated possible risk factors for the development of puerperal infection [115,117,118,119,120] in an attempt to identify those women who would most benefit from antibiotic prophylaxis, as there is still disagreement about whether all women undergoing caesarean section should be given such therapy or only those at greatest risk [122, 170, 172]. The administration of antibiotic therapy may have adverse effects on the mother, her baby or the hospital environment. Few of the studies reviewed by Enkin et al [168] mentioned adverse reactions in the women given such treatment, and even if specified, the reported incidence was lower than might have been expected. The neonatal sequelae of antibiotic therapy may be minimised by delaying administration until after clamping of the umbilical cord without loss of efficacy [173]. Antibiotic regimes may also have an effect on bacterial flora, with the development of resistant strains [172] and bacteriological

shifts within the hospital environment [122] and if implemented routinely, it would be essential to monitor women in whom infection developed despite receiving prophylaxis as well as surveying the general patterns of resistance in hospital flora on a regular basis [122,172].

Short-term Morbidity

In searching the available literature no studies were found which attempted to assess short-term morbidity associated with different delivery methods. The present study provided important information on the incidence and types of morbidity experienced by women delivered by caesarean section after discharge from hospital. However, this work needs to be replicated in future studies to allow comparison of morbidity rates by different delivery methods. In the study/control groups, fewer of the women delivered by caesarean section felt back to normal health at three months postpartum compared with those delivered vaginally (51% v 70%) and a greater number felt less healthy than they did before the pregnancy (40% v 28%). Interestingly though the patterns of reported morbidity were largely similar between the two groups of women. By 6 months after delivery, 38% of those delivered by emergency section still did not feel back to normal compared with 30% of the control group, and a further 12% were still taking medication for problems experienced since the birth. However, all of the women in the study group were delivered by emergency caesarean section and it is not possible to extrapolate these long-term findings to elective caesarean deliveries as well.

Further consideration also needs to be given to the discrepancies which were apparent in the morbidity recorded in the medical and nursing notes and that reported by the women in the study. It would appear that the assessment of women in the post-natal period requires more attention to detail if midwives are to properly respond to client needs.

Long-term Morbidity

It should be kept in mind that in addition to the immediate morbidity associated with caesarean section, future problems may develop. Any abdominal surgery may result in the formation of

abdominal adhesions which could result in intestinal obstruction. Adhesions between the uterus and loops of bowel may be damaged if a further peritoneal incision is made [1], and if the bladder subsequently becomes adherent to the uterus this could cause urinary tract symptoms, or at a further caesarean delivery, be injured when it is dissected free [1]. In the present study two women were known to have developed long-term complications following caesarean delivery. One woman experienced a bladder tear at the time of surgery and subsequently developed a vesico-utero fistula and urinary incontinence, the other experienced severe pain during the insertion of the epidural cannula prior to surgery and subsequently developed a dropped foot and leg paraesthesia. The neurology report showed a significant abnormality at the S1 segmental level and this case was the subject of subsequent litigation proceedings.

One further sequelae of caesarean delivery may be a defective uterine scar which may be liable to rupture in a future pregnancy. Certainly justification for the high rate of planned repeat section is usually based on the difficulty of predicting the behaviour of the uterine scar in labour and that elective caesarean delivery is associated with a lower maternal mortality and morbidity than emergency caesarean section. During 1984 there were 346 women with a past history of caesarean section in the general hospital population and only two cases of scar rupture (0.6%) occurred, which is no higher than the incidence reported in other studies. Both cases were associated with labour and oxytocic therapy had not been administered in either instance. No maternal or perinatal problems attributable to the rupture were apparent in either case. In an extensive review of the literature related to vaginal delivery after caesarean section, Flamm [59] reported no maternal deaths in over 10,000 successful trials of labour after previous caesarean delivery. However, the relative risk of maternal death directly attributable to caesarean section has been estimated at between 2 and 4 times greater than with vaginal delivery [114].

Psychosocial Morbidity

One problem in trying to measure satisfaction with maternity care is that no standardised or validated scales exist for doing so. Just as the recipients of perinatal care are not a homogeneous

group, satisfaction will inevitably mean different things to different women. Satisfaction may also be dependent on a number of other factors including the maternal personality, the amount of preparation received before delivery, prior expectations of childbirth, past childbirth experience, the type of delivery and the degree of control a woman feels she has over her experience. A further difficulty in assessing satisfaction is that it is unstable and changes according to unrelated variables such as the woman's mood at the time of the interview, who is asking the questions, how the questions are posed and how much time has elapsed after the event [174].

Perhaps the greatest difficulty in assessing women's attitudes to caesarean delivery is that few women doubt that the operation is only carried out in cases of *'real'* need when there is a risk for either the mother or her baby. If it is suggested to a woman that caesarean section is advantageous to either herself or more significantly her baby, then not surprisingly she will be glad to have the operation. Certainly in the present study none of the women delivered by emergency caesarean section who were interviewed questioned the need for the operation to be performed, although many wanted more information about the events that led up to its performance.

An important indicator of women's reactions to their experience on this occasion is probably the attitude to future pregnancies. Six months after delivery six (14%) of the women delivered by emergency caesarean section were adamant that they would never have another baby compared with only two (4%) in the group delivered vaginally. In five of the six cases the women stated that this decision was the direct result of their labour and delivery experience whereas in the control group the decision to limit the family to one child was unrelated. A further 7 (17%) women in the study group were unsure if they would have another baby and in 4 cases again this was as a result of their intrapartum experience. In contrast of the 7 (16%) women in the control group who were unsure about a future pregnancy, only one said that this was related to her experience on this occasion, although it was postnatal problems rather than traumatic labour events. Only three of the women in the study group said that they would be keen for a trial of

labour in a future pregnancy, the remainder had no desire to run the risk of a repeat performance of intrapartum events.

Another significant finding of the present study was that women delivered by caesarean section took significantly longer than those delivered vaginally to feel close to their infants and that these differences persisted for several months after the birth.

The promotion of bonding between the mother and her infant has become an increasingly important part of midwifery and obstetric care. The concept of bonding is characterised as being primarily undirectional, occurring rapidly and facilitated by physical contact [175]. Several studies have shown that the hour after birth is a particularly sensitive time and that bonding between parents and their infants can be enhanced by allowing them the maximum opportunity to feed, feel and hold their baby [134,135,146].

Labour and delivery may also influence the mother's reaction to the infant at birth. A short, rapid labour may make it difficult for the woman to accept that the event has occurred and a protracted, difficult labour may leave the woman exhausted and unable to show any enthusiasm for the baby. Robson and Kumar [147] reported an association between maternal indifference and forewater amniotomy, pain and the length of labour.

The performance of an emergency caesarean section will inevitably influence the amount of contact a mother has with her baby in the hour after delivery and in addition maternal reactions are likely to be affected by the stress associated with the operation. In the present study all of the women had less than 90 minutes to prepare themselves for the operation and 80% knew of the decision for less than an hour before going to theatre. As previously described in Chapter 10, when told of the decision many of the women felt exhausted, frightened, confused or detached. Although 70% of the group saw the baby immediately at delivery only 20% were actually allowed to hold the baby in theatre and this was usually just for a few moments before the baby

was taken away. Almost half of the women did not hold their baby in the 12 hours after delivery and 76% did not feed the baby in the 24 hour period following the birth. In contrast 90% of the control group held the baby immediately and 92% had fed the infant within 24 hours. Seventy per cent of the women delivered vaginally were allowed some time alone with the baby and their partner after delivery although in over 70% of these cases the duration of such contact was less than half an hour.

Klaus and Kennel [145] have suggested that separation of the mother and infant after delivery may have adverse effects on maternal attachment which can persist for several months. All women delivered by caesarean section are admitted to a Special Care Unit for a variable period of time following the birth. This unit has no nursery facilities and babies are nursed in the unit nurseries and brought up to the mothers at feeding time. The purpose of the unit is to provide extra support and rest for women who have experienced difficult deliveries or other problems after birth. During the hospital interview, 52% of the women said that they were unconcerned about the separation during the time in SCU, usually because they were tired and/or sore and appreciated being able to rest. However, 30% of women would have liked more time with the baby and a further 8% found it difficult to rest because they were worried about their infant. Such findings highlight the fact that different individuals have different needs and these must be considered so that the most appropriate care is given.

In the light of these findings, it is probably not surprising that women in the study group took longer than those in the control group to feel close to their infants.

Examination of the comments made by women in both the study and control groups at the time of both the hospital and home interviews revealed deficiencies in some aspects of the care they received. The distinct themes that were apparent were :

1. Lack of realistic preparation for labour, delivery and parenthood
2. Lack of support and conflicting advice from midwives, especially in the postnatal wards
3. Failure of communication between women and staff, and it was apparent that this occurred in all areas from antenatal care to the postnatal wards

Each of these areas will be considered in greater depth.

Prenatal Education

Antenatal preparation classes should play an important role in preparing women for pregnancy, delivery and parenthood and in the present study 76% of women in both the study and control groups attended on at least one occasion. Recent research has criticised the content of antenatal classes and also questioned the teaching abilities of midwives and health visitors [176]. Such criticism includes :

- *poor preparation of sessions*
- *conflicting advice being given*
- *lack of realism about the burdens of parenthood*
- *giving the wrong impression*

Midwives have little preparation for teaching and Myle's [177] suggestion that midwives' *"expert knowledge of midwifery and vast experience in dealing with women during pregnancy and labour qualify them as unrivalled teachers of expectant mothers"* would appear over optimistic. A major problem of parentcraft teaching is the didactic style frequently adopted by the teachers. Inevitably antenatal classes will have participants of mixed needs and abilities and good antenatal teaching requires staff to be responsive to the needs of individual women and their partners. This involves allowing the participants to direct the choice of topics to be discussed.

From some of the comments made by the women it would appear that in attempting to instil a positive attitude towards labour and delivery and the achievement of a spontaneous delivery, topics such as forceps delivery and caesarean section were downplayed or even ignored. During

1984 in Glasgow Royal Maternity Hospital 16% of primigravidae had caesarean deliveries and a further 28% were delivered by forceps, so almost half had other than *'normal'* deliveries. As primigravidae are the main attenders at such classes it would seem appropriate that some discussion of alternative delivery modes should be encouraged.

Postnatal Care

The third report of the Maternity Services Advisory Committee [178] recognised that postnatal care is as important a part of the childbearing process as the actual delivery yet noted that in many units it had the lowest priority. *"Inadequate and under qualified care"* resulted in communication failure, conflicting advice, confusion and lack of maternal satisfaction. The report emphasised the importance of meeting both the physical and emotional needs of the mother during this vital time. In the present study postnatal care was the area most frequently criticised and comments were made as often in the control group as the study group. Some of the criticism was directed to the physical environment within the wards such as lack of toilet facilities, single rooms, baths etc. Such factors are largely immutable to change, however much of the criticism was directed to areas which could be altered.

One of the most important objectives of postnatal care is to promote the physical recovery of the mother and yet at the time of the hospital interview, 44% of the study group and 24% of the controls felt they didn't get adequate rest or had difficulty in sleeping in hospital. When interviewed at home, 33% of the women re-iterated this problem and felt that something should be done to improve this aspect of postnatal care. Many of the wards in the hospital are *'open-plan'* or of a *'Nightingale'* design and inevitably when babies are nursed beside their mothers the problem of noise arises. However, in many cases women complained that the sleeping difficulties were caused by staff conversations, televisions, lights being left on etc and sensitivity on the part of the staff might have minimised these problems.

Another frequently mentioned complaint was the lack of support from the midwives in the wards. This was more commonly mentioned by those women delivered by caesarean section. In addition to the normal stressors associated with childbirth, the woman delivered by emergency caesarean section has to cope with the physical and psychological aftermath of major surgery which may have occurred on top of a long and exhausting labour. Sixty eight per cent of the study group said they found it difficult to cope with the physical care of the baby at the time of the hospital interview. These difficulties were related to lifting and handling the baby, getting in and out of bed, bending and finding a comfortable position in which to nurse the baby. Several of the women felt that it would be helpful to have a ward set aside for those delivered by caesarean section which was equipped with either beds with adjustable height control or stools to help the women get in and out of bed. Some also felt that the mutual support that would be afforded by this arrangement would be beneficial. A further advantage of this kind of ward would be that the midwifery staff would be more aware that these women might need more help with the physical aspects of baby care. It was also apparent from interviewing these women, especially those delivered under general anaesthesia, that the sequence of events leading up to the decision to operate and immediately prior to the delivery was often confused. Clarifying the confusion and allowing the women the opportunity to reconstruct their experiences and express their feelings is an important and often neglected part of facilitating adjustment in the postnatal period. Midwives have an important role to play in counselling in this area.

Conflicting advice from midwives was expressed by many women and this was usually related to the area of infant feeding. A number of women were still angry at the time of the home interview about the care they received in this area. Many of the women felt that their confidence was undermined by the conflicting professional advice give and ultimately this resulted in a number of them giving up breast feeding.

Klaus and Kennel [145] maintain that certain influences which affect mother-child relationships are fixed whilst others such as hospital practices and the attitudes of staff are alterable and may

be changed to improve the establishment of maternal relationships. Ball [179] found that the delivery of midwifery care had an effect on the transition to motherhood and could, by increasing or decreasing stress in mothers, make a notable difference to the way each adapted to the demands of mothering the child. Some of the factors which were shown to affect stress levels were conflicting advice from midwives which reduced the mother's self-image in feeding; rest; lack of continuity of information between midwives and the fact that most postnatal care seemed to be planned on a routinised basis with a chronological succession of increasing responsibility for the care of the infant by the mother irrespective of her age, condition after delivery or previous childbearing experiences.

Postnatal care which is planned on a routinised system is insufficiently flexible and sensitive to allow the best possible support of the mother and increasingly midwives have recognised that such systems need to be replaced with evaluated individualised care based on the available information. The midwifery/nursing process is a systematic problem solving or problem preventing approach to care which has an inherent acceptance of the woman's right to individualised care and to participate actively in that care including decision making [180]. It is used to assess individual needs, plan and deliver appropriate care to meet the identified needs and finally the effect of the care is evaluated. The process is ongoing and should be used from the booking visit until discharge by the community midwives after delivery. The single record ensures that all those involved in the delivery of care know what has been decided thus enhancing the continuity.

The midwifery process was adopted in Glasgow Royal Maternity Hospital in 1981 and had therefore been in operation for almost three years when the present study commenced. Despite this, the areas of postnatal care found to be deficient in the present study are the same areas frequently cited in other studies. It was particularly disappointing to find that routine, mechanistic care is still apparently being given. Part of the blame for this may lie with the midwifery managers who implemented this innovation without giving proper attention to the

training needs of those who were expected to use it. Another factor may be that midwives require further education about the emotional needs of women during this time.

Communication

Failure of communication is the most frequently complained of aspect of maternity care. Although this can occur in other medical and surgical fields, it appears that resentment about, or, criticism of poor communications is more acute in the maternity service than in any other area [181]. Several studies have shown that women are often dissatisfied with the lack of opportunities made available to them to ask questions and the quality of the information and explanations given to them by caregivers. This may occur in the course of antenatal care [181, 182], in the intrapartum period [183, 184] or in the postnatal period [179].

It was not the intention of the study to examine in detail communication between women and their caregivers, nevertheless, several of the findings have important implications for midwifery and obstetric practice. Failures of communication were seen on a number of occasions in the present study and occurred in both women delivered vaginally and by caesarean section. The comments made by the women as detailed in Chapter 10 speak for themselves and will not be discussed further.

It is of concern to note that three months after delivery, 13% of the women either did not know why the caesarean section was carried out or gave completely wrong explanations for the performance of the operation. In the study group of primigravidae delivered by emergency caesarean section, 20% of the respondents fell into one of the above two categories and a further 16% were only partially right in their comprehension. It may have been that these women were given information about the reasons for the operation at a time when they were unable to take in fully what was said or that the explanations were given in such a way that they were unable to understand. There may also have been confusion among the medical and midwifery staff in thinking that the reasons had already been given by someone else. Some of the women

interviewed said that they had never been told directly what had occurred but had gleaned information from overheard conversations between doctors or doctors and midwives.

At the time of the home interview it was apparent that 8 (19%) of the 42 women interviewed had little or no information about the events which occurred in labour and resulted in operative delivery and the management of future pregnancies. In each of these cases between one and three hours were spent with the women on completion of the interview going over what happened in labour and the reasons for caesarean delivery.

Irrespective of why communication failures arose, it is apparent from these findings that provision must be made to allow the woman to discuss the events of labour and the reasons for any operative intervention. To ensure that no cases are overlooked then it should be recorded in both the obstetric and midwifery notes. Discussion should also include the likely management of future pregnancies. The ideal timing of such discussion will depend on the woman's individual situation, but given that some women did not attend the postnatal examination and others are likely to attend the General Practitioner rather than the hospital, then the responsibility should lie with the hospital staff to ensure that it takes place before hospital discharge.

Conclusions

Conclusions

As in most other countries, the caesarean section rate in Scotland has risen markedly in the past two decades. With over 8500 sections being performed each year, caesarean section has become the most common surgical procedure involving skin incision.

Justification of the upward trend is usually made by linking caesarean section rates with perinatal mortality statistics. Often they are presented as reciprocally dependent variables without any mention of the other factors which have influenced perinatal outcome during the same time period when caesarean section rates have risen. Without doubt in some cases the timely performance of a caesarean section may be mandatory to ensure a safe outcome for the woman or her infant but most recent studies have failed to support the hypothesis that there is a causal relationship between improved perinatal outcome and the increased use of caesarean section.

The clinical indications mainly responsible for the rise in rates are now well described - dystocia, repeat caesarean section, breech presentation and fetal distress. However, there is a lack of available evidence to support the use of abdominal delivery for many of these common indications which led one obstetrician to comment that the increasing caesarean section rate *"is the result of one of the least controlled clinical experiments that has occurred in medicine"* [185].

Certainly the results of the present study showed that 87% of all caesarean sections carried out in Glasgow Royal Maternity Hospital were performed for indications which fell into the above mentioned categories, however, the indications were often poorly recorded and liberal use was made of poorly defined terms such as failure to progress in labour.

Few studies have addressed the importance of non-clinical variables in decisions to deliver by caesarean section. In the United States, failure to perform a caesarean section is one of the

commonest reasons for litigation [186] and although malpractice suits are much less common in the United Kingdom, fear of litigation was the second most common reason given by British obstetricians in a survey for the increased use of caesarean section [2].

Other factors may include the loss of clinical skills in vaginal delivery of breech presentations, interpretation of the results of technology such as electronic fetal monitoring and X-ray pelvimetry and the available facilities and staffing within maternity units [187, 188]. It is also notoriously difficult to reverse any established trend in medical practice because of the natural desire to conform to peer practice [188] and the effect of an individual consultant's policy both on its own and through its effect on junior staff has never been fully assessed [37].

In the United States and Canada attempts to reduce the number of caesarean deliveries have focused on the poor knowledge of research findings. Consensus panels have assessed the available research evidence and published recommendations on the use of caesarean section in different situations and usually called for reduced rates [1,189]. Evaluations of the NIH Task Force statement on caesarean birth showed that it may have improved doctors' knowledge but did little to reduce caesarean section rates overall [32,190].

The way towards a more judicious use of caesarean section would seem to lie through a more thorough audit of operative rates and should consider both individual cases and review trends.

Audit of clinical practice has been defined [191] as comprising :

> *"any evaluative process which explicitly aims to provide information which can lead to improvements in the care available to childbearing women and their families. Implicit in common usage of the word 'audit' is that it is a formal process"*

Data for audit can be collected on both a national and local level but whatever the sources of information, interpretation will occur against a background of the personal experiences of those involved and the available scientific evidence.

With regard to caesarean section this type of audit would involve the definition of acceptable norms of practice taking into account aspects of local circumstances such as the age and parity distribution of the obstetric population and the clinical skills of practitioners.

It seems likely that if audit is based solely on the monitoring of existing policies then the caesarean section rate is unlikely to decrease. Good clinical practice should be based on sound scientific evidence and the more liberal use of caesarean section is one example of a trend in obstetric practice which has never been properly evaluated.

Proper audit must also take account of the available scientific evidence and disseminate the findings of relevant research which will aid the assessment of the merits and demerits of the operation. The Royal College of Obstetricians and Gynaecologists Working Party on Perinatal Audit and Surveillance [192] strongly urged the definition of protocols of management, preferably for entire hospitals, which all staff could adhere to. Evaluation of such protocols could ultimately yield a scientific base for clinical policies as well as reducing confusion for junior medical staff and midwives who, as this study has shown, are responsible for the great majority of patients.

Controlled prospective randomised trials also have an important role to play in the definition of clinical policies, however as Lilford [193] has pointed out, while some trials can be realistically mounted within a short time in a single unit, others require multicentre collaboration and in some cases the population size required would make the design of a trial impossible.

The result of such trials would not necessarily provide the best management option for individual cases as other factors must also be considered. Research evidence may show that caesarean section is slightly safer than vaginal delivery in certain situations but the obstetrician will also have to consider the increased mortality and morbidity associated with the operation.

Certainly the present study showed that there is considerable maternal morbidity associated with caesarean delivery and that this can persist long after the woman is discharged home from hospital. Much more information is required about the health of women after delivery. No large scale systematic studies have been carried out to determine the comparative rates of morbidity associated with different delivery methods. Comparison of morbidity rates reported from single institutions is difficult because definitions of morbidity lack uniformity and other factors which may influence the rate of post-operative complications, such as the skill and experience of the surgeon performing the operation are rarely considered. Further attention to this aspect should be given in future studies.

A further important dimension of perinatal audit is that it should consider the views and opinions of the consumers of maternity care. Childbirth is a social and personal experience as well as an obstetric event and for most women a satisfactory outcome of pregnancy involves not only the delivery of a healthy baby but also a good experience. The achievement of both outcomes is not diametrically opposed but rather complementary to one another.

Women's attitudes to obstetric care have changed markedly during the time period when caesarean section rates have been rising. Increasingly women wish to be informed and to actively participate in decision making related to the care they receive. This involves women selecting from a wide range of options with varying risks and degrees of intervention. Caesarean section is just one example of an intervention currently practised in obstetrics where little is known about the short or long term psychosocial morbidity in mothers and babies.

Few studies to date have attempted to evaluate the psychological and social impact of caesarean delivery and those that have are mainly from the USA and Canada where the health care systems and consumer demands are different to those in the UK. Many of the available studies are descriptive in nature and have used non-representative samples eg participants in caesarean support groups or parents who voluntarily contacted the investigators. Such sampling is likely to provide an over-representation of women with negative views of their experience. In addition, the methods of data collection and the time which had elapsed between the birth and the interview are different making it consumer demands are different to those in the UK.

Another question which should be addressed is women's preferences regarding the method of delivery. In this study of the 42 women interviewed at home after emergency caesarean section, only three indicated that they would be keen for a trial of labour in a future pregnancy. The majority said they had no wish to risk the possibility of a repeat performance of their experience on this occasion and would prefer elective delivery. It may be more convenient for both the obstetrician and the woman to decide on an elective repeat caesarean delivery, but to what extent women's preferences should influence the performance of abdominal delivery has not been examined in the available literature.

The present study reflects the practice in only one hospital, however, the findings do identify several major areas of concern which warrant further study.

Recommendations

The following recommendations are made from the results of the present study :

1. Immediate attention should be given to the adoption of standard definitions of morbidity after delivery. Furthermore, deficiencies in the system of recording morbidity should also be addressed.

2. This should be followed by large-scale systematic studies to determine the morbidity associated with different delivery methods. Such studies should consider not only the immediate morbidity experienced by women during the postnatal stay in hospital, but also the short and long-term effects.

3. Midwifery staff should evaluate the validity and reliability of the information recorded on the problem-orientated midwifery record and ensure that individual needs are properly identified so that the most appropriate care can be planned and delivered. If uniform definitions of morbidity were used then this record might be utilised as a basis for the study of morbidity until the 14th postnatal day.

4. Further investigation should be carried out into the risk factors associated with the development of morbidity. Such studies should consider not only clinical variables but also the effect of non-clinical factors, such as the level and experience of the obstetrician performing the surgery.

5. All staff should initiate systematic evaluation of the care given throughout the antenatal, intrapartum and postnatal period. This should take into account the views and opinions of the consumers of such care.

6. Consideration should be given to the communication failures which were apparent in the study. Staff should develop and evaluate a variety of methods for imparting information to women, to ensure that individual needs are met.

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OUTCOMES

of

CAESAREAN SECTION

Volume II of II

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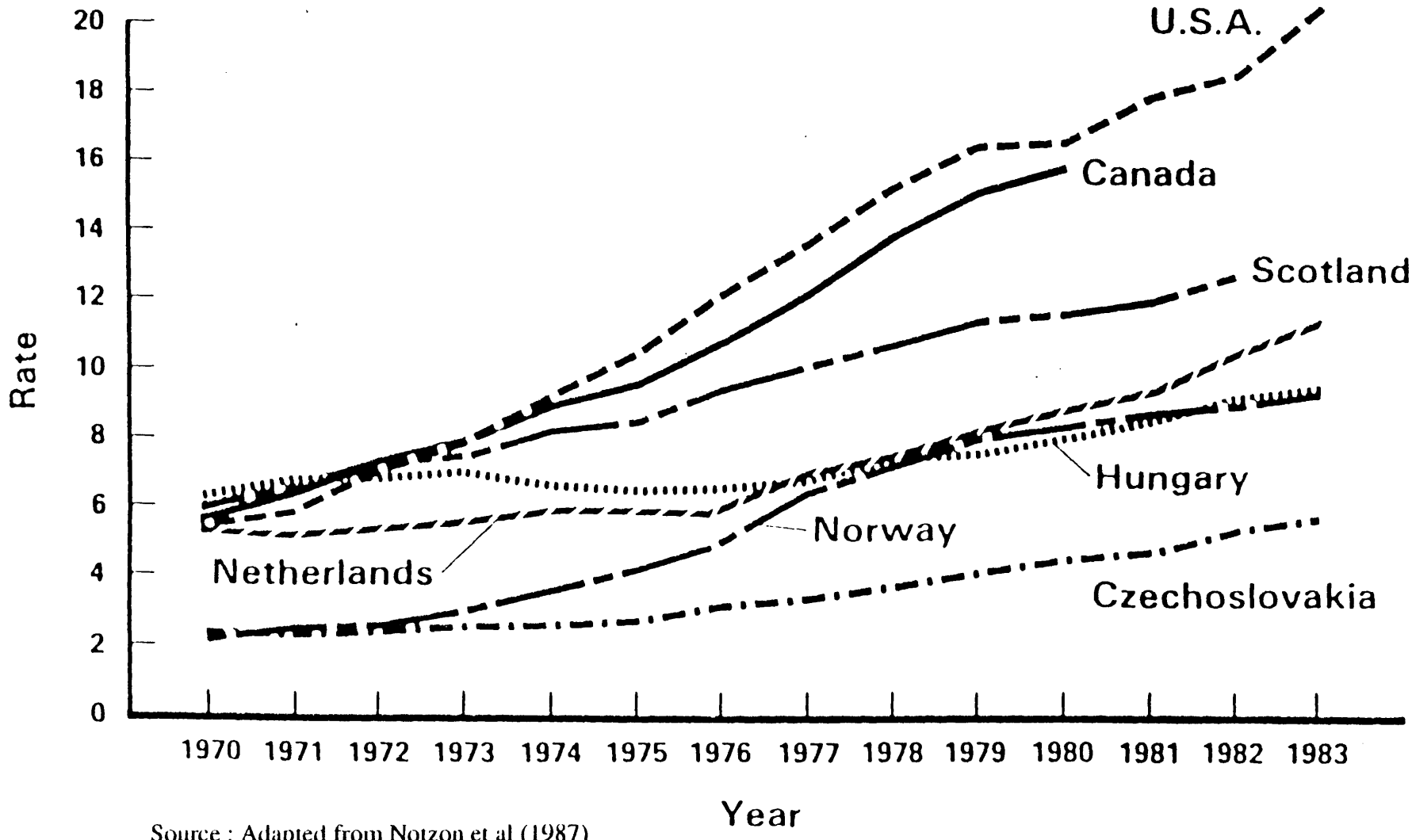
Figure 1.2 : CAESAREAN SECTION RATES PER 100 HOSPITAL DELIVERIES SELECTED COUNTRIES, 1970-83



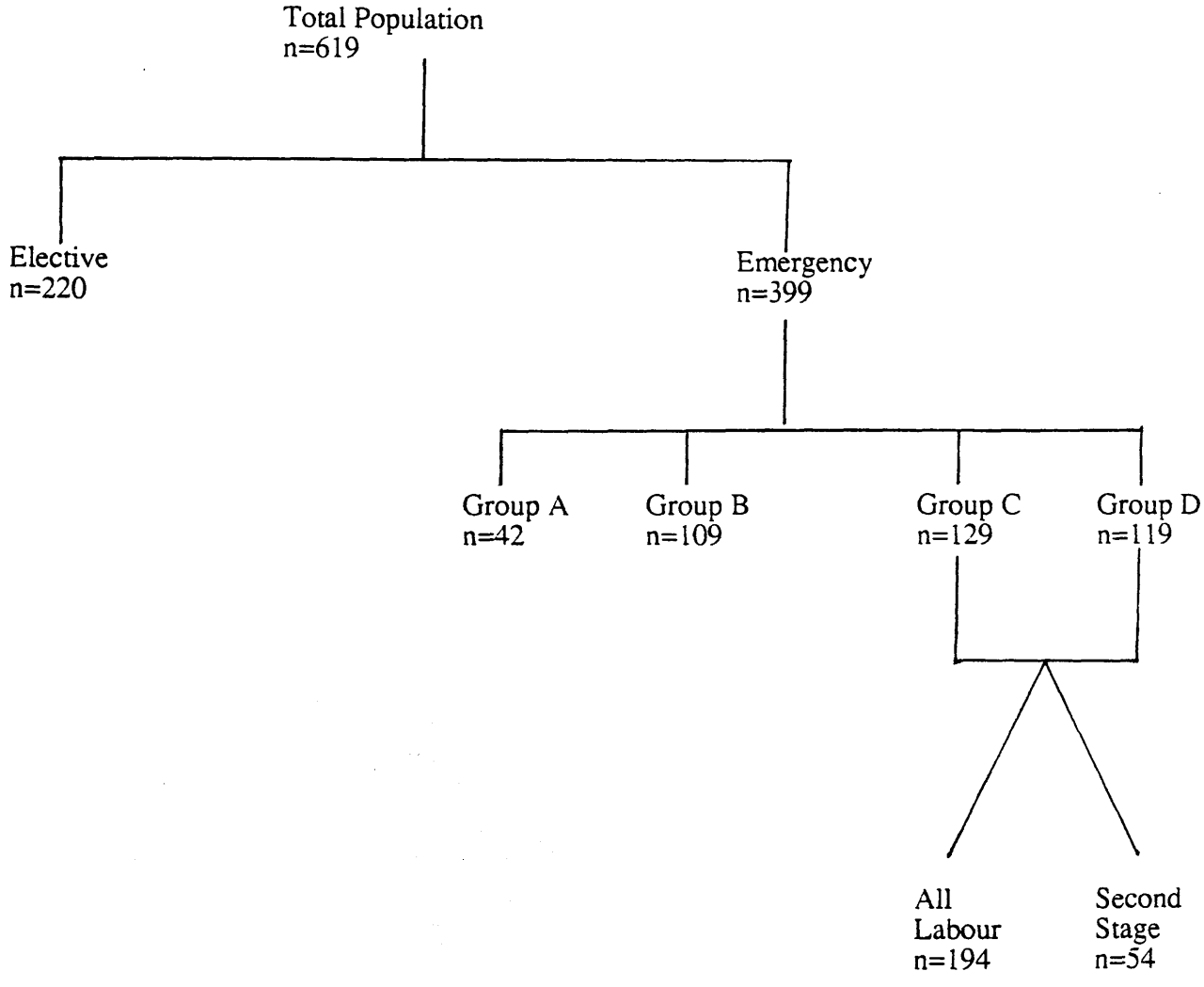
Source : Adapted from Notzon et al (1987)

Table 1.4a : MORBIDITY AFTER CAESAREAN SECTION
SUMMARY OF SELECTED STUDIES PUBLISHED
IN THE PERIOD 1977-84

STUDY	YEARS	No of CS	IU Infection	UTI	Wound Infection	Blood Trans	Paralytic Ileus	Pulmonary Embolus
Amirikia et al	1965-79	9718	7.0%	6.0%	3.8%	6.3%	0.6%	0.2%
Evrard et al	1977	1011	6.6%	6.3%	0.9%	3.5%	1.3%	-
Green & Sarubbi	1975	129	17.8%	7.8%	4.7%	-	-	-
Nielsen & Hokegard	1978-80	1319	6.6%	3.1%	1.6%	1.0%	0.2%	0.1%
Perloe & Curet	1975-6	592	6.1%	1.2%	2.2%	-	-	-
Rehu & Nilsson	1977	774	9.8%	7.3%	6.8%	-	-	-

Source : Adapted from Petitti (1985)

Figure 2a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
GROUPS WITHIN STUDY POPULATION (n=619)



Group A - Emergency caesarean sections before the onset of labour
Group B - Emergency caesarean section on admission to labour ward
Group C - Emergency caesarean section with a labour duration < 12 hours
Group D - Emergency caesarean section with a labour duration ⩾ 12 hours

Table 3a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
INFANTS BORN TO HOSPITAL POPULATION
MODE OF DELIVERY (3992 infants)

		TOTAL POPULATION	PRIMIGRAVIDAE	MULTIGRAVIDAE	*MULTIGRAVIDAE with prev CS*
		n=3952	n=1757	n=2195	*n=346*
MODE of DELIVERY	SVD	2687 (67%)	988 (56%)	1699 (77%)	*101 (28%)*
	FORCEPS	640 (16%)	497 (28%)	143 (6%)	*41 (12%)*
	BREECH	44 (1%)	17 (1%)	27 (1%)	*3 (1%)*
	CAESAREAN SECTION	621 (16%)	272 (15%)	349 (16%)	*208 (59%)*
Total no of infants		3992**	1774	2218	*353*

** + *2 infants from the triplet pregnancies where the mode of delivery was not known*

X^2 350.72 df 3 (comparison of primigravidae and multigravidae)

Significance $p < 0.001$

Source : SMR_2 Data 1984

Table 3.1a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
HOSPITAL POPULATION
AGE AND AGE GROUP

	PRIMIGRAVIDAE		MULTIGRAVIDAE	
	vaginal n=1493	caesarean n=264	vaginal n=1855	caesarean n=340
Mean (years)	23.14	25.09	27.29	28.36
Range	14 - 39	15 - 38	16 - 46	17 - 44
SD	4.47	4.73	5.01	4.99
T value	6.50		3.57	
Significance	$p < 0.0005$		$p < 0.0005$	
95% CI	1.36 - 2.54		0.49 - 1.65	
AGE GROUP				
< 18 years	128 (8.6%)	12 (4.5%)	5 (0.3%)	2 (0.6%)
18-34 years	1348 (90.3%)	244 (92.4%)	1687 (90.9%)	296 (87.0%)
⩾35 years	17 (1.4%)	8 (3.1%)	163 (8.8%)	42 (12.3%)
X^2	10.32 df 2		5.307 df 2	
Significance	$p < 0.01$		NS	

Source : SMR_2 1984

Table 3.1b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
HOSPITAL POPULATION
HEIGHT AND HEIGHT GROUP

	PRIMIGRAVIDAE		MULTIGRAVIDAE	
	vaginal n=1380	caesarean n=252	vaginal n=1789	caesarean n=327
Mean (cms)	160.74	158.75	160.36	158.02
Range	137-179	141-175	136-182	139-178
SD	5.95	6.15	6.11	6.77
T value	3.62		6.32	
Significance	$p < 0.0005$		$p < 0.0005$	
95% CI	1.19 to 2.79		1.61 to 3.07	
HEIGHT GROUP				
< 155 cm	193 (14.0%)	62 (24.6%)	303 (16.9%)	98 (30.0%)
⩾155 cm	1187 (86.0%)	190 (75.4%)	1486 (83.1%)	229 (70.0%)
X^2	18.221 df 1		30.572 df 1	
Significance	$p < 0.001$		$p < 0.001$	

Source : SMR_2 1984

Table 3.1c : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
HOSPITAL POPULATION
MARITAL STATUS

	PRIMIGRAVIDAE		MULTIGRAVIDAE	
	vaginal n=1493	caesarean n=264	vaginal n=1855	caesarean n=340
Single	450 (30.1%)	44 (16.7%)	134 (7.2%)	17 (5.0%)
Married / Common Law	988 (66.2%)	208 (78.8%)	1600 (86.3%)	295 (86.8%)
Separated / Divorced	19 (1.3%)	5 (1.9%)	53 (2.9%)	9 (2.6%)
Other / Not Known	36 (2.4%)	7 (2.6%)	68 (3.6%)	19 (5.6%)
X^2	20.415 df 3		4.798 df 3	
Significance	$p < 0.001$		NS	

Source : SMR_2 1984

Table 3.1d : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
HOSPITAL POPULATION
SOCIAL CLASS

	PRIMIGRAVIDAE		MULTIGRAVIDAE	
	vaginal n=1493	caesarean n=264	vaginal n=1855	caesarean n=340
I and II	187 (12.5%)	52 (19.7%)	266 (14.3%)	36 (10.6%)
III	453 (30.5%)	92 (34.8%)	612 (33.0%)	139 (40.9%)
IV and V	255 (17.0%)	47 (17.8%)	363 (19.6%)	66 (19.4%)
Other / Not Known	598 (40.0%)	73 (27.6%)	614 (33.1%)	99 (29.1%)
X^2	19.055 df 3		9.574 df 3	
Significance	$p < 0.001$		$p < 0.025$	

Source : SMR_2 1984

Table 3.1e : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
HOSPITAL POPULATION
PREVIOUS CAESAREAN SECTION

	MULTIGRAVIDAE	
	vaginal n=1855	caesarean n=340
None	1713 (92.3%)	136 (40.0%)
1	141 (7.6%)	138 (40.6%)
2	1 (0.1%)	61 (17.9%)
3	0	4 (1.2%)
4	0	1 (0.3%)

Source : SMR_2 1984

Table 3.1f : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
HOSPITAL POPULATION
PREVIOUS PERINATAL DEATH

	MULTIGRAVIDAE	
	vaginal n=1855	caesarean n=340
0	1790 (96.5%)	313 (92.0%)
> 0	65 (3.5%)	27 (8.0%)
X^2	14.088 df 1	
Significance	$p < 0.001$	

Source : SMR_2 1984

Table 3.2a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
HOSPITAL POPULATION
ADMISSSION TO HOSPITAL DURING ANTENATAL PERIOD

	PRIMIGRAVIDAE		MULTIGRAVIDAE	
	vaginal n=1493	caesarean n=264	vaginal n=1855	caesarean n=340
None	912 (61.1%)	139 (52.7%)	1278 (68.9%)	217 (63.8%)
1 admission	345 (23.1%)	77 (29.2%)	390 (21.0%)	79 (23.2%)
2 admissions	145 (9.7%)	31 (11.7%)	104 (5.6%)	26 (7.7%)
> 2 admissions	91 (6.1%)	17 (6.4%)	83 (4.5%)	18 (5.3%)
X^2	7.063 df 3		4.182 df 3	
Significance	NS		NS	
Admitted	581 (38.9%)	125 (47.3%)	577 (31.1%)	123 (36.2%)
Not admitted	912 (61.1%)	139 (52.7%)	1278 (68.9%)	217 (63.8%)
X^2	6.638 df 1		3.402 df 1	
Significance	$p < 0.01$		NS	

Source : SMR_2 1984

Table 3.2b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
HOSPITAL POPULATION
INDUCTION OF LABOUR

	PRIMIGRAVIDAE		MULTIGRAVIDAE	
	vaginal n=1493	caesarean n=264	vaginal n=1855	caesarean n=340
Induced	407 (27.3%)	81 (30.7%)	418 (22.5%)	34 (10.0%)
Spontaneous	1086 (72.7%)	183 (69.3%)	1437 (77.5%)	306 (90.0%)
X^2	1.309 df 1		27.604 df 1	
Significance	NS		$p < 0.001$	

Source : SMR_2 1984

Table 3.2c : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
HOSPITAL POPULATION
GESTATION AT DELIVERY

	PRIMIGRAVIDAE		MULTIGRAVIDAE	
	vaginal n=1493	caesarean n=264	vaginal n=1855	caesarean n=340
Mean (weeks)	39.06	38.50	39.08	37.78
Range	22 - 42	28 - 42	24 - 43	27 - 42
SD	2.133	2.652	1.981	2.447
T value	3.78		10.74	
Significance	$p < 0.0005$		$p < 0.0005$	
95% CI	0.27 - 0.85		1.06 - 1.54	
GESTATION GROUP				
< 37 weeks	104 (7.0%)	39 (14.8%)	111 (6.0%)	62 (18.2%)
≥37 weeks	1389 (93.0%)	225 (85.2%)	1744 (94.0%)	278 (81.8%)
X^2	18.287 df 1		59.403 df 1	
Significance	$p < 0.001$		$p < 0.001$	

Source : SMR_2 1984

Table 3.3a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
HOSPITAL POPULATION
BIRTHWEIGHT

	PRIMIGRAVIDAE		MULTIGRAVIDAE	
	vaginal n=1502	caesarean n=272	vaginal n=1869	caesarean n=349
Mean (grams)	3191	3190	3329	3166
Range	530 - 5170	750 - 5900	693 - 5500	1170 - 5450
SD	536	755	572	721
T value	0.026		4.625	
Significance	NS		$p < 0.0005$	
95% CI	-73.3 to 75.3		94.6 to 231.0	

BIRTHWEIGHT GROUP

< 2500 grams	117 (7.8%)	41 (15.1%)	109 (5.8%)	67 (19.2%)
≥2500 grams	1385 (92.2%)	231 (84.9%)	1760 (94.2%)	282 (80.8%)
X^2	15.060 df 1		79.914 df 1	
Significance	$p < 0.001$		$p < 0.001$	

Source : SMR_2 1984

Table 3.3b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
HOSPITAL POPULATION
SINGLETON INFANTS - CENTILE VALUES OF BIRTHWEIGHT FOR GESTATIONAL AGE (Controlled for Sex of Infant)

	PRIMIGRAVIDAE		MULTIGRAVIDAE	
MALE INFANTS	vaginal n=754	caesarean n=132	vaginal n=932	caesarean n=158
< 10th Centile	62 (8.2%)	10 (7.6%)	76 (8.2%)	10 (6.3%)
Normal	641 (85.0%)	96 (72.7%)	744 (79.8%)	122 (77.2%)
> 90th Centile	51 (6.8%)	26 (19.7%)	112 (12.0%)	26 (16.5%)
X^2	23.716 df 2		2.789 df 2	
Significance	$p < 0.001$		NS	

	PRIMIGRAVIDAE		MULTIGRAVIDAE	
FEMALE INFANTS	vaginal n=722	caesarean n=124	vaginal n=902	caesarean n=173
< 10th Centile	57 (7.9%)	13 (10.5%)	72 (8.0%)	13 (7.5%)
Normal	605 (83.8%)	93 (75.0%)	721 (80.0%)	139 (80.4%)
> 90th Centile	60 (8.3%)	18 (14.5%)	109 (12.0%)	21 (12.1%)
X^2	6.273 df 2		0.441 df 2	
Significance	$p < 0.05$		NS	

Source : SMR_2 1984

Table 3.3c : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
HOSPITAL POPULATION
INFANT OUTCOME

	PRIMIGRAVIDAE		MULTIGRAVIDAE	
	vaginal n=1502	caesarean n=272	vaginal n=1869	caesarean n=349
Live	1486 (98.9%)	267 (98.2%)	1845 (98.7%)	346 (99.1%)
Stillbirth	9 (0.6%)	1 (0.4%)	16 (0.8%)	2 (0.6%)
Early NND	7 (0.5%)	4 (1.4%)	7 (0.4%)	1 (0.3%)
Late NND	0	0	1 (0.1%)	0
X^2	1.173** df 1		0.441** df 1	
Significance	NS		NS	

** stillbirths and neonatal deaths combined for X^2 analysis

Source : SMR_2 1984

Table 3.3d : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
HOSPITAL POPULATION
APGAR SCORE < 7 AT 5 MINUTES
(Stillbirths excluded)

	PRIMIGRAVIDAE		MULTIGRAVIDAE	
	vaginal n=1493	caesarean n=271	vaginal n=1853	caesarean n=347
< 7	22 (1.5%)	12 (4.4%)	52 (2.8%)	8 (2.3%)
⩾7	1471 (98.5%)	259 (95.6%)	1801 (97.2%)	339 (97.7%)
X^2	10.592 df 1		0.276 df 1	
Significance	p < 0.005		NS	

Source : SMR_2 1984

Table 3.3e : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
HOSPITAL POPULATION
NUMBER OF INFANTS ADMITTED TO SCBU**
(Live Births)

	PRIMIGRAVIDAE		MULTIGRAVIDAE	
	vaginal n=1493	caesarean n=271	vaginal n=1853	caesarean n=347
Not Admitted	1390 (93.1%)	212 (78.2%)	1748 (94.3%)	276 (79.5%)
Admitted < 48hrs	27 (1.8%)	19 (7.0%)	32 (1.7%)	18 (5.2%)
Admitted ⩾48hrs	76 (5.1%)	40 (14.8%)	73 (4.0%)	53 (15.3%)
X^2	62.248 df 2		88.288 df 2	
Significance	$p < 0.001$		$p < 0.001$	

** Special Care Baby Unit

Source : SMR_2 1984

Table 3.4a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
HOSPITAL POPULATION
LENGTH OF POSTNATAL STAY IN HOSPITAL

	PRIMIGRAVIDAE		MULTIGRAVIDAE	
	vaginal n=1493	caesarean n=264	vaginal n=1855	caesarean n=340
Mean	4.68	7.56	3.39	7.31
Range	0 - 23	1 - 30	0 - 23	2 - 26
SD	1.663	2.542	1.428	2.383
T value	24		39.2	
Significance	$p < 0.0005$		$p < 0.0005$	
95% CI	2.64 to 3.12		3.72 to 4.12	

Source : SMR_2 1984

Table 4a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION (n=619)
MARITAL STATUS, SOCIAL CLASS AND RACE

		TOTAL POPULATION	PRIMIGRAVIDAE	MULTIGRAVIDAE	MULTIGRAVIDAE with prev CS	
		n=619	n=274	n=125	n=220	
MARITAL STATUS	married	550 (88.8%)	227 (82.9%)	113 (90.4%)	210 (95.4%)	X^2 4.08
	single	58 (9.4%)	45 (16.4%)	8 (6.4%)	5 (2.3%)	NS *
	w/s/div	11 (1.8%)	2 (0.7%)	4 (3.2%)	5 (2.3%)	
SOCIAL CLASS	I and II	96 (15.5%)	53 (19.3%)	13 (10.4%)	30 (13.6%)	X^2 7.44
	III	243 (39.3%)	97 (35.4%)	47 (37.6%)	101 (45.9%)	NS *
	IV and V	95 (15.3%)	50 (18.2%)	15 (12.0%)	32 (14.5%)	
	Other/OOW	185 (29.9%)	74 (27.1%)	50 (40.0%)	57 (25.9%)	
RACE	Caucasian	590 (95.3%)	266 (97.1%)	119 (95.2%)	205 (93.2%)	X^2 0.57
	Asian	25 (4.0%)	8 (2.9%)	6 (4.8%)	11 (5.0%)	NS *
	Negro	4 (0.6%)	0	0	4 (1.8%)	

* comparison of two groups of multigravidae

Source : Case Note Review (Data Form 1)

Table 4b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION (n=619)
AGE AND HEIGHT DISTRIBUTION

		TOTAL POPULATION	PRIMIGRAVIDAE	MULTIGRAVIDAE	MULTIGRAVIDAE with prev CS	
		n=619	n=274	n=125	n=220	
AGE (years)	mean	26.8	24.8	28.2	28.4	T - 0.49
	range	15 - 44	15 - 38	18 - 41	17 - 44	(pooled)
	SD	5.2	4.7	5.2	4.9	NS *
AGE GROUP	< 18	15 (2.4%)	13 (4.7%)	0	2 (0.9%)	X^2 1.65
	18-34	554 (89.5%)	252 (92.0%)	108 (86.4%)	194 (88.2%)	NS *
	⩾35	50 (8.1%)	9 (3.3%)	17 (13.6%)	24 (10.9%)	
HEIGHT (cms)	mean	158.4	158.9	158.7	157.6	T 1.61
	range	139 - 178	141 - 175	142 - 178	139 - 175	(pooled)
	SD	6.3	5.9	6.0	6.8	NS*
HEIGHT GROUP	< 155	159 (25.7%)	59 (21.5%)	28 (22.4%)	72 (32.7%)	X^2 4.13
	⩾155	460 (74.3%)	215 (78.5%)	97 (77.6%)	148 (67.3%)	p< 0.05*

* comparison of two groups of multigravidae

Source : Case Note Review (Data Form 1)

Table 4.1a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION (n=619)
PAST MEDICAL HISTORY - MAIN CATEGORIES

CONDITION	Number (%)
Short stature	159 (25.7%)
Renal disease/abnormality/ recurrent UTI	75 (12.1%)
Psychiatric history	46 (7.5%)
$1^{o}/2^{o}$ Infertility	32 (5.2%)
> 2 abortions/ > 1 perinatal death	17 (2.7%)
Previous gynaecological surgery	14 (2.3%)
Gynaecological disease/ abnormality	9 (1.5%)
Cardiac disease	9 (1.5%)
Diabetes mellitus	7 (1.1%)
Rhesus disease	4 (0.6%)
Essential hypertension	3 (0.5%)

Source : Case Note Review (Data Form 1)

Table 4.1b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION (n=619)
ANTENATAL ADMISSIONS

ADMISSIONS	TOTAL POPULATION	PRIMIGRAVIDAE	MULTIGRAVIDAE	MULTIGRAVIDAE with prev CS
	n=619	n=274	n=125	n=220
0 admission	329 (53.2%)	136 (49.6%)	55 (44.0%)	138 (62.7%)
1 admission	185 (29.9%)	84 (30.7%)	45 (36.0%)	56 (25.5%)
2 admissions	69 (11.1%)	37 (13.5%)	16 (12.8%)	16 (7.3%)
> 2 admissions	36 (5.8%)	17 (7.2%)	9 (7.2%)	10 (4.5%)

X^2 15.193, df 6; $p < 0.025$

ADMITTED	290 (46.8%)	138 (50.4%)	70 (56.0%)	82 (27.3%)
NOT ADMITTED	329 (53.2%)	136 (49.6%)	55 (44.0%)	138 (62.7%)

X^2 13.66, df 2; $p < 0.005$

Source : Case Note Review (Data Form 1)

Table 4.1c : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION (n=619)
ANTENATAL PROBLEMS - MAIN CATEGORIES

DISORDER	Number (%)
Hypertension	167 (27.0%)
Malpresentations/ Variable lie	160 (25.8%)
Urinary tract infection	94 (15.2%)
Investigations of weight gain	90 (14.5%)
Premature labour	59 (9.5%)
False labour	46 (8.4%)
Threatened abortion	42 (6.8%)
Anaemia (Hb < 10g)	31 (5.0%)
Placenta praevia	26 (4.2%)
Premature # membranes	22 (3.6%)

Source : Case Note Review (Data Form 1)

Table 4.2a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION
PREVIOUS CAESAREAN SECTIONS (n=220)
REASONS FOR FIRST CAESAREAN SECTION

REASON	Number (%)
Cephalopelvic disproportion	78 (35.5%)
Failure to progress	41 (18.6%)
Fetal distress	38 (17.3%)
Fetal malpresentation	26 (11.8%)
Other indication	37 (16.8%)

Source : Case Note Review (Data Form 1)

Table 4.2b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION
PREVIOUS CAESAREAN SECTIONS
TRIAL OF LABOUR (n=30)
RECORDED INDICATION FOR CAESAREAN SECTION

REASON	Number (%)
Previous caesarean section	18 (60.0%)
Cephalopelvic disproportion	5 (16.7%)
Failed trial of forceps	2 (6.7%)
Breech presentation	2 (6.7%)
Fetal distress	1 (3.3%)
Ruptured uterus	2 (6.7%)

Source : Case Note Review (Data Form 1)

Table 4.2c : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION
WOMEN WITH A HISTORY OF 1 PREVIOUS SECTION
NOT CONSIDERED FOR A TRIAL OF LABOUR (n=50)
RECORDED INDICATION FOR CAESAREAN SECTION

REASON	Number (%)
Previous caesarean section	25 (50%)
Breech presentation	9 (18%)
Other malpresentation	7 (14%)
Placenta praevia	3 (6%)
Other bleeding	1 (2%)
Severe pregnancy induced hypertension	3 (6%)
Intra uterine infection	1 (2%)
Previous pelvic floor repair	1 (2%)

Source : Case Note Review (Data Form 1)

Table 4.3a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
HOSPITAL POPULATION
MODE OF DELIVERY BY MONTH OF YEAR

MONTH	TOTAL BIRTHS	NORMAL	FORCEPS	SECTION	BREECH
January	310	202 65.2%	53 17.1%	52 17.1%	2 0.6%
February	327	231 70.6%	54 16.5%	33 10.4%	8 2.4%
March	305	196 64.3%	50 16.4%	54 18.4%	3 1.0%
April	316	213 67.4%	51 16.1%	49 15.8%	2 0.6%
May	325	217 66.8%	45 13.8%	56 17.8%	5 1.5%
June	303	220 72.6%	43 14.2%	34 11.2%	6 2.0%
July	380	246 64.7%	66 17.4%	59 16.3%	6 1.6%
August	342	236 69.0%	48 14.0%	50 15.5%	5 1.5%
September	379	253 66.8%	65 17.2%	58 15.6%	2 0.5%
October	338	218 64.5%	61 18.0%	54 16.3%	4 1.2%
November	326	198 60.7%	68 20.9%	55 17.2%	4 1.2%
December	340	203 59.7%	67 19.7%	65 19.1%	5 1.5%
TOTAL	**3991**	**2633**	**671**	**619****	**52**

** 635 infants were delivered

X^2 31.39 df 22 Significance NS

Source : Glasgow Royal Maternity Hospital Statistics

Table 4.3b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION (n=619)
TYPE OF CAESAREAN SECTION BY PARITY

TYPE	PRIMIGRAVIDAE n=274	MULTIGRAVIDAE n=125	MULTIGRAVIDAE Prev CS n=220
1 Elective	54 (20%)	27 (22%)	
1 Elective---> labour	13 (5%)	7 (6%)	
1 Emergency in labour	190 (69%)	73 (58%)	
1 Emergency no labour	17 (6%)	18 (14%)	
2 Elective			139 (63%)
2 Elective---> labour			29 (13%)
2 Emergency in labour			45 (21%)
2 Emergency no labour			7 (3%)

Source : Case Note Review (Data Form 1)

Table 4.3c GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION (n=619)
STATUS OF SURGEON BY MONTH OF YEAR

STATUS	Consultant n=97	Senior Registrar n=36	Registrar n=486
January	4 (4.1%)	7 (19.4%)	41 (8.4%)
February	4 (4.1%)	1 (2.8%)	28 (5.8%)
March	8 (8.2%)	2 (5.6%)	44 (9.1%)
April	3 (3.1%)	1 (2.8%)	45 (9.3%)
May	6 (6.2%)	5 (13.9%)	45 (9.3%)
June	7 (7.2%)	1 (2.8%)	26 (5.3%)
July	10 (10.3%)	7 (19.4%)	42 (8.6%)
August	11 (11.3%)	1 (2.8%)	38 (7.8%)
September	20 (20.6%)	2 (5.6%)	37 (7.6%)
October	7 (7.2%)	5 (13.9%)	42 (8.6%)
November	10 (10.3%)	3 (8.3%)	42 (8.6%)
December	7 (7.2%)	1 (2.8%)	56 (11.5%)

X^2 43.65 df 22

Significance $p < 0.005$

Source : Case Note Review (Data Form 1)

Table 4.3d GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION (n=619)
STATUS OF SURGEON BY DAY OF WEEK

STATUS	Consultant n=97	Senior Registrar n=36	Registrar n=486
Monday	16 (16.5%)	1 (2.8%)	41 (8.4%)
Tuesday	15 (15.5%)	3 (8.3%)	90 (18.5%)
Wednesday	21 (21.6%)	6 (16.7%)	79 (16.3%)
Thursday	27 (27.8%)	6 (16.7%)	73 (15.0%)
Friday	12 (12.4%)	14 (38.9%)	68 (14.0%)
Saturday	3 (3.1%)	4 (11.1%)	86 (17.7%)
Sunday	3 (3.1%)	2 (5.6%)	49 (10.1%)

X^2 49.88 df 12

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 4.3e GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION (n=619)
STATUS OF SURGEON BY TIME OF OPERATION

STATUS	Consultant n=97	Senior Registrar n=36	Registrar n=486
00.01-08.00	5 (5.2%)	5 (13.9%)	99 (20.4%)
08.01-16.00	77 (79.4%)	17 (47.2%)	221 (45.5%)
16.01-00.00	15 (15.4%)	14 (38.9%)	166 (34.1%)

X^2 38.93 df 4

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 4.4a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION (n=619)
MAIN INDICATION FOR CAESAREAN SECTION

REASON	**TOTAL** **n=619**	Prims n=274	Multips n=125	Multips with prev CS n=220
Previous Caesarean Section	**209 (33.8%)**	0	0	209 (95.0%)
Breech Presentation	**127 (20.5%)**	78 (28.4%)	46 (36.8%)	3 (1.4%)
Dystocia	**142 (22.9%)**	120 (43.8%)	19 (15.2%)	3 (1.4%)
Fetal Distress	**63 (10.2%)**	38 (13.9%)	23 (18.4%)	2 (0.8%)
Other Indication	**78 (12.6%)**	38 (13.9%)	37 (29.6%)	3 (1.4%)

X^2 624.44 df 8

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 4.4b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION(n=619)
INDICATIONS FOR CAESAREAN SECTION
MULTIPLE RESPONSE

REASON	**TOTAL**	Prims	Multips	Multips with prev CS
	n=619	n=274	n=125	n=220
PREVIOUS CS	**209 (33.8%)**	0	0	209 (95%)
MALPRESENTATION	**176 (21.4%)**	91 (33.2%)	60 (48.0%)	25 (11.3%)
breech	139 (22.5%)	78 (28.5%)	46 (36.8%)	15 (6.8%)
face	3 (0.5%)	1 (0.4%)	2 (1.6%)	0
brow	5 (0.8%)	4 (1.5%)	1 (0.8%)	0
other	29 (4.7%)	8 (2.9%)	11 (8.8%)	10 (4.5%)
CEPHALOPELVIC DISPROPORTION	**174 (28.1%)**	75 (27.3%)	12 (9.6%)	87 (39.5%)
FAILURE to PROGRESS	**133 (21.5%)**	95 (34.7%)	16 (12.8%)	22 (10.0%)
FETAL DISTRESS	**120 (19.4%)**	82 (29.9%)	26 (20.8%)	12 (5.5%)

Source : Case Note Review (Data Form 1)

Table 4.5a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION (n=619)
GROUPED LENGTH OF STAY (days) IN HOSPITAL

LENGTH OF STAY (days)	Number (%)
< 5 days	13 (2%)
5-10 days	562 (91%)
11-15 days	29 (5%)
> 15 days	15 (2%)

Source : Case Note Review (Data Form 1)

Table 4.5b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION
TYPE OF FEEDING INITIATED

		TOTAL POPULATION n=619	PRIMIGRAVIDAE n=274	MULTIGRAVIDAE n=125	MULTIGRAVIDAE with prev CS n=220
TYPE of FEEDING	breast	223 (36%)	117 (43%)	36 (30%)	70 (32%)
	bottle	388 (64%)	153 (57%)	86 (70%)	149 (68%)
	SB/NND	8	4	3	1

X^2 9.958** df 2

Significance $p < 0.01$

** comparison of primigravidae and multigravidae

Source : Case Note Review (Data Form 1)

Table 4.5c : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION (n=619)
TYPE OF FEEDING ON DISCHARGE

		TOTAL POPULATION n=619	PRIMIGRAVIDAE n=274	MULTIGRAVIDAE n=125	MULTIGRAVIDAE with prev CS n=220
TYPE of FEEDING	breast	159 (26%)	78 (29%)	27 (22%)	54 (25%)
	bottle	451 (74%)	191 (71%)	95 (78%)	165 (75%)
	SB/NND	9	5	3	1

X^2 2.404** df 2

Significance NS

** comparison of primigravidae and multigravidae

Source : Case Note Review (Data Form 1)

Table 4.6a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
INFANTS BORN TO STUDY POPULATION (n=635)
INFANT RESUSCITATION

	TYPE OF RESUSCITATION	Number (%)
	NIL	383 (60%)
	2o suction	121 (19%)
Active Resuscitation	Mask + IPPV	65 (10%)
	Intubation + IPPV	32 (5%)
	Intubation + IPPV + Drugs	24 (4%)
	Drugs only	7 (1%)
	Stillbirths	3 (0.5%)

Source : Case Note review (Data Form 1)

Table 4.6b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
INFANTS BORN TO STUDY POPULATION (n=635)
INFANT DISCHARGE FROM THEATRE

DISCHARGE TO	Number (%)
Unit nursery	274 (43%)
Observation in SCBU*	231 (36%)
Admission to SCBU*	127 (20%)
Stillbirths	3 (0.5%)

* Special Care Baby Unit

Source : Case Note review (Data Form 1)

Table 4.6c : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
INFANTS BORN TO STUDY POPULATION
REASONS FOR ADMISSION TO SCBU
(n=127 infants)

REASON	Number (%)
Preterm	72 (57%)
Intrauterine growth retardation	13 (10%)
Fetal abnormality	10 (8%)
Birth asphyxia	8 (6%)
Meconium aspiration	6 (5%)
Tachypnoea	5 (4%)
Maternal diabetes	4 (3%)
Respiratory distress syndrome	2 (2%)
Other indication	7 (5%)

Source : Case Note review (Data Form 1)

Table 4.6d : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
INFANTS BORN TO STUDY POPULATION
SINGLETON INFANTS - CENTILE VALUES OF BIRTHWEIGHT FOR GESTATIONAL AGE (Controlled for Sex of Infant)
(n=603)

CENTILE VALUES	Number (%)
Normal	462 (77%)
< 10th percentile	49 (8%)
> 90th percentile	91 (15%)
Missing	1 (0.2%)

SEX	**< 10th percentile**	**> 90th percentile**
MALE n=293	20 (6.8%)	47 (16.0%)
FEMALE n=310	29 (9.4%)	44 (14.2%)

Source : Case Note review (Data Form 1)

Table 4.6e : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
INFANTS BORN TO STUDY POPULATION
CAUSE OF STILLBIRTH/NEONATAL/POSTNEONATAL DEATH
(n=11 infants)

CAUSE	Number
Asphyxia	3
Respiratory distress syndrome	1
Sepsis/intraventricular haemorrhage	1
Cardiac hypoplasia	2
Vater's syndrome	1
Potter's syndrome	1
Cystic hygroma	1
Oesophogeal atresia	1

Source : Case Note review (Data Form 1)

Table 4.6f : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
INFANTS BORN TO STUDY POPULATION
TYPES OF FETAL ABNORMALITY
(n=36)

TYPE OF ABNORMALITY	Number
Oesophogeal atresia	1
Microcephaly	1
Hydrocephaly	2
Diaphragmatic hernia	2
Sacro-coccygeal tumour	1
Gastroschisis	1
Potter's syndrome	1
Vater's syndrome	1
Down's syndrome	2
Cystic hygroma	1
Cardiac hypoplasia	2
Other cardiac	7
Renal/genito-urinary abnormality	3
Congenital hip dislocation	8
Other minor abnormality	3

Source : Case Note review (Data Form 1)

Table 4.6g : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
INFANTS BORN TO STUDY POPULATION
TYPES OF BIRTH INJURY
(n=16)

TYPE OF BIRTH INJURY	Number
Facial bruising	1
Facial palsy	1
Facial laceration	6
Other laceration	2
Other bruising	3
Cephalhaematoma	3

Source : Case Note review (Data Form 1)

Table 5.1a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=619)
PARITY

TYPE OF SECTION	Elective n=220	Emergency n=399
Primigravidae	54 (24.5%)	220 (55.1%)
Multigravidae	166 (75.5%)	179 (44.9%)

X^2 52.56 df 1

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 5.1b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS
MULTIGRAVIDAE (n=345)
PREVIOUS CAESAREAN SECTION

	MULTIGRAVIDAE	
	Elective n=166	Emergency n=179
None	27 (16.3%)	98 (54.8%)
1	82 (49.4%)	73 (40.8%)
2	52 (31.3%)	8 (4.4%)
3	4 (2.4%)	0
4	1 (0.6%)	0

X^2 77.74 df 3

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 5.1c : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS
MULTIGRAVIDAE (n=345)
PREVIOUS PERINATAL DEATH

	MULTIGRAVIDAE	
	Elective n=166	Emergency n=179
0	154 (92.8%)	153 (85.5%)
> 0	12 (7.2%)	26 (14.5%)

X^2 4.68 df 1

Significance $p < 0.05$

Source : Case Note Review (Data Form 1)

Table 5.1d : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=619)
AGE AND AGE GROUP

	Elective n=220	Emergency n=399
Mean (years)	27.65	26.32
Range	16 - 42	16 - 44
SD	4.88	5.27
T value	3.08 (pooled)	
Significance	$p < 0.002$	
95% CI	0.48 to 2.18	
AGE GROUP		
< 18 years	3 (1.4%)	12 (3.0%)
18-34 years	194 (88.2%)	360 (90.2%)
⩾35 years	23 (10.5%)	27 (6.8%)

X^2 4.03 df 2

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.1e : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=619)
HEIGHT AND HEIGHT GROUP

	Elective n=220	Emergency n=399
Mean (cms)	158.40	158.42
Range	143 - 178	139 - 175
SD	6.90	6.00
T value	-0.02 (separate)	
Significance	NS	
95% CI	-1.06 to 1.02	

HEIGHT GROUP

< 155 cm	62 (28.2%)	97 (24.3%)
≥ 155 cm	158 (71.8%)	302 (75.7%)

X^2 1.13 df 1

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.1f : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=619)
MARITAL STATUS

	Elective n=220	Emergency n=399
Single	12 (5.5%)	46 (11.5%)
Married / Common Law	206 (93.6%)	344 (86.2%)
Separated / Divorced	2 (0.9%)	9 (2.3%)

X^2 11.21 df 2

Significance $p < 0.005$

Source : Case Note Review (Data Form 1)

Table 5.1g : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=619)
SOCIAL CLASS

TYPE OF SECTION	Elective n=220	Emergency n=399
I and II	31 (14.1%)	65 (16.3%)
III	99 (45.0%)	146 (36.6%)
IV and V	34 (15.5%)	67 (16.8%)
Other / Not Known	56 (25.4%)	121 (30.3%)

X^2 4.31 df 3

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.1h : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=619)
ADMISSION TO HOSPITAL DURING ANTENATAL PERIOD

TYPE OF SECTION	Elective n=220	Emergency n=399
None	134 (60.9%)	198 (49.6%)
1 admission	65 (29.5%)	120 (30.1%)
2 admissions	12 (5.5%)	57 (14.3%)
> 2 admissions	9 (4.1%)	24 (6.0%)

X^2 14.29 df 3

Significance $p < 0.005$

Admitted	86 (39.1%)	201 (50.4%)
Not admitted	134 (60.9%)	198 (49.6%)

X^2 7.26 df 1

Significance $p < 0.01$

Source : Case Note Review (Data Form 1)

Table 5.1i : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=619)
TYPE OF CAESAREAN SECTION BY MONTH OF YEAR

TYPE OF SECTION	Elective n=220	Emergency n=399
January	18 (8.2%)	34 (8.5%)
February	12 (5.5%)	21 (5.3%)
March	24 (10.9%)	30 (7.5%)
April	17 (7.7%)	32 (8.0%)
May	17 (7.7%)	39 (9.8%)
June	14 (6.4%)	20 (5.0%)
July	17 (7.7%)	42 (10.5%)
August	22 (10.0%)	28 (7.1%)
September	25 (11.4%)	34 (8.5%)
October	18 (8.2%)	36 (9.0%)
November	19 (8.6%)	36 (9.0%)
December	17 (7.7%)	47 (11.8%)
X^2 9.36	df 11	
Significance NS		

Source : Case Note Review (Data Form 1)

Table 5.1j : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=619)
TYPE OF CAESAREAN SECTION BY DAY OF WEEK

TYPE OF SECTION	Elective n=220	Emergency n=399
Sunday	1 (0.5%)	44 (11.0%)
Monday	50 (22.7%)	59 (14.8%)
Tuesday	43 (19.5%)	57 (14.3%)
Wednesday	33 (15.8%)	67 (16.8%)
Thursday	46 (20.9%)	63 (15.8%)
Friday	45 (20.5%)	57 (14.3%)
Saturday	2 (0.9%)	52 (13.0%)

X^2 58.87 df 6

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 5.1k : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=619)
TYPE OF CAESAREAN SECTION BY TIME OF SURGERY

TYPE OF SECTION	Elective n=220	Emergency n=399
00.01-08.00 hrs	3 (1.4%)	106 (26.6%)
08.01-16.00 hrs	216 (98.2%)	99 (24.8%)
16.01-00.00 hrs	1 (0.4%)	194 (48.6%)

X^2 305.601 df 2

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 5.11 : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=619)
TYPE OF CAESAREAN SECTION BY STATUS OF SURGEON

TYPE OF SECTION	Elective n=220	Emergency n=399
Consultant	67 (30.5%)	30 (7.5%)
Senior Registrar	12 (5.5%)	24 (6.0%)
Registrar	141 (64.0%)	345 (86.5%)

X^2 56.72 df 2

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 5.1m : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=619)
TYPE OF ANAESTHESIA

TYPE OF SECTION	Elective n=220	Emergency n=399
General	22 (10.0%)	126 (31.6%)
Regional	196 (89.1%)	265 (66.4%)
Combination	2 (0.9%)	8 (2.0%)

X^2 38.46 df 2

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 5.1n : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=619)
MAIN INDICATION FOR CAESAREAN SECTION

REASON	Elective n=220	Emergency n=399
Previous Caesarean Section	138 (62.7%)	71 (17.8%)
Breech Presentation	62 (28.2%)	65 (16.3%)
Dystocia	0	142 (35.6%)
Fetal Distress	1 (0.5%)	62 (15.5%)
Other Indication	19 (8.6%)	59 (14.8%)

X^2 208.82 df 4

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 5.1o : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=619)
OTHER INDICATIONS FOR CAESAREAN SECTION

OTHER INDICATION	Elective n=19	Emergency n=59
Placenta praevia	5	9
Placental abruption	0	3
Other bleeding	0	4
Severe PIH	1	7
Eclampsia	0	4
Face presentation	0	3
Brow presentation	0	3
Other malpresentation	5	10
Preterm labour	0	1
Intra-uterine infection	0	1
Intra-uterine growth retardation	0	3
Cord prolapse	0	4
Rhesus disease	1	0
Multiple pregnancy	1	4
Known fetal abnormality	1	1
Renal disease	1	1
Maternal diabetes	1	0
Vulval warts	1	0
Cx stenosis	1	0
Previous pelvic floor repair	1	0
Pancreatitis	0	1

Source : Case Note Review (Data Form 1)

Table 5.1p : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=619)
INDICATIONS FOR CAESAREAN SECTION
MULTIPLE RESPONSE

REASON	Elective n=220	Emergency n=399
DYSTOCIA		
Cephalopelvic disproportion	63 (28.6%)	94 (23.6%)
Failed trial of forceps	0	17 (4.3%)
Failure to progress	0	133 (33.3%)
MALPRESENTATION		
Breech	69 (31.4%)	70 (17.6%)
Face	0	3 (0.8%)
Brow	0	5 (1.3%)
Other	13 (5.9%)	16 (4.0%)
PREVIOUS CAESAREAN SECTION	138 (62.7%)	71 (17.8%)
FETAL DISTRESS	2 (0.9%)	118 (29.6%)

Source : Case Note Review (Data Form 1)

Table 5.1q : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=619)
LENGTH OF POSTNATAL STAY IN HOSPITAL

TYPE OF SECTION	Elective n=220	Emergency n=399
Mean (days)	7.82	8.36
Range	3 - 93	1 - 65
SD	5.88	4.09
T value	-1.22 (separate)	
Significance	NS	
95% CI	-1.33 to .252	

Source : Case Note Review (Data Form 1)

Table 5.1r : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS
INFANT FEEDING
(n=611)

TYPE OF SECTION	Elective n=219	Emergency n=392
Feeding Initiated		
Breast	71 (32.4%)	152 (38.8%)
Bottle	148 (67.6%)	240 (61.2%)

X^2 2.45 df 1

Significance NS

Feeding on Discharge		
Breast	54 (24.7%)	105 (26.9%)
Bottle	165 (75.3%)	286 (73.1%)

X^2 0.35 df 1

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.1s : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=619)
GESTATION AT DELIVERY

	Elective n=220	Emergency n=399
Mean (weeks)	38.64	38.06
Range	28 - 42	27 - 42
SD	1.15	3.14
T value	3.32 (separate)	
Significance	$p < 0.001$	
95% CI	0.149 to 1.01	

GESTATION GROUP

< 37 weeks	4 (1.8%)	94 (23.6%)
⩾37 weeks	216 (98.2%)	305 (76.4%)

X^2 50.30 df 1

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 5.1t : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS
SEX OF INFANT
(n=635)

TYPE OF SECTION	Elective n=224	Emergency n=411
Male	91 (40.6%)	221 (53.8%)
Female	133 (59.4%)	190 (46.2%)

X^2 10.03 df 1

Significance $p < 0.005$

Source : Case Note Review (Data Form 1)

Table 5.1u : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS
BIRTHWEIGHT OF INFANTS
(n=635)

TYPE OF SECTION	Elective n=224	Emergency n=411
Mean (grams)	3315.41	3126.22
Range	840 - 5600	750 - 5450
SD	492.37	826.68
T value	3.57 (separate)	
Significance	$p < 0.0001$	
95% CI	70.7 to 308	

BIRTHWEIGHT GROUP

< 2500 grams	10 (4.5%)	97 (23.6%)
⩾2500 grams	214 (95.5%)	314 (76.4%)

X^2 37.89 df 1

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 5.1v : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS
SINGLETON INFANTS - CENTILE VALUES OF BIRTHWEIGHT
FOR GESTATIONAL AGE (Controlled for Sex of Infant)
(n=603)

TYPE OF SECTION	Elective n=216	Emergency n=387
< 10th Centile	9 (4.2%)	40 (10.3%)
Normal	176 (81.5%)	286 (73.9%)
> 90th Centile	31 (14.3%)	60 (15.5%)
Missing	0	1

X^2 7.64 df 2

Significance $p < 0.025$

Source : Case Note Review (Data Form 1)

Table 5.1w : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS
APGAR SCORE < 7 AT 1 and 5 MINUTES
(Stillbirths excluded)
(n=632)

TYPE OF SECTION	Elective n=224	Emergency n=408
1 Minute		
< 7	13 (5.8%)	96 (23.5%)
⩾7	211 (94.2%)	312 (76.5%)

X^2 31.84 df 1

Significance $p < 0.001$

5 Minute		
< 7	0	15 (3.7%)
⩾7	224 (100%)	393 (96.3%)

X^2 8.44 df 1

Significance $p < 0.005$

Source : Case Note Review (Data Form 1)

Table 5.1x : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS
NUMBER OF INFANTS REQUIRING RESUSCITATION AT DELIVERY
(n=632)

TYPE OF SECTION	Elective n=224	Emergency n=408 **
Active resuscitation	15 (6.7%)	112 (27.5%)
No resuscitation	209 (93.3%)	296 (72.5%)

X^2 38.79 df 1

Significance $p < 0.001$

** stillbirths excluded

Source : Case Note Review (Data Form 1)

Table 5.1y : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS
NUMBER OF INFANTS ADMITTED TO SCBU
(Live Births)
(n=632)

TYPE OF SECTION	Elective n=224	Emergency n=408
Not Admitted	209 (93.3%)	296 (72.5%)
Admitted < 48hrs	6 (2.7%)	26 (6.4%)
Admitted ⩾ 48hrs	9 (4.0%)	86 (21.1%)

X^2 36.69 df 2

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 5.1z : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS
BIRTH INJURY
(n=635)

TYPE OF SECTION	Elective n=224	Emergency n=408
Yes	3 (1.3%)	13 (3.2%)
No	221 (98.7%)	395 (96.8%)

X^2 1.99 df 1

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.2a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=399)
PARITY

TYPE OF SECTION	Group A n=42	Group B n=109	Group C n=129	Group D n=119
Primigravidae	17 (40.5%)	36 (33.0%)	72 (55.8%)	95 (79.8%)
Multigravidae	25 (59.5%)	73 (67.0%)	57 (44.2%)	24 (20.2%)

X^2 54.55 df 3

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 5.2b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=399)
AGE AND AGE GROUP

TYPE OF SECTION	Group A n=42	Group B n=109	Group C n=129	Group D n=119
Mean (years)	27.30	27.28	25.79	25.66
Range	18 - 40	17 - 44	16 - 39	15 - 36
SD	5.52	5.73	5.21	4.65

F value 2.79

Significance NS

AGE GROUP

< 18 years	0	3 (2.8%)	6 (4.7%)	3 (2.5%)
18-34 years	37 (88.1%)	96 (88.1%)	115 (89.1%)	112 (94.1%)
≥35 years	5 (11.9%)	10 (9.2%)	8 (6.2%)	4 (3.4%)

X^2 7.50 df 6

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.2c : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=399)
HEIGHT AND HEIGHT GROUP

TYPE OF SECTION	Group A n=42	Group B n=109	Group C n=129	Group D n=119
Mean (cms)	159.33	158.45	158.32	158.15
Range	147 - 167	139 - 174	140 - 174	142 - 175
SD	5.52	6.39	6.10	6.06

F value 0.408

Significance NS

HEIGHT GROUP

< 155 cm	6 (14.3%)	29 (26.6%)	27 (20.9%)	35 (29.4%)
≥ 155 cm	36 (85.7%)	80 (73.4%)	102 (79.1%)	84 (70.6%)

X^2 5.09 df 3

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.2d : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=399)
MARITAL STATUS

TYPE OF SECTION	Group A n=42	Group B n=109	Group C n=129	Group D n=119
Single	3 (7.1%)	13 (11.9%)	16 (12.4%)	14 (11.8%)
Married / Common Law	36 (85.8%)	95 (87.1%)	110 (85.2%)	103 (86.6%)
Separated / Divorced	3 (7.1%)	1 (1.0%)	3 (2.3%)	2 (1.7%)

X^2 6.32 df 6

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.2e : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=399)
SOCIAL CLASS

TYPE OF SECTION	Group A n=42	Group B n=109	Group C n=129	Group D n=119
I and II	9 (21.4%)	14 (12.9%)	17 (13.2%)	25 (21.0%)
III	15 (35.7%)	35 (32.1%)	58 (45.0%)	38 (31.9%)
IV and V	3 (7.2%)	16 (14.7%)	24 (18.6%)	24 (20.2%)
Other / Not Known	15 (35.7%)	44 (40.3%)	30 (23.2%)	32 (26.9%)

X^2 17.94 df 9

Significance $p < 0.025$

Source : Case Note Review (Data Form 1)

Table 5.2f : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTION (n=399)
ADMISSION TO HOSPITAL DURING ANTENATAL PERIOD

TYPE OF SECTION	Group A n=42	Group B n=109	Group C n=129	Group D n=119
None	7 (16.7%)	53 (48.6%)	64 (49.6%)	74 (62.2%)
1 admission	21 (50.0%)	37 (34.0%)	34 (26.4%)	28 (23.5%)
2 admissions	11 (26.2%)	8 (7.3%)	25 (19.4%)	13 (1.7%)
> 2 admissions	3 (7.1%)	11 (10.1%)	6 (4.6%)	4 (3.4%)

X^2 37.40 df 9

Significance $p < 0.001$

Admitted	35 (83.3%)	56 (51.4%)	65 (50.4%)	45 (37.8%)
Not admitted	7 (16.7%)	53 (48.6%)	64 (49.6%)	74 (62.2%)

X^2 25.80 df 3

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 5.2g :

GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=399)
TYPE OF CAESAREAN SECTION BY MONTH OF YEAR

TYPE OF SECTION	Group A n=42	Group B n=109	Group C n=129	Group D n=119
January	1 (2.4%)	8 (7.3%)	13 (10.1%)	12 (10.1%)
February	1 (2.4%)	4 (3.7%)	7 (5.4%)	9 (7.6%)
March	5 (11.9%)	8 (7.3%)	11 (8.5%)	6 (5.0%)
April	7 (16.7%)	9 (8.3%)	9 (7.0%)	7 (5.9%)
May	5 (11.9%)	7 (6.4%)	10 (7.8%)	17 (14.3%)
June	1 (2.4%)	3 (2.8%)	11 (8.5%)	5 (4.2%)
July	4 (9.5%)	12 (11.0%)	11 (8.5%)	15 (12.6%)
August	3 (7.1%)	13 (11.9%)	5 (3.9%)	7 (5.9%)
September	4 (9.5%)	14 (12.8%)	10 (7.8%)	6 (5.0%)
October	3 (7.1%)	12 (11.0%)	12 (9.3%)	9 (7.6%)
November	4 (9.5%)	8 (7.3%)	12 (9.3%)	12 (10.1%)
December	4 (9.5%)	11 (10.1%)	18 (14.0%)	14 (11.8%)

X^2 35.08 df 33

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.2h : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=399)
TYPE OF CAESAREAN SECTION BY DAY OF WEEK

TYPE OF SECTION	Group A n=42	Group B n=109	Group C n=129	Group D n=119
Sunday	6 (14.3%)	12 (11.0%)	14 (10.9%)	12 (10.1%)
Monday	4 (9.5%)	19 (17.4%)	20 (15.5%)	16 (13.4%)
Tuesday	6 (14.3%)	12 (11.0%)	21 (16.3%)	18 (15.1%)
Wednesday	9 (21.4%)	21 (19.3%)	14 (10.9%)	23 (19.3%)
Thursday	8 (19.0%)	16 (14.7%)	24 (18.6%)	15 (12.6%)
Friday	5 (11.9%)	16 (14.7%)	17 (13.2%)	19 (16.0%)
Saturday	4 (9.5%)	13 (11.9%)	19 (14.7%)	16 (13.4%)

X^2 10.44 df 18

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.2i : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=399)
TYPE OF CAESAREAN SECTION BY TIME OF SURGERY

TYPE OF SECTION	Group A n=42	Group B n=109	Group C n=129	Group D n=119
00.01-08.00 hrs	10 (26.6%)	28 (25.7%)	29 (22.5%)	39 (32.8%)
08.01-16.00 hrs	14 (33.1%)	22 (20.2%)	37 (28.7%)	26 (21.8%)
16.01-00.00 hrs	18 (42.9%)	59 (54.1%)	63 (48.8%)	54 (45.4%)

X^2 7.28 df 6

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.2j : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=399)
TYPE OF CAESAREAN SECTION BY STATUS OF SURGEON

TYPE OF SECTION	Group A n=42	Group B n=109	Group C n=129	Group D n=119
Consultant	10 (23.8%)	8 (7.3%)	6 (4.7%)	6 (5.0%)
Senior Registrar	5 (11.9%)	7 (6.4%)	8 (6.2%)	4 (3.4%)
Registrar	27 (64.3%)	94 (86.2%)	115 (89.1%)	109 (91.6%)

X^2 23.92 df 6

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 5.2k : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=399)
TYPE OF ANAESTHESIA

TYPE OF SECTION	Group A n=42	Group B n=109	Group C n=129	Group D n=119
General	24 (57.1%)	38 (34.9%)	50 (38.8%)	14 (11.8%)
Regional	17 (40.5%)	66 (60.6%)	78 (60.5%)	104 (87.4%)
Combination	1 (2.4%)	5 (4.6%)	1 (0.8%)	1 (0.8%)

X^2 44.79 df 6

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 5.21 : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=399)
MAIN INDICATION FOR CAESAREAN SECTION

REASON	Group A n=42	Group B n=109	Group C n=129	Group D n=119
Previous Caesarean Section	4 (9.5%)	33 (30.5%)	22 (17.1%)	12 (10.1%)
Breech Presentation	4 (9.5%)	44 (40.4%)	14 (10.9%)	3 (2.5%)
Dystocia	0	2 (1.8%)	43 (33.3%)	97 (81.5%)
Fetal Distress	9 (21.4%)	7 (6.4%)	40 (31.0%)	6 (5.1%)
Other	25 (59.5%)	23 (21.1%)	10 (7.8%)	1 (0.8%)

X^2 306.70 df 12

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 5.2m : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=399)
OTHER INDICATIONS FOR CAESAREAN SECTION

REASON	Group A n=25	Group B n=23	Group C n=10	Group D n=1
Placenta praevia	7	2	0	0
Placental abruption	0	3	0	0
Other bleeding	1	3	0	0
Severe PIH	6	1	0	0
Eclampsia	4	0	0	0
Preterm labour	0	1	0	0
Intra-uterine infection	1	0	0	0
IU growth retardation	3	0	0	0
Face presentation	0	0	2	1
Brow presentation	0	0	3	0
Other malpresentation	1	8	1	0
Cord prolapse	0	1	3	0
Multiple pregnancy	1	3	0	0
Known fetal abnormality	0	1	0	0
Renal disease	1	0	0	0
Pancreatitis	0	0	1	0

Source : Case Note Review (Data Form 1)

Table 5.2n : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=399)
INDICATIONS FOR CAESAREAN SECTION
MULTIPLE RESPONSE

REASON	Group A n=42	Group B n=109	Group C n=129	Group D n=119
DYSTOCIA				
Cephalopelvic disproportion	0	12 (11.0%)	28 (21.7%)	54 (45.4%)
Failed trial of forceps	0	0	5 (3.9%)	12 (10.1%)
Failure to progress	0	0	55 (42.6%)	78 (65.6%)
MALPRESENTATION				
Breech	4 (9.5%)	47 (43.1%)	15 (11.6%)	4 (3.4%)
Face	0	0	2 (1.6%)	1 (0.8%)
Brow	0	0	3 (2.3%)	2 (1.7%)
Other	4 (9.5%)	10 (9.2%)	2 (1.6%)	0
PREV CAESAREAN SECTION	4 (9.5%)	33 (30.3%)	22 (17.1%)	12 (10.1%)
FETAL DISTRESS	9 (21.4%)	9 (8.3%)	64 (49.6%)	36 (30.3%)

Source : Case Note Review (Data Form 1)

Table 5.2o : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=399)
LENGTH OF POSTNATAL STAY IN HOSPITAL

TYPE OF SECTION	Group A n=42	Group B n=109	Group C n=129	Group D n=119
Mean (days)	8.95	8.28	8.45	8.14
Range	2 - 16	1 - 27	2 - 65	4 - 18
SD	3.18	3.74	5.73	2.04
F value	0.43			
Significance	NS			

Source : Case Note Review (Data Form 1)

Table 5.2p : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS
INFANT FEEDING
(n=392)

TYPE OF SECTION	Group A n=41	Group B n=105	Group C n=127	Group D n=119
Feeding Initiated				
Breast	18 (43.9%)	37 (35.2%)	42 (33.1%)	55 (46.2%)
Bottle	23 (56.1%)	68 (64.8%)	85 (66.9%)	64 (53.8%)

X^2 5.52 df 3

Significance NS

TYPE OF SECTION	Group A n=41	Group B n=104	Group C n=127	Group D n=119
Feeding on Discharge				
Breast	16 (39.0%)	26 (25.0%)	28 (22.0%)	35 (29.4%)
Bottle	25 (61.0%)	78 (75.0%)	99 (78.0%)	84 (70.6%)

X^2 5.16 df 3

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.2q : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=399)
GESTATION AT DELIVERY

TYPE OF SECTION	Group A n=42	Group B n=109	Group C n=129	Group D n=119
Mean (weeks)	34.30	36.27	39.17	39.82
Range	29 - 40	27 - 41	28 - 42	34 - 42
SD	2.70	3.36	2.37	1.36
F value	78.45			
Significance	$p < 0.0001$			
GESTATION GROUP				
< 37 weeks	33 (78.6%)	45 (41.3%)	13 (10.1%)	3 (2.5%)
≥37 weeks	9 (21.4%)	64 (58.7%)	116 (89.9%)	116 (97.5%)

X^2 131.86 df 3

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 5.2r : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS
SEX OF INFANT
(n=411)

TYPE OF SECTION	Group A n=43	Group B n=117	Group C n=131	Group D n=120
Male	21 (48.8%)	60 (51.3%)	70 (53.4%)	70 (58.3%)
Female	22 (51.2%)	57 (48.7%)	61 (46.6%)	50 (41.7%)

X^2 1.72 df 3

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.2s : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS
BIRTHWEIGHT OF INFANTS
(n=411)

TYPE OF SECTION	Group A n=43	Group B n=117	Group C n=131	Group D n=120
Mean (grams)	2294.45	2691.81	3267.72	3664.31
Range	750 - 3850	1060 - 4280	1210 - 5450	2520 - 5010
SD	761.58	757.39	737.80	503.40

F value 61.57

Significance $p < 0.0001$

BIRTHWEIGHT GROUP

< 2500 grams	25 (58.1%)	47 (40.2%)	20 (15.3%)	1 (0.8%)
⩾2500 grams	18 (41.9%)	70 (59.8%)	111 (84.7%)	119 (99.2%)

X^2 88.15 df 3

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 5.2t : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS
SINGLETON INFANTS - CENTILE VALUES OF BIRTHWEIGHT FOR GESTATIONAL AGE (Controlled for Sex of Infant)
(n=387)

TYPE OF SECTION	Group A n=41	Group B n=100	Group C n=127	Group D n=118
< 10th Centile	6 (14.6%)	12 (12.0%)	20 (15.7%)	2 (1.7%)
Normal	32 (78.1%)	81 (81.0%)	91 (71.7%)	82 (69.5%)
> 90th Centile	3 (7.3%)	7 (7.0%)	16 (12.6%)	34 (28.8%)
Missing		1		

X^2 34.82 df 6

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 5.2u : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS
APGAR SCORE < 7 AT 1 AND 5 MINUTES
(Stillbirths excluded)
(n=408)

TYPE OF SECTION	Group A n=43	Group B n=115	Group C n=130	Group D n=120
1 MINUTE				
< 7	21 (48.8%)	29 (25.2%)	29 (22.3%)	17 (14.2%)
≥ 7	22 (51.2%)	86 (74.8%)	101 (77.7%)	103 (85.8%)

X^2 21.44 df 3

Significance $p < 0.001$

5 MINUTE				
< 7	6 (14.0%)	5 (4.4%)	4 (3.1%)	0
≥ 7	37 (86.0%)	110 (95.6%)	126 (96.9%)	120 (100%)

X^2 17.68 df 3

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 5.2v : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS
NUMBER OF INFANTS REQUIRING RESUSCITATION AT DELIVERY
(n=408)

TYPE OF SECTION	Group A n=43	Group B n=115 **	Group C n=130 **	Group D n=120
Active Resuscitation	22 (51.2%)	33 (28.7%)	35 (26.9%)	22 (18.3%)
No Resuscitation	21 (50.0%)	77 (72.0%)	93 (72.1%)	97 (81.5%)

X^2 17.03 df 3

Significance $p < 0.001$

** stillbirths excluded

Source : Case Note Review (Data Form 1)

Table 5.2w : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS
NUMBER OF INFANTS ADMITTED TO SCBU (Live Births)
(n=408)

TYPE OF SECTION	Group A n=43	Group B n=115	Group C n=130	Group D n=120
Not Admitted	12 (27.9%)	70 (60.9%)	102 (78.5%)	112 (93.4%)
Admitted < 48hrs	5 (11.6%)	12 (10.4%)	6 (4.6%)	3 (2.5%)
Admitted ≥ 48hrs	26 (60.5%)	33 (28.7%)	22 (16.9%)	5 (4.1%)

X^2 82.20 df 6

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 5.2x : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS
BIRTH INJURY
(n=408)

TYPE OF SECTION	Group A n=43	Group B n=115	Group C n=130	Group D n=120
Yes	0	1 (0.9%)	3 (2.3%)	9 (7.5%)
No	43 (100%)	114 (99.1%)	127 (97.7%)	111 (92.5%)

X^2 10.98 df 3

Significance $p < 0.025$

Source : Case Note Review (Data Form 1)

Table 5.3a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
CAESAREAN SECTIONS IN LABOUR (n=248)
PARITY

TYPE OF SECTION	All labour n=194	Second stage n=54
Primigravidae	129 (66.5%)	38 (70.4%)
Multigravidae	65 (33.5%)	16 (29.6%)

X^2 0.288 df 1

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.3b GLASGOW ROYAL MATERNITY HOSPITAL (1984)
CAESAREAN SECTIONS IN LABOUR (n=248)
AGE AND AGE GROUP

	All labour n=194	Second stage n=54
Mean (years)	25.87	25.20
Range	15 - 39	17 - 36
SD	4.97	4.83
T value	-0.88 (pooled)	
Significance	NS	
95% CI	-.827 to 2.44	
AGE GROUP		
< 18 years	8 (4.1%)	1 (1.9%)
18-34 years	176 (90.7%)	51 (94.4%)
⩾35 years	10 (5.2%)	2 (3.7%)

X^2 0.849 df 2

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.3c : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
CAESAREAN SECTIONS IN LABOUR (n=248)
HEIGHT AND HEIGHT GROUP

	All labour n=194	Second stage n=54
Mean (cms)	158.37	157.77
Range	140 - 175	146 - 172
SD	6.15	5.79
T value	-0.64 (separate)	
Significance	NS	
95% CI	-1.24 to 2.44	

HEIGHT GROUP

< 155 cm	48 (24.7%)	14 (25.9%)
⩾155 cm	146 (75.3%)	40 (74.1%)

X^2 0.032 df 1

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.3d : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
CAESAREAN SECTIONS IN LABOUR (n=248)
MARITAL STATUS

	All labour n=194	Second stage n=54
Single	24 (12.4%)	6 (11.1%)
Married / Common Law	165 (85.1%)	48 (88.9%)
Separated / Divorced	5 (2.5%)	0

X^2 1.52 df 2

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.3e : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
CAESAREAN SECTIONS IN LABOUR (n=248)
SOCIAL CLASS

TYPE OF SECTION	All labour n=194	Second stage n=54
I and II	35 (18.0%)	7 (13.0%)
III	74 (38.2%)	22 (40.7%)
IV and V	36 (18.6%)	12 (22.2%)
Other / Not Known	49 (25.3%)	13 (24.1%)

X^2 1.034 df 3

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.3f : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
CAESAREAN SECTIONS IN LABOUR (n=248)
ADMISSION TO HOSPITAL DURING ANTENATAL PERIOD

TYPE OF SECTION	All labour n=194	Second stage n=54
None	104 (53.6%)	34 (62.9%)
1 admission	51 (26.3%)	11 (20.4%)
2 admissions	32 (16.5%)	6 (11.1%)
> 2 admissions	7 (3.6%)	3 (5.6%)

X^2 2.452 df 3

Significance NS

Admitted	90 (46.2%)	20 (37.1%)
Not admitted	104 (53.6%)	34 (62.9%)

X^2 1.498 df 1

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.3g : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
CAESAREAN SECTIONS IN LABOUR (n=248)
TYPE OF CAESAREAN SECTION BY TIME OF SURGERY

TYPE OF SECTION	All labour n=194	Second stage n=54
00.01-08.00 hrs	55 (28.4%)	13 (24.1%)
08.01-16.00 hrs	50 (25.7%)	13 (24.1%)
16.01-00.00 hrs	89 (45.9%)	28 (51.8%)

X^2 0.65 df 2

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.3h: GLASGOW ROYAL MATERNITY HOSPITAL (1984)
CAESAREAN SECTIONS IN LABOUR (n=248)
TYPE OF CAESAREAN SECTION BY STATUS OF SURGEON

TYPE OF SECTION	All labour n=194	Second stage n=54
Consultant	10 (5.2%)	2 (3.7%)
Senior Registrar	9 (4.6%)	3 (5.6%)
Registrar	175 (90.2%)	49 (90.7%)

X^2 0.26 df 2

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.3i : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
CAESAREAN SECTIONS IN LABOUR (n=248)
TYPE OF ANAESTHESIA

TYPE OF SECTION	All labour n=194	Second stage n=54
General	55 (28.4%)	9 (16.7%)
Regional	138 (71.1%)	44 (81.5%)
Combination	1 (0.5%)	1 (1.8%)

X^2 2.32 df 1

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.3j : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
CAESAREAN SECTIONS IN LABOUR (n=248)
MAIN INDICATION FOR CAESAREAN SECTION

REASON	All labour n=194	Second stage n=54
Previous Caesarean Section	26 (13.4%)	8 (14.8%)
Breech Presentation	13 (6.7%)	4 (7.4%)
Dystocia	99 (51.0%)	41 (75.9%)
Fetal Distress	45 (23.2%)	1 (1.9%)
Other Indication	11 (5.7%)	0

X^2 18.16 df 4

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 5.3k : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
CAESAREAN SECTIONS IN LABOUR (n=248)
LENGTH OF POSTNATAL STAY IN HOSPITAL

TYPE OF SECTION	All labour n=194	Second stage n=54
Mean (days)	8.38	8.03
Range	2 - 65	5 - 16
SD	4.83	1.92
T value	-0.79 (separate)	
Significance	NS	
95% CI	-.974 to 1.67	

Source : Case Note Review (Data Form 1)

Table 5.31 : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
CAESAREAN SECTIONS IN LABOUR
INFANT FEEDING
(n=246)

TYPE OF SECTION	All labour n=192	Second stage n=54
Feeding Initiated		
Breast	71 (37.0%)	26 (48.1%)
Bottle	121 (63.0%)	28 (51.9%)

X^2 2.20 df 1

Significance NS

Feeding on Discharge		
Breast	47 (24.5%)	16 (29.6%)
Bottle	145 (75.5%)	38 (70.4%)

X^2 0.59 df 1

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.3m : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
CAESAREAN SECTIONS IN LABOUR (n=248)
GESTATION AT DELIVERY

TYPE OF SECTION	All labour n=194	Second stage n=54
Mean (weeks)	39.41	39.72
Range	28 - 42	34 - 42
SD	2.11	1.37
T value	1.26 (separate)	
Significance	NS	
95% CI	-.908 to .288	

GESTATION GROUP

< 37 weeks	14 (7.2%)	2 (3.7%)
≥37 weeks	180 (92.8%)	52 (96.3%)

X^2 0.86 df 1

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.3n : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
CAESAREAN SECTIONS IN LABOUR
SEX OF INFANT
(n=251)

TYPE OF SECTION	All labour n=197	Second stage n=54
Male	110 (55.8%)	30 (55.6%)
Female	87 (44.2%)	24 (44.4%)

X^2 0.001 df 1

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.3o : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
CAESAREAN SECTIONS IN LABOUR
BIRTHWEIGHT OF INFANTS
(n=251)

TYPE OF SECTION	All labour n=197	Second stage n=54
Mean (grams)	3406.80	3642.00
Range	1210 - 5450	2520 - 4640
SD	696.33	503.04
T value	2.77 (separate)	
Significance	$p < 0.01$	
95% CI	35.5 to 435	
BIRTHWEIGHT GROUP		
< 2500 grams	21 (10.7%)	0
⩾2500 grams	176 (89.3%)	54 (100%)

X^2 6.28 df 1

Significance $p < 0.025$

Source : Case Note Review (Data Form 1)

Table 5.3p : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
CAESAREAN SECTIONS IN LABOUR
SINGLETON INFANTS - CENTILE VALUES OF BIRTHWEIGHT FOR GESTATIONAL AGE (Controlled for Sex of Infant)
(n=245)

TYPE OF SECTION	All labour n=191	Second stage n=54
< 10th Centile	20 (10.5%)	2 (3.7%)
Normal	135 (70.7%)	38 (70.4%)
> 90th Centile	36 (18.8%)	14 (25.9%)

X^2 3.18 df 2

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.3q : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
CAESAREAN SECTIONS IN LABOUR
APGAR SCORE < 7 AT 1 AND 5 MINUTES
(Stillbirths excluded)
(n=250)

TYPE OF SECTION	All labour n=196	Second stage n=54
1 MINUTE		
< 7	40 (20.4%)	6 (11.1%)
≥ 7	156 (79.6%)	48 (88.9%)

X^2 2.44 df 1

Significance NS

5 MINUTES		
< 7	4 (2.0%)	0
≥ 7	192 (98.0%)	54 (100%)

X^2 1.12 df 1

Significance NS

Source : Case Note Review (Data Form 1)

Table 5.3r : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
CAESAREAN SECTIONS IN LABOUR
NUMBER OF INFANTS REQUIRING RESUSCITATION AT DELIVERY
(n=250)

TYPE OF SECTION	All labour n=196 **	Second stage n=54
Active resuscitation	49 (25.0%)	8 (14.8%)
No resuscitation	157 (75.0%)	46 (85.2%)

X^2 2.01 df 1

Significance NS

** stillbirths excluded

Source : Case Note Review (Data Form 1)

Table 5.3s : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
CAESAREAN SECTIONS IN LABOUR
NUMBER OF INFANTS ADMITTED TO SCBU
(Live Births)
(n=250)

TYPE OF SECTION	All labour n=196	Second stage n=54
Not Admitted	167 (85.2%)	48 (88.9%)
Admitted < 48hrs	2 (1.0%)	6 (11.1%)
Admitted ⩾ 48hrs	27 (13.8%)	0

X^2 20.97 df 2

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 5.3t : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
CAESAREAN SECTIONS IN LABOUR
BIRTH INJURY
(n=250)

TYPE OF SECTION	All labour n=196	Second stage n=54
Yes	5 (2.6%)	7 (13.0%)
No	191 (97.4%)	47 (87.0%)

X^2 10.04 df 1

Significance $p < 0.005$

Source : Case Note Review (Data Form 1)

Table 6.1a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=619)
TYPE OF INCISION

TYPE OF SECTION	Elective n=220	Emergency n=399
Lower Segment	218 (99.0%)	389 (97.5%)
Classical	1 (0.5%)	6 (1.5%)
Inverted 'T'	1 (0.5%)	4 (1.0%)

X^2 1.90** df 1

Significance NS

** classical and inverted 'T' incisions combined for X^2 analysis

Source : Case Note Review (Data Form 1)

Table 6.1b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=399)
TYPE OF INCISION

TYPE OF SECTION	Group A n=42	Group B n=109	Group C n=129	Group D n=119
Lower Segment	39 (92.9%)	104 (95.4%)	128 (99.2%)	118 (99.2%)
Classical	3 (7.1%)	2 (1.8%)	1 (0.8%)	0
Inverted 'T'	0	3 (2.8%)	0	1 (0.8%)

X^2 8.56** df 3

Significance $p < 0.05$

TYPE OF SECTION	All labour n=194	Second stage n=54
Lower Segment	192 (99.0%)	54 (100%)
Classical	1 (0.5%)	0
Inverted 'T'	1 (0.5%)	0

X^2 0.56** df 1

Significance NS

** classical and inverted 'T' incisions combined for X^2 analysis

Source : Case Note Review (Data Form 1)

Table 6.2a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION
EXTENSION OF UTERINE INCISION
(n=46)

TYPE OF EXTENSION	Number
Surgical extension (including 5 '*T*' incisions)	7
Tear to one angle	23
Tear to both angles	6
Tear to upper segment	3
Tear to cervix	6
Tear to vagina	1

Source : Case Note Review (Data Form 1)

Table 6.2b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS
EXTENSION OF INCISION (other than '*T*' incisions)
(n=607)

	Elective n=218	Emergency n=389
Yes	5 (2.3%)	36 (9.3%)
No	213 (97.7%)	353 (90.7%)

X^2 10.85 df 1

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 6.2c : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=388)
EXTENSION OF INCISION (other than '*T*' incisions)

TYPE OF SECTION	Group A n=39	Group B n=104	Group C n=127	Group D n=118
Yes	3 (7.7%)	6 (5.8%)	14 (11.0%)	13 (11.0%)
No	36 (92.3%)	98 (94.2%)	113 (89.0%)	105 (89.0%)

X^2 2.52 df 3

Significance NS

TYPE OF SECTION	All labour n=192	Second stage n=54
Yes	16 (8.3%)	11 (20.4%)
No	176 (91.7%)	43 (79.6%)

X^2 6.25 df 1

Significance $p < 0.025$

Source : Case Note Review (Data Form 1)

Table 6.3a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION
ANAESTHETIC DIFFICULTIES
(n=61)

TYPE OF DIFFICULTY	Number
Failed spinal / epidural	39
Spinal tap	3
Inadequate block before CS	5
Inadequate block during CS	7
Pain on insertion of cannula	1
Hypotension	1
Difficult intubation	2
Aspiration	1
Cardiac arrythmias	1
Tooth loosened	1

Source : Case Note Review (Data Form 1)

Table 6.3b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=619)
ANAESTHETIC DIFFICULTIES

	Elective n=220	Emergency n=399
Yes	23 (10.5%)	38 (9.5%)
No	197 (89.5%)	361 (90.5%)

X^2 0.14 df 1

Significance NS

Source : Case Note Review (Data Form 1)

Table 6.3c : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=399)
ANAESTHETIC DIFFICULTIES

TYPE OF SECTION	Group A n=42	Group B n=109	Group C n=129	Group D n=119
Yes	6 (14.3%)	9 (8.3%)	15 (11.6%)	8 (6.7%)
No	36 (85.7%)	100 (91.7%)	114 (88.4%)	111 (93.3%)

X^2 3.05 df 3

Significance NS

TYPE OF SECTION	All labour n=194	Second stage n=54
Yes	18 (9.3%)	5 (9.3%)
No	179 (92.3%)	49 (90.7%)

X^2 0 df 1

Significance NS

Source : Case Note Review (Data Form 1)

Table 6.4a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION
TYPES OF BLADDER TRAUMA
(n=33)

TYPE OF BLADDER TRAUMA	Number
Bladder tear	4
Bleeding from bladder base	1
Bladder sutured to uterus	1
Haematuria before CS	4
Haematuria after CS	23

Source : Case Note Review (Data Form 1)

Table 6.4b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=619)
BLADDER TRAUMA

	Elective n=220	Emergency n=399
Yes	6 (2.7%)	27 (6.8%)
No	214 (97.3%)	372 (93.2%)

X^2 3.81 df 1

Significance $p < 0.05$

Source : Case Note Review (Data Form 1)

Table 6.4c : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=399)
BLADDER TRAUMA

TYPE OF SECTION	Group A n=42	Group B n=109	Group C n=129	Group D n=119
Yes	1 (2.4%)	0	9 (7.0%)	17 (14.3%)
No	41 (97.6%)	109 (100%)	120 (93.0%)	102 (85.7%)

X^2 19.86 df 3

Significance $p < 0.001$

TYPE OF SECTION	All labour n=194	Second stage n=54
Yes	15 (7.7%)	14 (25.9%)
No	179 (92.3%)	40 (74.1%)

X^2 13.54 df 1

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 6.5a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=619)
BLOOD LOSS AND GROUPED BLOOD LOSS

	Elective n=220	Emergency n=399
Mean (mls)	362.07	544.26
Range	75 - 1500	100 - 6500
SD	222.91	528.70
T value	-5.99 (separate)	
Significance	$p < 0.001$	
95% CI	109 to 256	

GROUPED BLOOD LOSS

TYPE OF SECTION	Elective n=220	Emergency n=399
< 500 mls	184 (83.6%)	225 (56.4%)
⩾500 mls	36 (16.4%)	174 (43.6%)

X^2 45.75 df 2

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 6.5b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=399)
BLOOD LOSS AND GROUPED BLOOD LOSS

TYPE OF SECTION	Group A n=42	Group B n=109	Group C n=129	Group D n=119
Mean (mls)	494.88	432.06	600.00	604.03
Range	150 - 1500	100 - 2000	150 - 6500	100 - 6000
SD	315.48	256.98	651.09	606.99
F value	2.78			
Significance	$p < 0.05$			

GROUPED BLOOD LOSS

TYPE OF SECTION	Group A n=42	Group B n=109	Group C n=129	Group D n=119
< 500 mls	25 (59.7%)	76 (69.7%)	66 (51.2%)	58 (48.7%)
⩾500 mls	17 (40.5%)	33 (30.3%)	63 (48.8%)	61 (51.3%)

X^2 12.31 df 3

Significance $p < 0.01$

Source : Case Note Review (Data Form 1)

Table 6.5c : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
CAESAREAN SECTIONS IN LABOUR (n=248)
BLOOD LOSS AND GROUPED BLOOD LOSS

TYPE OF SECTION	All labour n=194	Second stage n=54
Mean (mls)	547.34	798.05
Range	100 - 2300	175 - 6500
SD	375.03	1132.19
T value	1.60	
Significance	NS	
95% CI	62.3 to 439	

GROUPED BLOOD LOSS

TYPE OF SECTION	All labour n=194	Second stage n=54
< 500 mls	93 (47.9%)	31 (57.4%)
⩾500 mls	101 (52.1%)	23 (42.6%)

X^2 1.51 df 1

Significance NS

Source : Case Note Review (Data Form 1)

Table 6.5d : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=619)
INTRA-OPERATIVE BLOOD TRANSFUSION

	Elective n=220	Emergency n=399
Yes	13 (5.9%)	58 (14.5%)
No	207 (94.1%)	341 (85.5%)

X^2 9.56 df 1

Significance $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 6.5e : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=399)
INTRA-OPERATIVE BLOOD TRANSFUSION

TYPE OF SECTION	Group A n=42	Group B n=109	Group C n=129	Group D n=119
Yes	10 (23.8%)	7 (6.4%)	22 (17.1%)	19 (16.0%)
No	32 (76.2%)	102 (93.6%)	107 (82.9%)	100 (84.0%)

X^2 9.53 df 3

Significance $p < 0.025$

TYPE OF SECTION	All labour n=194	Second stage n=54
Yes	32 (16.5%)	9 (16.7%)
No	162 (83.5%)	45 (83.3%)

X^2 0.001 df 1

Significance NS

Source : Case Note Review (Data Form 1)

Table 6.5f : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION
WOMEN REQUIRING BLOOD TRANSFUSION (n=71)
NUMBER OF UNITS TRANSFUSED

NUMBER OF UNITS TRANSFUSED	Number
1	11
2	49
3	2
4	6
5	1
> 10	2

Source : Case Note Review (Data Form 1)

Table 6.5g : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION
WOMEN REQUIRING BLOOD TRANSFUSION (n=71)
OTHER RELEVANT DETAILS

ASSOCIATED DATA		Number
ANAESTHESIA	General	27 (38.0%)
	Regional	44 (62.0%)
INCISION	Lower uterine segment	57 (93.0%)
	Classical	2 (2.8%)
	Inverted "T"	3 (4.2%)
EXTENSION OF UTERINE INCISION		9 (12.7%)
BLADDER TRAUMA		13 (18.3%)

Source : Case Note Review (Data Form 1)

Table 6.6a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION (n=619)
OTHER INTRA-OPERATIVE COMPLICATIONS RECORDED

COMPLICATION	Number
Undiagnosed placenta praevia	4
Evidence of uterine rupture	7
Presentation wrongly diagnosed	6
Retro-placental clot	8
Repair of bladder tear	2
Repair of incisional hernia	3
Removal of cyst / fibroid	6
Division of adhesions	1
Difficult repair of uterus	6
Uterine haematoma	4
Uterine abnormality	6
Intra-uterine infection	5
General anaesthesia x 2	1
Cord tear	1
True knot of cord	1
Loin cut	1

Source : Case Note Review (Data Form 1)

Table 7.1a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION (n=619)
POSTNATAL COMPLICATIONS
NUMBER OF PROBLEMS RECORDED

PROBLEMS	Number (%)
0 problems	59 (9.5%)
1 problem	104 (16.8%)
2 problems	154 (24.9%)
3 problems	112 (18.1%)
4 problems	84 (13.6%)
5 problems	61 (9.9%)
6 problems	28 (4.5%)
7 problems	17 (2.7%)

Source : Case Note review (Data Form 1)

Table 7.1b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=619)
POSTNATAL COMPLICATIONS
NUMBER OF PROBLEMS RECORDED

Number of Problems	Elective n=220	Emergency n=399
0 problems	25 (11.4%)	34 (8.5%)
1 problem	42 (19.1%)	62 (15.5%)
2 problems	59 (26.8%)	95 (23.8%)
3 problems	43 (19.5%)	69 (17.3%)
4 problems	22 (10.0%)	62 (15.6%)
5 problems	22 (10.0%)	39 (9.8%)
6 problems	4 (1.8%)	24 (6.0%)
7 problems	3 (1.4%)	14 (3.5%)

X^2 14.29 df 7

Significance $p < 0.05$

Source : Case Note Review (Data Form 1)

Table 7.1c : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=399)
POSTNATAL COMPLICATIONS
NUMBER OF PROBLEMS RECORDED

Number of Problems	Group A n=42	Group B n=109	Group C n=129	Group D n=119
0 problems	1 (2.4%)	11 (10.1%)	11 (8.5%)	11 (9.3%)
1 problem	3 (7.1%)	26 (23.9%)	19 (14.7%)	14 (11.8%)
2 problems	8 (19.0%)	26 (23.9%)	29 (22.5%)	32 (26.9%)
3 problems	7 (16.7%)	20 (18.3%)	24 (18.6%)	18 (15.1%)
4 problems	9 (21.4%)	14 (12.8%)	22 (17.1%)	17 (14.3%)
5 problems	2 (4.8%)	6 (5.5%)	15 (11.6%)	16 (13.4%)
6 problems	5 (11.9%)	5 (4.6%)	5 (3.9%)	9 (7.5%)
7 problems	7 (16.7%)	1 (0.9%)	4 (3.1%)	2 (1.7%)

X^2 44.86 df 21

Significance NS

Source : Case Note Review (Data Form 1)

Table 7.1d : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION (n=619)
RECORDED POSTNATAL COMPLICATIONS

COMPLICATION	Number (%)
Pyrexia	357 (58%)
Wound leak	127 (21%)
Wound erythema	116 (19%)
Wind	110 (18%)
Asymptomatic bacteruria	90 (15%)
Constipation	70 (11%)
Urinary tract infection	65 (11%)
Urinary catheter < 48 hours	64 (10%)
Dysuria	51 (8%)
Backache	45 (7%)
Wound bruising	43 (7%)
Wound infection	42 (7%)
Urinary catheter ⩾48 hours	34 (5%)
Heavy lochia	32 (5%)
Intra-uterine infection	27 (4%)
Spinal headaches	25 (4%)
Labile blood pressure	24 (4%)
Chest infection	23 (4%)

Source : Case Note Review (Data Form 1)

Table 7.1e: GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=619)
POSTNATAL MORBIDITY

Complication	Elective n=220	Emergency n=399	Significance
Pyrexia	106 (48.2%)	251 (62.9%)	X^2 12.60, df 1 $p < 0.001$
Blood transfusion	3 (1.4%)	18 (4.5%)	X^2 4.29, df 1 $p < 0.05$
Antibiotic therapy	35 (15.9%)	130 (32.6%)	X^2 20.16, df 1 $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 7.1f : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=399)
POSTNATAL MORBIDITY

Complication	Group A n=42	Group B n=109	Group C n=129	Group D n=119	Significance
Pyrexia	24 (57.1%)	58 (53.2%)	82 (63.6%)	87 (73.1%)	X^2 10.32, df 3 $p < 0.025$
Blood transfusion	7 (16.7%)	2 (1.8%)	5 (3.9%)	4 (3.4%)	X^2 16.70, df 3 $p < 0.001$
Antibiotic therapy	15 (36.6%)	31 (28.4%)	44 (34.1%)	40 (33.6%)	X^2 1.34, df 3 NS

Complication	All labour n=194	Second stage n=54	Significance
Pyrexia	131 (67.5%)	38 (70.4%)	X^2 0.16, df 1 NS
Blood transfusion	7 (3.6%)	2 (3.7%)	X^2 0.001, df 1 NS
Antibiotic therapy	66 (34.0%)	18 (33.3%)	X^2 0.009, df 1 NS

Source : Case Note Review (Data Form 1)

Table 7.1g : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION
REASONS FOR ANTIBIOTIC THERAPY
(n=165)

REASON	Number
Evidence of IU infection at operation	6
Prolonged rupture of membranes	4
Intrapartum pyrexia	5
Operative complications	9
Eclampsia	3
Prophylaxis	2
Pyrexia of unknown origin	24
UTI - +'ve	59
UTI - suspected	2
Wound infection - +'ve	25
Wound infection - suspected	4
Chest infection - +'ve	3
Chest infection - suspected	1
IU infection - +'ve	15
IU infection - suspected	21
Breast infection	2
Septicaemia	2
Other infection	4

Source : Case Note Review (Data Form 1)

Table 7.1h : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION
OTHER DRUG THERAPY
(n=43)

TYPE OF THERAPY	Number
Diuretic	6
Anti-hypertensive	22
Insulin	6
Bromocryptine	2
Phenothiazine	5
Anticoagulant	2
Anti-convulsant	5
Bronchodilator	2

Source : Case Note Review (Data Form 1)

Table 7.1i : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION
READMISSION TO HOSPITAL
(n=29)

REASON	Number
Secondary PPH	10
IU infection	6
To handle baby	6
Wound resuture	3
Breast abscess	1
Wound sinus/infection	1
Psychiatric admission	1
Abdominal pain	1

Source : Case Note Review (data Form 1)

Table 7.1j: GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=619)
URINARY CATHETERISATION

Complication	Elective n=220	Emergency n=399	Significance
Catheter < 48 hrs	9 (4.1%)	55 (13.8%)	X^2 14.37, df 1 $p < 0.001$
Catheter ⩾48 hrs	6 (2.7%)	28 (7.0%)	X^2 5.03, df 1 $p < 0.025$
Total with indwelling catheter	15 (6.8%)	83 (20.8%)	X^2 20.81, df 1 $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 7.1k : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=399)
URINARY CATHETERISATION

Complication	Group A n=42	Group B n=109	Group C n=129	Group D n=119	Significance
Catheter < 48 hrs	11 (26.2%)	4 (3.7%)	16 (12.4%)	24 (20.2%)	X^2 19.11, df 3 $p < 0.001$
Catheter ⩾48 hrs	7 (16.7%)	1 (0.9%)	11 (8.5%)	9 (7.6%)	X^2 12.71, df 3 $p < 0.01$
Total with indwelling catheter	18 (42.9%)	5 (4.6%)	27 (20.9%)	33 (27.7%)	X^2 33.27, df 3 $p < 0.001$

Complication	All labour n=194	Second stage n=54	Significance
Catheter < 48 hrs	26 (13.4%)	14 (25.9%)	X^2 4.90, df 1 $p < 0.05$
Catheter ⩾48 hrs	10 (5.2%)	10 (18.5%)	X^2 10.18, df 1 $p < 0.005$
Total with indwelling catheter	36 (18.6%)	24 (44.5%)	X^2 15.44, df 1 $p < 0.001$

Source : Case Note Review (Data Form 1)

Table 7.2a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION (n=619)
SERIOUS POSTNATAL MORBIDITY

COMPLICATION	Number
Laparotomy	6
Paralytic ileus	4
Septicaemia	4
Complete wound dehiscence	4
Partial wound dehiscence	3
Leg paraesthesia	3
Evacuation of RPOC**	2
Psychiatric referral	2
Deep venous thrombosis	1

** retained products of conception

Source : Case Note Review (Data Form 1)

Table 7.3a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION
INFECTIOUS MORBIDITY - HOSPITAL
(n=134)

TYPE	Number (%)
Urinary tract infection	65 (10.5%)
Wound infection	42 (7.0%)
Intra-uterine infection	27 (4.0%)
Chest infection	23 (4.0%)
Septicaemia	4 (0.6%)
Subphrenic abscess	1 (0.2%)

Source : Case Note Review (Data Form 1)

Table 7.3b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION
INFECTIOUS MORBIDITY - HOSPITAL AND COMMUNITY
(n=178)

TYPE	Number (%)
Wound	79 (12.8%)
Urinary tract infection	74 (12.0%)
Intra-uterine infection	33 (5.4%)
Chest infection	23 (3.7%)
Septicaemia	4 (0.6%)
Subphrenic abscess	1 (0.2%)

Source : Case Note Review (Data Form 1)

Table 7.3c: GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=619)
INFECTIOUS MORBIDITY

Complication	Elective n=220	Emergency n=399	Significance
Urinary tract infection	24 (10.9%)	41 (10.3%)	X^2 0.61, df 1 NS
Wound infection	9 (4.1%)	33 (8.3%)	X^2 3.91, df 1 $p < 0.05$
Intra-uterine infection	3 (1.4%)	24 (6.0%)	X^2 7.36, df 1 $p < 0.01$
Chest infection	2 (0.9%)	21 (5.3%)	X^2 7.52, df 1 $p < 0.01$

Source : Case Note Review (Data Form 1)

Table 7.3d : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=399)
INFECTIOUS MORBIDITY

Complication	Group A n=42	Group B n=109	Group C n=129	Group D n=119	Significance
Urinary tract infection	4 (9.5%)	9 (8.3%)	17 (13.2%)	11 (9.3%)	X^2 1.82, df 3 NS
Wound infection	7 (16.7%)	5 (4.6%)	10 (7.8%)	11 (9.3%)	X^2 6.05, df 3 NS
Intra-uterine infection	3 (7.2%)	9 (8.3%)	7 (5.4%)	5 (4.2%)	X^2 1.84, df 3 NS
Chest infection	2 (4.8%)	11 (10.1%)	7 (5.4%)	1 (0.8%)	X^2 9.79, df 3 $p < 0.025$

Complication	All labour n=194	Second stage n=54	Significance
Urinary tract infection	23 (11.9%)	5 (9.3%)	X^2 0.28, df 1 NS
Wound infection	15 (7.7%)	6 (11.1%)	X^2 0.62, df 1 NS
Intra-uterine infection	10 (5.2%)	2 (3.7%)	X^2 0.19, df 1 NS
Chest infection	8 (4.1%)	0	X^2 2.30, df 1 NS

Source : Case Note Review (Data Form 1)

Table 8a: GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=588)
POSTAL QUESTIONNAIRE
RESPONSE RATES

	Elective n=213	Emergency n=375
Returned	164 (77.0%)	280 (74.7%)
Non-response	49 (23.0%)	95 (25.3%)

X^2 0.39 df 1

Significance NS

Source : Postal Questionnaire (Data Form 2)

Table 8b

GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=375)
POSTAL QUESTIONNAIRE
RESPONSE RATES

	Group A n=36	Group B n=97	Group C n=123	Group D n=119
Returned	27 (75.0%)	73 (75.3%)	91 (74.0%)	89 (74.8%)
Non-response	9 (25.0%)	24 (24.7%)	32 (26.0%)	30 (25.2%)

X^2 0.05 df 3

Significance NS

	All labour n=188	Second stage n=54
Returned	142 (75.5%)	38 (70.4%)
Non-response	46 (24.5%)	16 (29.6%)

X^2 0.59 df 1

Significance NS

Source : Postal Questionnaire (Data Form 2)

Table 8.1a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION (n=444)
POSTAL QUESTIONNAIRE
WOMEN'S KNOWLEDGE OF REASONS FOR CAESAREAN DELIVERY

REASON	Number (%)
Right	326 (73%)
Partially right	62 (14%)
Wrong	21 (5%)
Don't know	14 (3%)
Not stated	21 (5%)

Source : Case Note Review and Postal Questionnaire (Data Forms 1 and 2)

Table 8.1b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=444)
POSTAL QUESTIONNAIRE
WOMEN'S KNOWLEDGE OF REASONS FOR CAESAREAN DELIVERY

	Elective n=164	Emergency n=280
Right	134 (81.7%)	192 (68.6%)
Partially right	14 (8.5%)	48 (17.2%)
Wrong	6 (3.7%)	15 (5.4%)
Don't know	2 (1.2%)	12 (4.3%)
Not answered	8 (4.9%)	13 (4.5%)

X^2 11.64 df 4

Significance $p < 0.025$

Source : Case Note Review and Postal Questionnaire (Data Form 1 and 2)

Table 8.1c : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=280)
POSTAL QUESTIONNAIRE
WOMEN'S KNOWLEDGE OF REASONS FOR CAESAREAN DELIVERY

TYPE OF SECTION	Group A n=27	Group B n=73	Group C n=91	Group D n=89
Right	23 (85.2%)	52 (71.3%)	55 (60.4%)	62 (69.6%)
Partially right	2 (7.4%)	12 (16.4%)	17 (18.7%)	17 (19.1%)
Wrong	1 (3.7%)	2 (2.7%)	9 (9.9%)	3 (3.4%)
Don't know	0	2 (2.7%)	7 (7.7%)	3 (3.4%)
Not answered	1 (3.7%)	5 (6.9%)	3 (3.3%)	4 (4.5%)

X^2 13.15 df 9

Significance NS

TYPE OF SECTION	All labour n=142	Second stage n=38
Right	94 (66.2%)	23 (60.5%)
Partially right	25 (17.6%)	9 (23.7%)
Wrong	11 (7.8%)	1 (2.6%)
Don't know	8 (5.6%)	2 (5.3%)
Not answered	4 (2.8%)	3 (7.9%)

X^2 2.61 df 3

Significance NS

Source : Case Note Review and Postal Questionnaire (Data Forms 1 and 2)

Table 8.1d. : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=444)
POSTAL QUESTIONNAIRE
BACK TO NORMAL HEALTH AT 3 MONTHS

	Elective n=164	Emergency n=280
Yes	114 (69.5%)	176 (62.9%)
No	50 (30.5%)	104 (37.1%)

X^2 1.73 df 1

Significance NS

Source : Postal Questionnaire (Data Form 2)

Table 8.1e : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=280)
POSTAL QUESTIONNAIRE
BACK TO NORMAL HEALTH AT 3 MONTHS

TYPE OF SECTION	Group A n=27	Group B n=73	Group C n=91	Group D n=89
Yes	21 (77.8%)	45 (61.6%)	53 (58.2%)	57 (64.0%)
No	6 (22.2%)	28 (38.4%)	38 (41.8%)	32 (36.0%)

X^2 3.50 df 3

Significance NS

TYPE OF SECTION	All labour n=142	Second stage n=38
Yes	86 (60.6%)	24 (63.2%)
No	56 (39.4%)	14 (36.8%)

X^2 0.09 df 1

Significance NS

Source : Postal Questionnaire (Data Form 2)

Table 8.1f : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=444)
POSTAL QUESTIONNAIRE
REPORTED STATE OF HAPPINESS AT 3 MONTHS

	Elective n=164	Emergency n=280
Happier	96 (58.5%)	178 (63.6%)
Less happy	10 (6.1%)	21 (7.5%)
Unchanged	57 (34.8%)	79 (28.2%)
Not stated	1 (0.6%)	2 (0.7%)

X^2 2.16 df 3

Significance NS

Source : Postal Questionnaire (Data Form 2)

Table 8.1g : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=280)
POSTAL QUESTIONNAIRE
REPORTED STATE OF HAPPINESS AT 3 MONTHS

TYPE OF SECTION	Group A n=27	Group B n=73	Group C n=91	Group D n=89
Happier	16 (59.3%)	37 (50.7%)	55 (60.4%)	70 (78.7%)
Less happy	4 (14.8%)	5 (6.8%)	8 (8.8%)	4 (4.5%)
Unchanged	6 (22.2%)	31 (42.5%)	27 (29.7%)	15 (16.8%)
Not stated	1 (3.7%)	0	1 (1.1%)	0

X^2 18.21 df 6

Significance $p < 0.01$

TYPE OF SECTION	All labour n=142	Second stage n=38
Happier	98 (69.0%)	27 (71.1%)
Less happy	10 (7.1%)	2 (5.3%)
Unchanged	34 (23.9%)	8 (21.1%)
Not stated	0	1 (2.6%)

X^2 0.16 df 1

Significance NS

Source : Postal Questionnaire (Data Form 2)

Table 8.1h : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=444)
POSTAL QUESTIONNAIRE
REPORTED STATE OF HEALTH AT 3 MONTHS

	Elective n=164	Emergency n=280
Healthier	18 (11.0%)	28 (10.0%)
Less healthy	38 (23.2%)	85 (30.4%)
Unchanged	100 (61.0%)	156 (55.7%)
Not stated	8 (4.8%)	11 (3.9%)

X^2 2.51 df 3

Significance NS

Source : Postal Questionnaire (Data Form 2)

Table 8.1i : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=280)
POSTAL QUESTIONNAIRE
REPORTED STATE OF HEALTH AT 3 MONTHS

TYPE OF SECTION	Group A n=27	Group B n=73	Group C n=91	Group D n=89
Healthier	2 (7.4%)	8 (11.0%)	6 (6.6%)	12 (13.5%)
Less healthy	8 (29.6%)	17 (23.3%)	34 (37.4%)	26 (29.2%)
Unchanged	17 (63.0%)	45 (61.6%)	46 (50.5%)	48 (53.9%)
Not stated	0	3 (4.1%)	5 (5.5%)	3 (3.4%)

X^2 6.26 df 6

Significance NS

TYPE OF SECTION	All labour n=142	Second stage n=38
Healthier	16 (11.3%)	2 (5.3%)
Less healthy	48 (33.8%)	12 (31.6%)
Unchanged	72 (50.7%)	22 (57.9%)
Not stated	6 (4.2%)	2 (5.2%)

X^2 1.43 df 2

Significance NS

Source : Postal Questionnaire (Data Form 2)

Table 8.2a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=444)
POSTAL QUESTIONNAIRE
WOUND PAIN SINCE DISCHARGE FROM HOSPITAL

TYPE OF SECTION	Elective n=164	Emergency n=280
Yes	63 (38.4%)	121 (43.2%)
No	101 (61.6%)	159 (56.8%)

X^2 0.98 df 1

Significance NS

Source : Postal Questionnaire (Data Form 2)

Table 8.2b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=280)
POSTAL QUESTIONNAIRE
WOUND PAIN SINCE DISCHARGE FROM HOSPITAL

TYPE OF SECTION	Group A n=27	Group B n=73	Group C n=91	Group D n=89
Yes	12 (44.4%)	32 (48.8%)	46 (50.5%)	31 (34.8%)
No	15 (55.6%)	41 (56.2%)	45 (49.5%)	58 (65.2%)

X^2 4.57 df 3

Significance NS

TYPE OF SECTION	All labour n=142	Second stage n=38
Yes	68 (47.9%)	9 (23.7%)
No	74 (52.1%)	29 (76.3%)

X^2 7.17 df 1

Significance $p < 0.01$

Source : Postal Questionnaire (Data Form 2)

Table 8.2c : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION
POSTAL QUESTIONNAIRE
WOUND PAIN SINCE DISCHARGE FROM HOSPITAL (n=184)
LENGTH OF TIME PAIN EXPERIENCED

LENGTH OF TIME	Number (%)
< 1 week	13 (7%)
1-2 weeks	39 (21%)
3-4 weeks	53 (29%)
5-6 weeks	13 (7%)
7-8 weeks	20 (11%)
9-10 weeks	8 (4%)
11-12 weeks	4 (2%)
> 12 weeks	32 (18%)
Not stated	2 (1%)

Source : Postal Questionnaire (Data Form 2)

Table 8.2d : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=444)
POSTAL QUESTIONNAIRE
WOUND LEAKAGE SINCE DISCHARGE FROM HOSPITAL

TYPE OF SECTION	Elective n=164	Emergency n=280
Yes	51 (31.1%)	99 (35.4%)
No	113 (68.9%)	181 (64.6%)

X^2 0.84 df 1

Significance NS

Source : Postal Questionnaire (Data Form 2)

Table 8.2e : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=280)
POSTAL QUESTIONNAIRE
WOUND LEAKAGE SINCE DISCHARGE FROM HOSPITAL

TYPE OF SECTION	Group A n=27	Group B n=73	Group C n=91	Group D n=89
Yes	11 (40.7%)	20 (27.4%)	34 (37.4%)	34 (38.2%)
No	16 (59.3%)	53 (72.6%)	57 (62.6%)	55 (61.8%)

X^2 2.84 df 3

Significance NS

TYPE OF SECTION	All labour n=142	Second stage n=38
Yes	58 (40.8%)	10 (26.3%)
No	84 (59.2%)	28 (73.7%)

X^2 2.69 df 1

Significance NS

Source : Postal Questionnaire (Data Form 2)

Table 8.2f: GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION
POSTAL QUESTIONNAIRE
WOUND LEAKAGE SINCE DISCHARGE FROM HOSPITAL (n=150)
LENGTH OF TIME

LENGTH OF TIME	Number (%)
< 1 week	22 (15%)
1-2 weeks	71 (47%)
3-4 weeks	33 (22%)
5-6 weeks	9 (6%)
7-8 weeks	8 (5%)
9-10 weeks	0
11-12 weeks	2 (1%)
> 12 weeks	5 (4%)

Source : Postal Questionnaire (Data Form 2)

Table 8.3a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION (n=444)
POSTAL QUESTIONNAIRE
PROBLEMS EXPERIENCED FOLLOWING DELIVERY

PROBLEM	Number (%)
Tiredness	353 (80%)
Backache	246 (55%)
Constipation	216 (49%)
Wind	204 (46%)
Depression	169 (38%)
Sleeping problem	161 (36%)
Wound infection	121 (27%)
Urinary tract infection	96 (22%)
Painful piles	82 (19%)
Breast infection	45 (10%)

Source : Postal Questionnaire (Data Form 2)

Table 8.3b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION (n=444)
POSTAL QUESTIONNAIRE
MATERNAL MORBIDITY IN HOSPITAL
POSTAL QUESTIONNAIRE v MEDICAL/MIDWIFERY NOTES

COMPLICATION	POSTAL QUESTIONNAIRE	MEDICAL/MIDWIFERY NOTES
Urinary tract infection	70 (16%)	81 (18%)
Wound infection	91 (21%)	29 (7%)
Breast infection	33 (7%)	12 (3%)
Backache	189 (43%)	35 (8%)
Wind	194 (44%)	78 (18%)
Constipation	188 (42%)	54 (12%)
Painful piles	54 (12%)	0
Sleeping problem	142 (32%)	0
Tiredness	279 (62%)	1 (0.2%)
Depression	109 (25%)	16 (4%)

Source : Postal Questionnaire (Data Form 2)

Table 8.3c : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION (n=444)
POSTAL QUESTIONNAIRE
MORBIDITY AS REPORTED BY RESPONDENTS

COMPLICATION	In Hospital	Up to 4 weeks	Up to 8 weeks	Up to 12 weeks
UTI	70 (16%)	43 (10%)	21 (5%)	11 (2%)
Wound infection	91 (21%)	74 (17%)	18 (4%)	2 (.5%)
Breast infection	33 (7%)	19 (4%)	9 (2%)	3 (1%)
Backache	189 (43%)	185 (42%)	160 (36%)	150 (34%)
Wind	194 (44%)	59 (13%)	40 (9%)	35 (8%)
Constipation	188 (42%)	95 (21%)	47 (11%)	33 (7%)
Painful piles	54 (12%)	52 (12%)	28 (6%)	28 (6%)
Sleeping problem	142 (32%)	63 (14%)	43 (10%)	38 (9%)
Tiredness	277 (62%)	306 (69%)	229 (52%)	173 (39%)
Depression	109 (25%)	109 (25%)	80 (18%)	66 (15%)

Source : Postal Questionnaire (Data Form 2)

Table 8.3d : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION (n=444)
POSTAL QUESTIONNAIRE
MORBIDITY AS REPORTED BY RESPONDENTS
COMPLICATIONS BY NUMBER OF TIMES MENTIONED

COMPLICATION	0 mention	1 mention	2 mentions	3 mentions	4 mentions
UTI	348 (78%)	63 (14%)	21 (5%)	8 (2%)	4 (1%)
Wound infection	323 (73%)	70 (16%)	39 (9%)	11 (2%)	1 (0.2%)
Breast infection	399 (90%)	34 (8%)	6 (1%)	2 (0.5%)	3 (0.7%)
Backache	198 (44%)	60 (14%)	44 (10%)	32 (7%)	110 (25%)
Wind	240 (54%)	140 (32%)	28 (6%)	12 (3%)	24 (5%)
Constipation	228 (52%)	127 (28%)	53 (12%)	14 (3%)	22 (5%)
Painful piles	362 (82%)	37 (8%)	24 (5%)	7 (2%)	14 (3%)
Sleeping problem	283 (64%)	95 (21%)	31 (7%)	11 (2%)	24 (6%)
Tiredness	91 (21%)	57 (13%)	90 (20%)	76 (17%)	130 (29%)
Depression	275 (62%)	64 (14%)	48 (11%)	24 (5%)	33 (8%)

Source : Postal Questionnaire (Data Form 2)

Table 8.3e : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION
POSTAL QUESTIONNAIRE
INFECTIOUS MORBIDITY
FOR WHICH ANTIBIOTIC THERAPY WAS PRESCRIBED
(n=114)

COMPLICATION	Number (%)
Wound infection	43 (9.7%)
Urinary tract infection	30 (6.8%)
Intra-uterine infection	12 (2.7%)
Vaginal infection	11 (2.5%)
Viral infection	11 (2.5%)
Chest infection	9 (2.0%)
Breast infection	9 (2.0%)
Other infection	14 (3.2%)

Source : Postal Questionnaire (Data Form 2)

Table 8.3f : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION (n=444)
POSTAL QUESTIONNAIRE
OTHER ILLNESSES FOR WHICH
MEDICATION WAS PRESCRIBED

ILLNESS	Number (%)
Anaemia	36 (8.1%)
Backache	32 (7.2%)
Depression	18 (4.1%)
Tiredness	12 (2.7%)
Other pain	19 (4.3%)
'Nerves'	4 (0.9%)
Insomnia	3 (0.7%)
Painful piles	7 (1.6%)
Constipation	6 (1.4%)

Source : Postal Questionnaire (Data Form 2)

Table 8.3g : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION (n=444)
POSTAL QUESTIONNAIRE
MEDICATIONS PRESCRIBED

MEDICATION	Number (%)
Antibiotic	114 (25.7%)
Analgesia	52 (11.7%)
Iron therapy	46 (10.4%)
Vitamin preparations	9 (2.0%)
Haemorrhoid ointment	8 (1.8%)
Antidepressant	8 (1.8%)
Tranquillizer	7 (1.6%)
Anti-inflammatory drugs	6 (1.4%)

Source : Postal Questionnaire (Data Form 2)

Table 8.4a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION (n=444)
POSTAL QUESTIONNAIRE
INFANT ILLNESSES

ILLNESS	Number (%)
Candida albicans	95 (20.8%)
Cold	47 (10.3%)
Colic	37 (8.1%)
'Snuffles'	26 (5.7%)
Eye infection	23 (5.0%)
Chest infection	15 (3.3%)
Diarrhoea	15 (3.3%)
Viral infection	8 (1.8%)

Source : Postal Questionnaire (Data Form 2)

Table 8.4b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION
POSTAL QUESTIONNAIRE
INFANT MEDICATION

MEDICATION	Number (%)
Antifungal	93 (20.4%)
Antibiotic	49 (10.7%)
Nasal decongestant	44 (9.6%)
Antispasmodic	35 (7.7%)
Eye ointment	14 (3.1%)
Electrolyte replacement	9 (2.0%)

Source : Postal Questionnaire (Data Form 2)

Table 8.5a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION (n=444)
POSTAL QUESTIONNAIRE
FEEDING PLAN BEFORE DELIVERY

	BREAST	BOTTLE
Primigravidae	106 (53%)	96 (47%)
Multigravidae	86 (36%)	156 (64%)
TOTAL	**192 (43%)**	**252 (57%)**

X^2 12.87 df 1

Significance $p < 0.001$

Source : Postal Questionnaire (Data Form 2)

Table 8.5b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=444)
POSTAL QUESTIONNAIRE
FEEDING PLAN BEFORE DELIVERY

	Elective n=164	Emergency n=280
Breast	63 (38.4%)	129 (46.1%)
Bottle	101 (61.6%)	151 (53.9%)

X^2 2.16 df 1

Significance NS

Source : Postal Questionnaire (Data Form 2)

Table 8.5c : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=280)
POSTAL QUESTIONNAIRE
FEEDING PLAN BEFORE DELIVERY

TYPE OF SECTION	Group A n=27	Group B n=73	Group C n=91	Group D n=89
Breast	14 (51.9%)	29 (39.7%)	34 (37.4%)	52 (58.4%)
Bottle	13 (48.1%)	44 (60.3%)	57 (62.6%)	37 (41.6%)

X^2 9.79 df 3

Significance $p < 0.025$

TYPE OF SECTION	All labour n=142	Second stage n=38
Breast	64 (45.1%)	22 (57.9%)
Bottle	78 (54.9%)	16 (42.1%)

X^2 1.98 df 1

Significance NS

Source : Postal Questionnaire (Data Form 2)

Table 8.5d : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION
POSTAL QUESTIONNAIRE
INFANT FEEDING SINCE DELIVERY

	BREAST ONLY	MIXED BR and BOT	BREAST---> BOTTLE	BOTTLE ONLY
Primigravidae	17 (8%)	3 (2%)	64 (32%)	118 (58%)
Multigravidae	24 (10%)	7 (3%)	41 (17%)	170 (70%)
TOTAL	**41 (9%)**	**10 (2%)**	**105 (24%)**	**288 (65%)**

X^2 13.73 df 3

Significance $p < 0.005$

Source : Postal Questionnaire (Data Form 2)

Table 8.5e : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
ELECTIVE versus EMERGENCY CAESAREAN SECTIONS (n=444)
POSTAL QUESTIONNAIRE
ACTUAL FEEDING OF INFANT SINCE DELIVERY

	Elective n=164	Emergency n=280
Breast	20 (12.2%)	21 (7.5%)
Bottle	108 (65.9%)	180 (64.3%)
Breast --> Bottle	33 (20.1%)	72 (25.7%)
Mixed Breast/Bottle	3 (1.8%)	7 (2.5%)

X^2 4.08 df 3

Significance NS

Source : Postal Questionnaire (Data Form 2)

Table 8.5f : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
EMERGENCY CAESAREAN SECTIONS (n=280)
POSTAL QUESTIONNAIRE
ACTUAL FEEDING OF INFANT SINCE DELIVERY

TYPE OF SECTION	Group A n=27	Group B n=73	Group C n=91	Group D n=89
Breast	4 (14.8%)	4 (5.5%)	7 (7.7%)	6 (6.7%)
Bottle	17 (63.0%)	50 (68.5%)	63 (69.2%)	50 (56.2%)
Breast --> Bottle	6 (22.3%)	17 (23.3%)	18 (19.8%)	31 (34.8%)
Mixed Breast/Bottle	0	2 (2.7%)	3 (3.3%)	2 (2.2%)

X^2 9.22 df 9

Significance NS

TYPE OF SECTION	All labour n=142	Second stage n=38
Breast	10 (7.0%)	3 (7.9%)
Bottle	92 (64.8%)	21 (55.3%)
Breast --> Bottle	35 (24.7%)	14 (36.8%)
Mixed Breast/Bottle	5 (3.5%)	0

X^2 3.43 df 3

Significance NS

Source : Postal Questionnaire (Data Form 2)

Table 8.5g: GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION
POSTAL QUESTIONNAIRE
REASON FOR CHANGING FEEDING PLAN
(n=36)

REASON	Number
Too tired	8
Too sore	14
Medication	2
Baby not interested	4
Baby in SCBU	5
Embarrassment	3
TOTAL	**36**

Source : Postal Questionnaire (Data Form 2)

Table 8.5h: GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION
POSTAL QUESTIONNAIRE
AGE OF BABY WHEN BREAST FEEDING STOPPED
(n=106)

AGE	Number
< 1 week	33
1-2 weeks	16
3-4 weeks	21
5-6 weeks	13
7-8 weeks	8
9-10 weeks	4
10-11 weeks	4
⩾12 weeks	7
TOTAL	**106**

Source : Postal Questionnaire (Data Form 2)

Table 8.5i : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY POPULATION
POSTAL QUESTIONNAIRE
REASON FOR STOPPING BREAST FEEDING
(n=106)

REASON	Number
Maternal discomfort	24
Cracked nipples	7
Medication	7
No milk	13
Baby dissatisfied	45
Baby illness	4
Convenience	2
To return to work	4
TOTAL	**106**

Source : Postal Questionnaire (Data Form 2)

Table 8.6a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
POSTAL QUESTIONNAIRE
CHARACTERISTICS OF NON-RESPONDENTS
MARITAL STATUS, SOCIAL CLASS AND RACE
(n=130)

		Non-respondents(%) n=130	Study population(%) n=619
MARITAL STATUS	Married	101 (77.7%)	522 (84.3%)
	Single	17 (13.0%)	58 (9.4%)
	Separated	3 (2.3%)	11 (1.8%)
	Common-law	9 (7.0%)	28 (4.5%)

X^2 3.46 df 3 Significance NS

SOCIAL CLASS	I and II	15 (11.5%)	96 (15.5%)
	III	41 (31.5%)	243 (39.3%)
	IV and V	24 (18.5%)	95 (15.3%)
	Other/OOW	50 (38.5%)	185 (29.9%)

X^2 6.00 df 3 Significance NS

RACE	Caucasian	119 (91.5%)	590 (95.3%)
	Asian	11 (8.5%)	25 (4.0%)
	Negro	0	4 (0.6%)

X^2 3.03 df 1 Significance NS

Source : Case Note Review (Data Form 1)

Table 8.6b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
POSTAL QUESTIONNAIRE
NON-RESPONDENTS
TYPE OF CAESAREAN SECTION
(n=130)

		Non-respondents n=130	Study population n=619
TYPE of SECTION	1 elective	26 (20%)	101 (16%)
	1 emergency	50 (38%)	263 (42%)
	1 emerg - NL*	7 (5%)	35 (6%)
	2 elective	31 (24%)	168 (27%)
	2 emergency	14 (11%)	45 (7%)
	2 emerg - NL*	2 (2%)	7 (1%)

X^2 3.55 df 5

Significance NS

* No labour

Source : Case Note Review (Data Form 1)

Table 8.6c : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
POSTAL QUESTIONNAIRE
NON-RESPONDENTS
TYPE OF ANAESTHESIA FOR CAESAREAN SECTION
(n=130)

		Non-respondents n=130	Study population n=619
TYPE of ANAESTHESIA	General	34 (26%)	148 (24%)
	Regional	94 (72%)	461 (74%)
	Combination	2 (2%)	10 (2%)

X^2 0.30 df 2

Significance NS

Source : Case Note Review (Data Form 1)

Table 8.6d : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
POSTAL QUESTIONNAIRE
NON-RESPONDENTS
MAIN INDICATION FOR CAESAREAN SECTION
(n=130)

	Non-respondents n=130	Study population n=619
Previous Caesarean Section	49 (34.0%)	209 (33.8%)
Breech Presentation	32 (22.2%)	127 (20.5%)
Dystocia	32 (22.2%)	142 (22.9%)
Fetal Distress	11 (7.6%)	63 (10.2%)
Other Indication	20 (14.0%)	78 (12.6%)

X^2 1.119 df 4

Significance NS

Source : Case Note Review (Data Form 1)

Table 8.6e : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
POSTAL QUESTIONNAIRE
NON-RESPONDENTS
INFANT FEEDING
(n=130)

		Non-respondents n=130	Study population n=619
Feeding Initiated	Breast	33 (25%)	223 (37%)
	Bottle	97 (75%)	388 (63%)

X^2 5.85 df 1

Significance $p < 0.025$

Feeding on Discharge	Breast	22 (17%)	159 (26%)
	Bottle	108 (83%)	451 (74%)

X^2 4.85 df 1

Significance $p < 0.05$

Source : Case Note Review (Data Form 1)

Table 9.1a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
MARITAL STATUS AND SOCIAL CLASS

		STUDY GROUP	CONTROL GROUP
		n=50	n=50
MARITAL STATUS	married	41 (82%)	41 (82%)
	single	9 (18%)	9 (18%)

X^2 0 df 1 Significance NS

SOCIAL CLASS	I and II	9 (18%)	11 (22%)
	III	18 (36%)	23 (46%)
	IV and V	9 (18%)	6 (12%)
	OTHER/OOW	14 (28%)	10 (20%)

X^2 2.076 df 3 Significance NS

RACE	Caucasian	50 (100%)	50 (100%)

Source : Case Note Review (Data Form 1 and Data Form 3)

Table 9.1b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
AGE AND HEIGHT DISTRIBUTION

		STUDY GROUP	CONTROL GROUP
		n=50	n=50
AGE (years)	mean	24.9	25.0
	range	17 - 33	17 - 34
	SD	3.8	4.0
T		-0.20	
Significance		NS	
95% Confidence Interval		-1.45 to 1.65	
AGE GROUP	< 18	1 (2%)	1 (2%)
	18-34	49 (98%)	49 (98%)

X^2 0 df 1 Significance NS

HEIGHT (cms)	mean	161.2	162.0
	range	154 - 174	154 - 180
	SD	4.7	6.2
T		-0.73	
Significance		NS	
95% Confidence Interval		-1.38 to 2.98	

Source : Case Note Review (Data Form 1 and Data Form 3)

Table 9.1c : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
LENGTH OF LABOUR

		STUDY GROUP	CONTROL GROUP
		n=50	n=50
FIRST STAGE	mean	11.1	9.5
	range	2 - 23	3 - 21
	SD	4.9	4.3
T		1.80	
Significance		NS	
95% Confidence Interval		-0.230 to 3.43	
SECOND STAGE	mean	205.5**	110.9
	range	94 - 344	5 - 304
	SD	91.7	71.3
T		3.37	
Significance		$p < 0.001$	
95% Confidence Interval		49.7 to 139	
TOTAL LENGTH	mean	12.3	11.4
	range	2 - 23	3 - 23
	SD	4.9	4.8
T		0.92	
Significance		NS	
95% Confidence Interval		-1.03 to 2.83	

** n=15 women who reached the second stage of labour

Source : Case Note Review (Data Form 1 and Data Form 3)

Table 9.1d : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
ANALGESIA

		STUDY GROUP	CONTROL GROUP
ANALGESIA	Pethidine	1 (2%)	15 (30%)
	None	3 (6%)	4 (8%)
	Pethidine + Epidural	16 (32%)	14 (28%)
	Epidural	30 (60%)	17 (34%)

X^2 16.12 df 3

Significance $p < 0.005$

	Regional	46 (92%)	31 (62%)
	Other	4 (8%)	19 (38%)

X^2 12.70 df 1

Significance $p < 0.001$

Source : Case Note Review (Data Form 1 and Data Form 3)

Table 9.1e : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
LABOUR INTERVENTIONS AND COMPLICATIONS

INTERVENTION/COMPLICATION	STUDY GROUP	CONTROL GROUP	X^2 Significance
Fetal scalp electrode	47 (94%)	49 (98%)	1.042 NS
Urinary catheter	46 (92%)	36 (72%)	6.775 $p < 0.01$
Pyrexia	8 (16%)	2 (4%)	4.00 $p < 0.05$
Fetal distress	18 (36%)	11 (22%)	2.380 NS
Bleeding	2 (4%)	0	2.041 NS
Abnormal presentation	2 (4%)	0	2.041 NS
Cephalopelvic disproportion	25 (50%)	1 (2%)	29.938 $p < 0.001$
Slow progress in labour	25 (50%)	6 (12%)	16.877 $p < 0.001$

Source : Case Note Review (Data Form 1 and Data Form 3)

Table 9.2a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY GROUP
INDICATION FOR CAESAREAN SECTION

INDICATION	Number (%)	Number (%) using this as one of the indications
Cephalopelvic disproportion	20 (40%)	23 (46%)
Failed trial of forceps	5 (10%)	5 (10%)
Failure to progress	13 (26%)	26 (52%)
Failed induction	1 (2%)	1 (2%)
Fetal distress	8 (16%)	19 (38%)
Brow presentation	1 (2%)	1 (2%)
Other malpresentation	1 (2%)	1 (2%)
Cord prolapse	1 (2%)	1 (2%)

Source : Case Note Review (Data Form 1)

Table 9.4a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
BIRTHWEIGHT 10th and 90th percentiles

	STUDY GROUP	CONTROL GROUP
BIRTHWEIGHT mean	3714.54	3406.50
range	2700-4850	2570-4380
SD	504.24	382.72
T	3.44	
Significance	$p < 0.001$	
95% Confidence Interval	130 to 386	
CENTILE VALUES normal	34 (68%)	42 (84%)
< 10th	1 (2%)	2 (4%)
> 90th	15 (30%)	6 (12%)

X^2 4.882 df 1

Significance $p < 0.05$

CENTILE VALUES by sex	STUDY < 10th	STUDY > 90th	CONTROL < 10th	CONTROL > 90th
male	0	10	0	2
female	1	5	2	4

Source : Case Note Review (Data Forms 1 and Data Form 3)

Table 9.5a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
POSTNATAL PROBLEMS IN HOSPITAL

Number of Problems	STUDY GROUP Number (%)	CONTROL GROUP Number (%)
0 problems	3 (6%)	8 (16%)
1 problem	6 (12%)	8 (16%)
2 problems	12 (24%)	12 (24%)
3 problems	6 (12%)	17 (34%)
4 problems	8 (16%)	5 (10%)
5 problems	7 (14%)	0
6 problems	6 (12%)	0
7 problems	2 (4%)	0

Source : Case Note Review (Data Forms 1 and Data Form 3)

Table 9.5b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
RECORDED POSTNATAL COMPLICATIONS

COMPLICATION	STUDY Number (%)	CONTROL Number (%)	X^2	Significance
Pyrexia	39 (78%)	26 (52%)	7.43	$p < 0.01$
Wound leak	13 (26%)	0	-	
Urinary catheter < 48 hours	12 (24%)	0	13.64	$p < 0.001$
Wound erythema	11 (22%)	0	-	
Asymptomatic bacteruria	11 (22%)	8 (16%)	0.58	NS
Urinary tract infection	9 (18%)	0	9.89	$p < 0.005$
Constipation	8 (16%)	8 (16%)	0	NS
Wound infection	5 (10%)	0	-	
Intra-uterine infection	4 (8%)	0	4.17	$p < 0.05$
Painful perineum	0	14 (28%)	-	
Bruised perineum	0	11 (22%)	-	
Painful haemorrhoids	0	5 (10%)	-	
Perineal infection	0	3 (6%)	-	
Perineal gape	0	3 (6%)	-	

Source : Case Note Review (Data Forms 1 and Data Form 3)

Table 9.5c : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY GROUP
REASONS FOR ANTIBIOTIC THERAPY
(n=19)

REASON	Number
Intrapartum pyrexia	1
Operative problems	1
Prophylactic	2
Pyrexia of unknown origin	6
UTI - +'ve	8
Wound infection - +'ve	2
Chest infection - +'ve	1
IU infection - +'ve	1

Source : Case Note Review (Data Forms 1)

Table 9.6a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
HOSPITAL INTERVIEW
PROBLEMS EXPERIENCED SINCE DELIVERY

PROBLEM	STUDY Number (%)	CONTROL Number (%)	X^2 Significance
Difficulty in passing urine	16 (32%)	10 (20%)	1.871 NS
Pain on passing urine	14 (28%)	16 (32%)	0.190 NS
Nausea	8 (16%)	9 (18%)	0.071 NS
Backache	35 (70%)	19 (38%)	10.306 $p < 0.005$
Dizziness	11 (22%)	15 (30%)	0.832 NS
'Pins and needles'	8 (16%)	3 (6%)	2.554 NS
Headache	12 (24%)	4 (8%)	4.762 $p < 0.05$
Wind	37 (74%)	16 (32%)	17.704 $p < 0.001$
Constipation	34 (68%)	23 (46%)	4.937 $p < 0.05$
Pain at site of IVI	17 (34%)	6 (12%)	6.832 $p < 0.01$

Source : Hospital Interview (Data Form 4)

Table 9.6b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
HOSPITAL INTERVIEW
PROBLEMS STILL BEING EXPERIENCED AT TIME OF INTERVIEW

PROBLEM	STUDY Number (%)	CONTROL Number (%)	X^2 Significance
Difficulty in passing urine	4 (8%)	1 (2%)	1.895 NS
Pain on passing urine	7 (14%)	6 (12%)	0.088 NS
Nausea	4 (8%)	1 (2%)	1.895 NS
Backache	29 (58%)	16 (32%)	6.828 $p < 0.01$
Dizziness	11 (22%)	15 (30%)	0.832 NS
'Pins and needles'	4 (8%)	2 (4%)	0.709 NS
Headache	9 (18%)	1 (2%)	7.111 $p < 0.01$
Wind	22 (44%)	8 (16%)	9.333 $p < 0.005$
Constipation	20 (40%)	11 (22%)	3.787 NS
Pain at site of IVI	7 (14%)	3 (6%)	1.778 NS

Source : Hospital Interview (Data Form 4)

Table 9.6c : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
HOSPITAL INTERVIEW v MEDICAL/MIDWIFERY NOTES
PROBLEMS EXPERIENCED SINCE DELIVERY

PROBLEM	STUDY		CONTROL	
	Interview	Notes	Interview	Notes
Pain on passing urine	14 (28%)	4 (8%)	16 (32%)	0
Nausea	8 (16%)	0	9 (18%)	0
Backache	35 (70%)	4 (8%)	19 (38%)	2 (4%)
Dizziness	11 (22%)	0	15 (30%)	0
Headache	12 (24%)	0	4 (8%)	1 (2%)
Wind	37 (74%)	5 (10%)	16 (32%)	0
Constipation	34 (68%)	8 (16%)	23 (46%)	8 (16%)
Pain at site of IVI	17 (34%)	1 (2%)	6 (12%)	0
Wound / perineal pain	41 (82%)	0	44 (88%)	14 (28%)

Source : Case Note Review and Hospital Interview (Data Forms 1, 3, 4)

Table 9.7a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
POSTAL QUESTIONNAIRE
COMPREHENSION OF REASONS FOR OPERATIVE DELIVERY

REASON	STUDY Number (%)	CONTROL Number (%)
Right	29 (64%)	20 (80%)
Partially right	7 (16%)	4 (16%)
Wrong	4 (9%)	1 (4%)
Don't know	4 (9%)	0
Not stated	1 (2%)	0

Source : Postal Questionnaire and Case Note Review (Data Forms 1, 2 and 3)

Table 9.7b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
POSTAL QUESTIONNAIRE
STATE OF HEALTH AND HAPPINESS AT 3 MONTHS

NORMAL SELF	STUDY Number (%)	CONTROL Number (%)
Yes	23 (51%)	32 (69%)
No	22 (49%)	14 (31%)

X^2 3.24 df 1

Significance NS

HAPPINESS	STUDY Number (%)	CONTROL Number (%)
Happier	34 (75%)	33 (72%)
Less happy	4 (9%)	4 (9%)
Unchanged	7 (16%)	9 (19%)

X^2 0.254 df 2

Significance NS

HEALTH	STUDY Number (%)	CONTROL Number (%)
Healthier	4 (9%)	5 (11%)
Less healthy	18 (40%)	13 (28%)
Unchanged	23 (51%)	28 (61%)

X^2 1.397 df 2

Significance NS

Source : Postal Questionnaire (Data Form 2)

Table 9.7c : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
POSTAL QUESTIONNAIRE
WOUND/PERINEAL PAIN AFTER DISCHARGE FROM HOSPITAL
LENGTH OF TIME PAIN EXPERIENCED
(n=46)

LENGTH OF TIME	STUDY Number (%) n=20	CONTROL Number (%) n=26
<1 week	0	0
1-4 weeks	11 (55%)	19 (73%)
5-8 weeks	4 (20%)	7 (27%)
>8 weeks	5 (25%)	0

Source : Postal Questionnaire (Data Form 2)

Table 9.7d : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY GROUP
POSTAL QUESTIONNAIRE
WOUND LEAKAGE AFTER DISCHARGE FROM HOSPITAL
LENGTH OF TIME
(n=22)

LENGTH OF TIME	Number
< 1 week	0
1-4 weeks	17 (77%)
5-8 weeks	3 (14%)
> 8 weeks	2 (9%)

Source : Postal Questionnaire (Data Form 2)

Table 9.7e : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
POSTAL QUESTIONNAIRE
PROBLEMS EXPERIENCED SINCE DELIVERY

PROBLEM	STUDY Number(%)	CONTROL Number(%)	X^2 Significance
Tiredness	38 (84%)	43 (94%)	1.898 NS
Backache	28 (72%)	28 (61%)	0.018 NS
Constipation	26 (58%)	28 (61%)	0.090 NS
Wind	19 (42%)	12 (26%)	2.637 NS
Depression	18 (40%)	24 (52%)	1.357 NS
Sleeping problem	18 (40%)	18 (39%)	0.007 NS
Wound/perineal infection	22 (49%)	10 (22%)	7.354 $p < 0.01$
Urinary tract infection	10 (22%)	6 (13%)	1.323 NS
Painful piles	9 (20%)	19 (41%)	4.847 $p < 0.05$
Breast infection / Cracked nipples	6 (13%)	15 (33%)	4.761 $p < 0.05$

Source : Postal Questionnaire (Data Form 2)

Table 9.7f : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY GROUP
POSTAL QUESTIONNAIRE
MORBIDITY AS REPORTED BY THE RESPONDENTS
(n=45)

COMPLICATION	In Hospital	Up to 4 weeks	Up to 8 weeks	Up to 12 weeks
UTI	10 (22%)	5 (11%)	1 (2%)	0 (0%)
Wound infection	17 (38%)	12 (27%)	5 (11%)	2 (4%)
Breast infection	5 (11%)	2 (4%)	0 (0%)	0 (0%)
Backache	20 (44%)	18 (40%)	19 (42%)	16 (36%)
Wind	17 (38%)	11 (24%)	7 (16%)	5 (11%)
Constipation	25 (56%)	11 (24%)	6 (13%)	7 (13%)
Painful piles	8 (18%)	8 (18%)	3 (7%)	3 (7%)
Sleeping problem	17 (38%)	8 (18%)	4 (9%)	2 (4%)
Tiredness	34 (76%)	35 (78%)	27 (60%)	19 (42%)
Depression	11 (24%)	13 (29%)	9 (20%)	9 (20%)

Source : Postal Questionnaire (Data Form 2)

Table 9.7g : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
CONTROL GROUP
POSTAL QUESTIONNAIRE
MORBIDITY AS REPORTED BY THE RESPONDENTS
(n=46)

COMPLICATION	In Hospital	Up to 4 weeks	Up to 8 weeks	Up to 12 weeks
UTI	4 (9%)	4 (9%)	1 (2%)	0 (0%)
Wound infection	7 (15%)	9 (20%)	4 (9%)	1 (2%)
Breast infection	10 (22%)	7 (15%)	2 (4%)	1 (2%)
Backache	18 (39%)	22 (48%)	21 (46%)	17 (37%)
Wind	9 (20%)	6 (13%)	4 (9%)	5 (11%)
Constipation	24 (52%)	19 (41%)	8 (17%)	2 (4%)
Painful piles	15 (33%)	13 (28%)	11 (24%)	9 (20%)
Sleeping problem	17 (37%)	8 (17%)	5 (11%)	4 (9%)
Tiredness	31 (67%)	40 (87%)	28 (61%)	17 (37%)
Depression	8 (17%)	17 (37%)	13 (28%)	4 (9%)

Source : Postal Questionnaire (Data Form 2)

Table 9.7h : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY GROUP
POSTAL QUESTIONNAIRE
MORBIDITY AS REPORTED BY RESPONDENTS
COMPLICATIONS BY NUMBER OF TIMES MENTIONED
(n=45)

COMPLICATION	0	1	2	3	4
UTI	35 (78%)	5 (11%)	4 (9%)	1 (2%)	0
Wound infection	23 (51%)	12 (27%)	6 (13%)	4 (9%)	0
Breast infection	39 (87%)	5 (11%)	1 (2%)	0	0
Backache	17 (38%)	8 (18%)	4 (9%)	7 (13%)	9 (20%)
Wind	26 (58%)	8 (18%)	5 (11%)	2 (4%)	4 (9%)
Constipation	19 (42%)	13 (29%)	8 (18%)	0	5 (11%)
Painful piles	36 (80%)	2 (4%)	4 (9%)	0	3 (7%)
Sleeping problem	27 (60%)	11 (24%)	3 (7%)	2 (4%)	2 (4%)
Tiredness	7 (13%)	5 (11%)	6 (13%)	10 (22%)	17 (38%)
Depression	27 (60%)	5 (11%)	7 (16%)	4 (9%)	2 (4%)

Source : Postal Questionnaire (Data Form 2)

Table 9.7i : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
CONTROL GROUP
POSTAL QUESTIONNAIRE
MORBIDITY AS REPORTED BY RESPONDENTS
COMPLICATIONS BY NUMBER OF TIMES MENTIONED
(n=46)

COMPLICATION	0	1	2	3	4
UTI	40 (87%)	3 (7%)	3 (7%)	0	0
Perineal infection	36 (78%)	2 (4%)	5 (11%)	3 (7%)	0
Breast infection	31 (67%)	10 (22%)	5 (11%)	0	0
Backache	18 (40%)	5 (11%)	6 (13%)	7 (13%)	10 (22%)
Wind	34 (76%)	4 (9%)	6 (13%)	0	2 (4%)
Constipation	18 (40%)	10 (22%)	12 (27%)	5 (11%)	1 (2%)
Painful piles	27 (60%)	5 (11%)	6 (13%)	1 (2%)	7 (13%)
Sleeping problem	28 (61%)	10 (22%)	3 (7%)	2 (4%)	2 (4%)
Tiredness	3 (7%)	9 (20%)	11 (24%)	7 (13%)	16 (36%)
Depression	22 (48%)	11 (24%)	10 (22%)	1 (2%)	2 (4%)

Source : Postal Questionnaire (Data Form 2)

Table 9.7j : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
POSTAL QUESTIONNAIRE
MORBIDITY AS REPORTED BY RESPONDENTS
PRESENT FROM DELIVERY TO RETURN OF POSTAL QUESTIONNAIRE

PROBLEM	STUDY Number(%) n=45	CONTROL Number(%) n=46	X^2 Significance
Tiredness	17 (38%)	16 (36%)	0.088 NS
Backache	9 (20%)	10 (22%)	0.042 NS
Constipation	5 (11%)	1 (2%)	2.950 NS
Wind	4 (9%)	2 (4%)	0.762 NS
Depression	2 (4%)	2 (4%)	0.001 NS
Sleeping problem	2 (4%)	3 (7%)	0.189 NS
Painful piles	3 (7%)	7 (13%)	1.700 NS

Source : Postal Questionnaire (Data Form 2)

Table 9.7k : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
POSTAL QUESTIONNAIRE
MATERNAL MORBIDITY IN HOSPITAL
POSTAL QUESTIONNAIRE v MEDICAL/MIDWIFERY RECORDS

	STUDY		CONTROL	
COMPLICATION	PQ	Notes	PQ	Notes
Urinary tract infection	10 (22%)	9 (20%)	4 (9%)	0
Wound infection	17 (38%)	5 (11%)	7 (15%)	3 (7%)
Breast infection	5 (11%)	4 (9%)	10 (22%)	7 (15%)
Backache	20 (44%)	3 (7%)	19 (39%)	2 (4%)
Wind	17 (38%)	3 (7%)	9 (20%)	0
Constipation	25 (56%)	7 (16%)	24 (52%)	8 (17%)
Painful piles	8 (18%)	0	15 (33%)	5 (11%)
Sleeping problem	17 (38%)	0	17 (37%)	0
Tiredness	34 (76%)	0	31 (67%)	0
Depression	11 (24%)	0	8 (17%)	0

Source : Case Note Review and Postal Questionnaire (Data Forms 1 and 2)

Table 9.71 : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
POSTAL QUESTIONNAIRE
INFECTIOUS MORBIDITY

COMPLICATION	STUDY Number(%)	CONTROL Number(%)	X^2 Significance
Wound/perineal infection	6 (13%)	5 (11%)	0.130 NS
Urinary tract infection	1 (2%)	4 (9%)	1.836 NS
Intra-uterine infection	1 (2%)	5 (11%)	2.762 NS
Vaginal infection	3 (7%)	4 (9%)	0.132 NS
Viral infection	2 (4%)	2 (4%)	0.001 NS
Chest infection	1 (2%)	0	*
Breast infection	0	1 (2%)	*
Other infection	1 (2%)	2 (4%)	0.322 NS

* expected frequencies too small to carry out X^2 estimation

Source : Postal Questionnaire (Data Form 2)

Table 9.7m : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
POSTAL QUESTIONNAIRE
OTHER ILLNESSES FOR WHICH MEDICATION WAS PRESCRIBED

ILLNESS	STUDY Number(%)	CONTROL Number(%)	X^2 Significance
Anaemia	6 (13%)	8 (17%)	0.288 NS
Backache	4 (9%)	2 (4%)	0.762 NS
Depression	1 (2%)	0	*
'Nerves'	1 (2%)	0	*
Painful piles	1 (2%)	4 (9%)	1.836 NS
Constipation	1 (2%)	1 (2%)	*

* expected frequencies too small to carry out X^2 estimation

Source : Postal Questionnaire (Data Form 2)

Table 9.7n : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
POSTAL QUESTIONNAIRE
MEDICATIONS PRESCRIBED

MEDICATION	STUDY Number(%)	CONTROL Number(%)	X^2 Significance
Antibiotic	12 (27%)	17 (37%)	1.259 NS
Analgesia	6 (13%)	3 (7%)	1.184 NS
Iron therapy	6 (13%)	8 (17%)	0.288 NS
Vitamin preparations	1 (2%)	2 (4%)	0.322 NS
Haemorrhoid ointment	1 (2%)	4 (9%)	1.836 NS
Tranquillizer	1 (2%)	0	*
Anti-inflammatory drugs	2 (4%)	1 (2%)	0.368 NS

* expected frequencies too small to carry out X^2 estimation

Source : Postal Questionnaire (Data Form 2)

Table 9.7o : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
POSTAL QUESTIONNAIRE
INFANT ILLNESSES

ILLNESS	STUDY Number(%)	CONTROL Number(%)	X^2 Significance
Candida albicans	7 (16%)	4 (9%)	1.007 NS
Cold	7 (16%)	3 (7%)	1.898 NS
Colic	4 (9%)	2 (4%)	0.762 NS
'Snuffles'	3 (7%)	4 (9%)	0.132 NS
Eye infection	2 (4%)	4 (9%)	0.668 NS
Chest infection	3 (7%)	1 (2%)	1.093 NS
Diarrhoea	1 (2%)	0	*
Viral infection	1 (2%)	2 (4%)	0.322 NS

* expected frequencies too small to carry out X^2 estimation

Source : Postal Questionnaire (Data Form 2)

Table 9.7p : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
POSTAL QUESTIONNAIRE
INFANT MEDICATION

MEDICATION	STUDY Number(%)	CONTROL Number(%)	X^2 Significance
Antifungal	7 (16%)	4 (9%)	1.007 NS
Antibiotic	8 (18%)	4 (9%)	1.639 NS
Nasal decongestant	5 (11%)	4 (9%)	0.149 NS
Antispasmodic	4 (9%)	0	4.277 NS
Eye ointment	2 (4%)	4 (9%)	0.668 NS

Source : Postal Questionnaire (Data Form 2)

Table 9.7q : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
POSTAL QUESTIONNAIRE
FEEDING PLAN BEFORE DELIVERY
(n=91)

	Breast	Bottle
Study	29 (64.4%)	16 (35.6%)
Control	30 (65.2%)	16 (34.8%)
TOTAL	**59 (64.8%)**	**32 (35.2%)**

X^2 0.006 df 1

Significance NS

Source : Postal Questionnaire (Data Form 2)

Table 9.7r : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
POSTAL QUESTIONNAIRE
INFANT FEEDING SINCE DELIVERY

	BREAST ONLY	MIXED BR and BOT	BREAST ---> BOTTLE	BOTTLE ONLY
Study	6 (13.3%)	0	17 (35.6%)	22 (51.1%)
Control	8 (17.4%)	1 (2.2%)	17 (37.0%)	20 (43.5%)
TOTAL	**14 (15.4%)**	**1 (1.0%)**	**34 (37.4%)**	**42 (46.2%)**

Source : Postal Questionnaire (Data Form 2)

Table 9.8a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
HOME INTERVIEW
TIME UNTIL INTERCOURSE RESUMED

	< 1 month	1-2 months	2-3 months	3-4 months	4-5 months	5-6 months	Not resumed
STUDY	6	23	8	0	1	4	0
CONTROL	3	19	9	5	3	1	4

X^2 13.20 df 6

Significance $p < 0.05$

	STUDY n=42	CONTROL n=44
Less than 2 months	29 (69%)	22 (50%)
More than 2 months	13 (31%)	22 (50%)

X^2 3.23 df 1

Significance NS

Source : Home Interview (Data Form 5)

Table 9.8b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
HOME INTERVIEW
SEXUAL PROBLEM

	STUDY n=42	CONTROL n=44
Yes	15 (36%)	20 (45%)
No	27 (64%)	24 (55%)

X^2 0.845 df 1

Significance NS

SEXUAL PROBLEM AT 6 MONTHS POSTPARTUM

	STUDY n=42	CONTROL n=44
YES	2 (5%)	6 (14%)
Lack of interest	2	3
Dyspareunia	0	3

X^2 2.006 df 1

Significance NS

Source : Home Interview (Data Form 5)

Table 9.8e : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
HOME INTERVIEW
PLANS FOR FUTURE PREGNANCIES

	STUDY n=42	CONTROL n=44
Never	6 (14%)	2 (4%)
Don't know	7 (17%)	7 (16%)

X^2 1.244 df 1

Significance NS

Source : Home Interview (Data Form 5)

Table 10.1a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
HOSPITAL INTERVIEW
INTERVAL BETWEEN DELIVERY AND SEEING BABY

First Saw Baby

	< 1 hour	1-2 hour	2-6 hour	6-12hour	12 - 24 hour
STUDY	36	1	3	4	6
CONTROL	50	0	0	0	0

$X^2 = 17.64$ df 4

Significance $p < 0.005$

Source : Hospital Interview (Data Form 3)

Table 10.1b : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
HOSPITAL INTERVIEW
INTERVAL BETWEEN DELIVERY AND HOLDING BABY

First Held Baby

	< 1 hour	1-2 hour	2-6 hour	6-12hour	12-24hour	> 24hour	> 48hour
STUDY	14	2	6	6	6	12	4
CONTROL	46	1	1	0	0	2	0

$X^2 = 51.2$ df 6

Significance $p < 0.001$

Source : Hospital Interview (Data Form 3)

Table 10.1c : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
HOSPITAL INTERVIEW
INTERVAL BETWEEN DELIVERY AND FEEDING BABY

First Fed Baby

	< 1 hour	1-2 hour	2-6 hour	6-12hour	12-24hour	> 24hour	>48hour
STUDY	0	0	2	2	8	19	19
CONTROL	5	0	6	16	14	6	3

$X^2 = 37.92$ df 6

Significance $p < 0.001$

Source : Hospital Interview (Data Form 3)

Table 10.2a : GLASGOW ROYAL MATERNITY HOSPITAL (1984)
STUDY CONTROL GROUP
HOME INTERVIEW
TIME UNTIL CLOSE TO BABY

Time till close to baby	STUDY n=42	CONTROL n=44
Immediately	18 (43%)	28 (64%)
Not immediately	24 (57%)	16 (36%)

X^2 3.872 df 1

Significance $p < 0.05$

Time till close to baby	STUDY n=42	CONTROL n=44
Less than 1 month	24 (57%)	38 (86%)
More than 1 month	18 (43%)	6 (14%)

X^2 9.12 df 1

Significance $p < 0.005$

Time till close to baby	STUDY n=42	CONTROL n=44
Less than 2 months	30 (71%)	41 (93%)
More than 2 months	12 (29%)	3 (7%)

X^2 7.06 df 1

Significance $p < 0.01$

Source : Home Interview (Data Form 5)

Appendix 1

CAESAREAN SECTION STUDY CASE NOTE REVIEW

NAME : UNIT NO : STUDY NO :

MATERNAL DETAILS

AGE.....

MARITAL STATUS 1.married 2.single 3.separated 4.common-law 5.other.

PATIENTS OCCUPATION _____.....

HUSBANDS OCCUPATION _____.....

RACE 1.Caucasian 2.Asian 3.Chinese 4.Negro 5.Other .....

PAST OBSTETRIC HISTORY

TOTAL NUMBER OF PREGNANCIES.....

SPONTANEOUS ABORTIONS.....

THERAPEUTIC ABORTIONS.....

PERINATAL DEATHS.....

If YES - cause _____.....

NUMBER OF LIVING CHILDREN.....

PREVIOUS SVD.....

PREVIOUS FORCEPS DELIVERIES.....

PREVIOUS BREECH DELIVERIES.....

PREVIOUS CAESAREAN SECTION.....

Main reason for each CS 1._____...

2._____...

3._____...

PREVIOUS PRETERM LABOUR< 37 WEEKS.....

PREVIOUS INFANTS < 2500 grams.....

PREVIOUS X-ray PELVIMETRY.....

If YES - 1.normal 2.contracted 3. doubtful.....

RELEVANT PAST MEDICAL HISTORY

STUDY No :

1. _____.....

2. _____.....

3. _____.....

4. _____.....

5. _____.....

CURRENT PREGNANCY

HEIGHT (cms).....

WEIGHT (Kg).....

GESTATION AT FIRST ANTENATAL VISIT (weeks).....

TYPE OF ANTENATAL CARE 1.shared 2.hospital 3.GP 4.none.....

ANTENATAL PROBLEMS 1. _____.....

2. _____.....

prefix 3. _____.....

1=no admission 4. _____.....

2=admitted 5. _____.....

6. _____.....

7. _____.....

LENGTH OF HOSPITAL 1. _____.....

STAY (days) 2. _____.....

3. _____.....

4. _____.....

WAS DECISION TO SECTION MADE BEFORE LABOUR ONSET ?.....

If YES - by whom _____.....

ANTENATAL X-ray PELVIMETRY.....

If YES - result 1.normal 2.contracted 3.doubtful

INTRAPARTUM DETAILS

STUDY No :

DAY OF CAESAREAN SECTION.....

DATE OF CAESAREAN SECTION.....

TIME OF OPERATION 1.00.01-04.00 2.04.01-08.00 3.08.01-12.00.....

4.12.01-16.00 5.16.01-20.00 6.20.01-24.00

GESTATION AT DELIVERY (weeks).....

HAEMOGLOBIN (g).....

TYPE OF CAESAREAN SECTION.....

TYPE OF ANAESTHESIA 1.general 2.epidural 3.spinal 4.combination.....

REASONS FOR CS 1._____.....

2._____.....

3._____.....

SURGEON _____.....

ANAESTHETIST 1.consultant 2.SR 3.registrar.....

TYPE OF INCISION 1.LUS 2.classical 3.inverted 'T'.....

SUTURE MATERIAL 1._____.....

2._____.....

3._____.....

BLOOD LOSS (mls).....

STERILIZATION.....

SUBRECTUS DRAIN.....

INDWELLING CATHETER.....

COMPLICATIONS AT OPERATION

STUDY No : [ ][ ][ ]

HAEMORRHAGE..... [ ]

Reason _____..... [ ]

Rx _____..... [ ]

BLADDER DAMAGE..... [ ]

Specify_____..... [ ]

ANAESTHETIC DIFFICULTIES..... [ ]

Specify_____..... [ ]

EXTENSION OF INCISION..... [ ]

Specify_____..... [ ]

OTHER..... [ ]

Specify_____..... [ ]

Specify_____..... [ ]

BLOOD TRANSFUSION..... [ ]

No of units..... [ ][ ]

PUERPERIUM

STUDY No :

LENGTH OF STAY SCU (days).....

LENGTH OF STAY HOSPITAL (days).....

TYPE OF FEEDING INITIATED 1.breast 2.bottle.....

TYPE OF FEEDING ON DISCHARGE 1.breast 2.bottle.....

COMPLICATIONS 1._____.....

2._____.....

3._____.....

4._____.....

5._____.....

6._____.....

7._____.....

ANTIBIOTIC THERAPY.....

Reason_____.....

_____.....

OTHER RELEVANT DRUG THERAPY.....

Type _____.....

_____.....

BLOOD TRANSFUSION AFTER 24 hours.....

No of units.....

3rd DAY HAEMOGLOBIN.....

POSTNATAL PELVIMETRY.....

If YES - 1.normal 2.contracted 3.doubtful.....

COMMUNITY FOLLOW-UP.....

If YES - number of days.....

PROBLEMS AFTER DISCHARGE 1._____.....

2._____.....

3._____.....

READMISSION TO HOSPITAL.....

Reason _____.....

NEONATAL DATA

STUDY No : ☐☐☐

GESTATION AT DELIVERY (weeks)..... ☐☐

APGAR SCORE 1 minute..... ☐☐

5 minutes..... ☐☐

RESUSCITATION ..... ☐

TIME TO SPONTANEOUS RESPIRATION (mins)..... ☐☐

BIRTHWEIGHT..... ☐☐☐

SEX 1.male 2.female..... ☐

DISCHARGE 1.unit nursery 2.observation PD..... ☐

3.admission PD3 4.admission PD4

If 3 or 4 Reason _____..... ☐☐

_____..... ☐☐

Length of stay..... ☐☐

FETAL ABNORMALITY..... ☐

Specify_____..... ☐

STILLBIRTH..... ☐

Specify_____..... ☐

NEONATAL DEATH..... ☐

Specify_____..... ☐

BIRTH INJURY..... ☐

Specify_____..... ☐

EMERGENCY CAESAREAN SECTIONS IN LABOUR STUDY No :

ADMISSION TO LABOUR WARD FROM 1.home 2.hospital 3.ANC 4.other hospital..

If 4 - Reason_____.....

No OF HOURS FROM LABOUR ONSET TO LABOUR WARD ADMISSION.....

FLYING SQUAD.....

LABOUR SPONTANEOUS.....

ACCELERATED.....

If YES - method.....

INDUCED.....

If YES - reason_____.....

_____.....

- method.....

PRIMED.....

If YES - method.....

DURATION OF FIRST STAGE.....

DURATION OF SECOND STAGE.....

AMNIOTOMY DELIVERY INTERVAL.....

TOTAL LENGTH OF LABOUR.....

No OF VAGINAL EXAMINATIONS.....

No OF VAGINAL EXAMINATIONS AFTER AMNIOTOMY.....

FETAL SCALP ELECTRODE.....

No OF TIMES CATHERTERISED.....

PYREXIA IN LABOUR.....

TYPE OF MONITORING EQUIPMENT 1.Corometrics 2.Hewlet-Packard.....

3.Sonicaid 4.Other

TYPE OF ANALGESIA 1.Epidural 2.Pethidine.....

3.Epidural+Pethidine 4.None

COMPLICATIONS OF LABOUR

STUDY No :

FETAL DISTRESS.....

1.Bradycardia < 100 beats/min.....

2.Tachycardia > 180 beats/min.....

3.Baseline heart rate with late decelerations.....

4.Meconium with baseline heart rate < 120 beats/min...

5.Meconium with baseline heart rate > 160 beats/min...

6.Meconium with any decelerations.....

7.Fetal scalp pH < 7.20.....

Time of occurrence in relation to labour onset.....

ABNORMAL PRESENTATION.....

Type 1.breech 2.transverse 3.shoulder 4.face 5.brow...

BLEEDING.....

Reason 1.abruption 2.praevia 3.uterine rupture 4 NK...

Time of occurrence in relation to labour onset.....

CEPHALOPELVIC DISPROPORTION.....

1.moulding ++.....

2.full dilatation with presenting part above 0+0.....

3.failed trial of forceps.....

SLOW PROGRESS IN LABOUR.....

Reason 1._____.....

2._____.....

OTHER ABNORMALITY 1._____.....

2._____.....

VAGINAL DELIVERY ATTEMPTED.....

No of attempts.....

Episiotomy.....

Coding Schedule

Past Medical History
01 Elderly primigravida > 30 years
02 Elderly multigravida > 35 years
03 Short stature < 155cm
04 > 2 spontaneous abortions
05 > 2 therapeutic abortions
06 > 1 perinatal death
07 Previous uterine surgery
08 Previous cervical surgery
09 Other gynaecological surgery
10 Other gynaecological disease
11 Essential hypertension
12 Renal disease
13 Renal abnormality
14 Recurrent UTI
15 Asymptomatic cardiac disease
16 Symptomatic cardiac disease
17 Diabetes mellitus
18 Diabetes insipidus
19 DVT
20 Pulmonary embolus
21 Depression
22 Other psychiatric illness
23 Puerperal depression
24 Hypothyroidism
25 Hyperthyroidism
26 Spinal abnormality
27 Rickets
28 Asthma
29 GI disorder
30 Chlamydia +'ve
31 Encephalopathy
32 1° infertility
33 2° infertility
34 Epilepsy
35 Endometriosis
36 Ulcerative colitis
37 Mentally retarded
38 Rhesus disease
39 Failed vasectomy
40 Alcoholic
41 Pituitary microadenoma
42 Vulval warts
43 Bronchitis
44 Incisional hernia
45 Female circumcision
46 Yaws disease
47 Sickle cell anaemia
48 Tuberculosis
49 Rheumatoid arthritis
50 Polio
51 Heroin addiction
52 Spherocytosis
53 Double/bicornuate uterus
54 Previous coccyx
55 SLE
56 Cerebral palsy
57 Previous subarachnoid
58 Von Reckinhause disease
59 Sarcoidosis
60 Stein Leventhal

Cause of Perinatal Death
1 Prematurity
2 IVH
3 RDS
4 Fetal abnormality
5 Antepartum hypoxia
6 Intrapartum hypoxia
7 Placental abruption
8 Not known/specified

Antenatal Complications
01 Threatened abortion 1st trimester
02 Threatened abortion 2nd trimester
03 Nausea/vomiting
04 Asymptomatic bacteruria
05 Suspected UTI
06 Confirmed UTI
07 Amniocentesis < 20 weeks
08 Amniocentesis > 20 weeks
09 Multiple pregnancy
10 Mild PIH
11 Moderate PIH
12 Severe PIH
13 Eclamptic fits
14 Premature membranes < 37 weeks
15 Premature labour < 37 weeks,no Rx
16 Premature labour < 37 weeks,on Rx
17 Prophylactic Ritodrine therapy
18 Low weight gain < 0.33 Kg/week
19 High weight gain > 0.55 Kg/week
20 Decreased fetal movement
21 Suspected IUGR
22 Definite IUGR
23 PP on ultrasound
24 PP with bleeding
25 Placental abruption

26 Placental abruption-severe
27 Other APH
28 Gestational diabetes
29 Diabetes mellitus-uncomplicated
30 Diabetes mellitus-stabilised
31 Diabetes mellitus-complicated
32 Diabetes insipidus
33 Symptomatic cardiac disease
34 Rhesus disease-no Rx
35 Rhesus disease-on Rx
36 Anaemia < 10g
37 Breech presentation
38 Transverse lie
39 Unstable lie
40 Vaginal infection
41 Genital herpes
42 IU infection
43 +'ve VDRL
44 +'ve Chlamydia
45 Oedema
46 Proteinuria
47 Cervical suture
48 Abdominal pain
49 Polyhydramnios
50 Oligohydramnios
51 Epilepsy
52 PUO
53 Psychiatric illness
54 Bed rest
55 Social admission
56 Assessment
57 To await delivery
58 False labour
59 ? membranes
60 Cholecystitis
61 Pancreatitis
62 Backache
63 Breast abscess
64 Heart murmur
65 Chest infection
66 Drug overdose
67 Gastroenteritis
68 Glycosuria
69 Epileptic fit
70 Skin rash
71 Late booker
72 Uncertain gestation
73 Carpel tunnel
74 EWA
75 EUA
76 Headaches
77 Abnormal CTG
78 Essential hypertension
79 Labial/appendix abscess
80 Haemorrhoids
81 Raised AFP
82 Cord presentation
83 Renal failure
84 Blood transfusion
85 Heroin user
86 Fetal abnormality detected
87 Surgery

Type of caesarean section

1 1° elective
2 1° elective ----> labour
3 1° emergency in labour
4 1° emergency no labour
5 2° elective
6 2° elective ---> labour
7 2° emergency no labour

Reasons for caesarean section

01 Previous caesarean section
02 Failed trial of labour
03 Multiple pregnancy
04 Breech presentation
05 Face presentation
06 Brow presentation
07 Other malpresentation
08 Cephalopelvic disproportion
09 Failed trial of forceps
10 Failure to progress 1st stage
11 Failure to progress 2nd stage
12 Failed induction
13 Fetal distress
14 Preterm < 37 weeks
15 Other fetal indication
16 Maternal diabetes
17 Moderate PIH
18 Severe PIH
19 Eclamptic fits
20 Placenta praevia
21 Placental abruption
22 Ruptured uterus
23 Other bleeding
24 Intra-uterine infection
25 Other infection
26 Maternal hysteria
27 Pancreatitis
28 Previous PFR
29 Other maternal indication
30 Prolonged membranes > 37 weeks
31 Prolonged membranes < 37 weeks
32 High head

33 OP position
34 membranes
35 Cord prolapse
36 Hydramnios
37 Retraction ring
38 Rhesus disease
39 Unfavourable cervix
40 IUGR-suspected
41 IUGR-definite
42 Renal failure
43 Previous uterine surgery
44 IUD
45 BOH/previous traumatic delivery
46 Vulval warts
47 Cervical stenosis
48 Uterine abnormality
49 Abdominal pain
50 Fetal abnormality
51 Previous subarachnoid

Suture material

1 catgut	5 silk
2 dexon	6 silk+clips
3 vicryl	7 clips
4 prolene	8 ethilon

Surgeon

01 Macnaughton
02 Calder
03 McEwan
04 Black
05 Lunan
06 Hodge
07 Anthony
08 Laughland
09 Howat
10 Kennedy
11 Paterson
12 Hepburn
13 Lang
14 Haxton
15 Melrose
16 Hood
17 Walker
18 McCune
19 Cassiday
20 Yates
21 Crooks
22 Bonduelle
23 Herd
24 Newlands
25 Fairlie
26 Cameron
27 Morrison
28 Fares
29 Fayed
30 Shaht
31 Mahmoud
32 MacDougall
33 Odonker

Reason for haemorrhage

1 Atonic uterus
2 Vascular LUS
3 Tear
4 Vascular bladder base
5 Adherent placenta
6 PP/RPC
7 Difficult delivery
8 Not stated

Treatment

1 Sutured
2 Oxytocin
3 Not stated
4 Removed
5 Pack

Bladder damage

1 Bladder tear
2 Bleeding from bladder base
3 Haematuria-unknown cause
4 Haematuria-before cs
5 Sutured to uterus

Anaesthetic difficulties

1 Failed intubation
2 Difficult intubation
3 Failed spinal/epidural
4 Spinal tap
5 Inadequate block prior to cs
6 Inadequate block during cs
7 Hypotension/tooth loosened/cardiac
8 Aspiration/pain on insertion

Extension of incision
1 Extension of LUS incision
2 Conversion to *"T"*
3 Tear to one angle
4 Tear to both angles
5 Tear to UUS
6 Tear to cervix
7 Tear to vagina
8 Tear to cervix (self-inflicted)

Other problem - 1
1 Evidence of IU infection
2 GA x 2
3 Undiagnosed placenta praevia
4 Evidence of uterine
5 Presentation different at delivery
6 Removal of cyst/fibroid/abscess
7 Repair of bladder tear
8 Retro-placental clot

Other problem - 2
1 Repair of incisional hernia
2 Difficult delivery
3 Difficult repair
4 Uterine abnormality
5 Uterine haematoma
6 Cord tear
7 Division of adhesions
8 True knot of cord/loin cut

Postnatal complications
01 Wind
02 Constipation
03 Headache
04 Bloodpatch
05 DVT
06 Phlebitis - leg
07 Phlebitis - arm
09 Pulmonary embolus
10 Paralytic ileus
11 Wound bruising
12 Wound erythema
13 Wound leakage
14 Wound haematoma
15 Wound dehiscence
16 Wound infection-+'ve swab
17 IU infection-+'ve swab
18 Iu infection-suspected
19 Chest infection-+'ve sputum
20 Chest infection-suspected
21 Breast infection
22 UTI-+'ve culture
23 UTI-suspected
24 Asymptomatic bacteruria
25 Flu
26 Sub-phrenic abscess
27 Urinary retention-catheter x 1
28 Urinary retention-catheter > 1
29 Urinary catheter- < 48 hours
30 Urinary catheter- > 48 hours
31 Breast engorgement
32 Heavy lochia
33 2° postpartum haemorrhage
34 Evacuation RPOC
35 Oxytocin therapy
36 Rigor
37 Septicaemia
38 Pyrexia
39 Wound gape
40 Wound dehiscence-partial
41 Wound dehiscence-complete
42 General anaesthesia
43 Laparotomy
44 Other surgery
45 Tiredness
46 Weepy
47 Postnatal depression
48 Psychiatric referral
49 Diarrhoea
50 Oliguria
51 Labile blood pressure
52 Cracked nipples
53 Vomiting
54 Abdominal pain
55 Dysuria
56 Skin rash
57 Chest pain
58 Dyspnoea
59 Bells palsy
60 Pelvic haematoma

61 Fits
62 Labial abscess
63 Perianal abscess
64 Haemorrhoids
65 RPOC
66 Paraesthesia-leg
67 Decreased hip flexion
68 Pulmonary oedema
69 Ear infection
70 Wound burn
71 Haematuria
72 Dialysis
73 Perineal gape
74 Perineal bruising
75 Perineal pain
76 Perineal infection
77 Vulval swelling
78 Vesico-utero fistula
79 Incontinence
80 Multiple operations
81 Wound resuture

Reason for antibiotic therapy
01 Prophylactic
02 PUO
03 UTI - +'ve swab
04 UTI - suspected
05 Wound infection - +'ve
06 Wound infection - suspected
07 IU infection - +'ve swab
08 IU infection - suspected
09 Chest infection - +'ve sputum
10 Chest infection - suspected
11 Breast infection
12 Sub-phrenic abscess
13 Septicaemia
14 Perianal abscess
15 Ear infection

Other drug therapy
1 Diuretic
2 Anti-hypertensive
3 Bronchodilator
4 Insulin
5 Bromocryptine
6 Phenothiazine/tranquilliser
7 Anticoagulant
8 Anticonvulsant

Reason for re-admission
01 2° postpartum haemorrhage
02 IU infection
03 To handle baby
04 Wound re-suture
05 Abdominal pain
06 Breast abscess
07 Haematoma
08 RPOC
09 Psychiatric admission
10 Wound sinus
11 Wound infection
12 D&C

Reason for PD admission
01 Preterm
02 IUGR
03 Mild birth asphyxia
04 Severe birth asphyxia
05 Meconium aspiration
06 Tachypnoea
07 RDS
08 Maternal diabetes
09 Maternal infection
10 Prolonged membranes
11 Rhesus incompatibility
12 Fetal abnormality
13 IVH
14 Transfer Yorkhill
15 Transfer other maternity
16 Maternal drug overdose
17 Seizures
18 Duodenal atresia
19 Pyrexia
20 Hypoglycaemia
21 Vomiting
22 Feeding problem
23 Hydronephrosis
24 Pneumothorax
25 Maternal heroin user

Type of fetal abnormality
1 Down's syndrome
2 Microcephaly/hydrocephaly
3 Diaphragmatic hernia / sacro-coccygeal tumour
4 CDH
5 Gastroschisis/Potters/ cystic hygroma
6 Cardiac hypoplasia
7 Other cardiac abnormality
8 Hydrocoele/hypospadias/other

Cause of stillbirth
1 Antepartum asphyxia
2 Intrapartum asphyxia
3 Fetal abnormality
4 Not known

Cause of NND
1 IVH
2 RDS
3 Left heart hypoplasia
4 Vater's syndrome
5 Potter's syndrome
6 Cystic hygroma/haemangioma

Type of birth injury
1 Facial bruising
2 Other bruising
3 Facial laceration
4 Other laceration
5 Cephalhaematoma
6 Suspected neurological deficit
7 Cord tear
8 Facial nerve palsy

Reason for induction
01 PEDD
02 Mild PIH
03 Moderate PIH
04 Severe PIH
05 Poor weight profile
06 Weight loss at term
07 Social
08 Term
09 Previous cs
10 Psychiatric illness
11 APH
12 Decreased fetal movement
13 Decreased oestriol assay
14 Niggling
15 Diabetes mellitus
16 Abdominal pain
17 Multiple pregnancy
18 IUGR

Reason for slow progress
1 Cephalopelvic disproportion
2 Inco-ordinate uterine activity-
with adequate oxytocin
3 Inadequate oxytocin-without cause
4 Inadequate oxytocin-with cause
5 Oedematous cervix
6 Malpresentation/OP position
7 > 10 iu Syntocinon
8 < 10 iu Syntocinon

Other abnormality
1 Haematuria
2 Suspected uterine rupture
3 Presentation misdiagnosed
4 Evidence IU infection
5 Hypertension
6 Failed induction / spinal
7 Abnormal clotting screen/amylase
8 Prolonged membranes

Appendix 2

SURVEY OF MOTHERS AND BABIES THREE MONTHS AFTER DELIVERY STUDY No : ☐☐☐

1.What type of delivery did you have ?

a. NORMAL ☐

b. FORCEPS ☐

c. CAESAREAN SECTION ☐

2.If you had a FORCEPS DELIVERY or a CAESAREAN SECTION - why did you have this type of delivery ?

_____

3a.If you had a CAESAREAN SECTION - have you had any discomfort from your wound since you came home from hospital ?

YES ☐ NO ☐

If you answered YES - how long did this last for ? _____

3b.Have you had any leakage from your wound since you came home from hospital?

YES ☐ NO ☐

If you answered YES - how long did this last for ? _____

4a.If you had a NORMAL DELIVERY or a FORCEPS DELIVERY - did you have stitches ?

YES ☐ NO ☐

4b.If you had stitches - have you had any discomfort from your stitches since you came home from hospital ?

YES ☐ NO ☐

If you answered YES - how long did this last for ? _____

5. ALL WOMEN

Have you experienced any of the following problems since you had your baby ?

If you have please tick the appropriate boxes in the way that is shown in t examples below

eg If you have experienced backache ALL THE TIME since the baby was born you would mark the boxes like this :

Backache ☑ ☐ ☑ ☐ ☑ ☐ ☑ ☐

OR

If you experienced a wound infection in hospital ONLY you would mark the boxes like this :

Wound infection ☑ ☐ ☐ ☑ ☐ ☑ ☐ ☑

OR

If you have NEVER experienced painful piles since the baby was born you would mark the boxes like this :

Painful piles ☐ ☑ ☐ ☑ ☐ ☑ ☐ ☑

	in hospital		at 4 weeks		at 8 weeks		at 12 weeks	
	YES	NO	YES	NO	YES	NO	YES	NO
1.Urine infection.....	☐	☐	☐	☐	☐	☐	☐	☐
2.Backache.....	☐	☐	☐	☐	☐	☐	☐	☐
3.Wind.....	☐	☐	☐	☐	☐	☐	☐	☐
4.Constipation.....	☐	☐	☐	☐	☐	☐	☐	☐
5.Painful piles.....	☐	☐	☐	☐	☐	☐	☐	☐
6.Infection wound/stichline	☐	☐	☐	☐	☐	☐	☐	☐
7.Breast/nipple infection	☐	☐	☐	☐	☐	☐	☐	☐
8.Difficulty in sleeping.	☐	☐	☐	☐	☐	☐	☐	☐
9.Tiredness.....	☐	☐	☐	☐	☐	☐	☐	☐
10.Depression.....	☐	☐	☐	☐	☐	☐	☐	☐
11.Other (state)----------	☐	☐	☐	☐	☐	☐	☐	☐

6.Since you had your baby - have you received any tablets or medicines from your doc

YES ☐ NO ☐

if you answered YES - please fill in the table below stating what they were, what were for and at what stage you took them

	ILLNESS	MEDICINE	TIME
eg	Breast abscess	Ampicillin	4 weeks after the birth
1.			
2.			
3.			

7.Do you feel back to your normal self physically ?

YES ☐ NO ☐

If NOT - what do you feel is wrong ?_____

_____

8.Comparing yourself with the person you were before your pregnancy - are you (please tick one on EACH list)

A.HAPPIER	☐	A.HEALTHIER	☐
B.LESS HAPPY	☐	B.LESS HEALTHY	☐
C.UNCHANGED	☐	C.UNCHANGED	☐

9.Has your baby been well since he/she was born ?

YES NO

If NOT - what has been wrong with him/her (please fill in table)

	ILLNESS	MEDICINE	AGE
eg	Thrush	Nystan drops	2 weeks
1.			
2.			
3.			

10. Has he/she had any problems with any of the following ? (please also state how long it lasted for)

	YES	NO
1.WIND.....	☐	☐
2.FEEDING	☐	☐
3.CRYING	☐	☐
4.SLEEPING	☐	☐

11.How did you plan to feed you baby before he/she was born ?

BREAST BOTTLE

12.How has your baby ACTUALLY been fed since he/she was born ?

1.BREAST ONLY ☐

2.BOTTLE ONLY ☐

3.STARTED ON BREAST BUT CHANGED TO BOTTLE ☐

4.MIXED BREAST AND BOTTLE ☐

13.If you PLANNED to breast feed before your baby was born but changed your mind after the birth - why did you do so ? _____

14.If you STARTED to breast feed but CHANGED to bottle feeding - how old was your baby when you stopped breast feeding ? _____

Why did you stop ? _____

COMMENTS

Other Problem

01 High blood pressure
02 Irregular bleeding
03 Pelvic infection
04 No weight loss
05 Leg pain/foot drop
06 Wound paraesthesia
07 Surgery
08 Other

Maternal illness

01 Chest infection
02 Wound infection
03 Stitchline infection
04 Intra-uterine infection
05 Breast infection
06 Urine infection
07 Vaginal infection
08 Ear infection
09 Viral infection
10 Other infection
11 Asthma
12 Bronchitis
13 Heavy lochia
14 Anaemia
15 High blood pressure
16 Constipation
17 Painful piles
18 Headaches
19 Backache
20 Leg pain
21 Breast engorgement
22 Weight loss
23 Appetite loss
24 Tiredness
25 Nerves
26 Depression
27 Insomnia
28 Wound leakage
29 Skin rash
30 Irregular bleeding
31 Allergic reaction
32 Rheumatoid arthritis
33 Hay fever
34 Wound pain
35 PPH
36 Deafness
37 Rectal tear
38 Thrush
39 Bells palsy
40 Gall stones
41 Incisional hernia
42 carpel Tunnel
43 DVT
44 Contraception
45 Renal failure

Drug Therapy

01 Antibiotics
02 Iron therapy
03 Vitamin supplement
04 Analgesia
05 Anti-inflammatory
06 Laxative
07 Haemorrhoid preparation
08 Tranquillizer
09 Anxiolytic
10 Antidepressant
11 Diuretic
12 Antihypertensive
13 Bronchodilator
14 Cough bottle
15 Sleeping tablets
16 Antihistamine
17 Haemostat
18 Antifungal
19 "Powder"
20 OC pill
21 Steroids
22 Skin ointment
23 Mucolytic
24 Antidiarrhoeal
25 Other therapy
26 Surgery
27 Anticoagulent
28 Antispasmodic
29 No therapy

Baby Illness

01 Cold
02 Viral infection
03 Eye infection
04 Throat infection
05 Skin infection
06 Cord infection
07 Chest infection
08 Meningitis

09 Colic
10 Obstruction
11 Diarrhoea
12 Thrush
13 Skin rash
14 Eczema
15 Snuffles
16 Anaemia
17 Convulsions
18 Cough
19 Umbilical hernia
20 Sickness
21 Meconium aspiration
22 Exploration umbilicus
23 Wind
24 Ear infection
25 Rubella
26 Teething
27 Heart murmur
28 Septicaemia
29 Cyanotic attack
30 Rectal bleeding
31 Nappy rash
32 Failure to thrive
33 Pyloric stenosis

Drug Therapy

01 Antibiotic
02 Antifungal
03 Iron therapy
04 Vitamin therapy
05 Electrolyte replacement
06 Bronchodilator
07 Antispasmodic
08 Skin cream
09 Eye ointment
10 Hospitalisation
11 Cough bottle
12 Nasal decongestant
13 Cicatrin
14 Surgery
15 Gripe water
16 Antidiarrhoeal
17 Blood transfusion
18 Antiemetic
19 Calpol
20 Antacid
80 No therapy

Reason for Changing Feeding Plan

1 Too tired
2 Too sore
3 Medication
4 Baby not interested
5 Baby in PD
6 Baby dissatisfied
7 Embarrassment
8 Not stated

Reason for Stopping Breast Feeding

1 Maternal discomfort
2 Cracked nipples
3 Maternal medication
4 No milk
5 Baby dissatisfied
6 Baby illness
7 Convenience
8 To return to work

Appendix 3

CAESAREAN SECTION STUDY - CONTROL GROUP CASE NOTE REVIEW

NAME : UNIT NO : STUDY NO :

MATERNAL DETAILS

AGE.....

MARITAL STATUS 1.married 2.single 3.separated 4.common-law 5.other.

PATIENTS OCCUPATION _____.....

HUSBANDS OCCUPATION _____.....

RACE 1.Caucasian 2.Asian 3.Chinese 4.Negro 5.Other .....

PAST OBSTETRIC HISTORY

TOTAL NUMBER OF PREGNANCIES.....

SPONTANEOUS ABORTIONS.....

THERAPEUTIC ABORTIONS.....

RELEVANT PAST MEDICAL HISTORY

1._____.....

2._____.....

3._____.....

4._____.....

5._____.....

CURRENT PREGNANCY

HEIGHT (cms).....

WEIGHT (Kg).....

GESTATION AT FIRST ANTENATAL VISIT (weeks).....

TYPE OF ANTENATAL CARE 1.shared 2.hospital 3.GP 4.none.....

STUDY No :

ANTENATAL PROBLEMS 1._____.....

2._____.....

prefix 3._____.....

1=no admission 4._____.....

2=admitted 5._____.....

6._____.....

LENGTH OF HOSPITAL 1._____.....

STAY (days) 2._____.....

3._____.....

4._____.....

ANTENATAL X-ray PELVIMETRY.....

If YES - result 1.normal 2.contracted 3.doubtful

INTRAPARTUM DETAILS

DAY OF DELIVERY.....

DATE OF DELIVERY.....

TIME OF DELIVERY 1.00.01-04.00 2.04.01-08.00 3.08.01-12.00.....

4.12.01-16.00 5.16.01-20.00 6.20.01-24.00

GESTATION AT DELIVERY (weeks).....

HAEMOGLOBIN (g).....

No of units.....

ADMISSION TO LABOUR WARD FROM 1.home 2.hospital 3.ANC 4.other hospital..

No OF HOURS FROM LABOUR ONSET TO LABOUR WARD ADMISSION.....

FLYING SQUAD.....

LABOUR SPONTANEOUS.....

ACCELERATED.....

If YES - method.....

INDUCED.....

COMPLICATIONS OF LABOUR STUDY No :

FETAL DISTRESS.....

1.Bradycardia < 100 beats/min.....

2.Tachycardia > 180 beats/min.....

3.Baseline heart rate with late decelerations.....

4.Meconium with baseline heart rate < 120 beats/min...

5.Meconium with baseline heart rate > 160 beats/min...

6.Meconium with any decelerations.....

7.Fetal scalp pH < 7.20.....

Time of occurrence in relation to labour onset.....

ABNORMAL PRESENTATION.....

Type 1.breech 2.transverse 3.shoulder 4.face 5.brow...

BLEEDING.....

Reason 1.abruption 2.praevia 3.uterine rupture 4 NK...

CEPHALOPELVIC DISPROPORTION.....

SLOW PROGRESS IN LABOUR.....

Reason 1._____.....

2._____.....

OTHER ABNORMALITY 1._____.....

2._____.....

STUDY No :

If YES - reason_____.....

_____.....

- method.....

PRIMED.....

If YES - method.....

DURATION OF FIRST STAGE.....

DURATION OF SECOND STAGE.....

AMNIOTOMY DELIVERY INTERVAL.....

TOTAL LENGTH OF LABOUR.....

No OF VAGINAL EXAMINATIONS.....

No OF VAGINAL EXAMINATIONS AFTER AMNIOTOMY.....

FETAL SCALP ELECTRODE.....

No OF TIMES CATHETERISED.....

PYREXIA IN LABOUR.....

TYPE OF MONITORING EQUIPMENT 1.Corometrics 2.Hewlet-Packard.....

3.Sonicaid 4.Other

TYPE OF ANALGESIA 1.Epidural 2.Pethidine.....

3.Epidural+Pethidine 4.None

PYREXIA IN LABOUR.....

PLACE OF DELIVERY 1.bed 2.chair 3.squatting.....

MODE OF DELIVERY 1.SVD 2.FORCEPS 3.BREECH 4.VENTOUSE.....

If 2 or 4 reason _____.....

_____.....

PERINEAL DAMAGE 1.Episiotomy 2.1° tear-NS 3.1° tear-S 4.2° tear.....

5.3° tear 6.Intact.....

BLOOD LOSS (mls).....

BLOOD TRANSFUSION.....

If YES - No of units.....

PUERPERIUM STUDY No :

ADMISSION TO SCU.....

If YES - reason_____.....

LENGTH OF STAY HOSPITAL (days).....

TYPE OF FEEDING INITIATED 1.breast 2.bottle.....

TYPE OF FEEDING ON DISCHARGE 1.breast 2.bottle.....

COMPLICATIONS 1._____.....

2._____.....

3._____.....

4._____.....

5._____.....

6._____.....

7._____.....

ANTIBIOTIC THERAPY.....

Reason_____.....

_____.....

OTHER RELEVANT DRUG THERAPY.....

Type _____.....

_____.....

BLOOD TRANSFUSION AFTER 24 hours.....

No of units.....

3rd DAY HAEMOGLOBIN.....

COMMUNITY FOLLOW-UP.....

If YES - number of days.....

PROBLEMS AFTER DISCHARGE 1._____.....

2._____.....

3._____.....

READMISSION TO HOSPITAL.....

Reason _____.....

NEONATAL DATA STUDY No :

GESTATION AT DELIVERY (weeks).....

APGAR SCORE 1 minute.....

5 minutes.....

RESUSCITATION .....

TIME TO SPONTANEOUS RESPIRATION (mins).....

BIRTHWEIGHT.....

SEX 1.male 2.female.....

DISCHARGE 1.unit nursery 2.observation PD.....

3.admission PD3 4.admission PD4

If 3 or 4 Reason _____.....

_____.....

Length of stay.....

FETAL ABNORMALITY.....

Specify_____.....

STILLBIRTH.....

Specify_____.....

NEONATAL DEATH.....

Specify_____.....

BIRTH INJURY.....

Specify_____.....

MATERNAL QUESTIONNAIRE - STUDY GROUP STUDY No :

1.Where did you get you information about pregnancy and delivery ?

a.school.....

b.mother.....

c.friends.....

d.magazines/leaflets.....

e.books.....

f.antenatal classes (type_____).....

g.other (specify_____).....

2.Did any of the sources mentioned above give information about caesarean section ? If YES - what type of information _____

_____

3.Was the information you received accurate ? .....

If NO - in what way was it innaccurate ?_____

4.Was this prgnancy planned ?.....

5.Did you keep well during your pregnancy ?.....

If NOT - what was wrong ?_____

6.Did you ever think during your pregnancy that you might have a caesarean section ? .....

If YES - why and at what stage ?_____

7.Where were you when your labour started ? 1.home 2.hospital 3.other...

8.Was you labour induced or did you start spontaneously ? 1.ind 2.spont.

If INDUCED - why was this done ?_____

9.What was your labour like ?.....

1.as expected 2.better than expected 3.worse than expected

If you answered 2 or 3 - why was this _____

10.Was anyone with you during your labour ?.....

1.husband 2.boyfriend 3.mother 4.friend 5.other 6.no-one

11.What did you have to relieve the pain in your labour ?.....

1.pethidine 2.epidural 3.both 4.entonox 5.nothing 6.other

12.What had you planned to have for pain relief before your labour started ?

1.pethidine 2.epidural 3.entonox 4.nothing 5.other

13.Do you think the staff in the labour ward gave you enough information about the way your labour was progressing ?.....

If NOT - what other information would you have liked ?_____

_____

14.When were you first told that you would need a caesarean section ?...

1.< 15 mins 2.15-30 min 3.31-45 min 4.46-60 min 5.> 60 min before cs

15.Who first told you ?.....

1.consultant 2.SR 3.registrar 4.SHO 5.sister 6.st.mw 7.other

16.How did you feel when you were told you would have a section ?_____

_____

17.Had you suspected beforehand that things were not going smoothly in your labour ?.....

If YES - why _____

18.Do you think they waited too long before they decided to section you ?

If YES - why _____

19.Was your husband with you when you were told you would need a section ?

Do you think you should have been told together ?.....

20.What kind of anaesthetic did you have for the section ?.....

1.general 2.regional 3.combination

21.Did your husband/other go into theatre with you for the delivery ?...

If NOT - why ?_____

22. Had he planned to be there before for the delivery ?.....

23.When do you first remember seeing your baby after he/she was born ?..

24.When did you first hold your baby ?.....

25.When did you first feed your baby after he/she was born ?.....

26.Would you have preferred to go straight to the postnatal ward after delivery ? If YES - why_____

27.How long were you in SCU for after the delivery ?_____.....

Was this long enough ?_____.....

28.How did you feel about being separated from the baby at this time ?__

_____

29.Would you prefer to be in a ward with other women who had sections ?.

Why / why not_____

30.Do you think you get enough rest in the postnatal ward ?.....

If NOT - why ?_____

31.Is your baby in the ward with you ?.....

If NOT - why ?_____

32.What have you called him/her ? _____

33.How are you feeding him/her ?.....

1.breast 2.bottle

34.Was this the way you planned to feed before delivery ?.....

If NOT - why did you change your mind ? _____

35.How are you feeling today ?.....

1.well 2.not well

If NOT WELL - why ?_____

36.Have you any pain from your wound ?.....

If YES - is it there ?.....

1.all the time 2.only when moving 3.only when rising

37.How would you describe the pain ?.....

1.very severe 2.severe 3.moderate 4.mild

38.Since you had your baby which of the following discomforts have you experienced and which are you still experiencing today ?

a.difficulty in passing urine.....		
b.pain on passing urine.....		
c.nausea.....		
d.backache.....		
e.dizziness.....		
f.pins and needles.....		
g.headache.....		
h.wind.....		
i.constipation.....		
j.pain at drip site.....		
k.other_____		

39.Have any of the discomforts or wound pain made it difficult for you to look after your baby ?.....

If YES - why ?_____

40.Do you think you get enough pain relief in the ward ?.....

If NOT - why ?_____

41.Do you feel disappointed in any way about your delivery ?.....

If YES - why ?_____

42.Why did you have a section ?_____

Who told you that ?_____

43.Do you feel you would like any more information before you go home ?..

If YES - what kind ?_____

MATERNAL QUESTIONNAIRE - CONTROL GROUP STUDY No :

1.Where did you get you information about pregnancy and delivery ?

a.school.....

b.mother.....

c.friends.....

d.magazines/leaflets.....

e.books.....

f.antenatal classes (type_____)....

g.other (specify_____).....

2.Did any of the sources mentioned above give information about caesarean section ? If YES - what type of information _____

_____

3.Was the information you received accurate ? .....

If NO - in what way was it innaccurate ?_____

4.Was this prgnancy planned ?.....

5.Did you keep well during your pregnancy ?.....

If NOT - what was wrong ?_____

6.Did you ever think during your pregnancy that you might have a caesarean section ? .....

If YES - why and at what stage ?_____

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12.What had you planned to have for pain relief before your labour started ?

1.pethidine 2.epidural 3.entonox 4.nothing 5.other

13.Do you think the staff in the labour ward gave you enough information about the way your labour was progressing ?.....

If NOT - what other information would you have liked ?_____

_____

14.How long did your labour last for ?.....

1.< 2 hrs 2.2-4 hrs 3.5-8 hrs 4.9-12hrs 5.13-16 hrs 6.> 16 hrs

15.What kind of delivery did you have ? 1.SVD 2.Forceps.....

If FORCEPS - why ?_____

16.What was the actual delivery like ? .....

1.as expected 2.better than expected 3.worse than expected

If 2 or 3 - why ?_____

17.Did you have an episiotomy ?.....

If YES - do you know why this was done ?_____

18.Did you tear at the birth ?.....

If YES - did you need stitches ?.....

19.Was your husband/other with you for the delivery ?.....

If NOT - why ?_____

20. Had he planned to be there before for the delivery ?.....

21.When do you first remember seeing your baby after he/she was born ?...

22.When did you first hold your baby ?.....

23.When did you first feed your baby after he/she was born ?.....

24.How long were you in the labour ward for after delivery ?_____

If > 2 hours - why ?_____

25.Were you allowed some time alone with the baby and your husband/other ?

If YES - how long ?_____

Would you have preferred to have more time _____

26.Were you separated from your baby when you came down to the postnatal ward after delivery ? .....

How did you feel about this ?_____

27.Do you think you get enough rest in the postnatal ward ?.....

If NOT - why ?_____

28.Is your baby in the ward with you ?.....

If NOT - why ?_____

29.What have you called him/her ? _____

30.How are you feeding him/her ?.....

1.breast 2.bottle

31.Was this the way you planned to feed before delivery ?.....

If NOT - why did you change your mind ? _____

32.How are you feeling today ?.....

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If NOT WELL - why ?_____

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e.dizziness.....		
f.pins and needles.....		
g.headache.....		
h.wind.....		
i.constipation.....		
j.pain at drip site.....		
k.other_____		

36.Have any of the discomforts or pain made it difficult for you to look after your baby ?.....

If YES - why ?_____

37.Do you think you get enough pain relief in the ward ?.....

If NOT - why ?_____

38.Do you feel disappointed in any way about your delivery ?.....

If YES - why ?_____

39.Do you feel you would like any more information before you go home ?..

If YES - what kind ?_____

HOME INTERVIEW STUDY No :

1.How are you feeling ?

not at all well 1_____5 very well

COMMENTS :

2.Do you feel that you are as healthy now as you were before the pregnancy ? .....

If NOT - what do you feel is wrong ?

If YES - how long did it take to get back to your normal health ?

3.Have you received any tablets or medicines from your doctor in the last three months ?.....

If YES - what were they what were they for and at what stage did you take them ?

	ILLNESS	MEDICINE	TIME
1.			
2.			
3.			

4.How is your baby just now ?

discontented 1_____5 very contented

COMMENTS :

5.How is your baby being fed just now ?_____

6.How old was the baby when you first introduced solids ?_____

7.If you breast fed your baby - when did you stop ?_____

Why did you stop ?_____

8.When you first came home from hospital did you find caring for your baby -

not at all enjoyable 1_____ 5 very enjoyable

COMMENTS :

9.How do you find caring for your baby now -

not at all enjoyable 1_____5 very enjoyable

COMMENTS :

10.How long did it take before you felt close to your baby ?_____

COMMENTS :

11.How old was the baby when you felt that he/she had developed his/her own personality ?_____

Looking back on your labour and delivery

12.How did you find your labour ?

not at all enjoyable 1_____5 very enjoyable

COMMENTS :

13.How did you find the actual delivery ?

not at all enjoyable 1_____5 very enjoyable

COMMENTS :

14. Do you think that the baby has made any difference between you and your partner ?.....

If YES - in what way ?_____

_____

15. Have you had any sexual problems since the baby was born ?.....

If YES - what kind of problems ?_____

_____

16. How long was it until you had intercourse after the delivery ?_____

17. How long do you intend to wait before having a second baby ?_____

COMMENTS :

18. Have you been told how your next baby will be delivered ?.....

COMMENTS :

19. Is there anything that the hospital could have done to make things easier for you ?

Antenatal

In labour

Postnatal