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Postoperative pain in children

by
Marjorie L. Gillies

being a thesis submitted for
the Degree of MSc by Research
in the University of Glasgow

May 1995

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Abstract

Children of all ages have minor surgery, a recognised cause of acute pain, but little is known about the pain experiences of children postoperatively. This dissertation reports the findings of a study of postoperative pain in children of different ages, the aims of which were: to establish the existence and severity of postoperative pain in children; to examine the pain experience of children and their reactions postoperatively; to study the response of parents to pain experienced by their child; to establish the ways in which nursing and medical staff recognise postoperative pain in children; and to investigate how nursing and medical staff react to children who are in pain.

The three samples were children, aged from a few months up to eleven years, who had undergone elective minor surgery ($n=107$), their mothers ($n=85$) and nursing, surgical and anaesthetic staff ($n=80$). The children with language skills and all mothers were interviewed on the first postoperative day. School-aged children measured their pain using self-report methods: the adapted Eland Color Tool, a faces scale and two visual analogue scales, one of which involved colour. Mothers rated their children's pain with a visual analogue scale; the researcher assessed pain in pre-school children with Revised Objective Pain Scale and in all children with a visual analogue scale. The opinions of staff about postoperative pain in children were sought in semi-structured interviews.

Many children were in moderate or severe pain on their first postoperative day. Professionals routinely used informal methods of pain assessment although a number of staff knew of formal pain measures. Despite difficulties with some of the measures employed in the study, more children and mothers indicated the presence of pain with a measure than acknowledged pain verbally. Analgesic administration was infrequent. Concerns about creating opiate dependency and communication difficulties between adult groups and between adults and children were found. The responses of mothers to seeing their child in pain focused on their concern for their child and communication difficulties with staff. The implied failure of staff to recognise or relieve children's pain adequately could be attributed to lack of knowledge about pain, indicating a need to review the education of nurses and doctors. Implications for practice, education and research are postulated.

Keywords: children; postoperative pain; pain measurement; pain management; education.

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University of Glasgow
Regulations for Post Graduate Study

In accordance with these regulations
and as a candidate
for

The Degree of MSc by Research

I declare that this thesis
has been composed by me and
is a result of my own enquiries.

Marjorie L Gillies
31 May 1995

Chapter 1 Introduction

A certain degree of pain is likely to be experienced postoperatively by anyone, regardless of age. Yet, frequently, pain in children and adults is not recognised or relieved effectively. Where children are concerned, poor pain recognition may be further complicated by the failure of professional staff to consider children's responses in relation to the development of language and comprehension skills.

Clinical and research interest in pain has increased markedly over recent years with a corresponding expansion of the literature. With regard to children's pain, much of the research has been derived from North America. Only a small proportion is British in origin and little is known about the applicability of American research findings in the United Kingdom. Although there is growing awareness of the existence of children's pain in clinical practice in the United Kingdom, there is little research evidence of the effectiveness of pain recognition and management.

My interest in postoperative pain evolved from two directions. Firstly, in my role as a Sister of a paediatric surgical ward, I became aware of changes in the use of analgesics by some anaesthetists. In addition, my nursing colleagues were concerned by the reluctance of a number of junior doctors to prescribe sufficiently strong analgesia for effective pain relief. Secondly, in 1988, I was influenced by the findings of a literature review on children's pain which was undertaken for my Diploma in Nursing dissertation. I was worried by the number of problems concerning the recognition and management of pain in children, which were highlighted in the literature and were occurring in my ward. An increasing interest in pain management heightened my awareness of the number of children who appeared to be in pain following surgery. However, as this was before the introduction of clinical audit and my impressions were entirely subjective, I decided to plan and undertake a systematic study. The aims of the emergent descriptive study included an examination of the experience of postoperative pain in a group of British children. Opinions about postoperative pain were sought from mothers, nursing and medical staff involved in the care of children having surgery.

Chapter 2 presents a review of the literature about pain, with particular reference to children. It covers a wide range of reports and research studies relating to

pain theory, the relationship between pain and child development, hospitalisation and illness, and the assessment and management of pain. The research aims and the method employed are described in Chapter 3. It comprises an account of the samples, the instruments used and statistical analysis. Chapter 4 presents the results. It is separated into seven sections, corresponding to the aims. The results are discussed in Chapter 5 and, finally, the conclusions are presented in Chapter 6, together with the implications for clinical practice, professional education and possible future research directions.

Chapter 2 Review of the literature

2.0 Introduction

Pain is a complex phenomenon with sensory and affective components. It has numerous causes and may be influenced by cultural and environmental factors, sex and past experience (Schechter, Berde and Yaster, 1993). In addition, the recognition and management of pain is dependent upon the knowledge and practice of professional staff. While pain remains difficult to define, the sensory and affective aspects of pain perception may be explained by theories which have evolved over recent years.

Undoubtedly, like adults, children experience postoperative pain although allegedly their pain is often poorly recognised and undertreated (Royal College of Surgeons and College of Anaesthetists, 1990). There are factors, specific to children, which influence their expression of pain; for example, the stage of language and comprehension skills reached determines the quality of the child's ability to communicate about the pain experience. Consequently, the assessment and management of children's pain can be particularly difficult.

Initially, this review examines definitions of pain, the nature of pain and pain theories. Difficulties specific to the assessment and management of children's postoperative pain are then described, including an appraisal of how health care professionals' knowledge about children's pain may influence their practice. The chapter concludes with a review of the education of health professionals specifically in relation to pain.

2.1 Definition of pain

According to McCaffery and Beebe (1989), "pain is a universal human experience and is the most frequent reason that people seek health care". This description, however, does not address the subjectivity and the uniqueness of pain to the individual. Examples of definitions of pain given in nursing and medical texts include pain is "a feeling of distress, suffering or agony, caused by stimulation of specialised nerve endings. Its purpose is chiefly protective; it acts as a warning that tissues are being damaged and induces the sufferer to withdraw from the source." (Weller, 1989, p682); and pain is "a necessary part of conscious existence, all our sensations being accompanied by more or less feeling of pleasure or pain." (Macpherson, 1992, p432). Neither of these definitions clearly indicates that pain may be of a physical and/or emotional nature. A definition of pain

given in a popular dictionary is that pain is "the range of unpleasant bodily sensations produced by illness or by harmful physical contact" or "mental suffering or distress" (Allen, 1990, p856). The two parts of this definition divide pain into either physical or emotional components, when in fact, they may co-exist. A more holistic definition is given by the International Association for the Study of Pain: pain is "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" (International Association for the Study of Pain, 1979, p250). While this definition includes the physical and emotional components and associates the experience of pain with its cause, it does not address the uniqueness of pain to the individual. However, it is acknowledged widely as a definition of pain.

2.2 The nature of pain

Pain has numerous causes and different types of pain are described. It may be acute, chronic or recurrent (Schechter, Berde and Yaster, 1993). Expression of pain and response to the pain experience are influenced by factors such as developmental stage, sex, past experience of pain, the cultural context and the environment.

2.2.1 Types and causes of pain

Acute pain is intense and may last for days or weeks (Schechter et al, 1993). It may be caused by illness, surgery or injury and is relieved within a relatively short time-span. Surgical and medical procedures constitute two of the principal causes of acute pain in hospitals. Acute pain is likely to be a new, unexpected experience associated with greater awareness of the alteration in sensation than would be the case with a person with chronic or recurrent pain (Nie, Hunter and Allan, 1989).

Chronic persistent pain is long-standing, that is, of more than three months' duration (Schechter et al, 1993). It tends to be less intense than acute pain and may be caused by either malignant disease or non-malignant conditions such as arthritis. Chronic pain occurs less frequently in young people than in adults, for whom it can generate economic and social problems (Schechter et al, 1993). Nie et al (1989) suggest that individuals with chronic pain may adapt to living with their pain because it is constant. Consequently, they may be less aware of fluctuations in chronic pain than individuals who suffer acute pain.

Recurrent pain consists of intermittent painful episodes which can be difficult to treat (Schechter et al, 1993). It is more common in young people than chronic pain. Recurrent pain may indicate an exacerbation of disease such as arthritis or headache, or an injury, for example a sports injury, which takes time to heal (Schechter et al, 1993). The different types of pain can be difficult to distinguish; for example, cancer pain is unique as it may exist in more than one site, yet is caused by one disease. It may be acute, chronic or both (McGuire, 1989).

Psychological symptoms such as anxiety or depression are described in relation to the different types of pain. Varni and Walco (1987) and Page (1991) claim that anxiety is associated with acute pain, while depression is associated with chronic pain. On the other hand, Schechter et al (1993) state that anxiety may be related to any type of pain. In general, there is a consensus view that the perception of pain is intensified in the presence of anxiety. Further, sufferers of recurrent pain may develop psychological symptoms which complicate their management (Thomson, Varni and Hanson, 1987; Varni & Walco, 1988; Schechter et al, 1993).

2.2.2 Factors which influence pain perception

A variety of factors influence pain perception and, therefore, pain experienced by one person differs from pain experienced by another, even if the cause is the same.

The sensation of physical pain is perceived as unpleasant causing a number of physiological changes to take place; for example, raised pulse rate or blood pressure, dilated pupils and increased perspiration (McCaffery and Beebe, 1989). Biochemical and hormonal changes occur, which stimulate the production of stress hormones such as corticosteroids or glucagon (Fitzgerald and Anand, 1993). Reduced release of stress hormones results from prolonged analgesia in a postoperative situation. Flor, Miltner and Birbaumer (1993) suggest that measuring physiological signs is useful when assessing chronic pain, but Zeltzer and LeBaron (1986) report that, although analysis of physiological measures may result in statistically significant findings, the measures may not relate to the presence of pain. This could be said of any of the above physiological symptoms which may have causes other than pain.

The influence of emotional state can be complex. Emotional pain may be perceived as a negative change in mood, but emotion may also intensify perceived physical pain. According to Nie et al (1989), psychological reaction to pain accounts for differences in pain perception between individuals. In general, anxious people tolerate pain less well

than relaxed individuals. Hayward (1987) found that the sensitive communication of preoperative information reduces the need for postoperative analgesics in adults, that is, in situations of acute pain. Therefore, pain can increase in the presence of anxiety or fear (Jay et al, 1983; Bielby, 1984; Hayward, 1987; Schechter et al, 1993). Physiological and psychological reactions to pain are intrinsically linked. Anxiety increases pain perception and unrelieved pain heightens anxiety. A similar cycle can be found in patients with chronic pain who are depressed. Experiencing pain could be interpreted as a learning situation (Weller, 1989; Nie et al, 1989). Recall of an unpleasant experience may lead to avoidance if the situation is encountered again. If pain is foreseen, then this anticipation may result in anxiety (Pakoulas et al, 1984). It is essential, therefore, to consider both physiological and psychological reactions when assessing or managing pain.

Cultural factors and sex both influence pain perception and experience, but it is difficult to identify the individual effects. People from varying cultural backgrounds may perceive and react to pain differently. Eskimos, for example, unlike Americans, laugh at pain and although Jews and Italians both complain freely, their ideas about how to relieve pain differ (Adams, 1989). In Western society, males are expected to display less evidence of pain than females (Hosking & Welchew, 1985; Lyall, 1991); for example, males often do not admit to negative feelings, instead they tend to display bravado to conceal their true feelings. On the other hand, females are expected to admit to feelings such as misery or pain. Rollman and Lautenbacher (1993) claim that the male pain threshold is considerably higher than that of the female but Lander, Fowler-Kerry and Hill (1990) dispute this, stating that there is no difference in response to pain between males and females. Sex may be considered alone in only a few areas; for instance, as females increasingly outlive males, Ruda (1993) suggests that the experience of pain in elderly females could be addressed.

One component of the cultural context of pain addressed rarely is religion, which is reported to influence beliefs about the nature of pain. As an example, Buddhists and Hindus recognise pain as a sensation, but attach more significance to the emotions involved. On the other hand, the sensory element of pain is of primary importance for Christians (Keele, 1957; Craig, 1989). Overall, the limited literature concerning religion and pain is about the elderly, the dying and the effect of analgesic medication on the psychological state in Roman Catholics (O'Rourke, 1992); the role of pastoral care in the rehabilitation of patients whose spiritual needs may include coping with pain (Saylor, 1991); and alluding to the need for greater awareness by health professionals of the influence which religion is capable of having (Doyle, 1992). No reference either

reporting or disproving an association between religious beliefs and acute pain could be found.

Various environmental factors, such as high levels of noise, are thought to influence the perception of pain. Noise can interrupt sleep and delay healing in adults (Bentley, Murphy and Dudley, 1977). Furthermore, anxious people are said to be more sensitive to noise than relaxed individuals (Dias, 1992). It is known that anxiety and pain influence each other (Schechter et al, 1993) and the possibility that noise may heighten the perception of pain in individuals who are anxious warrants further investigation.

Fatigue, caused for instance by lack of sleep in a noisy environment, may increase the perception of pain. However, the reverse is also true in that pain also causes fatigue. According to McCaffery and Beebe (1989), individuals who are in pain may try to sleep as a distraction in an effort to enhance pain tolerance. McCaffery and Beebe (1989) imply that sleep may be mistaken by health care staff as an indication that the patient is pain-free, although for the patient, pain is still present on waking. Closs (1990) set out to examine, retrospectively, analgesic administration in adults whose sleep was or was not disturbed at night by postoperative pain. Although no difference in analgesic administration was found, Closs noted that the frequency of analgesic administration at night was less than during the day. The maintenance of a healthy environment tailored to suit the needs of patients, for example by reducing noise levels and allowing sleep uninterrupted by pain, may help to relieve pain as well as to promote faster recovery.

Johnston (1993) believes that two other questions are important when examining the nature of pain. The first concerns its quality, that is, what does the pain feel like to the individual? The second is its intensity, that is, how mild or severe is the pain? Both quality and intensity may be influenced by any of the outlined factors, so giving the perception and experience of pain its subjective nature.

2.2.3 Summary

Pain may be acute, chronic or recurrent. It has numerous causes and is influenced by many extraneous factors, all of which result in the fact that the perception and experience of pain is unique to the individual. Because of the degree of subjectivity, some understanding of the sensation of pain and the distinct possibility of a link with emotional state is now examined.

2.3 The development of pain theories

Attempts to explain the perception of pain are not new. In the 17th century, a sensory model of pain described by Descartes began to emerge (Marshall, 1894), but by the end of the 19th century, there was dispute over whether there was also an emotional element (Craig, 1989). In the middle of the 20th century, Dallenbach (1939) implied that pain was perceived as an affective rather than a sensory phenomenon. However, according to Craig (1989), pain remained a sensory concept in Western society until it was accepted by many that, in addition, there were affective components (Melzack and Wall, 1965).

Over the last 30 years, a number of pain theories have emerged (Melzack and Wall, 1965; Wall, 1978; Fordham, 1986; Wall and Melzack, 1989; Nie et al, 1989; McCreedy, MacDavitt and O'Sullivan, 1991). Only three have received consistent attention in the literature, namely the Gate Control Theory, the Multi-Opioid Receptor Theory and the Endorphin Theory.

There appears to be no scientific support for the theoretical positions of the Specificity Theory and the Pattern Theory. The Specificity Theory proposes that impulses pass from nerve endings in peripheral tissue via the spino-thalamic tract to a pain centre in the brain (Head, 1920). However, Wall and Melzack (1962) point out that this theory assumes that pain is felt when receptor fibres in the skin are stimulated, but this does not account for specific pain, such as phantom limb pain. Their assumption is the Specificity Theory's weakness, because it does not account for the transmission of impulses along nerve pathways to the brain.

The Pattern Theory proposes that all nerve endings are alike and that pain is perceived when non-specific fibres are stimulated up to a high enough level (Weddell, 1955; Sinclair, 1955). However, Melzack and Wall argue that evidence exists of nerve endings being highly specialised (Melzack and Wall, 1962) and that this casts doubt on the Pattern Theory.

2.3.1 Gate Control Theory

In the early 20th century, Head and Holmes (1911) reported that the thalamus was the centre for pain perception. No further significant findings about pain theory were made until Melzack and Wall proposed the Gate Control Theory in 1965. Based on knowledge from the early pain theories, the Gate Control Theory proposes that pain is felt when nerve endings pick up impulses from tissue cells. These impulses are

transmitted along myelinated and unmyelinated nerve fibres which constitute the pain pathways via the spinal cord to the hypothalamus. A return signal then is transmitted via descending fibres in the spinal cord, resulting in the sensation of pain. The gate mechanism occurs when large fibres from touch receptors inhibit small fibres from pain receptors, thus preventing sensation. However, if there is sufficient stimulation from the smaller fibres, the gate will be forced open, resulting in the perception of pain. Normally the gate is closed.

As well as considering the sensory aspect of pain, the Gate Control Theory addresses the emotional component. The hypothalamus is also the emotional centre of the brain, where thought, emotions and past experience are stored. The Gate Control Theory proposes that altered emotional state probably causes descending fibres from the hypothalamus to inhibit pain signals; for example, the reduction of anxiety may inhibit the transmission of pain signals, thereby linking physical and emotional pain (Nie et al, 1989; McCaffery and Beebe, 1989).

The development of techniques for the assessment and management of pain have been influenced by the Gate Control Theory. The McGill Pain Questionnaire, for instance, is based on this theory and involves the patient choosing words describing pain, from sensory, affective and evaluative categories (Melzack, 1975; Weisenberg, 1989; Melzack and Katz, 1992; Turk and Melzack, 1993). The theory also has prompted the development of transcutaneous electrical nerve stimulation (TENS), a successful method of pain relief which is used in limited situations. TENS is an electronic device, which brings about pain relief by stimulating nerves with electrodes (Allan, 1981).

The Gate Control Theory has been applied to the experience of pain in children by Johnston (1993). She explains that three of the main aspects of pain - intensity, quality and emotion - are particularly important in children, especially in preverbal children who have yet to acquire their language skills, until which time full verbal communication of their needs is precluded. In order to overcome this difficulty, Johnston stresses the need to know about pain behaviours in toddlers and infants, emotional development in infants and the ability of infants to remember sensory events.

Infants display specific pain behaviours (Owens and Todt, 1984; Johnston and Strada, 1986; Grunau and Craig, 1987; Burrows and Berde, 1993) such as thrashing body movements, loud crying and tense facial expressions. Evidence that memory of pain exists is displayed in avoidance behaviour by the time babies are six months' old. However, further research is required to determine the capacity of younger babies to

remember pain sensation. Infants differentiate emotions from an early age; for example, positive and negative responses to sweet and sour tastes or the ability to distinguish between happy and sad faces (Johnston, 1993). However, no research has focused on the relationship between emotional development in infants and pain. Johnston speculates that if infants are able to distinguish between happy and sad faces, it is possible that they experience the emotional aspects of pain. Further research is required in this difficult area.

Although the Gate Control Theory has been accepted widely, it is not without its critics. Nathan (1976) criticised it on the grounds that it assumed that the function of nerve endings was factual although it was hypothetical. Wall (1978) acknowledged that the physiology involved and the function of the control mechanism in both the original theory and its subsequent modifications needed clarification, but concluded that there was no doubt about the existence of a gate control.

A multi-dimensional model for pain was postulated in 1984 by Chapman. It focuses upon the inclusion of psychological and social aspects concerning the experience of pain, in addition to the sensation of pain. However, more recently, Mathews, McGrath and Pigeon (1993) have argued that the Gate Control Theory is primarily a physiological explanation of pain and that its psychological component is not proven from a scientific standing. Nevertheless, Seers (1987) points out that Chapman's model and the Gate Control Theory both allow for other influences on the experience of pain, making it a subjective phenomenon.

The major part of the literature pertaining to the theory of pain refers to the Gate Control Theory, which forms the basis of the Multi-Opioid Receptor and Endorphin Theories.

2.3.2 Multi-Opioid Receptor Theory

Building upon information concerning nerves and their action derived from the Gate Control Theory, the Multi-Opioid Receptor Theory was proposed by Houde (1979) and Millan (1986). It suggests that narcotics bind with the three multi-opioid receptor sites on nerve endings and that this occurs to differing degrees, allowing a variety of reactions; for instance, a response may be to turn on analgesia activity (agonist) or to block analgesia activity (antagonist) (McCaffery and Beebe, 1989). McCready et al (1991) suggest that decision-making about the use of medicines and their interaction with other drugs will alter significantly because of this theory. The Multi-Opioid receptor theory

has been refined to include the function and role of endorphins, which are natural analgesics.

2.3.3 Endorphin Theory

The Endorphin Theory proposes that the release of endorphins, morphine-like substances produced naturally by the body, is triggered by brain impulses (Fields and Basbaum, 1989). The endorphins lock into narcotic receptors in nerve endings in the spinal cord and brain and block pain signals. Therefore, the conscious state is never aware of the impulse.

Different levels of endorphins and other influencing factors allow this theory to be applied in the explanation of both pain perception and why different people need varying levels of analgesics. For example, while endorphin production may be reduced by prolonged pain or by recurrent stress, it may be increased by brief pain, stress, or transcutaneous electrical nerve stimulation (TENS) (Fields and Basbaum, 1989). Nie et al (1989) suggest that the presence of endorphins may explain the placebo response, in which pain relief is experienced without the use of analgesic drugs. Although McGrath and Unruh (1987) argue that research does not support the clinical benefit of endorphins, Nie et al (1989) suggest that endorphins may be responsible for the analgesic effect in acupuncture. Pain is relieved because acupuncture triggers the release of endorphins which, in turn, inhibit the pain pathways. This view is supported by Yee, Lin and Aubuchon (1993), who also postulate that the Gate Control Theory contributes to understanding the mechanism of acupuncture. It is noted that although endorphins influence mood, neither the Endorphin Theory nor the Multi-Opioid Receptor Theory take into account emotional reaction to pain.

2.3.4 Summary

At present, the Gate Control Theory is the most useful model in the clinical context, despite the fact that continuing research is necessary. It is the most widely accepted pain theory and has the benefit of involving both sensory and emotional components. It is becoming refined increasingly and is complemented by the Multi-Opioid Receptor and Endorphin Theories (Melzack and Wall, 1965; Wall, 1978; Wall and Melzack, 1989; Verril, 1990). The Gate Control Theory is also being investigated in relation to children's pain. For these reasons, the Gate Control Theory and its subsequent refinements currently offer the most appropriate explanation.

2.4 Pain in children

In 1988, Bray stated that children experience pain in the same way as adults. By the early 1990's, the volume of research and publications concerning children's pain was increasing. The topics covered included types of pain (Thomson, Varni and Walco, 1987; Thomson and Varni, 1988), pain related to illness and disease (Sutters and Miaskowski, 1992; Spitzer, 1993), the management of pain (Peutrell and Wolf, 1992) and the assessment of pain (Alder, 1990; Eland, 1990; Tyler, Tu, Douthit and Chapman, 1993; Melzack and Wall, 1993). The most frequently reported statement is that children's pain is poorly recognised and undertreated.

Before examining the literature describing postoperative pain in children, consideration is given to the particular influences that may impinge on the experience of pain in children.

2.5 Factors which influence pain in children

In addition to the general factors which influence pain perception in persons of all ages, there are certain factors which are specific to children.

2.5.1 Developmental processes

Theories of child development have been proposed by Erikson, Freud and Piaget (Hilgard, Atkinson and Atkinson, 1990). Piaget developed the concept of stages of intellectual development, which is particularly applicable to the understanding of pain perception in infancy and childhood. Piaget (1952) delineated stages determined by chronological age and expected behaviour. He postulated a sensori-motor stage (birth-2 years), in which the child is preverbal and is learning about his actions and the environment; a preoperational stage (2-7 years), in which the child begins to use language and is still egocentric; a stage of concrete operations (7-12 years) in which the child develops the ability to think logically and rationally; and, finally, a stage of formal operations (12 years upwards) in which the youngster uses abstract terms, develops problem solving abilities and begins to look to the future (Hilgard et al, 1990).

Although Piaget described the relationship between developmental stage and communication skills, the extent to which the former influences the latter is unclear. In general, older children are able to understand more than younger ones (Campbell, 1975; Bibace and Walsh, 1980; Perrin and Gerrity, 1981; Bray, 1988; Abu-Saad, Kroonen

and Halfens, 1990). Elsewhere, it has been debated that children's communication skills concerning pain are unrelated to their developmental stage (Ross and Ross, 1984^b). However, the most usually accepted view is that developmental stage and communication skills are related.

Generally, children's experiences and descriptions of pain depend upon their developmental stage (Savendra, Gibbons, Tesler, Ward and Wegner, 1982; Reissland, 1983; Beales, 1986; Gaffney and Dunne, 1986; Gaffney and Dunne, 1987; Swanwick, 1990; McCready et al, 1991). For example, McCready et al (1991) state that, based on the Piagetian framework, babies of one month can perceive localised pain as demonstrated by withdrawal of the limb during a heel prick. Children aged 2-7 years may interpret pain as punishment and cannot relate pain to positive future outcomes. Cause and effect is understood by some 7-12 year olds, who also begin to perceive psychological pain and while 12-18 year olds begin to think in an abstract way, understanding cause and effect, and they may deny pain to avoid appearing cowardly. The older a child is, the more it understands and can communicate. Logically, it might be assumed that the better a child's ability to communicate, the more effective it will be in helping others to recognise its pain.

Verbal communication about pain is not always possible or easy to achieve (Parish, 1986). While Eland (1985^b) and Alder (1990) do not dispute this, they reason that even if children cannot name the site of their pain, they are able to locate it on a body outline. However, there is still the problem of communicating with the preverbal child, who is unable to articulate if pain is present and, if so, how severe it is. Jerrett and Evans (1986) suggest that adults have difficulty in understanding children's descriptions of pain but this problem has not received much research attention.

Continuous pain may result in lowered rather than heightened pain perception (Page, 1991). For instance, if a child with chronic pain complains of pain, it is likely that the pain is considerable. On the other hand, although the child with acute pain may complain sooner, it does not mean that the pain is any more severe.

2.5.2 Psychological factors

Although the psychological effects of hospitalisation feature prominently in the literature on children, only those studies and reports relating to surgery are included in this review.

Children display less anxiety about hospitalisation when given understandable explanations about what is to take place (Melamed and Siegal, 1975; Vistainer and Wolfer, 1975; Eiser and Patterson, 1984; Glasper and Stradling, 1989). For example, Melamed and Siegal studied the responses of 60 children aged 4-12 years who were to have elective surgery, using either a film about hospitalisation and having an operation, or an unrelated film, in addition to preoperative preparation by staff. The children shown the first film were less anxious, both preoperatively and postoperatively, than those who saw the second film. The findings of Vistainer and Wolfer (1975) were similar but they also reported that parental anxiety is lowered by receiving information preoperatively. Preadmission programmes to reduce stress in children have since been recommended (Glasper and Stradling, 1989).

Emotional concepts and pain may be linked as described in Chapter 2.2.2. For instance, both anxiety and fear can make a child's experience of pain worse (Abu-Saad, 1981; Savedra, Gibbons, Tesler, Ward and Wegner, 1982; McGuire and Dizard, 1982; Bielby, 1984; Beales, 1986; Williams, 1987^a; Williams, 1987^b; Alder, 1990). In addition, Gauvain-Piquard, Rodary, Rezvani and LeMerle (1987) suggest that in a young child who is in pain and appears anxious, the anxiety symptoms may mask the pain. Under these circumstances, giving information to children about why they have pain and how it can be relieved may reduce the severity of their pain (Bielby, 1984). Similarly, persistent pain, anxiety and decreasing quality of life, resulting in self-imposed isolation, may combine to generate a lowering of mood (Gauvain-Piquard et al, 1987). In addition, it is suggested that physical pain may be misdiagnosed as a psychological problem when depression masks the symptoms of pain (Gauvain-Piquard et al, 1987): Trying to disentangle the different psychological problems is a difficult task. However, the information given to children should be at a level which they can understand in order to maximise reassurance and minimise any misinterpretation (Perrin and Gerrity, 1981; Rodin, 1983; Bielby, 1984; Beales, 1986; Eiser and Paterson, 1984; Pakoulas, Ring and Tew, 1984). Like adults, children do have a right to information about their care, particularly in the case of informed consent (Deeprrose, 1992; Royal College of Nursing Research Advisory Group, 1993; Shields and Baum, 1994).

Eiser and Patterson (1984) suggest that 5-10 year old children associate hospital with pain. Similarly, in the same age-group, because children may be given inadequate information by staff, hospitalisation is regarded as a punishment (Jago, 1985). This incomplete information results in the children becoming afraid because of their poor understanding of what is to happen (Jago, 1985). More recently, Eiser (1987) suggests that children may perceive illness as a punishment for misbehaviour but specifies that this

occurs in children under seven years because children's perceptions of illness and their bodies change with maturation. Like Piaget, Eiser describes children under seven years as having little understanding of their bodies and treatment; children aged 7-11 years as having more understanding while those over 11 years increasingly developing the ability to understand how the body works and that psychological factors may be present.

Jago (1985) believes that operations are very traumatic events for children. Therefore, it follows that untreated postoperative pain in children may contribute to the association of hospital, punishment and pain. As Price (1991a) stresses, it is essential to prepare children for hospitalisation and all that it involves by providing understandable information. This should pre-empt and minimise anxiety.

2.5.3 Previous experience of pain

Approximately ten years ago, Ross and Ross (1984a) reported that young children clearly remember past experiences of pain. In their study, 994 children aged 5-12 years were asked about a range of pain topics, the results of which indicate that it is possible to talk to children about pain and to glean in-depth information from them using interviews. McGrath (1989) concurs with the belief that children remember pain and goes on to suggest that experience of pain early in life influences future behaviour. In turn, this belief, is supported by Gureno and Reisinger (1991), who indicate that children as young as two years may be afraid of needles, because of the memory of painful injections in early infancy. Nevertheless, children have numerous experiences as they mature and, consequently, it is likely to be difficult to attribute pain behaviour in an older child to a previous experience of pain in infancy.

2.5.4 Cultural context

The influence of culture on pain perception in adults is often negative (Adams, 1989). It is possible that this also occurs with children, but the literature is sparse. Nevertheless, Adams (1989) argues that any cultural influence on children's pain is not necessarily negative; for example, Chinese children learn to associate acupuncture needles with pleasant experiences: an unusual concept for Westerners who dislike needles.

Culture has also been considered by Abu-Saad (1981) who makes three points; first, children learn at home what behaviours are accepted or expected of them; secondly, health care staff need to consider that children's behaviour, for example their reaction to pain, may be normal for them; and thirdly, health staff themselves have their own

personal expectations about how to behave in reaction to pain and these views may bias their assessment of children's pain, if the behaviour differs from their expectations. Therefore, when considering the assessment and management of pain, unexpected reactions to painful stimuli may occur.

2.5.5 Sex of the child

The influence of the sex of children on their experience of pain is rarely discussed in the literature. In a survey of nurses' decision-making about the relief of children's pain, Burokas (1985) reports that analgesics of varying strengths were given equally to boys and girls. The survey does not include the effect of the pain relief on the different sexes, leaving a gap in the literature. Since then, Lander et al (1990) have stated that there is no difference between male and female children who report pain. A further study by Fowler-Kerry and Lander (1991) examined 90 males and 90 females aged 5-17 years following venepuncture. They found many similarities between the sexes but note that males tend to underestimate and females overestimate the amount of pain, despite similar pain scores.

2.5.6 Lack of sleep

Unrelieved pain interrupts sleep in adults and in children (Schechter, 1989; Pfeil, 1993). Conversely, lack of sleep may increase perceived pain. Pfeil (1993) suggests that interruptions to sleep due to noise or vital sign recordings will not only disturb rapid eye movement (REM) sleep but also non-rapid eye movement sleep (NREM). Healing takes place in the latter which occurs in the immediate period after falling asleep. This is followed approximately 90 minutes afterwards by REM sleep (Kalat, 1988). Consequently, Pfeil (1993) suggests that interrupted sleep may cause an increase in perceived pain.

2.5.7 Environment

The possibility of environmental influences on children's pain has received little research attention. However, Jago (1985) reports that children aged 5-10 years find the hospital ward environment too noisy at night and also that night time is their most worrying time of day. Environmental influences may be important in the recognition and management of pain but more research is required in this area.

2.5.8 Role of parents

Children of all ages tend to be upset psychologically in hospital (Eiser and Patterson, 1984; Eiser, 1987). Following the Platt Report (Ministry of Health, 1959), which recommended that there should be more parental involvement for hospitalised children, parents have been present in hospital wards, either for a part of the day or throughout the child's admission, to a greater extent and in increasingly involved roles (Coyne, 1995). However, parents are often in unfamiliar territory in a hospital and are dependent upon professionals for information (Callery and Smith, 1991; Palmer, 1993; Coyne, 1995). Dearmun (1995) supports an increased role for parents in hospital with a child who has had surgery. This role includes more parental involvement in the assessment and management of children's pain.

Transferred anxiety from a parent to a child may increase the child's distress (Teichman, Rafael and Lerman, 1986; Glasper, 1990) and consequently his/her perception of pain. However, in general, children are less disturbed when a parent is present (Ross and Ross, 1984b). Consequently, the presence of parents in hospital wards is of benefit to the majority of children, particularly, as Dearmun (1995) suggests if there is partnership between professionals and parents in trying to relieve children's pain. Parents who are encouraged to feel involved in their child's care are likely to be more relaxed. In turn, this will influence their child by reducing his/her anxiety (Vaughan, 1957; Jay et al, 1983; Teichman et al, 1986; Glasper, 1990). Although it is accepted that mothers become anxious about their sick and hospitalised children and that maternal anxiety influences the emotional state of children, Mishel (1983) points out that there is limited research describing parents' perceptions of their child's illness. This is still the case.

2.5.9 Summary

The numerous influences on the perception and experience of pain in children makes the subjective nature of pain clearer. Although none of the influences are new, their importance has become more widely recognised due to recent research and consequent publications. When all the possible influences are considered, there is reason to believe that the level of pain experienced by any individual, whether a baby, toddler, child or adolescent, is unique to that person. Pain, therefore, is what the child says it is: a totally subjective experience (McGrath & Unruh, 1987; Devine, 1990).

Given that the experience of pain is a subjective phenomenon, it is necessary to examine whether the reports in the literature that children's pain is poorly recognised and is undertreated are accurate.

2.6 Comparison of pain management in adults and children

There is abundant literature concerning the experience of pain in adults and children. The recognition of children's pain is discussed in Chapter 2.9 but limited comparison with adults can be made because methods of pain assessment differ. Consequently, only the literature concerned with the management of postoperative pain is included in this section. Adult pain is poorly managed (Hayward 1975; Weis, Sriwatanakul, Alloza, Weintraub and Lasagna, 1983; Kodiath, 1986; RCS and CA, 1990), and it follows that this may be the case with children. In order to clarify the situation, the literature comparing the experiences of pain in adults and children was examined and is now summarised.

Several studies have compared pain management between the two groups. Comparison of analgesic administration between adults and children indicates that children receive fewer analgesics than adults (Eland and Anderson, 1977; Beyer, deGood, Ashley & Russell, 1983; Mather & Mackie, 1983; Schechter, Allen & Hanson, 1986). Beyer et al (1983) describe how 50 children were prescribed fewer analgesic drugs (aside from the differences in prescribing for younger ages) and given fewer doses than 50 adults, following cardiac surgery. Schechter et al (1986) examined 90 children and 90 adults with similar medical conditions and found that the adults were given twice as many doses of opiates as the children. Further, Schechter et al (1986) report that younger children are less likely to have opiates prescribed than older children, but that if they are all prescribed opiates the frequency of administration is the same.

These studies were carried out using reasonable numbers of subjects. They support the view that children are treated differently from adults with respect to their pain management. Since these two studies, the problem of poor analgesic administration to children has been reported elsewhere (Eland, 1990; Elander, Lindberg and Quarnstrom, 1991).

2.7 Reasons for treating pain

There are various views about the extent to which pain should be treated, if at all in some circumstances. One opinion is that the sensation of pain is necessary for survival, as it warns about tissue damage (Nie et al, 1989). An example may be touching a hot iron, to which there is an immediate reaction, that is, the sensation of pain results in the removal of the painful area from the stimulus. This may be regarded as a learning situation. However, with a second example, the pain response is not immediate and so pain may be avoided by preventing the cause; for instance, with sunburn, the skin is burned by the time pain is felt and the damage is already done.

Another approach is based on the view that experiencing pain is character building and, therefore, should not be prevented (Adams, 1989). This concept may be related to cultural or to peer pressure and may be based on a belief that learning to cope with a painful experience is part of the process of maturation. It may be one reason why adolescents appear to have greater control than children when they are in pain (Adams, 1989).

There are also situations where pain is induced unavoidably, for instance, postoperatively. Burokas (1985) suggests that the view that pain is character-building may influence nurses' management of pain in their (child) patients. However, unrelieved pain causes physiological and psychological problems (Eland, 1990). The former includes respiratory and cardiovascular difficulties and the latter involves emotional problems such as those described in Chapter 2.5.2.

McGrath (1989) suggests that experience of chronic or recurrent pain leads to the modification of behaviour. Where acute pain is concerned, relieving the pain, caused by an invasive procedure, is likely to make the whole experience less traumatic. If pain is not prevented or relieved, the child is likely to be more anxious, especially if the procedure has to be repeated. If a young child experiences pain repeatedly because of illness or invasive procedures such as operations, this may influence his future behaviour by creating a fear of operations, or even indirectly of hospitals. The implication is that pain should be anticipated and relieved.

The Royal College of Surgeons and the College of Anaesthetists (1990) and Eland (1990) suggest that an increase in morbidity could be prevented by relieving unavoidable pain, and that this is a reason for treating pain. One serious complication of pain in the very young, described by Anand, Sippell and Aynsley-Green (1987), is the increased risk of

intraventricular haemorrhage in preterm babies. Finally, Burrows and Berde (1993) consider that children of all ages who are in pain should be given optimal pain relief, because analgesics are available, effective and safe. The moral responsibility of professionals who do not relieve pain is addressed by Somerville (1993).

2.8 Postoperative pain in children

Surgery is an invasive procedure which causes pain (Rutter, 1989; Radford, 1990; RCS and CA, 1990). There is little evidence of improvement in postoperative pain relief since the 1950's when pain relief was first considered in a research context (McCaffrey and Hart, 1976; Cartwright, 1985; RCS and CA, 1990; Schechter et al, 1993).

Most paediatric pain literature is derived from North America, although there is an increasing output from Canada, Australia and Britain. A wide range of topics are covered, including the experience of pain in children (Mather and Mackie, 1983; Powers, 1987), recommendations for pain management (Collis, 1990; Ready and Edwards, 1992), and the current situation regarding the recognition and treatment of pain (Eland and Anderson, 1977; Royal College of Surgeons of England and the College of Anaesthetists [RCS and CA], 1990; Gillies, Parry-Jones and Smith, 1994). More specifically, there are reports about pain following major surgery (Abu-Saad, 1984; Burokas, 1985; Dilworth and McKellar, 1987; O'Brien and Konsler, 1988); different methods of pain assessment (Hester, 1979; McGrath, Johnson, Goodman, Schillinger, Dunn & Chapman, 1985; McGrath, deVeber & Ilearn, 1985; Baker and Wong, 1987; Beyer and Aradine, 1988; Savedra, Tesler, Holzemer, Wilkie, and Ward, 1989; Savedra and Tesler, 1989; Page and Halvorson, 1991; Tarbell, Cohen and Marsh, 1992; Salim, 1993); and the efficacy of analgesics (Bray, 1988; Lloyd-Thomas, 1990; Burrows and Berde, 1993).

Overall, research reports and reviews suggest that many health care workers have limited knowledge about the assessment and management of pain in children (Eland and Anderson, 1977; McGuire and Dizard, 1982; Mather and Mackie, 1983; Bradshaw and Zeanah, 1986; Cheetham, 1987; Burke and Jerrett, 1989; Eland, 1990; Lloyd-Thomas, 1990; Davies, 1992). It is noteworthy that the pain experience of children, following routine minor surgery, has received little research attention.

There are relatively few reports about pain in children under the age of five years (Thompson and Varni, 1986; Page and Halvorson, 1991), probably because accurate pain assessment in this group is difficult to accomplish. In addition, until the last few years, although adolescents are mentioned in the literature they are included frequently as

children, the implication being that children and adolescents have the same needs. More recently, however, literature specifically concerning the adolescent and pain is emerging (Favaloro and Touzel, 1990; Tyler, 1990; Litman and Shapiro, 1992; Savedra, Holzemer, Tesler and Wilkie, 1993).

2.9 Assessment of pain in children

A logical approach to the overall management of pain consists of assessment, management and evaluation. This could be described as similar to the systematic approach in the Nursing Process, in which nursing care is assessed, planned, implemented and evaluated (Kratz, 1984). This systematic approach to nursing is a tool which enables nurses to put conceptual theories of nursing (see Chapter 2.11) into practice, allowing individualised nursing care (Gillies, 1989 unpublished). In the same way, accurate pain assessment should precede effective management. To date, there are two reasons why accurate pain assessment is not normally accomplished. First, the recognition of pain is often biased by the practice of health professionals being based on traditional values rather than on research. Pain is assessed by nurses and doctors who rely upon methods such as verbal communication or observation of the child's behaviour (Powers, 1987). Observation may entail assessment of crying or measuring of vital signs. Secondly, nursing and medical practice are influenced by beliefs which include (i) nurses and doctors are more able to recognise the existence and rate the severity of children's pain than children themselves (Burokas, 1985); (ii) a withdrawn child may be perceived by nurses as coping with pain when he is overwhelmed by it (Mather and Mackie, 1983); and (iii) children always admit to pain, when a child who denies the presence of pain may not recognise that he has pain, may be afraid of being given an injection or may believe mistakenly that his discharge home may be speeded up by the denial of pain (Mather and Mackie, 1983; McCaffery and Beebe, 1989). Assessing pain by relying on verbal communication or the observation of behaviour presents problems which are now discussed.

2.9.1 Verbal communication

Verbal communication is relatively easy in adults who are able to explain the location and severity of their pain. Although very young children are able to and actually do communicate, it is more difficult for them. The primary reason for this difficulty is that, depending on their developmental stage, children have limited vocabulary and consequently are less able to articulate their needs or make themselves understood (Ault,

1977; Bibace and Walsh, 1980; Gaffney and Dunne, 1987; Swanwick, 1990); for example, babies and toddlers may be misinterpreted by adults because they have not yet developed appropriate language skills. A baby may cry for one of several reasons such as hunger, boredom or pain, but is unable to communicate which reason. Older children may not understand why they have pain because they think in less concrete terms and tend to look for alternative reasons, for instance, misbehaviour, for their pain. Although adolescents are able to make themselves understood, they may not admit to pain, so that an image of bravado is promoted (McCready et al, 1991).

2.9.2 Observation of behaviour

Crying, as a measure of pain, has tended to be examined from the research perspective rather than the practical viewpoint. Wasz-Hockert, Lind, Vuorenkoski, Partanen and Valanne (1968) report that babies have different cries for different stimuli such as hunger or pain, and that the different cries may be easily identified. However, subsequent reports vary considerably. Owens and Todt (1984) suggest that crying has face validity, that is, that using facial expression to measure pain is obvious to the observer. Johnston and Strada (1986) agree, stating that the facial response of an infant in pain displays lowering of the brow, tightly closed eyes and a square mouth. They are of the opinion that facial response is more consistently reliable than crying or physiological measures when assessing pain. Gauntlet (1987) is more specific, arguing that the use of crying as a measure of pain is both unreliable and impractical. Grunau and Craig (1987) suggest that crying in babies is influenced by the sex and the conscious state of the baby, for example, when having a heel lance boys cry before girls and alert babies cry before sleeping babies do. Considerable research has focused on the different meanings attached to the cry of babies but despite the findings Barr (1989) concludes that there is no decisive evidence that crying is an effective measure of pain in young children. This suggests that crying cannot be relied upon, on its own, as a measure of pain.

Observation of behaviour and its subjective evaluation is the method of pain assessment commonly used by many health professionals to judge pain in older children and adolescents (Powers, 1987). However, because of its objective nature, observation of behaviour is difficult to make systematic since there are many variables and the potential for observer bias exists (Lazarus and Alfert, 1964; Teske, Randall and Cleeland, 1983; Alder, 1990; Eland, 1990; Lloyd-Thomas, 1990). Observer bias may be the result of either the personal experience of the observer or the emotional response of an individual to seeing a child in pain (Lazarus and Alfert, 1964; Alder, 1990). Training of observers is recommended to avoid such bias and to ensure inter-rater reliability (Holm and

Llewellyn, 1986; Bordens and Abbott, 1988). However, the variables remain a problem; for instance, if a child is asleep, then it is possible to assume that the child is in little or no pain (McCaffery and Beebe, 1989; Eland, 1985^a). On the contrary, children may play actively when they are in pain: yet increased activity may be a sign of pain (Burokas, 1985). Therefore, it cannot be assumed that either sleeping or active children are pain-free.

Physiological measures such as vital sign recordings are variable and may indicate the presence of pain but elevated or lowered measures may also indicate other organic problems such as haemorrhage (Alder, 1990). Burrows and Berde (1993) report evidence of metabolic and cardiovascular changes in children of different ages during surgery and other invasive procedures. This is substantiated by Anand and Hickey (1992), who were involved in much of the research referred to by Burrows and Berde, and who argue that such responses could lead to increased morbidity, even death. Although the study by McIntosh, Van Veen and Brameyer (1993) which examined the painful effects of heel pricks in preterm infants, was small (n35), their findings suggest that changes in physiological measures may be of direct clinical use in assessing pain in this group. This is because it was found that the babies' heart rates increased and respiratory rates decreased in the presence of a painful stimulus, however the findings were not conclusive.

In summary, traditional pain assessment is an unreliable means of measuring pain. However, various new methods of assessing pain in children and adolescents have been developed. Many are still undergoing validation and the concept of pain measurement is not widely accepted. The next two sections focus on the pain measures which have been developed, some of which match specific maturational stages.

2.9.3 Pain measures for pre-school children (0-4 years)

Pain in pre-school children is difficult to assess and there are few methods of doing so, largely because of the inability of this group to articulate their needs. Consequently, assessment of their pain is more usually carried out objectively, by health care staff, than subjectively by children themselves. To date, most pain assessment in this group has been attempted using physiological measures and the cry of babies. However, in the last ten years, several more formal objective pain scales have been developed to measure pain in such young children but they are not without their problems.

The *Children's Hospital of Eastern Ontario Pain Scale* (CHEOPS) was developed in Canada (McGrath et al, 1985). It involves the rating of six criteria: crying, facial expression, verbal expression, body position, touch and leg movement. This scale is used to measure postoperative pain in children, aged 1-5 years, following minor surgery. Inter-rater reliability is good, when compared with a 10cm visual analogue scale used by nurses and a researcher. Pain scores with the two analogue scales correlate highly, particularly between CHEOPS and the nurses' ratings. Although the tool is reported as valid and reliable (McGrath et al, 1985), doubt has since been cast on the usefulness of CHEOPS (Beyer, McGrath & Berde, 1990; Tyler et al, 1993). The validity of the observation of behaviour has been questioned because, in a comparative study, findings from self-report pain measures differed from findings using CHEOPS, the point being that subjective measurement of pain is thought to be more reliable than objective measurement (Beyer et al, 1990). The doubt about the scale has been re-iterated to the researcher (McGrath, 1991).

The *Objective Pain Scale* (OPS) is an American five point scale (Norden et al, 1991^a). It measures blood pressure, crying, agitation, movement and either verbal expression or body language, using a 0,1,2 scoring system governed by set criteria. A total score of six or more out of ten provides the criterion for intervention with strong analgesics. The measure is used to assess pain in children aged 8 months to 13 years and, providing it is used by trained observers (people trained to observe the child in an unbiased manner), it is said to measure postoperative pain in pre-school children in the clinical situation (Norden et al, 1991^a). The validity of the OPS was confirmed when it was compared with CHEOPS in 1991 (Norden et al, 1991^b). However, the recent question over the validity of CHEOPS may in turn raise doubts about the validity of OPS, but this is not addressed in the literature.

The *Toddler Pre-schooler Postoperative Pain Scale* (TPPPS), is another American behavioural scale which is used to assess postoperative pain in children aged 1-5 years (Tarbell, Cohen and Marsh, 1992). The original format, called the Pain Assessment Scale, focused on 15 behaviours in three categories: vocal pain expression, facial pain expression and bodily pain expression. Evidence of developmental trends was found in the use of this measure; for example, 1-2 year olds used more bodily and less vocal expression than 3-5 year olds. It is suggested that the tool might provide sensitive assessment of postoperative pain in young children but validity and reliability are not proven (Tarbell and Cohen, 1990). Since then, the tool has been refined, in that the number of behaviours to be rated has been reduced to nine, still using the same three categories (Tarbell Marsh and Cohen, 1991). A preliminary report of a further study

suggests that the tool is useful in conjunction with analgesic administration to children aged 1-5 years (Tarbell et al, 1992). However, although this tool is rated according to the different items of behaviour, it appears to have no set criteria for scoring, unlike the Objective Pain Scale (Norden, 1991^{a,b}), casting doubt on its reliability.

The *Gustave-Roussy Child Pain Scale* (DEGR^R) is French in origin and has been developed for use 4 hourly in children, aged 2-6 years, with prolonged cancer pain. This scale was described at an International Association for the Study of Pain conference (Gauvain-Piquard et al, 1991) where it was reported that the 15 item scale had been refined to 10 items, with a choice of five responses to each item. Previously, Gauvain-Piquard et al (1987) reported that acute pain causes behaviour in children to change quickly, but that the influence of depression on prolonged pain results in slower changes. These findings make the DEGR^R scale more relevant in slow-changing situations than where behaviour may change quickly such as where acute pain is present.

2.9.4 Pain measures for school-age children (5-11 years)

The possession of increasing language skills should make pain assessment in older children less difficult, and yet problems still exist with both verbal communication and the use of formal pain measures. Savedra et al (1989) suggest that the person who asks a child about pain is important. This is because when the same question about pain is asked of children, by their mother and staff, the children may respond differently; that is, they may admit pain to their mothers but not to staff. Many children are able to describe their pain (Abu-Saad and Holzemer, 1981; Abu-Saad et al, 1990) but developmental variation in descriptions are reported (Savedra et al, 1982). In addition, Alder (1990) is of the opinion that some descriptive terms are abstract, with resulting difficulty in understanding what is meant. This corroborates the view of Jerrett and Evans (1986) that adults sometimes have difficulty in understanding children's descriptions of pain. Without being categorised, descriptors may be difficult to validate and, in addition, McGrath and Unruh (1987) point out that descriptions of pain are difficult to quantify, implying that their use in pain measurement may be doubtful.

The first formal measure for school-age children to be discussed is the *Eland Color Tool* which was designed in North America in the 1970s (Eland and Anderson, 1977). The theory behind the development of this measure is that young children link colour to sensation; for example, children aged 4-10 years are said to be able to link pain to colour (Eland and Anderson, 1977; Scott, 1978). However, as the association of sensation to colour diminishes and analytical thinking develops with age, the children who are most

aware of the link between colour and pain are aged 4-6 years (Scott, 1978). The use of colour in pain assessment is reported or recommended frequently (Eland and Anderson, 1977; Scott, 1978; Eland, 1985a; Eland, 1985b; Latham, 1987; Maunuksela, Olkkola and Korpela, 1987; Devine, 1990).

The underlying concept of the Eland Color Tool involves the child choosing colours to represent severe, moderate, mild and no pain from a choice of eight. Once the colours are chosen, a body outline is coloured, indicating the location and severity of the child's pain. Children tend to choose either red or black to represent severe pain (Eland and Anderson, 1977; Scott, 1978; Savedra et al, 1982). Nevertheless, Thomson and Varni (1986) stress the importance of each child being given a choice of colours. Savedra et al (1989) report that age, sex and ethnicity make no difference when using colour to measure pain and, more recently, Watt-Watson and Donovan (1992) question the reliability and validity of colour tools altogether. In addition, no mention is made in the literature of any potential effect from colour blindness, which affects a small proportion of males (Gouras, 1981; Hurvich, 1987).

The *Poker Chip Tool* is an American measure in which counting is involved (Hester, 1979). The child chooses between one and four poker chips which represent different amounts of pain. Hester (1979) used this measure with children aged 4-7 years, who were having immunisations and reports that it correlates highly with verbal and motor behaviour. Wong and Baker (1988) report from a comparative study that of three assessment measures, the Poker Chip Tool is the most reliable. However, only one more publication supporting the tool's validity and reliability could be found (Hester et al, 1990).

The *Oucher Scale* is another American development in pain measurement (Beyer and Aradine, 1986 and 1987). This tool takes the form of a vertical scale on a poster. It resembles a thermometer which, on one side, has a series of six faces depicting severe pain to no pain for young children, and on the other side, has a 1-100 vertical scale representing the same levels of pain, aimed at older children and adolescents. This tool has been used successfully to measure pain pre and postoperatively in children (Beyer and Aradine, 1987 and 1988). However, in practical terms and being of poster size the Oucher scale is large for everyday use. Nevertheless, an advantage of this scale over others is that the faces are available in different ethnic forms, allowing the measure to be used in different cultures (Denyes, Beyer, Villaurruel and Neuman, 1991).

Visual Analogue Scales may be simple 1-10cm lines; they may be numerical for example, 1,2,3.....9,10 (1 being no pain and 10 being the worst pain ever), or simply 'no pain' at one end and 'the sorest it could be' at the other end. This form of pain measurement is effective in children as young as five years (McGrath et al, 1985; Varni et al, 1987; Thomson et al, 1987; Powers, 1987; Tyler et al, 1993) as well as in older children (Abu-Saad and Holzemer, 1981; Abu-Saad, 1984; Eland, 1985^a; Eland, 1985^b; Broadman, Rice and Hannallah, 1988; Broome and Lillis, 1989; Jennings, 1990; Alder, 1990; Douthit, 1990). However, Thompson and Varni (1986) report a study in which although children under five years used visual analogue scales, a small but significant proportion, 11%, did not complete the measurement. Maunuksela et al (1987) indicate that, because of their small size, VAS are unsuitable for children but they also state that children under five years are able to use self-report measures. There is debate over the efficacy of the shape of analogue scales which children use to measure pain. Aradine et al (1988) report that pre-school children use vertical analogue scales more easily than horizontal scales, yet Varni and Walco (1988) dispute this. A general observation, made by Savedra et al (1989), is that while VAS are a sensitive measure of pain, they are disliked by children. Despite the reported difficulties with VAS, they are not only described as being reliable and valid (Beasley and Tibbals, 1987; Devine, 1990) but additionally are said to be more reliable than objective measures (Beyer et al, 1990; Goodman and McGrath, 1991).

Another variation of the analogue scale is the *Faces Scale*, of which there are different versions (Baker and Wong, 1987; Snell, 1988; Bieri, Reeve, Champion, Addicoat and Ziegler, 1990). Faces scales are reported frequently (Beyer and Aradine, 1986; Wong and Baker, 1988; Savedra et al, 1989; Douthit, 1990; Tyler et al, 1993). The concept of a faces scale involves the child choosing one of a series of faces, showing different expressions which depict 'no pain' to 'severe pain'. Beyer and Aradine (1986) describe faces scales as a useful measure for children aged 4-7 years but Douthit (1990) indicates that children as young as three years are able to use faces scales. Regardless of age, there is some question as to the reliability of faces scales as a measure of pain (Juniper, 1992). In 1988, Wong and Baker compared a faces scale with analogue scales and the Poker Chip Tool. Although the study concludes that the faces scale is less reliable than the Poker Chip Tool is the most reliable measure, it is suggested that different age-groups of children prefer different methods of assessment.

2.9.5 Summary

Deciding which method of pain measurement to use is complex. Beyer and Aradine (1988) and Johnstone (1991) suggest that no new measures should be developed, but that

current ones should be tested and refined. Self-report is of most value because it is subjective reporting by the child rather than objective reporting by another person. In a review of the epidemiology of pain in children and adolescents, Goodman and McGrath (1991) state that inaccurate findings are likely to result from pain measures which are not based upon self-report. However, it is necessary that any self-report measure is understood by the patient before it is used (Maunuksela et al, 1987). In addition, where possible, Savcra et al (1989) suggest that more than one method of assessment should be used to allow for variations. Regardless of which method of assessment is employed, measurement is a necessary pre-requisite to pain management.

2.10 Postoperative pain management

A tendency for the undertreatment of pain in children is well documented (Lloyd-Thomas, 1990; Elander, Lindberg and Quarnstrom, 1991). Ineffective pain management may result from a number of factors including (i) inaccurate pain assessment, (ii) negative staff attitudes (Burokas, 1985; Goodwin, 1988), (iii) practice based on traditional values rather than on research (Mather and Mackie 1983; Abu-Saad, 1984; Eland, 1985^a; McCaffery and Beebe, 1989; Alder, 1990), and (iv) health professionals' lack of knowledge (Swafford and Alian, 1968; Eland and Anderson, 1977; Mather and Mackie 1983; Burokas, 1985; Kuhn et al, 1990). Effective pain management depends, to a considerable extent, upon its accurate recognition because pain cannot be adequately relieved if the degree of severity remains unknown.

Staff attitudes to pain may result in negative or positive outcomes. Those which are founded in traditional values, sometimes perceived as mythical, may influence the management of children's pain negatively, resulting in its undertreatment (Sriwatanakul, Weis, Alloza, Kelvie, Weintraub and Lasagna, 1983; Burokas, 1985; Schechter et al, 1986). For example, some professionals believe that children easily become dependent upon opiates when no literature has been found supporting this view (Abu-Saad, 1984; Eland, 1985^a; Eland, 1990). In fact, Burrows and Berde (1993) suggest that it is safe to administer analgesics to children of all ages. On the contrary, pain management may be influenced positively by the staff's personal experience of pain (Rutter, 1989; Holm, Cohen, Dudas, Medema and Allen, 1989). For instance, if in the past, a nurse has had the same procedure as her patient, she may be more sympathetic to the patient's pain and ensure that effective pain relief is provided.

Poor management of pain is influenced by a lack of knowledge and is demonstrated by underestimation, by health professionals, of the strength and quantity of required analgesics after different surgical procedures (Mather and Mackie, 1983; Schechter et al, 1986). Mather and Mackie (1983) also report that the prescribing of analgesics by doctors is erratic and that prescriptions are misinterpreted by nurses, the implication being that fear of opiate dependency is the problem. The risk of creating dependency on opiates remains a real fear for many health care staff (Cohen, 1980; Donovan, 1982; McCaffery and Beebe, 1989; Davies, 1992).

2.10.1 Pharmacological management of children's pain

Children of all ages are likely to be given inadequate pharmacological pain relief (Mather and Mackie, 1983; Eland, 1985^b; Elander et al, 1991). Mather and Mackie (1983) surveyed 170 Australian children postoperatively. Sixteen per cent were not prescribed any analgesics and only 60% of those with prescriptions were given the drug; 25% of children were pain free on the day of surgery and 53% on the first postoperative day, irrespective of their analgesic administration. A study of 2000 American children aged 4-10 years, surveyed postoperatively, reveals that 66% received no analgesics (Eland, 1985^b). In a third study, Elander et al (1991) retrospectively examined 32 American infants under one year following varying types of surgery. Their findings include the fact that nurses were reluctant to reduce the 4 hourly intervals between analgesic administration in child patients and that less than half of the children were given opiates.

Concerns about dependency on analgesics and other side-effects are blamed for ineffective pain relief but there is almost no research supporting these views. Dilworth and McKellar (1987) argue that concerns about respiratory depression following administration of opiates to children are not valid. They studied 144 children and adolescents, aged 6 months to 15 years, who received 155 doses of opiates. Only one subject required reduction of the opiate dose and naloxone to reverse respiratory depression. It cannot be said that there is no risk but the actual risk is small (Dilworth and McKellar, 1987). Since then, recommendations that opiates can be safely administered to children have been made (Davis, 1992; Burrows and Berde, 1993).

The administration of opiates presents a further difficulty as this often involves an injection. The anticipation and the reality of being given an injection creates problems for many children. Wilson and Smith (1993) claim that children of different ages are afraid of injections. They also suggest that injections are a less effective means of controlling pain, because of inflexibility in drug dosage and timing. A recent

development to improve consistency in pain relief is the concept of patient-controlled-analgesia (PCA) in which the patient has control, with limitations, over administration of his analgesic medication (Webb, Stergios and Rodgers, 1989; Gillespie and Morton, 1992). This method of pain relief has been used in adults for some time but is relatively new in paediatrics. Where children are concerned, Llewellyn (1993) points out that although it is effective, PCA requires more patient monitoring than traditional means of pain relief. Although its successful use is reported in children as young as four to seven years of age, it is not a widely implemented means of pain relief (Berde, Lehn, Yee, Sethna Russo, 1991; Gillespie and Morton, 1992; Wilson and Smith, 1993; Llewellyn, 1993). Reasons for this include lack of funding to buy PCA pumps and inadequate staffing, necessary for the supervision of patients.

2.10.2 Non-pharmacological management of children's pain

Other techniques of relieving pain exist and do not involve the use of drugs. These non-pharmacological methods include the use of distraction and complementary therapies which may be used individually or as an adjunct to the use of analgesics. When practising complementary therapy of a more technical nature, for example aromatherapy, nurses are required to be competent in their practice (UKCC, 1994). However, although methods such as transcutaneous electrical nerve stimulation (TENS) and hypnosis are available, there are few reports of their use in children.

The use of distraction is more widely recognised than other forms of non-pharmacological pain relief. Save the Children Fund (1989) carried out an extensive research study examining the use of play in hospitalised children. One conclusion was that the use of structured play encourages children to co-operate with medical procedures. Play was also seen as a means of reducing anxiety for both children and parents. Chambers (1993) and Whiting (1993) both state that play is important in reducing stress in hospitalised children, particularly preoperatively. Beyer and Levin (1987) suggest that relaxation or distraction may reduce fear or anxiety which accompany pain but it not known whether reducing anxiety will lessen the perception of pain. McCaffery and Beebe (1989) describe activities which children of different ages may employ when attempting to relieve pain; for example, reducing sensory input such as noise for infants or allowing the child to select and hear a story. Nevertheless, little is known about the extent to which children actively use distraction.

Transcutaneous electrical nerve stimulation (TENS) is a method of relieving pain using electrodes which run a current through the skin. According to Eland (1993), TENS

works by stimulating the production of endorphins, the body's natural analgesia. The electrical current used for TENS is controlled by the patient and this may limit its use with children. However, Eland (1991) describes the use of TENS in children who have phantom limb pain following amputation, and also for repeated venepuncture. The possibility of using TENS in children of different ages also is reported by Eland (1993).

One of the primary uses for TENS is the relief of postoperative pain in adults (McCaffery and Beebe, 1989). Mannheimer (1984) describes TENS as being beneficial postoperatively in relieving pain and in reducing some postoperative complications such as the degree of ileus. Guidelines for the use of TENS are available (Lampe and Mannheimer, 1984; McCaffery and Beebe, 1989). However, Mannheimer (1984) stresses that TENS is of limited value and should not be the sole means of relieving pain, that is, in some circumstances, TENS should be used in conjunction with other means of pain relief.

Hypnosis is described by McCaffery and Beebe (1989, p222) as "a state of alertness and intense concentration, very similar to normal everyday thinking". It does not result in loss of consciousness but the patient must wish to be hypnotised and must be able to concentrate. These two criteria may be why hypnotism is an uncommon technique for relieving pain in children. Watt-Watson and Donovan (1992) suggest that the limited literature about the use of hypnosis, in adults and children, is flawed and that more research is required.

Guidelines for the management of children's pain are emerging in France (Arvieux, Alibeu and Drouet, 1990) and in North America (Ready and Edwards, 1992; Agency for Health Care Policy and Research, 1992). The recommendations include the suggestions that pain management for children should be flexible because of the many variables involved, self-report should be used to assess pain in children of four years upwards, pain should be suspected if it is denied and the degree of pain experienced should be of an acceptable level if it cannot be completely relieved (Agency for Health Care Policy and Research, 1992).

2.10.3 Summary

There are problems with the pharmacological management of children's postoperative pain. Pain tends to be undertreated because of ineffective assessment, negative attitudes held by professionals and a lack of knowledge about pain. In addition, the available information about non-pharmacological means of relieving children's pain is limited. The

lack of knowledge and the education of health professionals about pain management are discussed in the next section.

2.11 Knowledge and education of health professionals

Attempts to encourage a change to research-based education and practice in nursing have increased over the last two decades. With the concept of the Nursing Process and the development of theories of nursing this has been more possible although not without its difficulties (Bradshaw, 1995). Until recently, nursing theory has taken the form of Models of Nursing, of which there are many (Fraser, 1990). Models of nursing provide a framework for a research-based approach to nursing care. Different models are appropriate in different care settings and also for individual patients, each model having a different emphasis on the approach to care; for example, Orem's theory bases nursing care on a continuum from dependence to self-care with the ultimate aim being independence (Orem, 1991). Currently, nursing theory is taught as part of nurse education but there is a gap between the theory taught and actual practice (Kim, 1993; Howkins, 1994; Ferguson and Jinks, 1994).

Recent thinking about nursing practice casts doubt on the practicality of nursing models because although attempts have been made to provide a scientific base for nursing care, putting the models into practice has been problematic (Bradshaw, 1995). The traditional approach to nursing care involved carrying out specific tasks, such as bed-making or aseptic technique. However, this was overtaken by the development of Models of Nursing. These, in turn, are being superseded by a current theory that gaining experience in nursing practice leads to the development of expert nurses (Benner, 1985). However, this theory involves the use of intuition which has no scientific basis and consequently there is doubt about its validity (Bradshaw, 1995). Regardless of which nursing model is in vogue, holistic nursing care is not always practised and the theory-practice gap means that some aspects of nursing care are research-based and others are not. The assessment and management of pain belong to the practices which, in general, are not based upon research (Schechter et al, 1986; Eland, 1990; Hollinworth, 1994).

There is evidence that the education of health professionals in pain management is inadequate (Weis et al, 1983; Watt-Watson, 1987; RCS and CA, 1990; Graffam, 1990; Price, 1991^b); for example, Graffam (1990) reports that of 300 American university nursing courses, only 8% taught pain as a separate subject. Outline curricula on pain have been developed in America for both nursing and medical education (Pilowski, 1988;

Berde, 1993). Berde (1993) is encouraging universities world-wide to incorporate the International Association for the Study of Pain's "Pain curriculum for Basic Nurse Education" into their nurse education programmes.

With the introduction of Project 2000 courses in nurse education and the future of nurse training being in higher education, it is likely that pain may be taught in more depth than in the past (Pearce, 1993). However, in an exploratory study of the theory-practice gap in relation to Project 2000, Elkan and Robinson (1993) conclude that problems between educationalists and practitioners persist. A publication by the National Board for Nursing, Midwifery and Health Visiting for Scotland (NBS, 1990), on the education of sick children's nurses, names broad topics which should be covered but particular areas, such as pain, are not specified. The interpretation of curriculum objectives is up to individual colleges and so pain may be taught in varying depths. A small English study concurs that the subject of pain is still not adequately addressed in curriculum planning for nurses (Nethercott, 1994), although guidance on the inclusion of pain in nursing curricula is available (Jeans, Seers and Wilkie, 1993). Nevertheless, despite changes in nurse education, until the theory-practice gap reduces, some nursing care is likely to remain without an adequate research foundation.

In the same way, medical curricula do not include pain as a separate subject, one example being the University of Glasgow (University of Glasgow Faculty of Medicine, 1994-95). The situation is similar for postgraduates in surgery in that the examination curriculum (1994) for Fellowship of the Royal College of Physicians and Surgeons of Glasgow does not include pain as a separate topic either. On the other hand, the curriculum for Fellowship of the Royal College of Anaesthetists does include pain as a topic under 'Postoperative Care', but not as a separate subject (Royal College of Anaesthetists, 1992); however, pain relief is included under 'Data Interpretation' for Part 3 FRCA (Royal College of Anaesthetists, 1993).

Despite its place in some curricula, pain does not feature as a subject in many paediatric nursing textbooks. In the index of five such books which are widely available, one addresses pain to a small extent (Whaley and Wong, 1993), three mention pain under other headings (Brunner and Suddarth, 1986; Murphy, 1988; Lewer and Robertson, 1992) and the fifth does not mention pain at all (La Mothe, Ludwig and Wilson, 1992). The first British paediatric nursing textbook to contain a chapter devoted solely to pain is in press (Carter and Dearmun, in press).

Books devoted entirely to pain have emerged over recent years (Wall and Melzack, 1993). The first comprehensively written text about only paediatric pain was published in 1987 by McGrath and Unruh. Since then, others have followed (Schechter et al, 1993) but more often a chapter on children's pain is found in texts concerning adult pain (McCaffery and Beebe, 1989; Latham, 1991; Melzack and Turk, 1992; Watt-Watson and Donovan, 1992; Wall & Melzack, 1993).

Pearce (1993) reports that research findings about pain, in general, are not put into practice. This is important on two counts. First, it makes an argument for even more detailed training about pain for all health professionals as has been recommended several times in the last few years (Bradshaw and Zeanah, 1986; Dilworth and McKellar, 1987; Pilowski, 1988; Holm, Cohen, Dudas, Medema and Allen, 1989; Alder, 1990; Fields, 1991; Berde, 1993). In addition, there is a need for improving the education of the population at large about pain, the effect of pain on children and how to manage the relief of children's pain. One attempt at this is a booklet entitled 'Children and Pain', which is published by a voluntary organisation, Action for Sick Children (Alderson, 1992). The booklet is aimed at parents and is about the recognition and management of pain in children.

The second reason that it is important for research findings to be put into practice is that, for nurses, there is a professional code of conduct which must be adhered to (UKCC, 1992). The Code of Professional Conduct addresses accountability, making the point that every registered nurse is accountable for her practice to the patients, the profession, and her employers, and to the United Kingdom Central Council (UKCC), the governing body for nurses (UKCC, 1989 and 1992). This accountability could be perceived as including the practice of recognising and relieving pain, a point which has previously been made in North America (Broome and Lillis, 1989). In addition, the UKCC (1993) publish standards for record keeping and it is expected that registered nurses will adhere to these standards. The standards are about the accurate documentation of any care or problems relating to patients and this could be said to include the recognition, management and evaluation of pain. In Britain, observing and recording evidence of pain were included as the responsibility of nurses, in the curriculum for sick children's nurse training (NBS, 1983) and in medical curricula (Wilson et al, 1992). However, although pain charts exist in various forms, lack of nursing documentation is a problem, both generally and in relation to pain (Camp and O'Sullivan, 1987; Harrison, 1991; Scott, 1992; Albrecht, Cook, Riley and Andreoni, 1992; Kitson, 1994).

It appears that the need for more detailed education about pain for health professionals, in particular, is open to little doubt. In so doing, there may be more chance of clinical practice becoming research-based where pain assessment and management are concerned.

2.12 Summary

Although it is increasing, the relative lack of British research and literature about pain in children is striking when compared with that from North America. Problems relating to pain are more widely recognised, and the concept of pain is increasingly understood by nursing and medical practitioners as well as researchers.

From the practical viewpoint, obtaining information from children of different ages about their experience of pain is a delicate and complicated process. Where possible, subjective pain measurement by the child is recommended, using appropriate measures to the situation, type of pain and maturational stage of the child (Gillies, 1993). Where there is no alternative to objective measurement, there are potential difficulties with observer bias. A good rapport between the child, parent and health professionals, and using language tailored to suit the child, help to ease the process of pain measurement. Lack of knowledge and negative staff attitudes contribute to the difficulties.

Overall, formal assessment of pain is not practised routinely, its management remains poor and children continue to experience pain. This is in spite of the availability of guidelines for pain management as well as for education curricula. It is of note that the literature does not include any prospective study about the postoperative pain experiences of schoolage children having routine minor surgery, specifically, there are reviews, but few British research reports. Such research could add to the literature because minor surgery, a cause of acute pain, is relatively common in schoolage-children.

Phase 1				Phase 2		
Phases 1 and 2						
Group B (n=41)	Group C (n=26)	Mothers (n=50)	Staff (n=23)	Staff (n=36)	Staff (n=21)	Mothers (n=35)
				Group A (n=40)		

Table 1 Distribution of samples (Phases 1 and 2)

Chapter 3 Research method and design

3.0 Introduction

The study was undertaken in two phases. The first (Phase 1) involved school-age children and the second (Phase 2) pre-school children. Chronological order of age was not followed for two reasons. Firstly, Phase 1 was planned after an initial investigation of pain assessment tools revealed that more options existed for measuring pain in school-age children than in younger children. Secondly, school-age children are easier to involve in research than pre-school children because of their better communication skills.

The study took place in four surgical wards of the Royal Hospital for Sick Children, Glasgow. It involved semi-structured interviews for each of three samples: children, their mothers and staff. The child samples, in particular, were perceived as important in both phases because of the age-related implications in the assessment and management of pain. Consequently, they are described in more detail than the samples of staff or mothers.

To avoid response bias in Phase 2, the results of Phase 1 were not made available to staff until the data collection for the Phase 2 was complete. To avoid repetition of information, the combined aims are given and then each phase is described separately.

3.1 Aims

The overall aim was to examine the experience of postoperative pain in children and adolescents who were undergoing elective minor surgery as in-patients in a children's hospital.

The specific aims were:

1. To establish the existence and severity of postoperative pain in children and adolescents;
2. To examine the pain experience of children and adolescents and their reactions to postoperative pain;
3. To study the response of parents to pain experienced by their child;
4. To establish the ways in which nursing and medical staff recognise postoperative pain in children and adolescents;

5. To investigate how nursing and medical staff react to children and adolescents who are in pain.

3.2 Phase 1 (5-15 years)

The age-range of 5-15 years for patients in this phase was selected for two reasons. First, children under five years normally have limited language and comprehension skills, making communication more difficult. Secondly, although a number of patients aged 16 years or more were admitted to the hospital, there were too few (Gillies and Parry-Jones, 1990) to include them in this study. Children under five years and adolescents of 16 years upwards were perceived as important groups in their own right, who could warrant future examination.

3.2.1 Sampling

Children. The age of the children was important because of its link with cognitive changes resulting in differences in perception, understanding and communication. Where pain is concerned, Gaffney and Dunne (1987) provide evidence of a relationship between children's ability to understand and communicate with Piagetian stages of development. Consequently, the sub-division of the sample was based theoretically upon Piaget's stages of cognitive development (Piaget, 1952).

Detailed scrutiny of the surgical waiting-list in October-November 1990 revealed that the proportions of children aged under 5 years and between 5-15 years were very similar (Table 2).

Age of children (years)	Proportion (%)
under 5	50
5-15	49
over 15	1
Total	100

Table 2 Children on surgical waiting-list (October-November 1990)

Patients aged 5-15 years (inclusive) comprised almost half of the total. This large group was sub-divided further into three age-groups: 5-7 years, 8-11 years, and 12-15 years (Table 3), according to the developmental stages described by Piaget. The

corresponding cognitive developmental stages to these ages were pre-operational, concrete operations and formal operations (Swanwick, 1990).

Childrens' age (years)	No. of children (%)
5-7	45
8-11	40
12-15	15
Total	100

Table 3 Children on waiting list in Phase 1

Four wards admitted patients for general surgery, with 57-66 planned admissions each week (mean 62). However, approximately nine patients per week were not admitted for various reasons, resulting in a possible average weekly number of 53.

Inclusion criteria. Initially, it was envisaged that all patients having general surgery would be included. However, to enhance the validity of the findings, this was amended to patients with the five most common minor surgical diagnoses which were undescended testis, inguinal hernia or hydrocele, bat ears, hypospadias and a need for circumcision (Table 4). Although there were more patients with cleft lips or palates than bat ears, the children requiring cleft lip or palate repairs were mainly under five years, therefore, were unrepresentative in the age-group in question. Instead, patients having bat ear correction were selected.

Diagnosis	No. of children	Proportion (%)
Undescended testis, inguinal hernia, hydrocele	162	34
Circumcision, hypospadias, epispadias	128	27
Cleft lip, cleft palate	45	9
Bat ear(s)	23	5
Others	96	20
Not for surgery	23	5
Total	477	100

Table 4 Diagnoses of waiting-list patients (October-November 1990)

Of the 477 patients on the October-November 1990 waiting-list, 210 were aged 5-15 years; and of these patients, 69% had one of the selected five diagnoses (Table 5).

Diagnosis	No. of patients	Proportion (%)
Undescended testis	66	31
Inguinal hernia, hydrocele	23	11
Bat ear(s)	20	10
Hypospadias	20	10
For circumcision	15	7
Total	144	69

Table 5 Five most common diagnoses of children on waiting-list (October-November 1990)

It was calculated that if half of the admissions were aged 5-15 years, approximately 24-25 planned in-patient admissions per week would fit the age criteria. This figure allowed for a convenience sample of 7-8 patients to be studied each week, giving a total of 90 in twelve weeks. To ensure the optimal distribution from each diagnosis, age-group and ward, the ideal sample was to consist of 41 children aged 5-7 years (46%), 36 aged 8-11 years (40%) and 13 aged 12-15 years (14%).

Exclusion criteria. By confining the sample to Caucasians, the possibility of cross-cultural differences was limited. In order to maximise comprehension and limit possible variables in the data collection children with mental or physical handicap were excluded.

Mothers. The mother of each child or adolescent in the patient sample was to be invited to take part - 90 in total. Mothers were chosen in preference to fathers for two reasons. First, males are thought to complain of pain more than females (Owens and Todt, 1984; Hosking and Welchew, 1985; Lyall, 1991; Rollman and Lautenbacher, 1993) and therefore it was possible that fathers might have different perceptions from mothers of the amount of pain experienced by their son or daughter. The second reason was that mothers were more available for interview. Although interviewing both parents would have elicited data which may have yielded new information this would have involved a considerable increase in the data collection period. Consequently, only mothers were invited to participate and if a mother was unavailable or declined the invitation there was no substitute. In addition, the possibility of different variables from the responses of mothers and fathers was decreased by having the same sex parent.

Staff. The staff sample comprised registered and enrolled nurses (RSCN and EN), post-registration student nurses (registered nurses undertaking their RSCN training), surgical staff and anaesthetic staff. In order to obtain an unbiased sample from each staff group,

all staff were selected randomly using a computer programme, Minitab. Each group is described separately.

(a) Nurses. The total nursing staff population of the four wards comprised 41 registered and enrolled nurses with experience in child care. Both registered and enrolled nurses were included because they were the health care staff who have the most patient contact and who have immediate responsibility for pain relief. The number of trained nurses per ward differed. Nevertheless, the majority (63%) worked on both day and night duty.

The Unit Nurse gave permission for nursing staff, who had been randomly selected, to be approached with a request for interview. Permission was obtained also from the Acting Director of Nurse Education to include eight RSCN Students, in their last module of training, two from each ward. Because of the small numbers of student nurses in this module on each ward, every student in the module on the off-duty rotas was included (n=8). Therefore, the planned nurse sample consisted of 26 trained nurses and 8 students, that is, 63% of the population.

(b) Surgeons. Of the 25 surgical staff in the four wards, 16 (64%) were randomly chosen for interview. They were from all designations, from Consultant to Junior House Officer. Each designation was perceived as important because of their roles in terms of responsibility for patient care (senior staff) and in terms of having more direct patient contact (junior medical staff). All surgical staff but one were allocated to one of the four wards at the time of the data collection. The one exception was a registrar, whose responsibilities were divided between two of the four wards. Permission to approach staff for interview was obtained from the Surgical Division as was permission to include patients in the study.

(c) Anaesthetists. The anaesthetic staff were responsible for specific operating lists rather than attached to individual wards. The population of 16 consisted of Consultants, Senior Registrars and Registrars, of whom ten (63%) were selected randomly for interview. Each designation was included because one of the major roles of an anaesthetist is the management of postoperative pain. Permission to interview staff was granted by the Anaesthetic Division.

In summary, the staff sample consisted of 34 nurses and 16 surgeons from four surgical wards, and ten anaesthetists (total 60). Each sample represented approximately 63% of its respective population. The proportions of medical and nursing staff were 57%

nurses and 43% doctors, there being more nurses because they have more patient contact than their medical colleagues.

3.2.2 Design of data collection tools

The design of the data collection tools in research determines which data will be collected (Holm and Llewellyn, 1986; Kirkwood, 1988; Bordens and Abbott, 1988; Abramson, 1990; McNeill, 1990).

Two of the principal methods of data collection is by the use of interviews and questionnaires (Holm and Llewellyn, 1986; Bordens and Abbott, 1988; Abramson, 1990; McNeill, 1990; Fife-Schaw, 1995^a). An interview is "a data collection method employing a verbal questioning technique" (Holm and Llewellyn, 1986). A questionnaire is "a data collection technique consisting of a set of written items requesting a response from subjects; a self-administered interview schedule" (Holm and Llewellyn, 1986). Questions used in either an interview or a questionnaire may be formatted in three ways: structured, semi-structured and unstructured. In the structured format, the questions are fixed and have set responses (closed-ended) therefore restricting the reply; the unstructured format allows the interviewer to ask questions freely, thereby allowing the respondent to reply in his own words (open-ended); the semi-structured format includes both questions with set responses and those allowing for unplanned responses (Holm and Llewellyn, 1986). The unstructured format therefore, is more flexible than the structured form. Closed-ended questions are easier than open-ended questions to code and analyse for statistical purposes because of the restricted responses (Kirkwood, 1988; Abramson, 1990).

The differences between interviews and questionnaires include (i) response rates to self-completion questionnaires tend to be poorer than responses to interviews; (ii) the ability to probe with open-ended questions during an interview may result in unforeseen data whereas once a self-completion questionnaire is designed there can be no additional questions at the time of its completion; in addition, artificially forced responses may result from closed-ended questions; (iii) the quality of data may be sound with both an interview and a questionnaire, however the quality depends upon the type of questions, that is the use of open-ended and closed-ended questions; (iv) interviews tend to be more time-consuming when collecting the data but questionnaires often involve time for mailing and for reminders to non-respondents; (v) problems with validity may exist when survey methods are employed however the results can be reliable if the research is conducted properly and it is representative of the population (Fife-Schaw, 1995). The decision was

made to interview all three samples using a semi-structured format to (i) maximise comprehension for the children; (ii) collect as much data as possible; and (iii) achieve as high a response rate as possible. Consideration of statistical analysis methods and coding was given when designing the questions to prevent unnecessary complications (Kirkwood, 1988; Abramson, 1990; Clark, 1990).

Interviewing children is more complex than interviewing adults, principally because of children's specific communication needs in relation to their development. Questions asked of a young child need to be worded more simply than if asked of an older child. Ross and Ross (1984^a) suggest that the approach of an interviewer to a child determines the child's response and, more recently, Barker (1990) comprehensively describes the method and approach to be taken when interviewing children and adolescents. Recommendations include preparation of the child and family of what to expect and consideration of the comprehension skills of the child. Barker (1990) suggests that the interview should be a simple, two-way process, in comfortable surroundings. The building-up of rapport is seen as paramount in terms of receiving and giving information: a child who is distrustful of the interviewer will not co-operate as well as the child who trusts the interviewer (Barker, 1990). It was agreed that because of her previous experience with sick children, the researcher did not require training in interviewing techniques, in talking to children or in observing their behaviour. However, a researcher without such experience would require appropriate training.

The children's interviews were designed to take place approximately 16-24 hours after surgery, that is, on the first postoperative day. It was unlikely that many children would be able to respond to questions after a general anaesthetic, whereas the following day the effects of the anaesthetic were likely to have worn off. In addition, as local anaesthesia is used commonly as part of postoperative pain relief, measuring the children's pain immediately postoperatively could have measured the effect of intraoperative analgesics rather than the child's experience of pain once the local anaesthetic had worn off. It was policy to discharge the majority of patients on the first postoperative day, so delaying data collection until after that time was not an option.

It was essential that all the children understood what was being asked. For this reason, different interview schedules were employed for children of different ages (Appendices 1, 2, 3). The questions in the interview schedules were developed as a result of the researcher's nursing experience and from the review of the literature. The schedules were identical in layout, that is, the order of the questions, but the wording of the questions differed slightly for each age-group, the youngest children being asked

questions in simpler terms than the older children to maximise comprehension. The interview schedules were long but were designed to be easy to understand and the questions were short. Most questions were closed-ended. Biased, leading, ambiguous and complex questions were avoided (Holm and Llewellyn, 1986; McNeill, 1990; Fife-Schaw, 1995b). The topics comprised demographic details, past experience of pain, preoperative information, anxiety related to pain or operations and present experience of pain. The purpose of the latter was to establish the presence of pain, its description, the children's ability to localise the site, the use of formal methods of pain assessment and the youngsters' behaviour when in pain.

After each child's interview, details were noted from the medical and nursing notes about the type of operation, premedication, intraoperative analgesics and analgesics prescribed and actually administered postoperatively. In addition, the researcher measured each child's pain both behaviourally and with a Visual Analogue Scale (VAS) (Appendix 4).

Mothers were interviewed on the child's first postoperative day, just after the child. Semi-structured questions were on the same topics as those included in the children's interview; for example, demographic data, the mother's past experience of pain, anxiety about pain or operations, expectations about their child's operation and postoperative pain, the mother's assessment of the child's pain at the time of interview and their perception of how the child's pain was being relieved (Appendix 5). The questions were phrased similarly to the children's, so that direct comparison could be made between the respective responses.

The staff were interviewed, using semi-structured questions, developed from the literature and from the researcher's experience as a nurse. Staff were not asked about specific patients because the organisation of nurse interviews would have been complex and time-consuming due to the rapid turnover of patients and nurses' shifts. Instead, the opinions of nurses and doctors were sought about postoperative pain, in particular, its assessment and management, as well as current practice and attitudes to the management of pain. Demographic information concerning personal details such as sex, profession, designation and training, were collected as well as information about their personal experience of pain and its influence upon their practice, preoperative information given to children and families, anxiety related to pain and surgery, and current practice, that is, the assessment, management and evaluation of pain in children. (Appendix 6). The questions were similar to those asked of the children and mothers. This allowed triangulation, that is comparison of responses from three different samples to the same question, to take place in the analysis.

The reason for the choice of semi-structured interviews for the staff sample was to balance the need for as much information as possible with need for as simple a coding system as possible. It also allowed the amount of time which staff were away from clinical commitments to be minimised. Structured questions would have gathered less information while unstructured questions would have allowed further probing, so in order to answer the research questions, a balance was struck by employing a semi-structured format.

3.2.3 Pain measures

Self-report is less biased than objective measurement (Teske et al, 1983; Goodman and McGrath, 1991; Beyer et al, 1991). Consequently, children in each of the three age-groups measured their own pain using different methods. In addition, all children were asked to indicate the severity of their pain at the time of interview, regardless of whether or not they admitted to being in pain.

Each child's pain was measured by the child using pain measures selected to match their ability to understand and communicate, that is, their developmental stage. In order to find the most appropriate measures, all five of those described in the literature review (Chapter 2.9.4) were examined prior to the study. The Eland Color Tool, Visual Analogue Scales (VAS) and a faces scale were chosen. The mothers rated their child's pain verbally and then with a measure (VAS). The researcher also rated formally the children's pain using a measure (VAS). The method relating to each measure is described below.

Colour tool. The Eland Color Tool is described in Chapter 2.9.4. This self-report measure was chosen in preference to the Oucher Scale, the Poker Chip Tool and Visual Analogue Scales because it appears to have been widely used in North America and it is recommended (Eland and Anderson, 1977; Maunuksele et al, 1987; Devine, 1990). Therefore, it was chosen for the youngest group, aged 5-7 years, but with two alterations. First, the body outline was adapted from a single outline to two, with one representing males and one for females, in addition to back and front views; the second change was that the number of degrees of pain was reduced from four to three to enhance comprehension (Appendix 7). The children were asked to choose one of eight brightly coloured crayons in relation to 'very, very sore', 'a little sore' and 'not sore'. They were then asked to colour the outline using the three crayons, thereby indicating the presence and severity of their pain. The amended version is known as the Revised Eland Color Tool.

Visual Analogue Scales. Many research studies and papers report that visual analogue scales are of value in measuring pain in older children (Abu-Saad, 1984; Broome and Lillis, 1989; Douthit, 1990). This form of self-report is described as a valid, reliable and simple means of assessing pain (Chapter 2.9.4) and consequently was selected for patients aged 8-11 years and 12-15 years. It was chosen in preference to the more complicated McGill Pain Questionnaire or measures more appropriate for younger children (Chapter 2.9.3). A simple 0-10 rating scale was designed, using different wording at each end to account for potentially different levels of understanding in each age-group (Appendices 8 and 9).

Combined Coloured Visual Analogue Scale and Faces Scale. The researcher intended to try to design a measure which could be used throughout the hospital, that is, simple to learn, easy to carry and practical to use. With this in mind, a pocket-sized measure was developed in the shape of a six inch ruler, which involved, on one side, for older children a red horizontal triangle, the base of which forms 0-10 scale which increases from 'no pain at all', at the narrowest end (0), to 'the worst pain there could be' at the broadest end (10) (Appendix 10). This Coloured Visual Analogue Scale was for use by patients aged 8-15 years, in conjunction with the validated VAS described in 2.9.4; this allowed a comparison to be made between the two measures. Although the coloured scale is theoretically a combined analogue and numeric scale, it is referred to, hereafter, as the *Coloured Analogue Scale (CAS)*. On the other side, for younger children aged 5-7 years (Group B), there was a series of five faces representing 'no pain' to 'severe pain'. Faces scales were also described in chapter 2.9.4. The simple faces ranged from happy, smiling, not sore, to sad, unhappy, very sore on a five-point ladder, descending from 'very sore' (sad face) to 'not sore at all' (happy face) (Appendix 11). The findings with this measure were to be compared with those from the Revised Eland Color Tool.

Observation. Each child's behaviour was observed by the researcher throughout the interview and at the end, the child's facial expression, body position and mobility were each rated on a three-point scale (see Appendix 1,2 or 3). Although it is argued in the literature that observation is unreliable as a measure of pain (Teske et al, 1983; Goodman and McGrath, 1991; Beyer et al, 1991) it was decided that comparing each of the above variables (which are often used in informal assessment) with formal assessment might prove or disprove their reliability.

Similarly, it is implied in the literature that verbal assessment alone is an unreliable measure of pain for children (Jerrett and Evans, 1986; Savedra et al, 1989). However, being able to show if and how children within the age-groups could communicate their

pain might provide valuable developmental information. The findings from verbal assessment were also compared with the findings from formal measures.

Mothers' and Researcher's Measures. The mothers and researcher rated each child's pain using an identical 0-10cm analogue scale (Appendix 4).

3.2.4 Ethical approval and informed consent

Ethical approval was given by the Ethics Committee at the Royal Hospital for Sick Children prior to both the pilot study and main study. Informed consent was obtained in writing from a parent of each child and from each adolescent aged 12 years or more (Appendices 13). Every child, mother and each member of staff consented verbally. It was explained to the children preoperatively that with their permission, the researcher would return the day after their operation to talk with them, but on the understanding that if they did not wish to cooperate the researcher would leave without question. The parents were reassured that their child's care would not be adversely affected if permission was not given or if consent was withdrawn.

3.2.5 Pilot study

Four doctors and four nurses from the four wards were selected randomly for interview using Minitab. The child sample was a convenience sample, consisting of six children and two adolescents. Seven mothers were interviewed. All interviewees for the pilot study were excluded from the main study.

The interviews with the children took about 15 minutes each and the interviews with the mothers about 20 minutes. The questions elicited the required information. Two changes were necessary in the staff interviews. Firstly, the interviews took too long (40 minutes) and some questions were repeated. The schedule was revised, the final time taking about 20 minutes. Secondly, during the pilot study, 50% of appointments with nursing and medical staff were postponed, either before the interview or at the arranged time, because of their workload demands. Consequently, it was decided to reduce the number of staff to be interviewed in the definitive study, from the original plan of the whole nursing population of the four wards, and medical staff involved, to approximately 60% of each. ^(see Chapter 3.2.1 p53) This decision was supported by a change in nursing hours which had resulted in a reduction of overlap time from 2.5 to 1.5 hours each day, reducing the time for nurses to be available for interview.

3.2.6 Data collection

The definitive data collection took place over 14 weeks (February-June, 1991). All interviews were conducted by the researcher, on a one-to-one basis, within 16-24 hours of the operation (95%). Interviews took place at the child's bedside or in a location of the child's choice within the ward. As far as possible, privacy was maintained and interruption and distraction were minimised. Agreement was always reaffirmed prior to commencing the interviews. Mothers were interviewed either at the child's bedside or in an office on the ward, depending upon the wishes of the mother and child and the circumstances on the ward; the child was never present. Staff interviews took place in a ward office, on a one-to-one basis, ensuring privacy, and at a mutually suitable time. At no time were staff asked about individual patients.

The interview technique used for the children was based on well-recognised criteria for interviewing children (Barker, 1990). This involved giving each child as much time as was needed to answer questions to produce as reliable information as possible; making the children feel comfortable with the researcher in order that the interviews were successful; and ensuring that, to the best of her knowledge, any potential threat created by an interview or interviewer was eliminated. The researcher used an informal approach with the interviewees and was not dressed in nursing uniform in the hope that she was not mistakenly identified by children and mothers as a possible member of staff. In addition, where the staff were concerned, it was important to remove any potential response bias which may have occurred because the researcher was known by the majority of interviewees as a previous staff member.

Problems arose in the data collection. There were difficulties in obtaining the proposed numbers of patients during the first half of the data collection, and although the numbers increased during the second half, the collection period had to be extended from 12 to 14 weeks. In order to maximise the size of the sample of children and adolescents, all patients who were admitted to the four wards, and were in the defined age and diagnostic categories were considered, rather than using a convenience sample. If any child was crying or otherwise distressed the interview would have been stopped or not commenced at all. However, no such problems arose.

3.2.7 Analysis of data

Data were analysed using Minitab. The data were stored on computer and in a locked cabinet, according to the regulations of the Data Protection Act (1984). The analysis

was primarily descriptive, but chi-squared analysis (standard and Yates Corrected) was used to make comparisons between groups. Advice was sought from a statistician. The majority of the data were coded simply, that is, yes=1, no=2. However, in the case of open-ended questions, to simplify the coding, the answers were categorised once the data collection was completed. For example, there were numerous different responses to the question "what does your sore *relevant body part* feel like?", so the words were categorised into sensory, affective, blood-related and other responses and coded accordingly. Some of the categories were based upon those in the McGill Pain Questionnaire (sensory and affective) and the remainder were categorised by the researcher (blood-related and others) (Appendix 13 and Table 12).

3.3 Phase 2 (under 5 years)

Phase 2 was concerned with the examination of pre-school children. This group understand less and communicate verbally or otherwise less effectively than older children because of their developmental stage (Bibace and Walsh, 1980; Gaffney and Dunne, 1987; Swanwick, 1990). The method was similar to that in Phase 1. Differences are explained as follows.

3.3.1 Sampling

The surgical waiting-list in October 1991 was scrutinised in the same way as for Phase 1. A similar proportion of children was aged under five years: 50% in 1990 and 47% in 1991. When the 1991 children aged under five years were further subdivided, the proportion of those aged 1 month - 2 years 11 months was slightly larger than those aged 3 years - 4 years 11 months (53% : 46% respectively) (Table 6).

Age (months)	No. of children	Proportion (%)	Age-group proportion (%)
1-11	40	18	53
12-23	30	14	
24-35	46	21	
36-47	54	25	46
48-59	45	21	
Total	215	99	99

Table 6 Children under five years on surgical waiting-list (October 1991)

Children. To obtain data from children, they were sub-divided into two groups based on the proportions in Table 6, after considering Piaget's stages of development (Piaget, 1952; Gaffney and Dunne, 1987; Swanwick, 1990). The two groups were children aged 1 month - 2 years 11 months who were either preverbal or only learning to speak and 3 years - 4 years 11 months who had begun to develop language skills. Neonates (babies under one month) were excluded because they are separate group in terms of assessing and managing their pain.

In order to maintain variable continuity between the two phases, the patient sample was chosen from those with the most common minor surgical diagnoses: undescended testis, inguinal hernia or hydrocele, hypospadias and the need for circumcision. The fifth category, bat ears, was omitted because there were no patients in the under five group on the list for this operation. Although most children admitted for cleft lip or cleft palate repair were within the age limits, these procedures were classed as major operations and after discussion with a consultant surgeon, they were excluded. When the surgical waiting-list was scrutinised, 196 children were listed for undescended testis (39), inguinal hernia or hydrocele (55), hypospadias (31) and for circumcision (71).

The sample numbers were examined using the same method as in Phase 1. Of a total of 460 on names on the waiting list in October 1991, 215 were under 5 years (47%). Having established that almost half of the admissions were under five years, there would be approximately 24-25 planned in-patient admissions per week, allowing a convenience sample of 7-8 patients per week, totalling 40 in six weeks. To ensure the optimal distribution according to diagnosis, age-group and ward, the ideal sample consisted of 21 aged 1 month - 2 years 11 months (53%) and 18 aged 3 years - 4 years 11 months (47%). This was simplified to 20 in each sub-group, giving a total of 40. All children were Caucasian and those with physical or mental handicap were excluded.

Mothers. The mother of each child assessed was invited to participate (total 40). Fathers were excluded to maintain continuity.

Staff. The staff sample was similar to that of Phase 1. Where possible to avoid repetition, the same registered and enrolled nurses (RSCN and EN), surgical staff, and anaesthetic staff were invited to participate. Replacements for those who were on rotation either from hospital to hospital (registrars and house officers) or from ward to ward (post-registration student nurses) were of the same designation, from the same profession, and were chosen randomly using Minitab.

(a) Nurses. The nursing sample consisted of 27 trained nurses (66%) representing day and night duty, and two RSCN Students from each ward, in their last module of training. On this occasion, the student nurses were selected randomly using Minitab, if there were more than two allocated to each ward. The nursing sample consisted of 27 trained nurses and 8 students.

(b) Surgeons. The 24 surgical staff were of all designations from Consultant to Junior House Officer. Fifteen (63%) were selected for interview.

(c) Anaesthetists. The population of 16 anaesthetic staff consisted of Consultants, Senior Registrars and Registrars, of whom 10 (63%) were selected for interview.

The proportion of nurses to doctors was higher (67%: 60%) because nurses are in constant contact with their patients, while doctors have more limited contact.

3.3.2 Design of data collection tools

The design was less complex than that employed in Phase 1. A semi-structured interview, based upon a simplified version of the interview schedule designed for children of 5-7 years, was developed for the children aged 3-4 years. The schedules were adapted several times during the pilot study, each time the number of questions being reduced and simplified further. The final schedule consisted of five questions concerned with the presence of pain, its description, and its location (Appendix 14). The method of data collection in this group changed from a semi-structured interview to one based upon the schedule, but intended to appear, from the child's point-of-view, unstructured. The reasons for the change are given in the Pilot Study (Chapter 3.3.5).

Children under three years were not interviewed because of the difficulties in communicating with children who have limited language skills. Instead, they were assessed objectively by the researcher (Appendix 15). Data describing details about the operation and analgesics prescribed and given, were collected for all children after the interview or assessment.

Mothers were interviewed just after their child's assessment or interview. The interviews were carried out in the presence of the child and at the bedside because children under five years became distressed if their mothers tried to leave them. The topics were the same as in Phase 1, but related to children under five years. There were two interview schedules for the mothers: one for mothers of children aged 3 and 4 years (Appendix 16)

and one for mothers of children who were either preverbal or who were beginning to speak (Appendix 17). This ensured that mothers in the second group were not asked inappropriate questions about their child's ability to communicate verbally.

The staff sample was interviewed throughout the data collection period using semi-structured questions. All the staff were asked about their opinions on postoperative pain in children under five years, in particular, its assessment and management (Appendix 18). Those who were new to the study had an initial interview to gather baseline information about their opinions, practice and attitudes to pain in general. This was based on the staff interview schedule in Phase 1 (Appendix 19). As in Phase 1, they were not asked about specific patients.

3.3.3 Pain measures

Two pain measures, appropriate to pre-school children, were selected from the four described in the literature review (Chapter 2.9.3). The method relating to their use is described below.

Objective measurement. The primary pain measure for all children under five years was an adapted version of the Objective Pain Scale (Norden et al, 1991^a). It was chosen in preference to the Children's Hospital of Eastern Ontario Pain Scale (CHEOPS), Toddler Pre-schooler Postoperative Pain Scale (TPPPS) and the Gustave-Roussy Child Pain Scale (DEGR^R). By 1991, CHEOPS was suspected to be unreliable, but the researcher did not know about the findings of Beyer et al (1990) which question the usefulness of even formal observation of behaviour in pain assessment. Had this information been known by the researcher the OPS is unlikely to have been chosen for this study. There were no criteria relating to the scoring of the TPPPS nor information on subsequent action to be taken depending upon the score, so it was excluded. The Objective Pain Scale, which had outcome criteria, appeared easy to administer and was described as having high inter-rater reliability. The original version of the Objective Pain Scale was adapted in two ways as described in the pilot study (Chapter 3.3.5); it included a sixth item, facial expression (Appendix 20). As the study was mainly about assessment rather than management, the criteria set for management purposes were not adapted for the new 6 item scale. The measure was being tested as a research assessment tool rather than a research management tool for pain.

Self report. Self-report is difficult to achieve with young children and although its use is rarely reported in children under five years, Maunuksela et al (1987) suggest that it was

possible in children aged 1.5 years upwards. To test this out, and after discussion about the feasibility of such a concept with a psychologist, whose speciality is child development, self-report was included for children aged 3 and 4 years. This was in the form of a red triangular vertical 1-10cm scale (Appendix 21). The tool was explained in simple terms to each child and he or she was asked to use it to measure their pain.

Observation of behaviour Young children are known to become upset when hospitalised (Eiser and Patterson, 1984; Jago, 1985) and this may involve becoming clingy to their mothers. It was decided that it would be interesting to observe how clingy each child was to their mother postoperatively. This was accomplished by the researcher who used set criteria on a three point scale from not clingy to very clingy.

Mothers and Researcher's Measurements. The mothers and the researcher rated each child's pain as described in Phase 1 (Appendix 4).

3.3.4 Ethical approval and informed consent

Ethical approval was given by the Ethics Committee at the Royal Hospital for Sick Children, Glasgow, prior to both the pilot study and the main study. Informed consent was obtained in writing from a parent of each child (Appendices 22). Every mother and all staff consented verbally. Where the children appeared able to understand what was intended, it was explained simply, preoperatively, that with their permission, the researcher would return on the day after their operation to talk with them, but on the understanding that if they did not wish to cooperate the researcher would leave without question.

3.3.5 Pilot Study

Three doctors and three trained nurses were selected randomly and interviewed. In addition, five of the six were interviewed using the basic schedule (for new staff). No problems arose and less time than anticipated was required, each interview taking 10 minutes.

Five mothers were interviewed, each one taking approximately 10 minutes. Three had children aged 3-4 years and the others had children under three years, so both schedules were tested without difficulty.

No difficulties arose with the assessment of the three children under three years. However, had any child been crying or otherwise distressed the interview would have been stopped. There were problems with the interview schedule for 3-4 years-olds which had to be revised on several occasions. This resulted in the pilot study taking longer than planned and the child sample of children aged 3-4 years being larger ($n=9$). The problems are described below.

(i) The interview schedule appeared too advanced for the comprehension skills of the age-group (3-4 years). The first draft, based upon that used for 5-7 year-olds, was simplified but was too long and, in addition, appeared to require too much concentration from the children. As a result, a question arose over whether this age-group could cope with semi-structured interviews. Although a second draft was shorter it was still unsuccessful for the same reasons.

(ii) A marked difference was noted between children aged 3-4 years and those aged 5 years with respect to the absence of their mothers; the younger group could not tolerate being separated from their mothers. These children were very clingy to their mothers, of whom all but one were present.

(iii) One-to-one interviews with the children of 3-4 years were impossible, creating difficulties with mothers answering for their children. Therefore, mothers were asked not to reply for their child and also not to distract the child; for example, the child appeared 'coerced' if the mother removed their toy, saying "speak to the lady". Mothers did not object to these requests.

(iv) After several attempts using less complicated schedules, one involving only five questions was successful (Appendix 14).

The developmental abilities of children proved even more important than originally believed. This was highlighted by the failure of the initial and subsequent interview schedules with the 3-4 year olds and the eventual simplification to only five questions. Although a marked cognitive difference is suggested between 3-4 year olds and 5 year olds, this may have occurred by chance because of the small numbers; therefore, it could not be assumed that this difference in cognitive ability was the case with all children aged 3-4 years. Nevertheless, unlike 5 year olds, the fact is that all nine children aged 3-4 years appeared unable to cope with a semi-structured interview, that is, formal questioning. The following are suggested by the researcher as reasons for this:

a) the maturational stage of the children, that is their language and comprehension skills, were overestimated by the researcher;

- b) the children were clingy to their mothers and needed a parent present;
- c) the presence of a third person, that is the mother, appeared to distract the child from concentrating on talking to the researcher.

As a result, a simpler method of assessment was justified. It had to be accepted that significantly less data would be collected. The interview schedules were completed immediately after the 'interview' with the child.

All of the children under five years were assessed by the researcher using the Objective Pain Scale. However, this formal pain measure also proved less straightforward than anticipated and it was adapted during the pilot study when difficulties became apparent. Two changes were required. First, it was realised that facial expression was a necessary but absent feature. A child who is crying may be, for instance, frowning, indicating that something is amiss but no account was taken of this possibility in the original scale. Consequently, a sixth item, facial expression, was added in addition to criteria with which to measure it. Secondly, the vital sign section was altered, after discussion with an anaesthetist, because blood pressure was not routinely measured in children having minor surgery. This was replaced with pulse rate or apex beat. One further difficulty was that the pulse rate or apex beat often was not charted by ward staff on the morning after theatre so the researcher measured these herself. The revised objective pain scale is referred to hereafter as ROPS.

The coloured vertical analogue scale designed for the 3-4 years olds was offered to all nine children. Some played with it and others were not interested, but none appeared to understand what it was for.

This pilot study clearly highlighted the difficulties in interviewing young children, as well as the need for skilled communication when trying to elicit specific information about pain from children in this age-group.

3.3.6 Data collection

The data collection was similar in many respects to that of Phase 1. All children admitted for minor surgery and who met the operative and age criteria were considered for the study. All the interviews were conducted by the researcher. Those with the children and mothers took place at the child's bedside or in a location of their choice within the ward, ensuring that privacy was maintained. Staff interviews took place in a ward office, on a one-to-one basis ensuring privacy, and at a mutually suitable time.

Agreement to the interview always was reaffirmed prior to commencing. The data collection period had to be lengthened initially to 9 weeks because of difficulties in obtaining subjects, ward closures and reduced lists over a holiday period. However, it ultimately took place over a 14 week period (January, March-May, 1992).

Differences in the data collection between the Phases 1 and 2 are now summarised:

- (1) Interviews with the children were conducted with the mother absent in Phase 1 and present in Phase 2;
- (2) The mothers were interviewed either at the child's bed or in an office on the ward depending upon the child's wishes and the circumstances on the ward; in Phase 1 the child was never present and in Phase 2 the child was usually present.

Two unanticipated difficulties arose in the data collection. Firstly, in one ward, routine surgical admissions were stopped temporarily, for a period of a few weeks, to accommodate emergency medical admissions; secondly, in another ward many patients having minor surgery were admitted for day surgery rather than as in-patients, thereby reducing the potential study population. Consequently, most patients in Phase 2 were accommodated in the two remaining wards. In order to achieve the planned number of children for the child sample, five children who had minor surgery, but whose operations were outwith the operative category, were included in the study.

3.3.7 Analysis of data

Data were analysed using Minitab. However, on this occasion, analysis of the children's data was simpler because the interviews were considerably shorter. Coding of the data and its protection are as described in Chapter 3.2.7. The analysis was primarily descriptive but chi-squared analysis (standard and Yates Corrected) was used to make comparisons. Advice was sought from a statistician. Standard chi-squared analysis was normally applied; however, if any number in the calculation was equal to or less than 5, Yates corrected chi-squared analysis was applied, to account for the small number(s).

Chapter 4 Results

4.0.0 Samples and response rates

In this study there are three samples; children, mothers and hospital staff. Each of the three samples is described separately. As noted earlier in Chapter 3, the children's sample was divided further into three groups for the purposes of data collection and data analysis. Group A consists of children under 5 years, Group B is children of 5-7 years and Group C is children of 8-11 years; five adolescents aged 12-15 years were interviewed but are excluded from the results because the sample size is small. The results are presented either for a total sample or for a proportion of the sample depending on the understanding of the age group.

4.0.1 Description of children: age, operation and hospital ward

There were 188 potential subjects who met the inclusion criteria for this study within the age, operative and ward categories. A total of 107 children (102 males: 5 females) were included. The age distribution is shown in Table 7. Apart from the five adolescents, the remaining 76 subjects were lost to the study for reasons such as cancelled operations, failure to attend and being unfit for surgery.

Group	Age (years)	No. of children	Total	(%)
A	<1	7	40	(37)
	1	8		
	2	5		
	3	13		
	4	7		
B	5	17	41	(38)
	6	16		
	7	8		
C	8	5	26	(24)
	9	7		
	10	4		
	11	10		
Total		107	107	(100)

Table 7 Age distribution according to Group

The type of operation for each child is detailed in Table 8. The majority of children had either orchidopexy (39%) or inguinal hernia/hydrocele repair (30%).

Operation	No. of children	(%)
Orchidopexy	42	(39)
Hydrocele or inguinal hernia repair	32	(30)
Circumcision	12	(11)
Hypospadias	12	(11)
Bat ear repair	4	(4)
Other	5	(5)
Total	107	(100)

Table 8 Type of surgical operation

As can be seen in Table 9 the majority of patients were from two wards: that is wards 1 and 2.

Ward	No. of children	(%)
1	43	(40)
2	43	(40)
3	18	(17)
4	3	(3)
Total	107	(100)

Table 9 Distribution by ward

4.0.2 Description of mothers' sample

A total of 85 mothers were interviewed; 33 from ward 1, 34 from ward 2, 16 from ward 3 and two from ward 4. Fifty mothers had children aged 5-11 years while 35 had children under 5 years. A total of 71% of the interviewed mothers were resident in hospital with their child.

The data for the remaining 22 mothers are missing; ten missed appointments, no mutually suitable time could be arranged for six; five were working and were unable to be present; and one mother did not visit her child during his hospitalisation.

4.0.3 Description of staff sample

A total of 42 nurses, 24 surgical and 14 anaesthetic staff were interviewed (n=80). A breakdown of staff by designation is shown in Table 10. There were no refusals to participate. Thirty six staff were interviewed for both Phases 1 and 2; the remaining number of Phase 1 interviewees was 23 while the number for Phase 2 was 21 (total 80). However, a further two doctors were excluded from the study after several attempts to arrange interviews failed.

Each ward was represented by a random sample of 11-13 staff consisting of nurses and surgical staff. Anaesthetists were not ward-based and therefore are not included in the 11-13 total.

A majority of staff (63%) had more than two years' experience of working with children. Of the remainder, approximately half (n=16) had between 1 and 2 years' experience in paediatrics; and the rest had less than one year's experience (12 surgical and 2 anaesthetic staff).

Professional group	Designation	Number (n=80)
Nursing staff	Sisters	6
	Staff Nurses	16
	Enrolled Nurses	4
	Student Nurses	16
	<i>All Nurses</i>	<i>42</i>
Surgical staff	Consultants	5
	SR/Registrars	7
	SHO	6
	JHO	6
	<i>All Surgeons</i>	<i>24</i>
Anaesthetic staff	Consultants	6
	Registrars	8
	<i>All Anaesthetists</i>	<i>14</i>
All staff		80

Table 10 Staff sample by designation

Over a third of all staff had received some formal training in the management of pain, that is a minimum of one lecture. This group comprised 21 doctors, of whom 9 were surgical staff and 12 were anaesthetic staff. Of the eight nurses who had received at least one lecture in pain management, 6 were students and 2 were registered nurses.

4.1. Children: verbal reports of pain

4.1.1 Words used by children for 'pain'

It was important to establish what word each child normally used for 'pain'. This question was directed only at children aged 5-11 years (n=67) as the pilot study had demonstrated that those younger than 5 years (n=40) did not understand the question. Children could provide more than one response.

The four most common replies were 'sore' (73%), 'painful' (12%), 'hurt' (9%) and 'very/dead sore' (9%) (Table 11). It is to be noted that five children (aged 5-7 years) used words such as 'a lump' and 'bleeding' which may not be perceived immediately by adults as pain descriptors.

Word	No. of children (n=67)	(%)
Sore	49	(73)
Painful	8	(12)
Hurt	6	(9)
Very/dead sore	6	(9)
Bleeding	4	
Nippy	2	
A lump	1	
Stinging	1	
Skint	1	
Aching	1	
Not understood/did not know	5	(7)

Table 11 Words for 'pain'

The majority of Groups B (78%) and C (65%) chose 'sore'. In order to verify that the word given for 'pain' was understood in the correct context, children were asked to describe something which had been 'sore' using their own words. Many (67%) talked about incidents including falls, injuries and previous operations. Over a third (36%)

volunteered that they had been 'sore' during their current admission, most blaming their operation.

Of the children in Groups B and C, 46 were able to give a description of severe pain. They described their worst hurt as 'sore' (41%), very,very sore' (17%) or very painful (9%) (Table 12). More than one response was provided by some children.

Description	No. of children (n=46)	(%)
Sore	19	(41)
Very very sore	8	(17)
Very painful	4	(9)
Painful	3	(7)
Sharp/like a needle	2	
A pain every second	1	
Really aching	1	
Like blood	1	
Like big staples	1	
Very painful and sharp	1	
Nippy	1	
Nippy and like my leg's lost	1	
A big pain	1	
Very very sore and disgusting	1	
Sore and itchy	1	

Table 12 Descriptions of severe pain (Groups B and C)

4.1.2 Verbal reports of current pain

It had been shown in the pilot study that children of three years and over could state that they were sore at the time of interview. Of the 87 children aged three years and more, 74% said that they were in pain at the time of interview, on their first postoperative day.

As the children's age increased, the proportion who said that they were in pain increased although this was not statistically significant ($p=0.1NS$)

3-4 years	45%
5- 7 years	76%
8-11 years	92%

4.1.3 Type of questions

Only children aged 3 years and upwards were asked questions about pain. The first question was general in nature, for example, 'how are you feeling'? The next question referred to pain specifically; for instance, 'are you sore?' Three of the twenty children aged 3-4 years responded to 'how are you feeling'? with answers referring to pain whereas 15 children replied positively when asked if they were sore. When the same questions were asked of children aged 5-11 years, 17% referred to pain in their reply to the general question and 81% responded positively in their reply to the specific question.

4.1.4 Description of postoperative feelings

Only children in Groups B and C were asked how they had felt on awakening after their operation. Over a third of the children (37%) mentioned pain in some form (Table 13); more than one response was given by some children.

When the children in Groups B and C were asked about how they were feeling on their first postoperative day, almost all (95%) were able to describe how they felt (Appendix 13).

The children aged three years and upwards were asked to describe the quality of their pain. Four children aged 3-4 years could describe their pain and used the following terms; 'hurt', 'sore', 'a bit better' and 'strawberry'; two children aged 3 years said that they did not know how to describe their pain and the question was beyond the ability of the remaining 3-4 year olds. The children over 5 years who were in pain (n=64) at time of interview used a variety of terms to describe the quality of their pain with only the word 'sore' being identified more regularly.(Appendix 13).

Category	Words	No. of children	No. of children per category	(%)
Pain	sore	14	25	(37)
	very sore	4		
	a bit sore	5		
	hurts	1		
Mood	happy	1	2	(3)
	sad	1		
Related to gastro-intestinal tract	very sick	2	4	(6)
	hungry	2		
General	drowsy	15	36	(54)
	fine/okay	9		
	dizzy	4		
	weak	2		
	not very well	2		
	restless	1		
	strange	1		
	sweaty	1		
	numb limbs	1		
Did not know or could not remember		6	6	(9)

Table 13 Descriptions of immediate postoperative feelings (Groups B and C)

4.2 Children: measurement of pain

Information about the severity of pain is required if the pain is to be relieved effectively. In this section, the results using different methods of pain measurement are described, starting with objective assessment and followed by self-report; they are summarised according to Groups A, B and C as follows:

Objective measurement

Visual analogue scale (Groups A, B and C)

Objective pain scale (Group A)

Self-report

Vertical coloured analogue scale (Group A)

Colour tool (Group B)

Faces scale (Group B)

Visual analogue Scale (Group C)

Coloured analogue scale (Group C)

Comparisons are made between the findings from measures used for each age-group. Pain severity is also examined according to operative procedure.

Where analogue scales are concerned, the severity of pain scoring, 0-10, is subdivided into no pain (score 0), mild pain (score 1-3), moderate pain (score 4-6) and severe pain (score 7-10). This is based upon VAS categories used by Powers (1987).

4.2.1 Objective measurement

All Groups (n=107): Visual analogue scale (VAS)

The researcher rated the presence and severity of pain in each child using a 1-10cm visual analogue scale. All children in Groups B and C and the majority of Group A were in pain; this was statistically significant (Table 14 $p=0.005^*$).

Group	In pain	Not in pain	Total
A	34	6	40
B & C	67	0	67
All Groups	107	6	107

$$\chi^2=8.002, df=1, p=0.005^*$$

Table 14 Researcher's ratings of children's pain

Two-thirds of Groups B and C (67%) were in moderate-severe pain while of those in Group A, half (50%) were in mild pain and a quarter (25%) were in moderate pain.

Group A (n=40): Revised objective pain scale (ROPS)

Similar proportions of Group A were in mild (50%) or moderate (23%) pain with ROPS (Table 15). There were 10 missing values because of data collection anomalies, that is, one of the six categories to be scored was missing.

Degree of pain	VAS ratings (n=40) %	ROPS ratings (n=30) %
None	15	13
Mild	50	50
Moderate	25	23
Severe	10	13

Table 15 Distribution of pain severity in Group A: VAS and ROPS

Children aged 3 and 4 years were more likely to be in pain than those under 3 years ($p=0.025^*$ Table 16).

Age	No pain	Pain	Total (n=40)
Under 3 years	6	14	20
3 years-4years 11months	0	20	20
Total	6	34	40

$$\chi^2=4.90, df=1, p=0.025^*$$

Table 16 Experience of pain in Group A: VAS

When the VAS and ROPS scores were compared directly a total of 30 children was used, thereby excluding the missing values for ROPS and the equivalent values for VAS. Proportionally, more children were in (any) pain with the analogue scale than the objective scale (93%:87%) but this was not statistically significant ($p=0.5NS$). Although fewer children were in pain according to ROPS than to VAS, more children were in moderate-severe pain with ROPS (36%) than with VAS (33%). This was not statistically significant ($p=0.5NS$).

Responses from the 20 children aged 3 and 4 years to "are you sore?" were compared with both VAS and ROPS ratings. There was greater agreement with ROPS (61%) than with VAS (47%) but the difference was not statistically significant ($p=0.25NS$).

4.2.2 Self-report

Group A (3-4 years; n=20): Vertical coloured analogue scale

As was reported in the pilot study, self-report of pain assessment was unsuccessful with children aged 3 and 4 years. In the main study, two children understood what was meant, scoring 1/10 (mild pain) and 7/10 (severe pain) respectively. The reliability of

their responses was checked by asking them to explain what they had done and why. The remaining 18 children either played with the tool or showed no interest in it. Measures in the remaining results for children under 5 years are based on ROPS findings, because this objective scale measures more criteria than the visual analogue scale and therefore may be more sensitive.

Group B (n=41): Revised Eland Color Tool

When Group B children were asked postoperatively to choose colours relating to their worst pain, 31 co-operated. Of the rest, 9 appeared not to understand the concept of what was being asked in that they either prolonged making a choice or failed to do so. On the other hand, those who understood, chose a colour immediately. A tenth child decided upon colours but volunteered that he chose the colours because he liked them. Therefore, this child's details are omitted from the colour tool results, reducing the total number to 40.

Initially, the first interviewees were not asked to justify their use of colour in the body outline, however, the majority were asked to do so to ensure understanding and to detect the possibility of colour blindness, of which none was found.

The colour red was chosen most often to represent severe pain (64%); blue or yellow followed, representing both mild and no pain (Table 17). Skin colour and white were not among the options but were volunteered by 17% of children.

Degree of pain	Choice of colour					
	1st	%	2nd	%	3rd	%
Severe	red	64	black	7	nil	
			green	7		
			yellow	7		
Mild	blue	16	yellow	14	red	10
					orange	10
No pain	blue	19	yellow	17	skin/white	17

Table 17 Choices of colour representing pain

Thirty-one children understood the colour-pain association (76%). Twenty two of these children identified and coloured the area of their wound (71%). The presence and severity of their pain is detailed in Table 18. The remaining nine (29%) coloured an area unrelated to the wound as being in severe pain

Degree of pain	No. of children (n=31*)	%
None	2	6
Mild	5	16
Severe	24	77
Total	31	99**

* not understood by 10 children

** rounded to nearest %

Table 18 Distribution of pain severity in Group B: Revised Eland Color Tool

No relationship was shown between those who coloured the operation site as sore and those who said that they were in pain ($p=0.5NS$). The majority of children who both understood the Revised Eland Color Tool, and the majority who did not, stated that they were in pain. In total, ten children (24%), did not understand about the colour association, six of whom said that they were in pain. When subdivided by age or by operation, the numbers were too small to analyse for any possible link. There was no statistical significance between the presence of anxiety and understanding of the colour tool ($p=0.5NS$).

Group B (n=41): faces scale

One child did not understand the request to rate his pain on the faces scale; the remaining 40 did so, many indicating that they were in pain of varying degrees (Table 19).

Degree of pain	No. of children (n=40*)	%
None	16	40
Mild	4	10
Moderate	9	23
Severe	11	28
Total	40	101**

* not understood by 1 child

** rounded to nearest %

Table 19 Distribution of pain severity in Group B: faces scale

There was 73% agreement between verbal responses and the faces scale results: 60% in pain and 13% in no pain. However, of 31 who stated that they were in pain, ten indicated no pain with the faces scale. In addition, of the ten who reported that they had no pain four indicated moderate-severe pain with the faces scale.

The comparison of findings between the colour tool and the faces scale is detailed in Table 20. Many more children rated their pain as moderate-severe with the colour tool than with the faces scale.

Degree of pain	Color tool (n=31) %	Faces scale (n=40) %
None	6	40
Mild	16	10
Moderate-severe	77	50
Total	99**	100

** rounded to nearest %

Table 20 Distribution of pain severity in Group B: Revised Eland Color Tool and faces scale

Of the 15 children who coloured the operation site as severely sore, four indicated severe pain with the faces scale and four indicated no pain. The remaining seven children were in mild (n=3) or moderate (n=4) pain with the faces scale.

Of the eleven children who indicated severe pain on the faces scale, six indicated severe pain with the colour tool. Fifteen indicated no pain on the faces scale but with the colour tool eleven had severe pain, one had mild pain and three had not understood the colour tool. When the distribution of pain, rated by all children using and understanding the two scales, was examined (Table 20), more children indicated pain using the colour tool (93%) than with the faces scale (60%). When asked which tool they preferred, 41% chose the colour tool and 53% the faces scale.

Measures for the remaining results in Group B are based upon colour tool findings. This is because, although not understood by all children, the Revised Eland Color Tool was understood by many and seemed to be more sensitive than the faces scale.

Group C (n=26): Visual analogue scale (VAS)

Twenty-five children successfully used this measure; one did not understand the concept. Most (62%) were in moderate-severe pain (Table 21).

There was 88% agreement between the proportions of children

Degree of pain	No. of children (n=25*)
None	3
Mild	6
Moderate-severe	16
Total	25

* not understood by 1 child

Table 21 Distribution of pain severity in Group C: VAS

Group C: Coloured analogue scale (CAS)

The same children also rated their pain using the coloured analogue scale set on a horizontal axis. All understood the tool. Of the 26 children, 58% were in moderate-severe pain (Table 22.)

Degree of pain	No. of children (n=26)
None	4
Mild	7
Moderate-severe	15
Total	26

Table 22 Distribution of pain severity in Group C: CAS

There was 88% agreement between the proportions of those who stated that they were or were not in pain and the findings with this scale.

The comparison of findings between the two analogue scales showed little difference and is detailed in Table 23. There was 60% agreement when the findings from the two scales were compared. When the degrees of pain, as measured by each analogue scale, were compared the findings were not statistically significant ($p=0.5NS$).

Degree of pain	VAS (n=25) %	CAS (n=26) %
None	12	15
Mild	24	27
Moderate-severe	64	58
Total	100	100

Table 23 Distribution of pain severity in Group C: VAS and CAS

When asked which of the two analogue scales they preferred, there was a clear preference for the coloured analogue scale (81% : 19%).

Measures for Group C in the remaining results are based upon the CAS ratings. This is because the results were very similar and there was a preference for the coloured scale by the children concerned.

4.2.3 Comparison of pain ratings by operation

Although it was not possible to analyse statistically the degree of pain by individual operation because of the small numbers, it was possible to examine the distributions. The most usual distribution of pain ratings for each operation from the children in Groups B and C, mothers and the researcher are detailed in Appendix 23. In most operative categories, the pain ratings of the mothers and the researcher were less severe than the ratings given by the children.

4.3 Children's experience of pain

This section examines the children's feelings about hospitalisation, their past experience and expectation of pain, sleep and pain, their perceptions of others' recognition of their pain and their current experience of pain relief.

4.3.1 Children's feelings about hospitalisation

Two-thirds (69%) of the children in Groups B and C wondered what would happen to them in hospital. Of these 46 children, 26 admitted to worrying about what would happen.

Most children in Groups B and C (n=48) gave accurate descriptions of why they were in hospital; eleven (16%) did not know, while the remainder (12%) gave vague descriptions. There was 69% agreement between the children and their mothers that they knew or did not know why they were in hospital.

Fourteen children in Groups B and C admitted to being afraid hospital. When asked why they were afraid, a small proportion (6%) volunteered a fear of injections. When the 14 children who admitted to being afraid were asked what they were *most* afraid of, injections (n=3) and operations (n=3) were the usual answers; the remaining eight gave

a variety of responses. Separation from their family and home was not mentioned by any child. When all children in Groups B and C were asked specifically about injections, 36% admitted to being afraid. There was some difference between age-groups: fewer of Group B (53%) than Group C (62%) were afraid but this was not statistically significant ($p=0.5NS$).

Sixty six children (99%) in Groups B and C knew that they were to be admitted to hospital. One child had not been told prior to admission either about coming into hospital or about having an operation; this was corroborated by the mother. Forty children (61%) had been told what would happen. Proportionally more children in Group C (73%) than in Group B (51%) had been told what would happen and this difference was statistically significant (Table 24; $p=0.01^*$).

Knowledge	Group B (n=41)	Group C (n=26)	Total
Told	21	19	40
Not told	20	7	27
Total	41	26	67

$$\chi^2=3.16, df=1, p=0.01^*$$

Table 24 Children's knowledge about what would happen in hospital

Over two-thirds of the children (70%) in Groups B and C could give an accurate description of what would happen. Although proportionally fewer in Group B were able to do this, it was not to be a significant factor (Table 25; $p=0.5NS$). A larger sample might have produced different results.

Description	Group B (n=41)	Group C (n=26)	Total
Accurate	28	19	47
Vague/none	13	7	20
Total	41	26	67

$$\chi^2=0.17, df=1, p=0.5NS$$

Table 25 Children's ability to accurately describe what would happen

More children over five years knew why their operation was necessary and what operation had been done (Table 26).

Group	Why operation necessary %	What operation done %
B (n=41)	34	54
C (n=26)	77	81

Table 26 Children's understanding of their operation

Age played a part in this understanding: that is, more of Group C than Group B knew why the operation was necessary (Table 27; $p=0.001^*$) and what operation was performed in theatre (Table 28 $p=0.05^*$).

Reason for surgery	Group B (n=41)	Group C (n=26)	Total
Known	14	20	34
Not known	27	6	33
Total	41	26	67

$$\chi^2=11.65, df=1, p=0.001^*$$

Table 27 Children's knowledge of why surgery was necessary

Operation	Group B (n=41)	Group C (n=26)	Total
Known	22	21	43
Not known	19	5	24
Total	41	26	67

$$\chi^2=3.98(y.c), df=1, p=0.05^*$$

Table 28 Children's knowledge of which operation was performed

Less than half of the children over 4 years had been told that they were to have an operation by their parents (44%); a further 49% had been told by a doctor. Both parents and a doctor had discussed this with three children. The remaining three children had discovered about their operation by opening mail from the hospital.

4.3.2 Past experience of pain

When children in Groups B and C were asked to talk about their worst (ever) experience of pain, a variety of responses were given; these included past injuries (52%) and their present operation (22%).

4.3.3 Expectation of postoperative pain

Over half of the children in Groups B and C (58%) expected to have pain postoperatively. The majority of these 39 children were less sore than they anticipated (69%). However, 12 experienced more pain than they had expected (31%). The remaining 28 children believed that they would have no pain. There was a significant difference ($p=0.025^*$) between Groups B and C in the amount of pain expected, with more of Group C than Group B anticipating pain (Table 29).

Pain	Group B (n=41)	Group C (n=26)	Total
Expected	20	19	39
Not expected	21	7	28
Total	41	26	67

$$\chi^2=4.74, df=1 p=0.025^*$$

Table 29 Children's expectation of postoperative pain

4.3.4 Cause of pain

Many children in Groups B and C (54%) said that their pain was caused by either their stitches or their wound. Fewer children in Group B (36%) than Group C (72%) made this connection: statistically, age was related to the cause of their pain (Table 30 $p=0.005^*$). However, there were ten missing values and had these been included the results might have been different.

Cause of pain	Group B (n=41)	Group C (n=26)	Total
Wound or stitches	10	21	31
Not wound or stitches	18	8	26
Total	28	29	57**

$$\chi^2=7.73, df=1, p=0.005^*$$

**10 missing values

Table 30 Cause of pain

4.3.5 Anxiety about operations

The majority of children in Groups B and C (55%) said preoperatively that they had thought a great deal about their operation. These 37 children had undergone orchidopexy, hernia or hydrocele repair and hypospadias repair, rather than circumcision

or bat ear repair. The 37 children were almost equally divided between Group B (56%) and Group C (58%).

Group C were asked how much information they would prefer to have had about what was to happen to them; of the 26, half (50%) said everything, a third (35%) said some and three (12%) wanted no information.

4.3.6 Sleep and pain

Of the 67 patients in Groups B and C, over a third (39%) did not sleep on the first postoperative night. As Table 31 demonstrates, the most common reason was pain.

Reason	No. of children (n=26)	(%)
Pain	13	(50)
Nausea	3	
Baby crying	3	
Toilet	2	
Thirst/noise	1	
Had to keep eyes open	1	
Did not know	3	

Table 31 Reasons for sleep disturbance

4.3.7 Recognition of pain: children's perceptions

Over three-quarters of Groups B and C (79%) felt that their pain needs were understood by adults. Over half (57%) were of the opinion that nurses always knew when they were in pain. Age was not a discriminating factor, as the group comprised 59% of Group B and 54% of Group C.

The 67 children in Groups B and C had varying ideas about who knew best when they were in pain. Some cited their mothers (22%) while the others were divided equally between nurses (37%) and doctors (37%). Age made no difference to the children's responses (parents $p=0.5NS$; nurses $p=0.5NS$; doctors $p=0.5NS$). The fact that professionals were chosen more than mothers was not significant ($p=0.5NS$). There was agreement between ten of the patient sample and their mothers that parents were the best judge; one mother and child agreed that staff were best.

Eleven children in Groups B and C (16%) had been told that they should be in no pain; most by their mothers (n=6) and a few by nurses (n=3) or doctors (n=2).

4.3.8 Children's ideas of how to relieve pain

When asked what relieved (any) pain at home, the most usual ideas from Groups B and C were topical remedies such as elastoplasts, cream, rubbing (33%), followed by 'medicine' (18%). The remaining children gave a variety of responses. Although more children in Group B stated a topical remedy and more in Group C stated medicine (Table 32), these responses were not statistically significant (topical remedy $p=0.5NS$; medicine $p=0.5NS$).

Group	Remedy	Children (%)
B	topical	37
C		27
B	medicine	15
C		23

Table 32 Children's ideas about pain relief

The children in Groups B and C were asked what helped their current (postoperative) pain. The most usual replies were immobility (30%), medicine (22%), or topical care such as cream or elastoplast (15%). The differences in responses between the age-groups are illustrated in Table 33. Immobility was statistically significant in that it was selected by more of Group C than Group B (Table 34 $p=0.025^*$). The fact that more of Group B than Group C chose topical remedies appears to have no statistical significance ($p=0.1$) but had the sample been larger the results might have been different; and no relationship was found between the age-groups and the choice of medicine ($p=0.25$).

Group	Remedy	Children (%)
B	topical	22
C		4
B	medicine	17
C		31
B	immobility	41
C		12

Table 33 Children's ideas about postoperative pain relief

Pain relief remedy	Group B (n=41)	Group C (n=26)	Total
Immobility	17	3	20
Other strategies	24	23	47
Total	41	26	67

$$\chi^2=5.45 \text{ (yc), df=1, } p=0.025^*$$

Table 34 Immobility and pain relief

4.3.9 Current experience of pain relief

Of the 67 children in Groups B and C, 50 realised that they had been given analgesic pain relief; of these children, 24% had complete relief from their pain, 67% had some relief and 8% had no relief. The four who had had no relief were split equally between Group B (n=2) and Group C (n=2).

The remaining 15 children in Groups B and C (22%) said that they had been given nothing to relieve their pain. A statistical relationship ($p=0.025^*$) was found between children in Group C who had been given analgesics (Table 35) but not with those in Group B ($p=0.5\text{NS}$); that is the older children in Group C were more likely to know that they had been given some medicine to relieve their pain.

Analgesic medication	Received	Not received	Total (n=26)
Administered	20	2	22
Not administered	1	3	4
Total	21	5	26

$$\chi^2=5.70 \text{ (yc), df=1 } p=0.025^*$$

Table 35 Knowledge of having received analgesic medication (Group C)

4.4 Children's reaction to pain

An important objective of this study was to learn as much as possible from the children themselves about their pain. This section examines the children's impressions of the cause of their pain, if they are able to describe and localise their pain and observations by the researcher of their behaviour postoperatively.

4.4.1 Anxiety and pain

Approximately half of Groups B and C (n=34) said that they preferred to be told in advance about the possibility of pain. This group comprised more from Group C (65%) than Group B (41%); the difference in ages was statistically significant (Table 36 $p=0.05^*$).

Warning	Group B (n=41)	Group C (n=26)	Total
Preferred	17	24	41
Not preferred	17	9	26
Total	34	33	67

$$\chi^2=3.64, df=1, p=0.05^*$$

Table 36 Preference for advance warning about pain

According to Groups B and C, 25 children had been told about the possibility of postoperative pain: fourteen by parents, seven by doctors and four by nurses. Ten out of the eleven children informed by staff were from Group C; the eleventh was aged 5 years. Of the 31 children in Group B who reported that they were in pain, 23 (74%) reported being anxious; of 24 children in Group C who reported that they were in pain, 15 (63%) reported being anxious. There was evidence of a possible relationship between pain and anxiety in Group B, however, although this is of interest, the relationship was not statistically significant at 5% ($p=0.1$). It is possible that a larger sample might provide evidence of such a relationship. There was no evidence of any relationship between pain and anxiety for Group C ($p=0.5NS$).

4.4.2 Localising the site of the pain

Forty nine of the 54 children in Groups B and C, who said that they were sore, localised the site of their pain. This was statistically significant for both groups at $p=0.001^*$ (Tables 37 and 38).

Pain	Stated pain present	Stated no pain	Total (n=41)
Localised	26	0	26
Not localised	5	10	15
Total	31	10	41

$$\chi^2=19.45(\text{yc}), \text{df}=1, p=0.001^*$$

Table 37 Ability to localise pain (Group B)

Pain	Stated pain present	Stated no pain	Total (n=26)
Localised	23	0	23
Not localised	0	2	2
Total	23	2	25*

$$\chi^2=19.92(\text{yc}), \text{df}=1, p=0.001^*$$

*1 missing value

Table 38 Ability to localise pain (Group C)

When the twenty children in Group A who were aged 3-4 years were asked to localise the site of their pain, 15 understood what was being asked of them; ten pointed to their wound site and five repeated that they were not sore; five did not answer. Seven out of eight children aged 3-4 years, who admitted or denied the presence of pain, also localised the site of their pain. One child stated that he had no pain but localised a painful site at his wound.

4.4.3 Admission or denial of pain

Seventy nine per cent of children in Groups B and C stated that they would tell someone if they were in pain. This occurred more with Group C than with Group B (96%: 68%) and was statistically significant at $p=0.025$ (Table 39). Of those who would tell someone ($n=53$), over two-thirds (69%) would tell their parents, over half (57%) would tell nurses and 8% mentioned doctors; some children gave more than one response. Over half of Group B said that they would confide in their mother (59%) while Group C were equally divided between their mothers and nurses.

Admission of pain	Group B (n=41)	Group C (n=26)	Total
Yes	28	25	53
No	13	1	14
Total	41	26	67

$$\chi^2=5.88(\text{yc}), \text{df}=1, p=0.025^*$$

Table 39 Admission of pain (Groups B and C)

Thirteen children would not tell anyone if they were in pain for a variety of reasons. Three did not know why and four gave inappropriate replies; of the remaining six, who were all from Group B, three said "they would laugh at me", one did not want 'them' to know, one felt that whoever he told would run away and the sixth stated that his mother had told him not to admit to pain.

When asked directly if they would deny the presence of pain, over one third from Groups B and C (n23) claimed that they would. This group comprised of almost half of Group C (46%) and just over a quarter of Group B (27%). This difference between the ages appears to have occurred by chance ($p=0.1\text{NS}$).

Almost half of the children in Groups B and C (48%) stated that they would deny pain to avoid an injection. Although more were in Group C (50%) than in Group B (39%), this was not statistically significant ($p=0.5\text{NS}$).

4.4.4 Children's perceptions of expected behaviour when in pain

Most children in Groups B and C (82%) stated that they felt as though they had to be brave after their operations: the exception was the group having hypospadias repair, many of whom said that they did not feel as though they had to be brave (60%). The 59 children who felt as though they had to be brave were from Groups B (80%) and C (88%). When asked if they ever feel like crying when they had pain, many children (70%) said that they did; of these forty, 30 always cried, seven sometimes did and three never did.

4.4.5 Observed behaviour 24 hours postoperatively

The behaviour of children in Group A was assessed on a three-point scale, by observing the extent of clinginess (physical or emotional closeness) to the mothers when the researcher was present. Most children were either not clingy (45%) or a little clingy

(42%); the remaining 13% were very clingy. Following orchidopexy and hypospadias repair, more children were clingy (70% and 71% respectively) than after hernia/hydrocele repair or other operations (47% and 33% respectively). Despite the differences in proportions these results were not statistically significant although a larger sample might have produced different findings.

Groups B and C were assessed on a three point scale by observing their behaviour, position and mobility when the researcher was with them postoperatively. The most usual observed behaviour in each category was behaviour - smiling (66%), position - relaxed (47%) and mobility - limited activity (70%) as can be seen in Table 40.

Behaviour (n=67) %		Position (n=67) %		Mobility (n=67) %**	
Smiling	66	Relaxed	47	Active	11
Groaning	33	Flinching	45	Activity limited	70
Crying	1	Rigid	8	Immobile	20

** rounded to nearest %

Table 40 Researcher's assessment of behaviour (Groups B and C)

Just over half of the 25 children who were groaning or crying had undergone orchidopexy (n=13), but this was only a third of all those who had orchidopexy. The same group of 25 also included half of the patients who had undergone hypospadias repair and bat ear repair. The majority of children who were flinching or rigid had also undergone orchidopexy (n=20). Half of each operative group were in this category. Where mobility was concerned, most of the children were limited in their activity or immobile (90%), however, some were on bedrest. As bedrest was a variable of unknown quantity, mobility was not analysed further.

No evidence of a relationship was shown between those complaining of pain and behaviour ($p=0.5\text{NS}$); or between those complaining of pain and their position ($p=0.25\text{NS}$).

4.4.6 Distraction from pain

Over half of Groups B and C (n=38) claimed that they tried to distract themselves from pain. This group comprised of over two-thirds of Group C (69%) and almost half of Group B (49%); age was not a significant factor ($p=0.1\text{NS}$). Many children stated that they would distract themselves from pain by watching television (n=24) or by playing

(n=8). These findings were similar to the views of staff about children's use of distraction.

When specifically asked if they would get up to play when they were in pain, 33% of Groups B and C responded positively. This group comprised of eleven from each of Groups B and C but the difference between the age-groups is of no significance ($p=0.25NS$). The most usual reason given by the children for getting up to play was to take their mind off their pain (n=8).

4.5 Mothers' responses

Mothers often accompany their child in hospital. Because of their role as carers, mothers' beliefs and opinions about pain and how their children cope with pain were sought; a comparison of responses was then made between mothers and their children and between mothers and staff.

4.5.1 Past experience of pain

The majority of mothers (95%) reported having experienced pain at some time in the past. When asked about surgery, almost three-quarters of the mothers (72%) had undergone an operation; of these 61 mothers, most (n=50) remembered having pain. Sixteen of the 50 were surprised at the severity of their pain (32%).

4.5.2 Word used by families for 'pain'

When asked which word each family used for 'pain', more than one response per mother was given. The majority of mothers replied 'sore' (71%) but 'hurt' (24%), 'painful' (5%) and 'discomfort' (2%) were also given. Two-thirds of the children from Groups B and C and their mothers agreed on the same word (67%).

4.5.3 Mothers' perceptions of their child's behaviour

Eighty per cent of mothers stated that they were worried about what would happen to their child in hospital.

A third of mothers whose children were aged three years upwards were of the opinion that their child was worried about what would happen in hospital. Some mothers (29%) stated that their child worried about the operation. Of these 25 mothers, 21 felt that an attempt to relieve the child's worry could be made by, for example, explanation from the parents (8) or being given a gift postoperatively (7). Other varied responses were given.

Of all the mothers with children aged 5 years upwards ($n=50$), half were in agreement with their children, either that the child was worried (22%) or that the child was not worried (28%). Of the other half, most mothers said that their child did not worry when the child admitted to worrying (72%) and the rest of the mothers stated that the child worried when the children denied this (28%).

When asked what caused most fear for hospitalised children, the most usual replies from mothers were unfamiliar faces and surroundings (28%) and injections (19%) for children from Groups B and C, and unfamiliar places and people (61%) for Group A children. One-in-ten mothers of Groups B and C children mentioned either pain, leaving their child, or the child not knowing what will happen. There was little agreement between Groups B and C mothers and children, only two agreeing that injections caused most fear for children in hospitals.

Two-thirds of the Groups B and C mothers (67%) said that they believed that children over five years try to be brave when they are in pain. Twenty six mothers and their children (53%) agreed that the child should behave bravely when experiencing pain and two (4%) agreed that this was not necessary. Fifteen mothers replied that their child did not need to be brave when their child responded that he should be brave (31%); the remaining seven mothers and children disagreed, the mothers stating that the child should be brave when the child said the opposite. Fourteen mothers believed that the gender of the child was influential, the majority ($n=13$) believing that boys hide their pain more than girls.

Most mothers (86%) were of the opinion that, compared with professionals, they were the best judge of their children's pain; the remaining mothers cited health professionals (doctors 10%; nurses 6%). More than one response was allowed.

Over half of the mothers of Groups B and C children (55%) felt that adults have difficulty understanding children's descriptions of pain.

4.5.4 Mothers' expectations of their child's condition

Mothers of children in Groups B and C were asked what degree of pain children should expect postoperatively. Although the most usual responses were in the same order as those of the staff, the proportions were very different: fewer mothers than staff expected children to have no pain postoperatively (Table 41). The difference in responses between the mothers and staff was not statistically significant at $p=0.1$. A larger sample might have produced different findings.

Opinions from	No pain %	Mild pain %	Moderate-severe pain %
Mothers (n=50)	42	38	20
Staff (n=80)	70	26	5

Table 41 Expectations of pain severity (mothers of Groups B and C and staff)

Mothers of all children had differing opinions about whether their child's pain was more or less than *they* expected. Some reported that their child's pain was either less than (45%) or about what they expected (31%) but 18% stated that their child's pain was worse than they had expected. Five of the remaining six mothers stated that their children were not in pain and the sixth could not answer the question. Of the 15 mothers whose child's pain was more than expected, nine described their child as being in 'moderate pain with limited activity', and two, with children in Group A, 'very upset and in severe pain'. One mother whose child was 'unable to get up and in severe pain' had expected this. The remaining three gave various responses.

The majority of mothers (95%) accurately described why their child was admitted to hospital. Two-thirds of these 81 mothers and their children concurred. Almost all the mothers (96%) stated what operation their child had undergone; three did not know.

Under half of the mothers (46%) reported that they had told their child about the impending operation; more children in Group A than in Groups B and C were told (54%: 40%). When the mothers were asked whose professional responsibility it was to tell children and their families about postoperative pain, the most usual responses were surgeons (47%) or nurses (32%); few stated anaesthetists (7%); the remaining 14% offered various responses. Twenty-seven mothers of children in Groups B and C (54%) said that their child had been told by staff about postoperative pain. Of all the interviewed mothers, thirty (35%) had been informed that their child could have pain postoperatively, by doctors (n=17), nurses (n=10) and others (n=3). A total of 69% of

all mothers believed that their children should be told in advance if a procedure was to cause pain: Group A (63%) Groups B and C (74%).

Approximately half of all the mothers (54%) were of the opinion that giving children factual information about what might happen resulted in the children worrying less while 21% felt that it would make no difference and 13% believed that this would create further worry. The remaining mothers replied with responses such as "it depends on the child". When asked specifically about their child, 96% of the mothers with children aged 3 years or more felt that their child would rather be told all (59%) or some (37%) of what would happen.

Mothers were questioned on their knowledge about pain. This was achieved by asking about their beliefs concerning pain in children. Approximately half of the mothers (49%) felt that children's distress was more due to being homesick than to being in pain; one-in-four mothers (24%) were of the opinion that children do not experience as much pain as adults and that injection is the best method of relieving pain (25%); one-in-three mothers (35%) stated that postoperative pain cannot be prevented; and very few mothers (2%) believed that active children are not in pain. Some differences were noted in the responses of mothers of children from different age-groups; these are detailed in Table 42.

Question Have you heard that:	Group A mothers (n=35) %	Groups B and C mothers (n=50) %
Children have less pain than adults	37	24
Injection is the best method of relieving pain	8	31
Postoperative pain cannot be prevented	40	31

Table 42 Positive responses from mothers to questions about pain

4.5.5 Mothers' impressions of their child's immediate postoperative condition

Ninety-eight per cent of all the surveyed mothers were present when their child awoke postoperatively. When asked about their child's condition at that time, a number of mothers fitted into each category on a 5 point scale from 'not upset and in no pain' to 'very upset and in severe pain'. The responses differed between groups of mothers: those with children in Group A reported that their children were less upset or in less pain

than mothers of children in Groups B and C (Table 43). This finding was statistically significant (Table 44 $p=0.005^*$). In addition, some mothers volunteered that their children were crying but not in pain (mothers of Group A 8%; mothers of Groups B and C 11%).

Scale of distress	Group A mothers (n=35) %	Groups B and C mothers (n=50) %
Not upset and in no pain	16	29
Not upset and in slight pain	18	37
Slightly upset and in some pain	34	11
Upset and in moderate pain	12	3
Very upset and in severe pain	12	9
Other responses	8	11

Table 43 Immediate postoperative condition of children

Degree of upset/pain	Group A mothers (n=35)	Groups B and C mothers (n=49**)	Total
Upset and in some-severe pain	12	32	44
Not upset and in slight-no pain	23	17	40
Total	35	49	84

$$\chi^2=7.88 \text{ df}=1 \text{ } p=0.005^*$$

**1 missing value

Table 44 Children's degree of upset/pain

Seventy-two per cent of the mothers who stayed with their child overnight in hospital (n=43) said that their child had not slept well on the first night after their operation, the most usual reason being pain (21%).

The majority of mothers (82%) agreed that their child would confide in them if they were in pain, 8% believed that their child would confide in nurses and 2% in doctors; the remaining 8% stated a combination of mothers and staff. When cross-tabulated, there was 24% agreement between mothers and their children that the children would admit about pain to their parents. When asked specifically about whether their child would volunteer the presence of pain to staff, 68% of the mothers responded positively.

4.5.6 Mothers' assessment of their child's pain

Fifty-six mothers (66%) of children of all ages reported that their child was in pain on the day after operation; almost all (90%) described this as wound pain. The majority of mothers said that their child complained of wound pain intermittently (63%). A quarter of the mothers with children in Groups B and C (24%) stated that their child never complained of wound pain. One mother stated that her child, aged 9 years, constantly complained of pain. Of the 17 mothers of Group A children who believed that their child was in pain, seven stated that the child sometimes complained of pain.

The mothers were asked to rate the severity of their children's pain, on a scale of 1-10 where 0 was 'no pain' and 10 was 'severe pain' (Appendix 4), at the time of interview. Table 45 demonstrates that almost half of the mothers of Group A and of Groups B and C children rated their child's pain as moderate or severe. Almost two-thirds of the mothers (66%) stated that their child was in pain, yet nearly all (95%) indicated with the visual analogue scale that the child was in pain of varying degrees.

Degree of pain	Group A mothers (n=35) %	Groups B and C mothers (n=50) %
None	3	4
Mild	51	52
Moderate	37	30
Severe	9	14
Total	100	100

Table 45 Mothers' pain ratings

A comparison was made of the pain ratings of Group A mothers and the researcher's pain ratings using VAS and ROPS. The mothers' scores were closer to the ROPS scores than to the VAS scores; more mothers rated their children in moderate-severe pain (47%) than the researcher had done (ROPS 36%; VAS 33%).

When the responses of children aged 3 years upwards were compared with their mothers' responses to a question about the presence of pain at interview, thirty-nine mothers and their children (59%) agreed that the children were in pain and nine mothers and their children (14%) agreed that the child did not have pain; the total agreement was 73%. The responses of the remaining 27% differed.

4.5.7 Mothers' impressions of their child's postoperative pain relief

Approximately a third of mothers with children aged 3 years or more (31%) said that their son or daughter would ask for painkillers. 15% of all mothers indicated that they were asked regularly if their child needed pain relief but 40% stated that they were never consulted; the remaining mothers (45%) indicated that their child was offered analgesics but not on a regular basis. Almost two-thirds of all mothers had asked for analgesics for their child (66%). Of these 56 mothers, 24 reported that the drug was administered immediately, 20 stated that this took a 'long time' (long unspecified) and 12 had to ask again; three mothers said that analgesic medication was never administered at this time. Four mothers did not inform staff of their child's continuing pain (7%).

The majority of all mothers (91%) expected painkillers, given after an operation, to completely (45%) or mainly (46%) relieve pain. Over half of the mothers (58%) felt that their child's pain was completely relieved.

Ten mothers (11%) worried about their child being given potentially addictive drugs while in hospital; this was less than estimated by the staff, of whom fewer than half of whom (40%) felt that parents worry about this.

Less than one-in-four mothers reported that their child would deny pain (22%). Three principal reasons for this were given by the 15 mothers with children in Groups B and C: the child did not like causing a fuss (n=3), the child did not want any medicine or injections (n=3), or the child believed that admitting to pain could keep him/her in hospital for longer (n=2). Other reasons were given only once each.

Thirty one per cent of mothers and their children from Groups B and C agreed that the youngsters objected to injections and 15% agreed that they did not. Over one third (38%) of the children preferred not to have injections when their mothers said that their child did not mind.

Mothers of children in Groups B and C suggested that medicine (54%), comfort (30%) or distraction (10%) helped their child when he was in pain. Most mothers (82%) of children aged 3 years upwards felt that children would distract themselves from pain.

4.5.8 Mothers' expectations for analgesics for discharge

Approximately half of the mothers (51%) had analgesics at home for when their child was discharged home. Almost one quarter of the mothers believed that painkillers would not be necessary (22%) and less expected to be given a supply from the hospital (14%) or planned to buy some (8%). Five per cent said that they would ask their General Practitioner for analgesic drugs if necessary.

4.6 Staff recognition of children's pain

No local survey of the normal methods of pain assessment by staff or their beliefs about issues which influence pain has been reported. Consequently, staff opinions about children's abilities to recognise and articulate their pain needs were sought because they could influence the staff's assessment of and attitudes to children's pain.

4.6.1 Children's behaviour

Staff were asked which factors could influence children's perception and expression of pain. Many staff talked about psychological factors, such as the benefit of parental presence, fear and personality (71%); physiological factors, such as type of operation, mobilisation postoperatively and fear of being given an injection (66%); a number stated that they believed that analgesics were inadequate (20%). Issues such as culture, environment, age and attitudes were rarely considered. More doctors believed that psychological factors were influential whereas more nurses believed that physiological factors were of greater importance. However, these views contradict other opinions given by staff as to how personal pain experience influences their management of children's pain (see Chapter 4.7.1). Overall, nurses included a greater selection of influences than doctors (Table 46); more than one response was allowed.

All staff except three trained nurses believed that a child's age and maturity influences the way in which children react to or communicate pain; the principle reason for this was that the older children are more articulate (80%).

Factors	All staff (n=80) %	Nurses (n=42) %	Surgeons (n=24) %	Anaesthetists (n=14) %
Psychological	71	56	87	100
Physiological	66	65	60	80
Analgesics	20	12	40	20
Cultural	10	6	7	30
Environmental	8	15	0	0
Attitudes	3	6	0	0
Age	3	3	7	0
Sex	2	3	0	0
Other	2	0	7	0

Table 46 Factors which influence children's pain

When considering children over five years, 56% of the staff were of the opinion that these children try to be brave by not crying when they have pain. Of these 33 staff, 13 stated that the gender of the child was influential: seven believed that girls hide their pain more, and the remaining six that boys do. Half of the staff (51%) had told children aged five years upwards that there was no need to be brave when they were in pain; in other words, it was acceptable for them to cry. When considering children under 5 years, 27 staff felt that such children try to be brave; less than half (n10) felt that gender was influential, three believing that girls hide their pain more, and the remaining seven that boys do.

The sex of the staff appeared to be an influence on staff opinion about children's bravery. Female nurses and mothers felt that boys hide their pain more than girls but doctors, who were almost all male, were of the opinion that girls hide their pain more than boys. When nurses, surgeons and anaesthetists were examined separately, nurses believed that males hide their pain more, surgeons were of the opinion that females hide their pain more and anaesthetists believed that there was no difference between the sexes.

Many staff (73%) stated that fatigue would increase pain perception in children over five years; one member of staff felt that fatigue would decrease pain perception and the rest (22%) did not know. Few staff (22%) believed that fatigue would increase pain perception in children under five years. The fact that staff had different beliefs about children's pain perception in relation to fatigue was statistically significant ($p=0.001$) in

that younger children were thought less likely to have increased perception of pain caused by fatigue (Table 47).

Fatigue	Children <5 years	Children >5 years	Total
Influential	13	43	56
Not influential	45	16	61
Total	58	59	117

$$\chi^2=29.85, df=1, p=0.001^*$$

Table 47 Fatigue and pain perception

4.6.2 Fear and pain

The majority of staff (98%) were of the opinion that children over 5 years worry about what might happen to them in hospital, and a smaller proportion (91%) felt children under 5 years worry. The most usual responses from staff and mothers to the main causes of fear for hospitalised children of different ages are detailed in Table 48 (children under 5 years) and Table 49 (children over 5 years). The largest proportions of nurses, surgeons and anaesthetists chose the same cause for each age-group: what might happen, in the case of children under 5 years and injections in the case of children over 5 years. These differed from the first choice of mothers which was strange places or people, regardless of the children's age.

When asked what children were *most* afraid of in hospital, almost half of the staff (47%) were of the opinion that this was injections. One nurse and one doctor mentioned separation from parents. The majority of staff believed that fear increases pain (95%).

Cause of fear	Nurses (n=34) %	Surgeons (n=15) %	Anaesthetists (n=9) %	Mothers (n=35) %
Injections	15	13	0	11
What might happen	62	47	67	0
Strange places or people	32	40	22	61
Theatre	56	40	67	0
Doctors/white coats	0	0	0	14

Table 48 Principal causes of fear for children under 5 years (staff and mothers' perceptions)

Cause of fear	Nurses (n=34) %	Surgeons (n=15) %	Anaesthetists (n=10) %	Mothers (n=50) %
Injections	38	60	70	19
What might happen	24	20	0	9
Strange places/people	0	0	0	28
Something will hurt	29	27	0	0

Table 49 Principal causes of fear for children over 5 years (staff and mothers' perceptions)

4.6.3 Admission or denial of pain

Many staff believed that children of all ages would deny the existence of pain. Although the proportions differed according to the child's age-group (under 5 years 66%; over 5 years 80%), this was not statistically significant ($p=0.1NS$). All staff stated that, when in hospital, children would confide pain in their parents.

Just over half of the staff (53%) said that they always believe a child who complains of pain. The 28 staff who did not represented all grades and comprised of almost half of the nurses (44%), over a third of the anaesthetists (40%) and almost two-thirds of the surgeons (60%).

4.6.4 Customary method of pain assessment

Staff were asked to describe their customary methods of assessing children's pain. Nurses, surgeons and anaesthetists normally decided whether children over five years were in pain, using three principle methods: verbal and non-verbal communication such as facial expression, speech or lack of speech (64%); observation of behaviour, for instance, body language, general attitude (59%); or by clinical impression, considering the operation, drugs administered and vital sign recordings (31%). Some staff gave more than one answer.

The responses were similar when children under five years were considered: verbal and non-verbal communication (57%), observation of behaviour (52%) or by clinical impression (31%). Over half of the staff (53%) did not consider children's language skills when assessing pain in this age-group and one-in-three staff claimed to assess pain in all children under five years in the same way. Fewer staff (22%) stated that they would assess pain in children over five years in the same way. Of the remaining 46 staff, almost half differed in their assessment technique by considering the child's ability to

comprehend (n=22), over a quarter considered the child's clinical condition, for example, pain or the operative procedure (n=12), and the rest (n=10) considered the child's psychological state, for instance, preoperative anxiety and previous experience of pain.

A minority of staff (29%) claimed to always know when children over five years are in pain; a larger proportion (43%) claimed to know when children under five years are in pain. When nurses, surgeons and anaesthetists were examined separately, more nurses and surgeons claimed to always know when children under five years were in pain whereas more anaesthetists claimed to always know when children over five years were in pain (Table 50).

Children's ages	Staff (n=) %	Nurses (n=42) %	Surgeons (n=24) %	Anaesthetists (n=14) %
Under 5 years	29	50	40	22
Over 5 years	43	32	20	30

Table 50 Staff ability to recognise pain in children

Approximately half of the staff (48%) believed that children under five years could describe their pain. Most children in Group A were unable to do so. Fewer staff (24%) were of the opinion that children over five years could describe their pain. Most children in Groups B and C did so. The reasons given by staff for children being unable to describe their pain were mainly developmental in relation to language difficulties (84%) and the fact that children had no previous experience of pain (26%). Some staff gave more than one reason.

Over half of the staff (59%) stated that children under five years could localise their pain and almost three-quarters of those aged 3-4 years did so. One-in-five staff (20%) were of the opinion that children over five years were all able to localise the site of their pain. This latter group comprised of more doctors than nurses (28%:14%). Most children in Groups B and C did localise the site of their pain (Table 51). The proportions of staff who felt that children could localise their pain and the number of children who actually did were at opposite extremes (Table 51). The primary reason given by staff for children being unable to localise their pain was that children make general rather than specific statements about the site of their pain (45%) but maturational stage, that is, comprehension, was cited by 19%

Group	Sample	Proportion %
A	children (n=20)	74
	staff (n=57)	59
B and C	children (n=67)	93
	staff (n=59)	20

Table 51 Ability to localise pain

Staff were asked how much pain children should expect after (any) operation, on a 5 point scale from no pain to severe pain. Two-thirds (66%) of staff stated that children should expect to have no pain while 6% said children should expect moderate-severe pain. The former group comprised of nurses (79%), surgeons (63%) and anaesthetists (57%). There is no evidence to support the difference in proportions between staff groups: nurses and doctors ($p=0.1NS$), nurses and surgeons ($p=0.25NS$), nurses and anaesthetists ($p=0.1NS$), surgeons and anaesthetists ($p=0.5NS$).

Staff estimates of the proportion of children with moderate-severe pain 16-24 hours postoperatively, following any operation, are detailed in Table 52. Almost two-thirds of the staff (63%) expected between one half and all children to experience moderate-to-severe pain. The majority of nurses (88%) estimated that between a half and all children were in moderate to severe pain but fewer doctors (34%) estimated this. Statistical evidence of the difference between the staff groups is shown in Table 53 ($p=0.001^*$). Medical opinion was divided: 46% of surgeons and 14% of anaesthetists believed that a half to all children were in moderate-severe pain. However, when surgeons and anaesthetists were compared there was no statistical significance ($p=0.1NS$), suggesting that the difference between the groups could be attributed to chance. A larger sample of doctors might have produced different results.

Moderate-severe pain	Staff estimates (n=80) %
No children	5
25% children	33
50% children	30
75% children	25
100% children	8

Table 52 Distribution of children in moderate-severe pain on 1st postoperative day

Staff group	0-25% of children	50-100% of children	Total
Nurses	5	37	42
Doctors	25	13	38
Total	30	50	80

$$\chi^2 = 22.47(44), df=1, p=0.001*$$

Table 53 Distribution of children in moderate-severe pain (by staff group)

When considering children under 5 years, staff stated that nurses (41%) and parents (39%) are the best people to assess children's pain; doctors were cited on three occasions. When divided by profession, doctors believed that nurses are more effective than parents at assessing children's pain (48%: 36%) and nurses were of the opinion that parents were better than they (41%:35%). When children under five were considered, most staff believed that parents (66%) were best, followed by nurses (12%). Overall, both nurses and doctors stated that parents are most able to assess pain in children under five years; this staff group comprised more nurses than doctors (71%: 58%).

When asked about their beliefs concerning pain in children, small proportions of doctors and nurses responded positively to the questions. Almost one-in-five staff stated that children do not experience as much pain as adults (nurses more than doctors); approximately 1:10 staff were of the opinion that active children are not in pain (all doctors), that children easily become dependent upon opiates (nurses and surgeons) and that intramuscular injections are the best method of relieving pain (surgeons more than nurses or anaesthetists). One-in-four surgeons were of the opinion that children will always say if they are in pain, whereas few nurses and no anaesthetists believed this. Finally, over a third of the staff (36%) were of the opinion that children of five years upwards believe that pain is a punishment, the largest proportion being nurses (Table 54).

Question	Staff (n=80) %	Nurses (n=42) %	Surgeons (n=24) %	Anaesthetists (n=14) %
Is it true that:				
children do not experience as much pain as adults?	19	21	17	14
active children cannot be in pain?	8	0	13	21
injection is the best method of relieving pain?	8	2	17	7
children always say if they are in pain?	9	2	25	0
children easily become addicted to opiates?	8	10	8	0
children over 5 years believe that pain can be a punishment?	36	53	13	10

Table 54 Positive staff responses to questions about pain

4.6.5 Knowledge of formal pain measures

Formal measurement of pain was not practised in the hospital, however staff knowledge and use of formal measures were examined.

Over half of the staff (61%) had heard of pain assessment tools (methods of measuring pain). Although the proportions of doctors and nurses were similar (63% and 60% respectively), more anaesthetists than surgeons (100%: 42%) and more student nurses than trained nurses (88%: 42%) knew of their existence. Of the 49 staff who had heard of pain measures, 43 named at least one, most frequently scales such as visual analogue scales (88%). Other methods such as verbal response and subjective or objective assessment were also cited. The staff who named pain measures comprised of almost half of the nurses (48%), over a quarter of surgeons (29%) and most anaesthetists

(86%). Over a quarter of the staff (n=21) had assessed pain using a measure, usually a scale. Sixteen described the tool as useful. Six staff had used more than one method, their preferences being scales (3), trained observation (1), a colour tool (1) and drawing (1).

Six student nurses and two trained nurses had received formal training (a minimum of one lecture) in the management of pain. Nurses' knowledge of pain measures was related to having had training in pain management (Table 55 $p=0.025^*$).

Training	Knowledge of pain measures		Total
	Present	None	
Yes	8	0	8
No	17	16	33
Total	25	16	41**

$$\chi^2=4.89(\text{yc}), \text{df}=1, p=0.025^*$$

**1 missing value

Table 55 Nurse training and knowledge of pain measures

Every anaesthetist and nearly half of the surgeons (42%) had heard of pain measures. Statistical evidence also linked doctors' training in pain management and their knowledge of pain measures (Table 56 $p=0.005^*$).

Training	Knowledge of pain measures		Total
	Present	None	
Yes	18	3	21
No	6	11	17
Total	24	14	38**

$$\chi^2=8.21(\text{yc}), \text{df}=1, p=0.005^*$$

Table 56 Medical training and knowledge of pain measures

Evidence was found that staff with training are more likely to report fewer patients with moderate or severe pain, in comparison to staff with no training (Table 57 $p=0.01^*$). When the staff were sub-divided into professional groups, training did not appear to influence their estimates of moderate-severe postoperative pain in children (doctors $p=0.1\text{NS}$; nurses $p=0.5\text{NS}$).

Training	Children in moderate-severe pain		Total
	0-25%	50-100%	
Yes	16	13	29
No	14	37	51
Total	30	50	80

$$\chi^2=6.06, df=1, p=0.01^*$$

Table 57 Professional training and estimates of children's pain

4.7 Staff reaction to children's pain

In order to gather as much information about the routine management of pain nursing and medical staff were asked their opinions about possible influences on pain management and about their perceptions of their practice. This section examines the staff's personal experience of pain and its influence on the management of their patients' pain; their views on preoperative information-giving; their perceptions of children's experience of postoperative pain; their perceptions of their own practice when treating pain; their views on the role of alternative therapy in pain relief; and their views on the importance of documenting information about pain.

4.7.1 Past experience of pain

Most staff (73%) had undergone surgery themselves. Of these 58 people, 47 had experienced pain at that time; 20 of the latter (43%) stated that their pain was worse than they had expected and eight were surprised that they had pain.

The majority of staff (n=77) believed that personal experience of pain could influence the management of pain in their (child) patients by being more sympathetic towards their patients (62%) and by managing pain more specifically (39%).

4.7.2 Preoperative information

The majority of staff (96%) were of the opinion that reducing anxiety would promote recovery postoperatively, in children aged five years upwards. Most staff were of the opinion that preoperative information which is understood would decrease anxiety in children over five years (71%) and in children under five years (74%). With the younger group, a small proportion of staff felt that giving information made no difference (21%)

or increased anxiety (5%). All staff but one stated that they believe that anxious mothers transfer anxiety to their children.

Half of the staff were of the opinion that nurses, surgeons and anaesthetists have a combined role to play in telling child patients about postoperative pain. The remaining staff felt that it was the role of one or two groups (Table 58). (More than one response was given by several people).

Locus of responsibility	Staff opinions			
	Nurses (n=42)	Surgeons (n=24)	Anaesthetists (n=14)	All staff (n=80)
Nurses	21	2	0	23
Surgeons	8	5	3	16
Anaesthetists	3	6	5	14
All 3 groups	20	12	8	40

Table 58 Responsibility for information giving

The majority of staff (95%) were of the opinion that children over five years worry about operations; a smaller proportion of staff (79%) felt that children under five years worry.

Three-quarters of the staff (76%) believed that children aged five years upwards should be told in advance if a procedure is to cause pain (79% nurses and 68% doctors). A larger proportion of staff (83%) believed that children under five years should be warned in advance of possible pain (91% nurses and 71% doctors).

The majority of staff (85%) claimed that they explain to patients over five years and their families about postoperative pain but fewer staff (71%) claimed that they give such explanation to children under five years and their families. The age of the child appears to influence whether children and mothers are informed by staff about postoperative pain, the proportion increasing as the child's age increases (Table 59).

Children's age	Children (%)	Children's age	Mothers(%)
>4 years	88	<4 years	21
>5 years	90	<5 years	29
>6 years	96	<6 years	41

Table 59 Children and mothers informed about postoperative pain

Statistical significance is greatest at four years of age (Table 60, $p=0.001^*$; Table 61, $p=0.001^*$; Table 62 $p=0.001^*$).

Told about pain	Mothers of children		Total
	<4 years	Children >4 years	
Yes	6	64	70
No	22	9	31
Total	28	73	101**

$\chi^2=41.75$, $df=1$, $p=0.001^*$

**6 missing values

**Table 60 Verbal explanation about postoperative pain
(under and over 4 years)**

Told about pain	Mothers of children		Total
	< 5 years	Children >5 years	
Yes	10	60	70
No	24	7	31
Total	34	67	101**

$\chi^2=38.35$, $df=1$, $p=0.001^*$

** 6 missing values

**Table 61 Verbal explanation about postoperative pain
(under and over 5 years)**

Told about pain	Mothers of children		Total
	< 6 years	Children >6 years	
Yes	20	50	70
No	29	2	31
Total	49	52	101**

$\chi^2=33.76(ye)$, $df=1$, $p=0.001^*$

** 6 missing values

**Table 62 Verbal explanation about postoperative pain
(under and over 6 years)**

4.7.3 Responsibility for prescribing analgesic drugs

The staff were asked whose responsibility the prescribing of pain relieving drugs should be. No group was thought to have clear responsibility for this, 36% replying anaesthetists, 23% stating surgeons and 41% responding both surgeons and anaesthetists (Table 63). The last response (both groups) was not an optional answer but was volunteered by the largest proportion of interviewees. On further examination, the views of the three different professional groups varied. The largest group of nurses stated that it was the responsibility of anaesthetists (43%) and most surgeons (63%) believed that the responsibility should be combined between them and anaesthetists. The anaesthetists either stated that it was a combined responsibility or that it was theirs alone. Most doctors (87%) stated that they regularly prescribe drugs for postoperative pain relief.

Staff giving opinions	Professional group responsible:		
	Surgeons %	Anaesthetists %	Both groups %
Nurses (n=42)	33	43	24
Surgeons (n=24)	21	17	63
Anaesthetists (n=14)	0	43	57

Table 63 Responsibility for prescribing analgesic drugs

4.7.4 Preoperative and intraoperative analgesic administration

Eight per cent of the children (n=9) had been given an opiate as part of their premedication. Intraoperatively, 21% were given an opiate (n=23). Almost all children (93%) were given local anaesthesia (nerve blocks or skin infiltration) for postoperative pain relief while under general anaesthetic. Although there were other factors such as medical history to consider, there was no evidence of a statistical relationship between the administration of a local anaesthetic or opiate in theatre and the prescription of postoperative opiates (children: under 5 years $p=0.25NS$; over 5 years $p=0.5NS$). The figures were too small to analyse separately for each operation.

4.7.5 Postoperative prescribing of analgesic drugs

Postoperatively, paracetamol, a mild analgesic, was prescribed for all children in Group A. Four children (10%) in this group were prescribed opiates; this occurred after hypospadias repair more than after other operations (Table 64 $p=0.05^*$).

Operation	Opiate prescribed	Opiate not prescribed	Total (n=40)
Hypospadias repair	3	4	7
Other operations	2	31	33
Total	5	35	40

$$\chi^2=4.18(\text{yc}), \text{df}=1, p=0.05^*$$

Table 64 Opiate prescribing, by operation (Group A)

Ninety-nine per cent of children in Groups B and C were prescribed paracetamol postoperatively, and three children were prescribed oral dihydrocodeine in addition to paracetamol. Postoperative opiates were prescribed for 37% of Groups B and C. The fact that more children in Groups B and C than in Group A were prescribed opiates is statistically significant (Table 65; $p=0.005^*$).

Opiate	Group A (n=40)	Groups B and C (n=67)	Total
Prescribed	4	25	29
Not prescribed	36	42	78
Total	40	67	107

$$\chi^2=8.13(\text{yc}), \text{df}=1, p=0.005^*$$

Table 65 Postoperative opiate prescribing (Groups A, B and C)

4.7.6 Postoperative administration of analgesic drugs

When administering analgesic drugs to children over five years, two-thirds of the staff (68%) stated that they aim for complete pain relief. The remaining staff said that they aim to relieve most pain. Proportional differences were noted between the professional groups who aim for complete pain relief (79% nurses, 60% surgeons, 40% anaesthetists). Where the children were under five years, 71% of staff claimed that they aim for complete relief; the remaining staff (29%) aimed for relief of most pain. Over a third of the staff (35%) stated that they would let a child of 5 years or more talk them out of taking pain relieving drugs if the child did not want to take them.

Staff stated that parents ask for analgesic drugs for their children often (60%) or occasionally (32%). Over a third of the staff said that children over 5 years (36%) normally ask for analgesic drugs. Less than two-thirds of the nurses (62%) stated that they regularly offer prophylactic drugs for postoperative pain relief. 'Regularly' was not

defined but was assumed as on each medicine round, that is 4-6 hourly. Twelve nurses (29%), including three ward sisters and three staff nurses, reported that they offer analgesics but not on a regular basis and 10% stated that they never offer analgesics.

Thirty-nine children in Groups B and C were offered analgesics (58%). Most were offered by a nurse (67%), and the remainder by their mothers (28%) or a doctor (5%). The children who were offered analgesics comprised almost half of Group B (46%) and two-thirds of Group C (69%). The fact that more children in Group C than Group B were offered analgesics is statistically significant (Table 66 $p=0.05^*$).

Analgesic medication	Group B	Group C	Total
Offered	19	18	37
Not offered	22	8	30
Total	41	26	67

$$\chi^2=3.37, df=1, p=0.05^*$$

Table 66 Analgesic medication offered to children

Over three-quarters of all children (76%) were given pain relieving drugs ($n=83$). Most had received mild analgesics (99%) and four had been given opiates (3%). A total of 24 children were given no analgesics (22%); they were from Group A (30%), Group B (20%) and Group C (15%). Although the proportions differed for each age group the differences were not statistically significant ($p=0.5NS$).

No child in Group A was given regular analgesics i.e. 4 hourly. Five children in Groups B and C were given regular analgesics (7%).

Age and paracetamol administration were linked in Group A children: those under three years were more likely to be given paracetamol than those of 3-4 years (Table 67 $p=0.025^*$).

Age	Paracetamol given	Paracetamol not given	Total
<3 years	18	2	20
>3 years	10	9	19*
Total	28	11	39**

$$\chi^2=5.00_{(1)}^{(3)} df=1, p=0.025^*$$

**1 missing value (1 refusal)

Table 67 Paracetamol administration

4.7.7 Pain management following different operations

There is no separate comment on the experience of Group A children because, when subdivided by operation, the figures were too low to analyse. However, overall, there was no evidence of a relationship between the patients under five years who were pain free and whether or not they had been given analgesics ($p=0.5NS$).

***Hypospadias* (n=12)**

Forty-five per cent of staff (the largest single group) believed that hypospadias repair was the sorest operation in the operative category. While anaesthetised, all children were given a local anaesthetic and an opiate was administered to two.

Postoperatively, 7/12 children were prescribed opiates: none were given. One child was prescribed and given oral dihydrocodeine. All children were prescribed paracetamol which was given to 8/12. A ninth child refused analgesics. Three children had no analgesics. Of the four children over five years who were given analgesics, three had some relief from their pain; the fourth denied having any analgesics.

On the first postoperative day, four children were in moderate-severe pain (33%).

***Orchidopexy* (n=42)**

Twenty-four per cent of staff believed that orchidopexy was the sorest operation in the operative category. Five children had received an opiate as part of their premedication. While anaesthetised, 95% of children were given a local anaesthetic and an opiate was given to twelve.

Postoperatively, 15 children were prescribed opiates: three were given. One child was prescribed and given oral dihydrocodeine. Thirty eight children were prescribed paracetamol, which was given to 34. Four children, all over five years, were given analgesics on a regular basis (10%). One child refused analgesics. Three children, two of whom were under five years, had no analgesics. Of the 31 children over five years who were given analgesics, five had had complete relief from their pain, 18 had some relief, and three had no relief (five missing values).

On the first postoperative day, 59% of children were in moderate-severe pain.

Circumcision (n=12)

Twenty per cent of staff believed that circumcision was the sorest operation in the operative category. While anaesthetised, all children were given a local anaesthetic and four had an opiate.

Postoperatively, two children were prescribed opiates, of which none was given. All children were prescribed paracetamol, which was given to seven. One child of over five years was given analgesics on a regular basis (8%). Five children had no analgesics. Of the six children over five years who were given analgesics, three had complete relief from their pain and three had some relief.

On the first postoperative day, 42% of children were in moderate-severe pain.

Bat ear repair (n=4)

Fifteen per cent of staff believed that bat ear repair was the sorest operation in the operative category. One child had been given an opiate as part of the premedication. While anaesthetised, three children were given a local anaesthetic; no opiates were administered.

Postoperatively, one child was prescribed an opiate which was not given. All children were prescribed paracetamol, which was given to three, but never on a regular basis. One child was given no analgesics. Of the three children who were given analgesics, one had complete relief from their pain and two had some relief.

On the first postoperative day, all children were in moderate-severe pain.

Hernia or hydrocele repair (n=32)

No member of staff believed that hernia or hydrocele repair was the sorest operation in the operative category. Three children had an opiate as part of their premedication. While anaesthetised, 91% of children were given a local anaesthetic and six had an opiate.

Postoperatively, four children were prescribed opiates of which none were given. All children were prescribed paracetamol which was given to 19, but never on a regular basis. Four children had no analgesics. Of the 12 children over five years who were given analgesics, three had complete relief from their pain, six had some relief and two had no relief (one missing value).

On the first postoperative day, 50% of children were in moderate-severe pain.

Other (n=5)

The remaining operations were not individually analysed because there were four different operations involved.

4.7.8 Effectiveness of analgesic medication

Less than three-quarters of the staff expected analgesics to relieve pain completely in children under 5 years (71%) and over five years (68%). A higher proportion of nurses (79%) expected complete relief than surgeons (60%) or anaesthetists (40%). When asked how effective analgesic drugs are, on a 5 point scale from 'totally effective' to 'totally ineffective', almost two-thirds of the staff answered 'mostly effective' (64%); nurses, surgeons and anaesthetists all gave similar replies. All the remaining staff but one answered 'effective for some of the time' (35%); one surgeon replied 'totally effective'.

The staff were asked how long opiate analgesics should be maintained after minor in-patient surgery. The responses for children over and under five years were similar, with the largest proportion of staff stating 24 hours (Table 68).

Differences in responses were noted when the different staff groups were examined. Nurses were of the opinion that opiates should be given for either 24 hours or for as long as necessary to children under five years, and for 24 hours or once only to children over five years. Surgeons stated that once only or 24 hours was long enough for children under five years, while in the case of children over five years surgeons said as long as necessary, 24 hours and once only. Less than half of the anaesthetists used opiates in

Duration	Child <5 years %	Child >5 years %
As long as necessary	29	27
48 hours	5	3
24 hours	31	41
Once only	24	22
Not used	10	7
Total	99**	100

** rounded to nearest %

Table 68 Opiate administration after minor surgery

children under five years, and of the four who said that they did, three did so for 24 hours only. The majority of anaesthetists used opiates in children over five years, most doing so for as long as necessary.

All nurses stated that they believe that children of any age should be given opiates but some doctors disagreed. Seven per cent of surgeons did not use opiates in children of any age whilst many anaesthetists did not use opiates in children over five (30%) or under five years (56%).

Over a third of the staff (34%) had concerns about giving analgesics to children over five years. When subdivided, this group comprised of almost one third of the nurses (32%), under half of the surgeons (47%) and one-in-five anaesthetists. The main concern reported was side-effects (45%) although dependency on drugs (20%) and exceeding the recommended dose (15%), inadequate prescribing (10%) and pain caused by injections (10%) were all included.

Although a larger proportion of staff (41%) was concerned about giving analgesics to children under five years, the proportions of the staff groups differed. Two-thirds of the surgeons (67%), over three-quarters of the anaesthetists (78%) and under a quarter of nurses (24%) were concerned about giving opiates to children under five years. Nurses worried about inadequate doses and side effects equally (50% each) while doctors worried about side effects (67% surgeons; 88% anaesthetists) and masking symptoms (33% surgeons). The children's age appeared to be unrelated to these concerns for nurses ($p=0.5NS$) and surgeons ($p=0.5NS$) but was related for anaesthetists (Table 69 $p=0.005^*$)

Anaesthetists (n=24)	Analgesic administration		Total
	To children <5 years	To children >5 years	
Concerned	10	2	12
Not concerned	2	10	12
Total	12	12	24

$$\chi^2=8.167 \text{ (yc), df=1, } p=0.005^*$$

Table 69 Concern about administration of analgesic drugs

Over a quarter of the staff worried about patients becoming dependent upon analgesic drugs (28%). This group comprised of 14 nurses (17%), six surgeons (25%) and two anaesthetists (14%). When this group of nurses, surgeons and anaesthetists were

examined according to their designation, it comprised of approximately one third of staff nurses (31%), House Officers (34%) and Surgical Registrars (29%), that is the staff groups who are most closely involved in the prescribing and administering of drugs on the wards.

Less than half of the staff (40%) were of the opinion that parents worry about their children becoming dependent upon drugs given in hospital.

4.7.9 Non-pharmacological pain management

Three groups of methods of non-pharmacological pain relief were referred to frequently by staff: (i) position or temperature such as heat or cold (58%); (ii) alternative methods such as transcutaneous electrical nerve stimulation (TENS), acupuncture or hypnosis (44%); and (iii) psychological such as preoperative explanation, parental presence or distraction (41%).

The methods most often used by staff were position or temperature (50%), psychological (36%) methods, then alternative methods such as TENS or hypnosis (20%). None of the children in the study were using TENS or had been hypnotised at the time of interview. Less than half of the staff (44%) had experience of using non-pharmacological methods of relieving pain with children. This group comprised of a few nurses (15%), under a third of the anaesthetists (30%) and less than half of the surgeons (47%). Most of the staff who knew of methods such as using positional change or altering temperature and psychological means used them, however, less than half of those who knew of more technical methods, such as TENS, used them (Table 70).

Staff knowledge (n=80)	Position or temperature %	Alternative e.g. TENS %	Psychological e.g. distraction %
Method known	58	44	41
Method used	51	20	36

Table 70 Alternative methods of pain relief

Nurses commonly used heat/cold or repositioning (71%) or psychological means (42%); surgeons used heat or cold and psychological methods equally (27% each); and anaesthetists most often used alternative methods e.g. TENS (60%).

When asked specifically if children actively distract themselves from pain, for example by reading, almost two-thirds of the staff (64%) were of the opinion that children did this; the staff groups involved were nurses (79%), surgeons (50%) and anaesthetists (43%).

4.7.10 Documentation of pain issues

Less than a half (47%) of nursing notes contained a minimum of one statement about the presence of postoperative pain; an additional 2% of notes included comments such as 'no complaints'. Two children, on one occasion each, had an entry in their nursing notes indicating that analgesics (paracetamol) had been refused.

Two-thirds of the staff (68%) claimed that they always evaluate pain relief after administering analgesics. This group comprised most nurses (95%), under two-thirds of the anaesthetists (64%) and over a quarter of the surgeons (29%). When asked how they evaluated the effect of pain relief, the majority answered by observation (52%) or by asking the patient (34%). When the nursing notes of the surveyed children were examined, 56% contained no written evidence of evaluation of the effectiveness of pain. Although not noted in the data collection, no formal mention was made of pain in the medical other than by implication from prescribed analgesics. Pain charts were not in use.

Chapter 5 Discussion

This survey of postoperative pain in children of different age-groups has revealed findings which support previous research and, in addition, some which are unexpected. Contradictory responses given by children and their mothers and between staff groups occurred several times; and, on occasion, the actual practice of staff differed from their perceptions of their practice. Six main themes emerged:

- developmental stage is of great importance in terms of language and comprehension skills, when assessing and managing children's pain;
- effective communication between adults and children and between different groups of adults is essential in pain management;
- children's pain is often not recognised adequately;
- formal measures of pain are not in general use and there are difficulties with their implementation;
- the management of children's pain and the evaluation of pain relief are inadequate;
- the training of health care professionals in pain assessment and management requires reappraisal.

The themes are now discussed separately, although the boundaries between them often overlap.

5.0 Influence of developmental stage

Fear of hospitalisation

Although consideration of postoperative pain was the primary objective of this study, fear concerning hospitalisation is another stressor for children. Reissland (1983) and Eiser and Patterson (1984) have suggested that the ability of children to cope with hospitalisation depends upon their age and developmental stage, because their capacity to understand what is happening emerges as they mature, that is, older children understand more than younger children. School-aged children said that they felt that operations and injections caused their fears. The children who were afraid of operations were nearly all aged 8-11 years, a finding which contrasts with the views of Eiser and Patterson (1984), who have reported that 5 and 6 year olds are also likely to worry about operations. However, this difference could be attributed to the relatively small samples in both the current study and in Eiser and Patterson's study.

Opinions expressed by the mothers about the causes of children's fear in hospital were based on a combination of factors, which included unfamiliar surroundings, unfamiliar faces and the prospect of injections and pain. These opinions differed, to an extent, from both the views of children and staff perceptions. The staff believed that children under five years were most afraid of what might happen and the prospect of having an operation, while children aged over five years were most afraid of the operation itself and of being given injections. Most children in Groups B and C stated that they had wondered about what would happen to them in hospital and children of all ages thought a great deal, preoperatively, about their operations. Although these thoughts could stem from natural curiosity, over one third of the children in Groups B and C actually admitted to worrying about what would happen in hospital. The proportion of children over five years (39%) who said that they worried was slightly higher than that (33%) found by Pakoulas, Ring and Tew (1984).

A small proportion of mothers stated that their children were worried when the children claimed that this was not the case. In the light of this, the views of mothers who state that their children are not anxious could be clarified, by talking directly with the children. Fears and anxiety in children might be reduced by addressing issues such as the operation, injections and by identifying staff to reduce unfamiliarity. Such preoperative explanation, given in understandable language to those who want it, has been advocated by Glasper and Stradling (1989) and by Price (1991^a).

Provision of information about operations and pain

Information about the operation and postoperative pain was desired preoperatively by both children and mothers, but was not forthcoming from the staff. Preoperative information was given to the children largely by their parents rather than by professional staff, when professionals were involved this was more by doctors than by nurses. In contrast, half of the staff believed that it was part of the nurses' rather than the doctors' role although the other half of the staff stated that informing children and families about postoperative pain was a joint responsibility for nurses, surgeons and anaesthetists.

Age appeared to be a determining factor in whether children were told about their operation or warned about the likelihood of postoperative pain, but in an unexpected way. A greater number of children under five years than over that age were told about their operation, by mothers more than staff, and fewer children over five years (Groups B and C) were warned about the possibility of postoperative pain, by staff more than mothers. However, of the children in Groups B and C who were briefed by professionals, all but one was aged eight years or more. The number was too small to

analyse, so that no comment can be made about the provision of information to children of five years upwards.

Children's ability to recognise pain and to speak about it to others is thought to be influenced by developmental stage (Gaffney and Dunne, 1986; Swanwick, 1990; McCready et al, 1991). Although the surveyed staff held this opinion, over half of the staff did not consider developmental stage when assessing pain in children under five years, this group normally having less ability than older children to articulate their needs. The lack of consideration of developmental stage is a cause for concern as it can be argued that this group of children should be paid particular attention, to facilitate reassurance and understanding of what is happening.

Acknowledgement of pain

Many children over five years admitted to being in pain, particularly those in Group C. Although the number who denied pain was small, the reasons, for example being laughed at or left alone, for doing so are worrying. It is noteworthy that half of the staff did not always believe children who complained of pain. This tendency was more apparent with surgeons than with nurses or anaesthetists. In circumstances where children deny pain or their reports of pain are not believed, their pain may go unrecognised.

Another factor which influenced children's admission of pain was the prospect that it could lead to an injection; in fact, many children over five years stated that they would deny pain in such a situation. It is possible that this occurred more frequently with Group C children (8-11 years), because they had reached the developmental stage at which logical thinking begins to emerge (Hilgard et al, 1990). If this was the case, the argument of Ross and Ross (1984^b) that children's communication about pain is not linked to age could be questioned. In order to ensure that children are not frightened about acknowledging pain, verbal communication from adults should be as full as possible while given in a sensitive and understandable manner.

Savedra et al (1989) have suggested that children are more likely to admit pain to their mothers than to staff. In the current study, most children said that they would tell someone about their pain, but as the children's age increased, Group C told nurses as well as their mothers, whereas Group B usually told their mothers. Only a quarter of children and mothers agreed that children would admit pain to their parents. This low level of agreement could be attributed to the difficulty that adults sometimes have in understanding children's descriptions of pain (Jerret and Evans, 1986). Evidence of this

was found in that many mothers stated that they had difficulty in understanding schoolage children's descriptions of pain.

Description of pain and its localisation

Many children have the ability to both describe (Abu-Saad et al, 1990) and localise (Eland, 1985^b; Devine, 1990) their pain. Some of the results, however, concerning these issues are unexpected. The surveyed staff indicated that children under five years were more likely than those over five years to be able to describe their pain and to accurately localise it. From a developmental viewpoint, the reasons for this apparent contradiction are unclear, as it would be logical to assume that the older group would have a better understanding than the younger group (Perrin and Gerrity, 1981; Bray, 1988; Abu-Saad et al, 1990). These contradictory findings are compatible with the fact many staff stated that they did not consider developmental stage when assessing pain children under five years. Although children of 3-4 years did have difficulty in describing their pain, most aged five years upwards were able to describe their pain to the researcher and most children aged three years or over were able to localise their pain. These findings offer support to the view that children's descriptions of pain can be influenced by their stage of development (Savendra et al, 1982). Nevertheless, the fact that staff underestimated the abilities of children to both localise and describe their pain is concerning.

Children's views about what relieves pain

According to Swanwick (1990), young children do not have the conceptual skills to associate medicine with pain relief. To some extent, there is support for this idea in that different responses to a question about what relieves pain were given by children of various ages. Injections were not mentioned by any child. Older children appeared to be able to connect an apparently unrelated item, such as medicine, to pain relief. Younger children, however, only connected items which had direct contact with the site of their pain, such as an elastoplast. This suggests that the younger group do not understand the nature of medicine and how it can help. Further, it offers support to the findings of Eiser and Patterson (1984) who have reported that more children aged seven years upwards than under that age believe that medicine improves their condition in hospital. Although the actual sample numbers in both the Eiser and Patterson (1984) study and in the current study were relatively small, in each case, a larger proportion of older than younger children stated that medicine helps pain.

Analgesics, injections and pain relief

Children's knowledge about whether they had received analgesic medication may be related to developmental stage. A greater number of children in Group B than in Group C stated that they had not had analgesics, when, in fact, it had been administered. This was corroborated by evidence from the drug prescription and information sheets.

Summary

There is little doubt that developmental stage plays a key role in children's understanding of pain and its expression. Consequently, the argument of Ross and Ross (1984^b) that age is not linked to communication about pain could be viewed with scepticism. Preoperative preparation is known to reduce anxiety and possibly, as a consequence, it may reduce pain (Bielby, 1984). As a result, a case can be made for all children to be given information preoperatively, in a sensitive manner, particularly for younger children. It follows that when communicating with children about their pain, serious consideration has to be given to the child's comprehension and language skills in order to maximise the information given and to minimise fear and anxiety.

5.1 Verbal communication

Personal term for pain

In order to maximise understanding about pain, effective communication is required between the different groups, particularly adults and children, and Jago (1985), Eiser (1987) and Price (1991^a) have emphasised the need for language which is easily understood by each child. A starting point is the clarification of which word each child uses for "pain". Although most of the surveyed children chose the word "sore" other terms were used. There was agreement between a majority of children and their mothers about the chosen term. Establishing the appropriate term for "pain" helps to improve communication. This is more important than many professional staff realised because anecdotal comment, noted while planning the study and throughout the data collection, highlighted differences in pain language. Scottish and English children often use different terms; for example, 'sore' appears to be more commonly used in Scotland, and this is also the case for 'jag' rather than injection.

Amount of information required

Most children over eight years preferred to have detailed information about what was to happen to them, but many did not. Similarly, although the majority of children expected to have pain after their operation, a third admitted to experiencing more pain than they

had expected. These issues raise the ethical question of how much information should be given to children about what is to happen. On one hand, every child has a right to informed consent (Deeprase, 1992; Shield and Baum, 1994); on the other hand, preoperative discussion about the possibility of postoperative pain might plant the suggestion that the child should experience pain. Accepting the fact that not all children want to know every detail, lack of information may have been an added concern for the children who did not know why they were in hospital.

Discussing pain

It is generally accepted that specific age-related communication helps to minimise fear and anxiety (Pakoulas, Ring and Tew, 1984; Beales, 1986). In this context, the findings of this study revealed that talking directly to children about their pain resulted in useful information about the presence and severity of their pain; in contrast, if pain was not addressed directly, ambiguous or unreliable information resulted. A higher number of children admitted to having pain when asked directly 'are you sore?' than when asked indirectly using the question 'how are you feeling?'. In addition, as was shown in the Phase 2 (Group A) pilot study, trying to elicit information about pain from pre-school children was not a simple procedure; it is time-consuming and makes it necessary that the child is given a chance to answer in his own time, if the reply is to be meaningful. As proposed by Pakoulas, Ring and Tew (1984) and Beales (1986) the use of language which is understandable, encourages reassurance and, consequently, co-operation.

Pain and anxiety

A relationship between pain and anxiety in children (Jay et al, 1983) and in adults (Hayward, 1987) is reported in the literature. This was not replicated in the present study, as no statistical relationship was found between those children who reported that they were in pain and those who reported being anxious. This may be the result of the small numbers involved or it may be that the reports of pain or of anxiety were unreliable. Use of a formal validated measure of anxiety might have produced more reliable findings.

Transferred anxiety

The issue of transferred anxiety between mother and child is described by Teichman et al (1986) and Glasper (1990). In this context, the findings of the current study revealed that mothers were worried about their children and anticipated that their children would experience a higher level of pain than staff estimates indicated. Although most mothers found that the amount of pain which their child was experiencing was less than or equal to their expected level, a small proportion discovered that their child's pain was worse than they had anticipated. It follows that early recognition of maternal anxiety may be

important, clinically. Its reduction could be hastened by the staff giving more information to mothers about the possibility of pain and effecting its relief.

Summary

Effective verbal communication between children, parents and staff forms the basis of competent paediatric health care. However, the language involved needs to be worded so that children of various ages easily understand what is being communicated. The effective recognition and management of pain is dependent upon it.

5.2 Recognition of pain

Memory of pain

The memory of previous pain may be a possible influence on future experiences of pain for the child and it has been suggested that infants as young as 6 months remember pain (Johnston, 1993; Schechter et al, 1993). In the present study, children under five years were not asked about this because of the communication difficulties which arose in the Phase 2 Pilot Study. However, children of five years or more did talk about previous pain experiences, frequently saying that injuries had caused their worst experience of pain, although almost a quarter concentrated on their present operation.

Memories of a painful experience may also influence the management of children's pain by health professionals. Devine (1990) has suggested that staff with personal experience of pain manage their patients' pain differently to those with no such experience. Almost three-quarters of the surveyed staff had undergone surgery, although doctors and nurses had different perceptions of how this experience influenced their management of children's pain. Nurses said that their own experience made them more sympathetic to their patients, whereas doctors felt that the main influence was on their planning of pain management. The view of the nurses may arise because they see psychological support as part of their professional work, complementing active treatment of pain, whereas the main objective for doctors entails pharmacological pain relief. These views were given despite the fact that when asked which factors could influence the experience of pain for children, nurses referred mainly to physiological issues, while doctors emphasised the psychological aspects. Nevertheless, there is support for Devine's (1990) suggestion.

Responsibility for pain assessment

Devine (1990) also reported that parents believe that staff can estimate the presence and severity of their children's pain more accurately than parents, because of the staff's

professional knowledge. By contrast, he suggested that professional staff believe that parents are more accurate in their assessment of children's pain, because of their intimate relationship with their children. In the current study, if the child was over five years, nurses and mothers held the view that parents should assess their children's pain, whereas doctors felt that nurses should have this responsibility. Where children under five years were concerned, all staff and mothers believed that children's pain assessment should be carried out by parents. The intimate mother-child relationship may render the mother less likely to be objective, especially in an emotive situation where the child may be suffering. Consequently, the mother may take a more active role in trying to relieve the child's pain (Dearmun, 1995). Children of all ages were of the opinion that nurses and doctors know better than anyone else when they were in pain. In addition to the child's contribution, it is likely that the suggestion of Dearmun (1995) that a combination of professionals and, in this case, mothers, would be most effective when attempting to recognise and assess the level of children's pain.

Estimated and actual pain

The literature contains no reference to the expectations of different staff groups about the severity of pain experienced by children after routine minor surgery. In order to establish or refute the existence of such preconceived ideas, staff were asked about their views. Their responses revealed that such expectations did exist; in addition, there were differences between staff groups, in that a greater number of nurses than doctors expected children to have a high degree of postoperative pain. One-third of the doctors believed that at least a half of all children would experience moderate or severe pain, while almost all nurses supported this view. This difference in proportions was statistically significant suggesting that the different views were representative of each group; in fact, over half of the children were in moderate or severe pain.

It could be argued that the expectations of doctors might be more accurate because they have more technical surgical knowledge than nurses. On the other hand, the nurses' expectations may be more realistic because they spend more time with the children than doctors do and, consequently, have a different quality of experience to doctors in caring for children postoperatively. Regardless of such possible reasons, differences do exist and they are likely to influence the recognition and consequent management of children's pain.

Observation of behaviour

The observation of behaviour is an unreliable measure of pain (Barr, 1989; Eland, 1990; Lloyd-Thomas, 1990); Barr (1989), for example, has shown that children do not always

show that they are in pain. The findings of the present study indicated that observation of behaviour is unreliable in the following five areas.

1. **Facial expression.** On the first postoperative day, most children over five years were seen to be smiling, by the researcher. Despite this, most children said that they were sore and an even greater number indicated pain of varying degrees with a pain measure.
2. **Activity.** Similarly, the majority of children in Groups B and C were seen to be active in varying degrees, by the researcher.
3. **Clinginess.** Most children under five years (Group A) were a little clingy to their mothers, but the majority of those who were more than a little clingy had undergone orchidopexy or hypospadias repair, the two operations which many staff classified as the most painful. Despite this, no statistical evidence of a relationship between clinginess and the presence of pain was found.
4. **Bravery and crying.** The claim by mothers that children of all ages try to be brave when they are in pain was supported by most staff, who said that children hide their pain by not crying. Although behaviour was not discussed with children under five years (Group A), most children over that age (Groups B and C) said that they felt that they had to be brave when in pain. In addition, some that they felt like crying but did not always do so. Only half of the staff had ever told a child that it was acceptable for them to cry if they were in pain.
5. **Staff gender and children's behaviour.** According to Hosking and Welchew (1985) and Lyall (1991), displaying evidence of pain is not acceptable from a male stance. However, as the majority of surveyed children were male, no comment can be about gender and the children's behaviour. Nevertheless, opinions from a minority of the staff suggest that the sex of health professionals may influence pain recognition. Female nurses and doctors and mothers expected boys to hide their pain more than girls; while male nurses and doctors expected girls to hide their pain more than boys. Such findings are not reported in the literature.

Summary

The recognition and evaluation of pain in children remains inadequate. Influences such as the memory of previous pain for both children and staff, the ambiguity about who should assess pain, the existence of preconceived ideas, held by staff, about pain levels and the doubt about the accuracy of observation of behaviour all contribute to incomplete pain assessment. Consequently, more reliable means of pain assessment using formal measures are required.

5.3 Measurement of pain

Formal measures of pain for children have existed for some time (Eland and Anderson, 1977; Hester et al, 1979; McGrath et al, 1985; Savedra and Tesler, 1989; Bieri et al, 1990; Tyler et al, 1993); and Beyer and Aradine (1988) and Johnston (1991) have recommended that existing pain measures should be used in their original or a refined form for validation purposes, instead of developing new measures. As a result, the theoretical basis of most of the formal measures used in this study was not new. The need for more than one measure for each of the children's age-groups was based upon the view of Savedra and Tesler (1989) that variations in children's age have to be accounted for. In summary, of the six measures used in this study, one was in an original format (visual analogue scale), three were in an adapted form (objective pain scale, faces scale, colour tool) and two were developed specifically for the study (vertical and horizontal coloured analogue scales).

Objective assessment

Objective measurement of pain is the method of choice reported most frequently for children under five years (McGrath et al, 1985; Beyer et al, 1990; Norden et al, 1991a,b; Tarbell et al, 1992). This is because, with few exceptions (Maunuksela et al, 1987), the concept of self-report is difficult for this age-group. Consequently, the researcher rated pain in children under five years (Group A) using the revised objective pain scale (ROPS) and a visual analogue scale (VAS). The findings with both measures were similar, in that most children were found to be in mild to moderate pain. When the scores from both scales were compared, there was 63% agreement. However, when the numbers of children in severe pain were contrasted more cases were identified with the ROPS. In addition, in children of 3-4 years, there was greater agreement with the scores from the ROPS, than from the VAS, with both the children's admission of pain and with their ability to localise the site of their pain.

No statistical difference between the findings of the two measures was found. However, it is suggested that the ROPS may be a more sensitive tool than the VAS, because it identified fewer children in mild pain and more in severe pain, than did the VAS. Additionally, the ROPS measured several items governed by set criteria, whereas the VAS only measured the presence and degree of pain. However, one statistically significant finding about the effectiveness of the VAS was that more children aged 3-4 years than under 3 years were in pain. Analgesic administration to children under five years was not regular, so it is unlikely that any of this group were pain free for this reason.

Both the ROPS and the VAS may be of value, but additional research is required for validation purposes. Neither measure could be validated easily in preverbal children because of the need for language and comprehension skills. Nevertheless, validation would be necessary in the light of the suggestion that one measure may be more effective than the other.

A final consideration is that the sample size of Group A was small ($n=40$) and a larger sample might have indicated that one measure was more effective than the other. Overall, validation is particularly important in view of the doubts about the accuracy of CHEOPS, upon which the original Objective Pain Scale was based (Beyer et al, 1990; McGrath, 1992).

Self-report measures

Two reports in the literature have suggested that preschool children are able to use self-report measures (Maunuksela et al, 1987; Beyer and Aradine, 1988). In the present study, self-report using the vertical coloured analogue scale in children of 3-4 years was of no value. This may have been due to inadequate explanation of the measure and its use by the researcher, to the inadequate design of the measure or to the fact that language and comprehension skills in this age-group are not fully developed. The possibility of inadequate explanation by the researcher is unlikely to be the whole answer because, although the majority of children did not comply with the request, two children understood clearly what was being asked of them. Design defects could be responsible but it was made after consulting a developmental psychologist. In addition, consideration was given to the literature in which Aradine et al (1988) suggested that preschool children could use a vertical self-report measure and in which Maunuksela et al (1987) proposed that children under five years are able to use analogue scales to self-report pain. The most likely explanation is that the concept of self-report was too advanced for pre-school children to follow and use. This counters the ideas of both Aradine et al (1988) and Maunuksela et al (1987) about using self-report measures in young children. However, it offers some support to Varni and Walco (1988), who have contradicted Aradine et al (1988) by suggesting that vertical self-report pain measures are no more successful than horizontal measures in preschool children.

Self-report was the basis for pain measurement in all other children (Groups B and C) in this study. The use of colour to measure pain is described in the literature (Eland and Anderson, 1977; Scott, 1978; Abu-Saad, 1981; Eland, 1985^b; Maunuksela et al, 1987; Devine, 1990). The Revised Eland Color Tool was used for Group B (5-7 years) children. Although the majority successfully indicated the presence and severity of their

pain, the proportion of children who did not use this measure was disappointingly high. The colour which was chosen most often to represent severe pain was red, supporting the findings of Eland and Anderson (1977) and Savedra et al (1982).

One advantage of a tool which involves a body outline is that it allows children to indicate if they have pain anywhere in their body, other than at the wound site. Over a quarter of the Group B children indicated pain at sites other than their wound. Despite this, no statistical relationship was found between the children's verbal reports of pain and those who coloured the body outline as 'sore', irrespective of severity and the site. This suggests that either the verbal responses or the Revised Eland Color Tool results, or both, may be unreliable or invalid.

The apparent failure of a relatively high proportion of children to use the colour tool may be explained by potential cultural differences, colour blindness or, simply, a lack of understanding. Cultural differences in the use of the Eland Color Tool are not reported in the literature, so that no comparison could be made between American and British children's ability to use the measure. However, Eland and Anderson (1977) and Savedra et al (1982) have reported that the colours red and black are frequently chosen by children to represent different degrees of pain. There may be further substantiation for some of these findings as, in the present study, red was chosen frequently but not unanimously, to represent severe pain. This lends support to the views of Thomson and Varni (1986) who have recommended that children should be given a choice of colours when using colour to measure their pain.

The possibility of colour blindness influencing the use of a colour tool is not described in the literature. In this study, no formal check was made for colour blindness, but the fact that, on informal testing, no children were found to be colour blind is surprising as fewer than 10% of males are affected by colour blindness (Gouras, 1981; Hurvich, 1987) and most of the child sample was male.

Lack of comprehension may explain why some children either took their time to use the Revised Eland Color Tool or why some failed to do so at all. The explanation given to the children and technique employed by the researcher were discussed with Professor Eland, but she could not identify any specific problems. The colour tool used in this study was adapted from the original, by adding front and back views to the body outline, rather than the front only, and by reducing the options for degree of pain from four to three. The justification for this was that these changes could have made the measure easier to use.

The Revised Eland Color Tool was time-consuming to use, and, although this may be acceptable as part of a research project, its clinical practicality is questionable. The various problems related to the use of this colour tool appear to give some credence to doubts raised by Watt-Watson and Donovan (1992) about the reliability and validity of pain measures involving colour.

The faces scale was understood by all but one of the children in Group B. Many more children indicated with this tool, rather than with the Revised Eland Color Tool, that they were pain free. The faces scale was quick to use, but it proved to have other problems. There was a large difference between the number of Group B children who indicated pain using the faces scale and the Revised Eland Color Tool: almost half of the children had no pain according to the faces scale, while very few were pain free using the colour tool.

In addition to the difficulties already described with the Revised Eland Color Tool, there are doubts about whether faces scales actually measure pain. A scale of faces in which there are tears and/or a smiling face is cited as being a possible measure of emotion rather than a measure of pain (Juniper, 1991). There were no tears in the faces scale used in this study, but there was a smiling face.

The researcher's experience in carrying out this data collection has impressed upon her that many children may misunderstand faces scales when they are being used as a measure of pain. The design of the faces scale, which incorporated the concept of faces on a ladder, may have contributed to the apparent misuse of this scale. Presenting two different concepts, namely a ladder and a series of faces, to this age-group may have demanded too much of these children's conceptual skills, so that their understanding of the faces scale was too difficult to achieve.

Verbal responses to questions about the presence of pain were compared with the scores from the faces scale and about a third were at opposite extremes; for example, if a child stated that he had no pain, the faces scale indicated that he was in moderate-to-severe pain. Similarly, the distribution of the children who rated severe pain with both the Revised Eland Color Tool and the faces scale showed a clear difference: a greater number of children rated their pain as severe with the colour tool than with the faces scale. This suggests that the Revised Eland Color Tool could be the more sensitive measure, thereby supporting previous reports about the effectiveness of colour tools (Eland and Anderson, 1977; Scott, 1978; Abu-Saad, 1981; Eland, 1985^b; Maunuksela et al, 1987). However, because of the problems with each tool in this study, it is suggested that neither the Revised Eland Color Tool nor the faces scale measures pain

accurately. This raises further doubt about the effective use of either colour tools or faces scales and it leaves a potential gap in the availability of valid and reliable tools to measure pain in children of 5-7 years.

It is inferred in the literature that children have the ability to use analogue scales (Beasley and Tibbals, 1987; Douthit, 1990; Tyler et al, 1993). The present study corroborates these reports, as both the visual analogue scale (VAS) and the horizontal coloured analogue scale (CAS) were used successfully by all but one of the Group C children. The pain scores for both scales were very similar, most children being in moderate to severe pain. Both sets of scores also correlated closely with verbal responses.

Although visual analogue scales have been described as valid pain measures (Beasley and Tibbals, 1987; Devine, 1990), the triangulation between VAS, CAS and verbal responses in Group C offers further support to the validation of both the scales and verbal response in this age-group. Nevertheless, it is suggested that the CAS appeared to be the less sensitive of the two measures because there were fewer children in moderate to severe pain than with the VAS. Despite this, the CAS was preferred by the children. Consequently, although either scale may be used effectively by children of 8-11 years, the CAS may be of more value, if children prefer using it. In addition, the CAS may be of use in measuring pain in children of 5-7 years, based upon the report of Tyler et al (1993) about the successful use of VAS in five year-old children.

Both analogue scales (VAS and CAS) appear to be of more value than verbal response to a question about the presence of pain. This is because, in this study, the scales measured the presence and severity of pain while the verbal response indicated only information about the presence of pain. Although the majority of children of five years upwards stated that they were in pain, more indicated that they were in pain, of differing degrees, with the formal measures. This lends support to the use of formal measures, although it is acknowledged that additional research is required to ascertain the reliability and validity of such measures.

Pain scores rated by mothers

In 1983, Mishel reported that there was a gap in the literature about the role of mothers caring for their children after surgery. To some extent, since then, this has been addressed, as there have been studies discussing maternal involvement in children's pain assessment (Savcedra et al, 1989; Dearmun, 1995). However, these papers do not report mothers' actual assessment of their children's level of pain. The present study provides

information about the views of mothers concerning their role in caring for their child following surgery, as well as mothers' ratings of their child's level of pain.

It is accepted practice that parents play a part in caring for their hospitalised children (Coyne, 1995; Dearmun, 1995). However, the effect of worry on the mother may influence her ability to reassure and help her child (Dearmun, 1995). When the surveyed mothers in this study were asked if their child was in pain, many responded positively. However, using a visual analogue scale, more mothers indicated that their child was in varying degrees of pain. The formal measurement of pain by mothers may provide a more sensitive assessment of children's pain than relying solely upon their verbal responses.

Comparison between pain scores of the children and their mothers

In this study, staff were shown to rely upon mothers' verbal reports about their child's pain. The majority of the verbal responses of mothers and their children concurred about the presence of pain; however, when using pain measures, the degree of pain differed in that the children often rated their pain as more severe than their mothers'. The finding that mothers underestimate the severity of their child's pain has implications for the role of mothers in assessing their children's pain. Although mothers' verbal responses about the presence and severity of children's pain could be inaccurate, if the child cannot use self-report then the mother's rating of her child's pain, using an appropriate measure, may, at least, give an indication of the severity of the child's pain.

Researcher's assessment

The use of analogue scales to measure pain is well documented (Abu-Saad, 1984; McGrath et al, 1985; Broadman et al, 1988; Douthit, 1990; Tyler et al, 1993). The researcher's objective assessment of every child's pain with a visual analogue scale showed that most children were in some degree of pain. All children over five years were rated as having some pain, but under a quarter of those in Group A (under 5 years) were pain free. As no pre-school child was given analgesic medication regularly, this raises a controversial issue about whether children under five years experience the same degree of pain as children over five years, following the same operation. It is feasible that the difference between the numbers of children in Group A and in Groups B and C combined, who were in pain, may have occurred because of potential unreliability with some of the pain measures used in this study. On the other hand, the type and amount of intraoperative pain relief may have been influential if longer-acting drugs were administered to younger children but not to older children. However, this seems unlikely considering the apparent reluctance by doctors to use strong analgesics for Group A

children. Further research is needed to examine the differences in observer pain ratings between the age-groups.

The pain scores of children, mothers and the researchers were compared in a way which has not been described previously. In general, the scores indicated that the children were in a higher degree of pain than the ratings of the mothers or the researcher suggested. For example, two-thirds of the children in Groups B and C, who had undergone hernia repair, indicated that they were in severe pain, yet most of these children's mothers rated their child's pain as mild and the researcher also found that the most common degree of pain in these children was mild. As this pattern was repeated with each operative group, it seems that mothers and the researcher underestimated the extent of pain experienced by many children.

Summary

It is difficult to find formal measures of pain for children of different ages which are both reliable and valid. With older children, analogue scales appear to be of value and self-report is the method of choice. However, with younger children, proving that the measures do assess pain remains a problem. While certain measures appear to be useful, further work is required to refine them and demonstrate their validity.

Despite some difficulties, the findings of the present study have implications for clinical practice. These include the need to listen closely to children, relying less on the opinions of mothers and more on formal assessment of pain, in addition to examining the abilities of professionals to assess pain. The accurate assessment of children's pain is an essential prerequisite for effective management.

5.4 Management of pain

It is reported frequently that postoperative pain in children is undertreated (Mather and Mackie, 1983; Burokas, 1985; Lloyd-Thomas, 1990; Elander, Lindberg and Quarnstrom, 1991; Gillies et al, 1994), and, in the present study, the findings suggest that the management of pain was inadequate on the first day after surgery.

Prescribing analgesic medication

Beyer et al (1983) and Schecheter et al (1986) have reported that analgesic drugs prescribed for children, postoperatively, were likely to be prescribed in unnecessarily small doses. However, to date, no consideration has been given, in the literature, to the

responsibility for prescribing of postoperative analgesics. In this study, although it was shown that many staff believed that both anaesthetists and surgeons have a combined role to play in prescribing analgesic medication, each group was also cited as having sole responsibility. The lack of clarity as to whether anaesthetists or surgeons should prescribe analgesics may present problems for nurses, when difficulties arise in relieving pain.

Although it could be debated whether anaesthetists or surgeons should have the responsibility for prescribing postoperative analgesics, implementing any change in practice is likely to be difficult. At the time of data collection, pain relief while the child was in theatre was the responsibility of anaesthetists, and, although this could continue for 24 hours postoperatively, surgical staff generally attended children in the wards. One possible solution to the ambiguity of whose role it is to prescribe postoperative analgesics would be for both groups to assume the responsibility, based on joint training from the surgical and anaesthetic perspectives. Another answer might be the involvement of a multi-disciplinary acute pain team, which, in recent years, have been emerging in hospitals (RCS and CA, 1990). The principal aim of such groups is the relief of postoperative pain but these teams frequently have little responsibility for in-patients following minor surgery.

The literature does not address the subject of prescribing analgesics for children on discharge after in-patient surgery. In the study hospital, it was not usual practice to prescribe analgesic drugs in preparation for discharge. In addition, the majority of surveyed children were discharged home on the first postoperative day, when the majority of children were still in pain. Although a number of mothers had obtained a supply of pain relieving drugs for their child's discharge home, many had not, including some who expected to be given analgesic medication from the hospital and others who believed that painkillers would not be necessary. In view of the fact that so many children were in pain at this time, reappraisal of routine practice regarding discharge analgesic medication is indicated.

Aims and practice of nurses

The stated aims of nurses concerning pain relief may sometimes differ from their actual practice (Weis et al, 1983; Burokas, 1985; Page and Halvorson, 1991). Thus, while most nurses in the current study claimed that they aimed to achieve complete relief of children's pain, using analgesics, one-in-five children were not given analgesic medication. In fact, as many as one-in-ten nurses stated that they never offered analgesics to their child patients. However, the proportion of nurses who claimed to offer analgesic

medication regularly, to children over five years, was supported by a similar proportion of children who stated that they were offered analgesics. Nevertheless, a discrepancy exists between nurses' aims in their practice and their actual practice.

Concern about drug dependency

Concerns about overdosage and drug dependency, using strong analgesics, reputedly influence the administration of analgesics (Dilworth and McKellar, 1987; McCaffery and Beebe, 1989; Davies, 1992). In the present study, over a quarter of the staff claimed that they worried that children might become dependent easily upon analgesics and this view may account for the low administration of opiates. Approximately one third of staff nurses, house officers and surgical registrars said that they were worried about generating drug dependency in their child patients; these staff groups tended to be more involved than other colleagues in the prescribing and administration of analgesics at ward level postoperatively.

Nurses and doctors had varied opinions about the length of time for which opiates should be administered following minor surgery. Half of the trained nurses and most student nurses stated that opiates should be given for 24 hours only, while many surgeons and anaesthetists felt that they should be given for as long as necessary. The child's age was apparently an influencing factor, in that many staff stated that 24 hours is long enough for opiate administration in children under five years. Most anaesthetists indicated that they did not use opiates for minor surgery in this age-group, although they were given to older children.

A low rate of reversible side effects experienced by children who have had opiates has been reported by Dilworth and McKellar (1987), who emphasise the need for health care professionals to have better education about pain and analgesic administration. Recently, Burrows and Berde (1993) have stated that opiates can be given safely to infants and children of all ages.

Preconceived ideas about pain

Preconceived ideas about the degree of pain likely to be experienced by children after specific operations were held by staff; for example, no doctor or nurse believed that hernia repair could be the most painful operation of those in the criteria for operations. There is some support for this view, in that opiates were prescribed for only two out of fifteen children, no child in this category received regular analgesics, despite the fact that most children having hernia repair were in severe pain. However, following orchidopexy, the operation which a quarter of the staff rated as the most painful, more

than half of the children were in moderate or severe pain. Such situations might be explained by professionals holding preconceived ideas about the severity of postoperative pain with the resulting influence on the management of that pain. If an operation is not regarded by staff as painful, it is likely that pain, experienced by children having this operation, may be undertreated.

Administration of analgesic medication

Mather and Mackie (1983), Schechter et al (1986), Elander et al (1991) and Gillies et al (1994) have all described inadequate analgesic administration to children after surgery. This is supported by the current study, in which medication was given at least once to most children but was rarely administered regularly. Nurses, surgeons and anaesthetists agreed that most analgesics are effective postoperatively, and although most children were given paracetamol and a few were given opiates, the end result was that each of the surveyed children received less than the maximum possible dosage of analgesics and their pain scores indicated that over 80% remained in pain.

Mothers and analgesics

Almost half of the staff were of the opinion that mothers worried about their children becoming dependent upon drugs given in hospital, although only a small proportion of mothers acknowledged this concern. Instead, most mothers said that they had requested analgesic drugs for their children. This was corroborated when staff stated that it is usual for mothers to request pain relief for their child. Although some mothers stated that analgesics were administered immediately when they were requested, others had to ask more than once. Provision of information about pain, drugs and the risks of dependency might help to change the attitudes of mothers to pain relief and allow them to feel comfortable about requesting analgesic medication for their children.

Non-pharmacological pain relief

Although the literature on the use of non-pharmacological methods of postoperative pain relief is relatively sparse, methods such as transcutaneous electrical nerve stimulation (TENS) have been used successfully in adults (Manheimer, 1989; McCaffery and Beebe, 1989) and in children (Eland, 1991; Eland, 1993). These were known to many of the surveyed staff but had not been used. None of the children had a TENS machine in situ, postoperatively, when seen by the researcher. Other less technical methods such as the use of heat or cold were employed at times by staff in pain relief, but none was found to be in use on the day the children were interviewed.

Pain relief using reassurance or distraction was often said to be beneficial by staff. Many children of all ages claimed to have used distraction, usually by watching television. In addition, children of all ages said that they got up to play when they were in pain, often in an attempt to forget their pain, and the researcher observed many children being active on their first postoperative day, despite the fact that they were in pain. Use of the less technical methods of non-pharmacological pain relief and of the less well-known methods for children warrant wider investigation.

Nursing documentation

Nursing documentation about pain issues is reported as being limited (Harrison, 1991; Scott, 1992; Albrecht, Cook, Riley and Andreoni, 1992); in the present study, evidence of inconsistency in nursing documentation about pain was found. For example, 56% of nursing notes contained no sign of evaluation of the efficacy of analgesic medication. This is in keeping with the findings of previous research by Albrecht et al (1992), who reported that 53% of nurses did not document the effectiveness of analgesic medication. There can be no doubt that regular and accurate nursing documentation contributes to the consistency in care and consequently to the effective management of children's pain.

Summary

The effective management of children's pain by staff is a problem. Lack of knowledge leading to low analgesic administration and fear of dependency on opiates are likely to have assisted the process of ineffective pain management. The findings indicate a need for enhanced training about pain.

5.5 Education about pain

Recent reports suggest that children's pain has not been adequately recognised, its management has been ineffective and research findings have not been put into practice (Watt-Watson, 1987; RCS and CA, 1990; Pearce, 1993). The present study supports these findings, highlighting the need for making better use of the available information and research to educate health professionals. In addition to the recognition and management of pain in children, the particular areas which could be addressed are the need to base practice upon well-established research and the requirement to change negative staff attitudes.

One of the contributing factors to inadequate pain recognition and management is that some professionals base their practice on traditional beliefs rather than using a research base (Mather and Mackie, 1983; Burokas, 1985; Schechter et al, 1986; McCaffery and Beebe, 1989; Eland, 1990; Lloyd-Thomas, 1990). The findings of the current study revealed that a small number of staff still accept such traditional beliefs; for example, one-fifth of the staff believed that postoperative pain cannot be prevented, although there is evidence that this is possible (RCS and CA, 1990).

Discrepancies were apparent between the practice of nurses, surgeons and anaesthetists. As an example, a quarter of the surgeons were of the opinion that children will always say if they are in pain but no anaesthetists and almost no nurses agreed; some children admitted that they would deny the existence of pain corroborating similar reports from Mather and Mackie (1983) and McCaffery and Beebe (1989). Therefore, poor recognition and management still can be attributed, in part, to traditional rather than research-based practice. Enhanced training for staff may help to dissipate some of these beliefs.

Negative staff attitudes towards children's pain have been described by Sriwatanakul, Weis, Alloza, Kelvie, Weintraub and Lasagna (1983) and Weis et al (1983). In the present study, nearly a quarter of the child sample had been told that they should not have pain. Comments such as 'you should not be in pain' assume that the person making the comment has full knowledge about the individual's pain; this is not possible, because of the subjective nature of pain (McGrath and Unruh, 1987).

The apparently unapproachable attitude of some staff may have deterred a number of mothers from asking for analgesics for their child. According to the mothers, there was little discussion with staff about whether analgesics were required for their children. Anecdotal comment from the mothers suggested that there was sometimes a feeling that 'the nurses are very busy and I don't want to bother them' supporting previously reported negative attitudes (Goodwin, 1988). Such opinions may have contributed to the fact that a small number of mothers failed to report to staff that their child still was in pain after analgesic medication had been administered.

Education about pain for nurses

The need for additional education about pain recognition and management for nurses is not in doubt. There is some evidence that such training is being taken more seriously than in the past (Jeans, Seers and Wilkie, 1993; Pearce, 1993). This is supported by the fact that in the current study, most student nurses claimed to have had some such training

whereas, in contrast, few nurses who trained in the past had received any formal training about pain. Such training was related to nurses' knowledge of pain assessment.

This lack of knowledge about pain in registered and enrolled nurses may cause concern for three reasons. Firstly, trained nurses are not up-to-date with current research and education, in both theory and practice. The concern is that students are not seeing theory being put into practice in the clinical situation, where the trained nurses supervise the students. Pain was not assessed consistently or reliably and its management was ineffective. Pain charts were not in use and although most nurses claimed to evaluate pain relief, evidence of this was lacking. Secondly, trained nurses have a responsibility for their practice (UKCC, 1992) and this could be said to include the recognition of pain and administration of effective pain relief to children. If nurses do not use validated methods of pain measurement, their patients' pain will not be adequately recognised and, consequently, will not be relieved effectively. Thirdly, trained nurses are accountable for their practice to their patients, employers and professional bodies (UKCC, 1989; UKCC, 1992; UKCC, 1993). By failing to keep their knowledge up-to-date and failing to implement research findings, nurses risk providing poor quality of care to their patients. Therefore, it is suggested that although the education about pain for current learners is expanding, it could be enhanced even further. In addition, trained nurses currently in post could improve their knowledge about the assessment and management of children's pain.

Education about pain for doctors

Recommendations concerning the training of doctors about the management of pain also are being taken more seriously (Wilson et al, 1992). In the present study, doctors had received some formal training about pain management and this was related to their knowledge about pain measures. However, it depended to which profession they belonged; most anaesthetists had had some training about pain management, but most surgeons had not. At the time of data collection, anaesthetists took much of the responsibility for pain management but it is suggested that because surgeons carry out operations, they could have a larger role in postoperative pain relief, as they often have responsibility for postoperative pain relief in the wards. Further training in pain assessment and management may be of value for all surgical and anaesthetic staff.

Differences in the estimates of children's pain between doctors and nurses

Staff with specific training about pain assessment and management were more likely to estimate that fewer children would have moderate or severe pain than staff with no such training. Children's pain may be more effectively treated because of the knowledge of

staff and so be estimated at a lower level, but, on the other hand, pain may be more accurately recognised by the group who have additional knowledge. When doctors and nurses were examined separately, all nurses with specific training about pain estimated children's pain as moderate or severe whereas the majority of doctors did not. However, this finding should be regarded cautiously because of the small number of nurses (n=8) who had received training in pain management.

The need for education about pain for mothers

Mothers rely upon health professionals for information (Coyne, 1995; Dearmun, 1995). In the current study, a third of the mothers believed that pain cannot be prevented and this may have been a reason for their expectation that their children would experience pain postoperatively and, in some cases, consequent lack of request for analgesic medication for their child. Some mothers did not recognise pain in their children, at times blaming the child's distress on hospitalisation alone.

As described by Dearmun (1995), mothers appear to need education to clarify what to expect in terms of their child's anticipated postoperative condition; this information could include the potential role of the mothers in the relief of postoperative pain. An attempt to deal with some of the issues has been made in a booklet, "Children and Pain", written for Action for Sick Children (Alderson, 1992). However, direct discussion with each mother during the child's admission or at a preadmission visit could also increase the mother's knowledge, while reducing her level of anxiety and that of her child.

Summary

Overall, further education about the many aspects of pain is needed for both health care professionals and mothers. The practice of some professionals continues to be based on tradition and negative attitudes from others still exist and influence practice. Professionals in current practice could learn to make use of the publications available, to update and maintain their knowledge base while those responsible for lectures could base their teaching on the literature. In addition, mothers lacked relevant information which may have contributed to the children's experience of pain. This lack of knowledge on the part of professionals and mothers could be addressed by improving lines of communication and by enhancing training.

5.6 Limitations of the study

This study is limited in several areas. Firstly, it took place in one paediatric hospital and therefore the results cannot be generalised elsewhere. Secondly, the majority of children in the study were male so no comment could be made regarding differences between sexes in the perception of and experience of pain. However, this was unavoidable as the most usual operations were those which were carried out on males. Thirdly, the inexperience of the researcher in conducting research studies may have contributed to methodological problems.

Several variables were not examined. Religion is one which, according to the literature, may influence the perception and experience of pain (Craig, 1989; O'Rourke, 1992; Doyle, 1992). Information about the influence of religion on children's experience of pain could be a useful addition to the existing, inadequate literature. Similarly, social class was not assessed. Additionally, although children were asked about anxiety, there was no formal measurement. Data derived from formal anxiety measures could have increased knowledge about the relationship between anxiety and pain in children.

Questions arose about the reliability and validity of some of the pain measures employed. The Revised Eland Color Tool and the Revised Objective Pain Scale were each adapted from their original designs. Because of this, there was no research with which to compare validity and reliability for either scale. In addition, the doubt about the accuracy of the Children's Hospital of Eastern Ontario Pain Scale (Beyer et al, 1990; McGrath, 1992), upon which the original Objective Pain Scale was based, is likely to cast doubt on the usefulness of the Objective Pain Scale (original or revised). Although the Eland Color Tool was revised, this will not have made any difference to the possibility that colour-blindness could influence the use of colour in pain measurement. The new design of the faces scale also meant that no comparison could be made with previous research. However, the question about whether a faces scale measures pain or emotion remains unanswered and as the faces scale in this study included a smiling face (Juniper, 1991) it is possible that pain was not being measured.

The study was governed by specified criteria which included the exclusion of non-Caucasians and mentally handicapped children. As a result, the researcher had to exclude children in a city where there are many Asians, and in a hospital to which mentally-handicapped children are referred frequently. This resulted in important information being missed about possible cultural differences and about children with mental handicap who, by virtue of their condition, often cannot communicate their needs

as well as others. The latter is a group whose pain is likely to be difficult to measure but this should not preclude the importance of attempting to do so.

Overall, the three main samples (children, mothers and staff) were of an acceptable size. The children's sample size is reasonable and could be said to be representative of the population having the operations specified in the study criteria; but, at times, when the sample is split into sub-groups the numbers become too small to be representative and to analyse accurately. A fourth sub-group of patients aged 12-15 years would have been included had the sample size been larger; five was too small a number to statistically analyse, so no comment could be made on any differences found between adolescents and children. In some areas where results were inconclusive, larger samples might have provided evidence of statistical significance and consequently results with a definite meaning. The number of mothers was representative as was the staff sample. As most staff were experienced in the care of children, opinions from such a group are of more value than from a group with less paediatric experience. Both this and the fact that the sample of staff was randomly selected give greater validity to the results from the staff sample.

Finally, because of the length of time since the data collection ended (the middle of 1992), it is possible that progress has been made in improving the assessment and management of postoperative pain in the clinical areas used in this research study.

5.7 Summary

This descriptive study, which has some limitations, has revealed a range of findings which may have substantial implications for nursing and medical practice and training. Some differences between the three professions involved in the care of children undergoing minor surgery have been highlighted. Communication problems about the experience, presence and severity of pain were demonstrated between children and the adults caring for them, whether mothers or health care professionals. Unfamiliarity with current knowledge and research was often revealed by staff and attempts to put research findings into practice were not in evidence. Information has been provided about mothers' views and about the importance of the mothers' role in caring for their children following surgery.

The recognition and management of children's pain will only become of an acceptable, effective standard for children, their families and staff, once communication is improved,

training becomes more in-depth and research findings about pain measurement and its management become normal practice. In the meantime, as Somerville (1993) reflects "Failure by physicians" (and nurses) "to respond to patients' pain or suffering is a serious breach of ethics and of human rights".

Chapter 6 Conclusions

6.0 Conclusions

A high proportion of the children included in this study were in pain following minor surgery, the degree frequently being moderate to severe. Contributing factors to this situation included inadequate recognition of the importance of language and comprehension skills, communication difficulties, lack of knowledge in pain assessment and management, and practice which was not based on established research. Many mothers were aware of their child's pain, but their involvement in the care of their child was not optimal. At times, the opinions of different professional groups were discrepant, as were those of children and staff. The study provides evidence supporting previous research although some findings were limited by methodological problems, such as the size of the sub-samples.

Presence of pain

The majority of children were in pain on their first postoperative day; commonly, this was moderate or severe pain. The fact that so many children were found to be in pain occurred despite problems with some of the pain measures.

Recognition of pain

Pain in children may not have been noticed routinely by professionals. Although staff were aware of physiological and psychological influences on pain, other factors, such as the sex of the child, were considered rarely. Verbal communication and observation of behaviour were the customary methods of pain assessment, but these are known to be unreliable when used on their own. The question arose about whether mothers or staff assess pain more accurately in children while the possibility that assessment should be carried out by children themselves was considered infrequently. Contrary to staff opinion, many children were able to localise the site of their pain and to describe it accurately. As a result, staff and mothers made what the researcher considers to be subjective decisions about the presence and severity of children's pain. It appears that both staff and mothers had preconceived ideas about pain levels, which may have influenced the recognition and consequent management of pain.

The language and comprehension skills of children were not taken into consideration by many staff when assessing pain. As a result, unnecessary difficulties were created for both groups. Most children aged five years and upwards were able to describe their pain, although occasionally in language which adults had difficulty in understanding.

Effective verbal communication between adults and children involves the use of language which facilitates comprehension; for example, using the child's usual term for pain. Similarly, the wording of questions about pain is crucial, and in this context, direct rather than general questions are more likely to elicit useful information about pain. Specifically, children aged three and four years require a more casual and conversational approach than children of five years or more. Consequently, more reliable means of pain assessment using formal measures are required.

Formal methods of pain measurement were familiar to some professionals, but they were not used routinely in practice. Although some of the formal measures utilised in the study generated clinically useful results, others proved to be problematic. The number of formal measures of pain which are both reliable and valid for children of different ages is very limited. With older children, self-report is the method of choice and analogue scales are of value. However, with younger children, it remains a problem to prove that objective measures actually assess pain. Of the pain measures employed in this study, self-report, in the form of analogue scales (VAS and CAS), was successful in older children of eight years upwards, but not in children under five years. The reliability of the other two self-report measures, namely the colour tool and the faces scale, is in question. The Revised Objective Pain Scale may be of value in children under five years but further research is required to prove its validity. If there is no alternative to objective pain measurement, basing the evaluation upon set criteria could reduce bias in the interpretation of the observed findings. The implementation of formal pain measures is desirable, but is not a simple procedure. Nevertheless, the accurate assessment of children's pain is a necessary forerunner to effective management. In general, the lack of knowledge of nurses and doctors about the recognition of pain in children indicates the need for a reappraisal of the education of health professionals in this field.

Management of pain

In general terms, the management of pain in the surveyed children was inadequate. Communication between different groups of adults was poor, despite the fact that it is an essential element in effective pain management. Analgesics were prescribed by doctors, although frequently they were not administered by nurses. In addition, alternative methods of pain relief were not in use even to complement the effects of drugs. Inconsistency in routine documentation of pain issues by nurses contributed, undoubtedly, to ineffective pain management. One consequence of poor documentation was that the evaluation of the efficacy of analgesics was hampered and the potential was created for producing a cycle where pain is neither recognised nor managed effectively.

The practice of a number of staff had a traditional basis rather than being founded on up-to-date research. In addition, a few professionals held attitudes which influenced their practice in a negative way. Pain management also may have been affected by several other factors; for instance, preconceived ideas held by many staff about the level of pain which children could expect after surgery, previous personal experiences of pain in the staff and concern about problems such as opiate dependency. Such contributing factors indicate a real need for improved lines of communication and for enhanced education for health professionals about pain.

Children's experience of pain

The information gathered about the experiences of children who have pain following surgery has implications for clinical practice in terms of the need for consideration of language and comprehension skills, verbal communication and differences in opinions between children and staff.

The ability of children to understand and talk about pain plays not only a vital role in their experience, but also may influence maternal and staff responses. For example, more older children than younger children were given preoperative explanation about what to expect by staff and mothers; more children of eight years upwards than 5-7 years denied the presence of pain; children under three years were given more analgesics than those aged 3-4 years; and although opiates were administered rarely to children over five years, they were never given to children under that age.

Verbal communication between children and either their mothers or staff was not always at a premium. A number of children were worried about hospitalisation, their operations and the prospect of pain. The failure of staff to impart relevant information preoperatively to mothers and to children may have contributed to anxiety in the children and consequently their adverse experience of pain. Similarly, the attitudes of a number of staff and mothers to children who had undergone surgery, were not always positive. For instance, children were told that they should not have pain. Such comments may have discouraged some children from admitting to the presence of pain, particularly when approximately a third of the children over five years claimed that they would deny pain.

A number of differences in opinion emerged about pain between children and staff. For example, the majority of children stated that they feel they have to be brave following surgery, and yet only just over half of the staff held the view that children would behave in this manner. Similarly, more children than staff estimated were able to describe and localise the site of their pain. Such staff opinion about the ability of children could limit

their involvement in the assessment of their pain. Discrepant opinions were also shown between staff groups. For example, contrary to the views of doctors, nurses believed that children could be active when they are in pain, the implication being that pain may not be recognised adequately by doctors. Likewise, nurses suggested a shorter period of time, than surgeons or anaesthetists, for the administration of opiates following minor surgery. This difference, where one group prescribe and the other group administer the drugs, may influence pain management.

Responses of mothers

The responses of mothers to seeing their child in pain reflected their concern for the well-being of their child, their involvement in the child's care and communication difficulties. Mothers were worried about what was to happen to their children and about what to expect in terms of degree of pain. A small proportion also worried about their child becoming dependent on drugs administered in hospital.

Mothers were not involved routinely in pain assessment, although, in practice, the majority felt that they were most suitably placed to assess their child's pain. The view of the mothers was given some support by the fact that young children tended to acknowledge pain to mothers rather than to staff. Very young children were less able to cope than older children with the necessary language, when trying to assess their level of their pain and needed mothers to be present. In addition, the manner in which questions about the child's pain are put by staff to mothers is important: fewer mothers stated that their child was in pain whereas a higher proportion indicated the presence and severity of pain using a visual analogue scale. Consequently, formal pain measures are of more value than verbal responses for mothers. Nevertheless, many mothers underestimated the level of their children's pain and it follows that it would be prudent for staff to be cautious about relying solely on pain assessment of mothers. However, the inclusion of mothers in the overall assessment of their child's pain remains of value.

Communication between staff and mothers was problematic. On a few occasions, for example, mothers did not approach professionals for further pain relief, when the administered drug had not relieved their child's pain effectively. Mothers also made anecdotal comment that, at times, they could not approach staff because the professionals were too busy. A general opinion from mothers was that there was little discussion with staff about the relief of their child's pain. The majority of mothers expected analgesic drugs to relieve pain completely or substantially; however, in fact, almost half of the mothers indicated that their child's pain was not adequately relieved. It is possible that, in this case, the expectations of the mothers were unrealistic, but it is also possible that

the management of the children's pain was ineffective. Either way, it is evident that mothers needed more information than they were given. In addition, the expectations of mothers differed widely about the requirement for analgesics, once the child was home; many were unprepared. Lack of knowledge in the mothers was also apparent when some expressed the belief that children experience less pain than adults and that postoperative pain cannot be prevented.

A more active and elaborate role for mothers in the care of their children could include being involved more in pain assessment. However, their lack of knowledge and their understanding about pain, need to be addressed first. Such information could be passed on from professionals to mothers thereby improving reciprocal communication between the two groups.

In conclusion, unrelieved pain in children causes unpleasant experiences and unnecessary problems. On the other hand, the prevention or relief of pain could promote quicker recovery which, in turn, is contingent upon effective nursing and medical practice. Although there is no excuse for children suffering unnecessary pain after elective minor surgery, it will take time before further research is conducted, the education of health professionals can be altered and the application of research findings put into practice. In the interim, if children are given the benefit of the doubt and analgesics are administered regularly, their pain might be relieved more effectively.

6.1 Implications for clinical practice, education and research

6.1.1 Clinical practice

Health care professionals could enhance the quality of care by using research-based practice when assessing and managing pain in children. Promptly recognised and effectively managed pain will improve the physical and emotional well-being of children following surgery.

It has been suggested by the Royal College of Surgeons and the College of Anaesthetists (1990) that early discharge from hospital could be facilitated by effectively treated postoperative pain. The current economic climate in the NHS requires financial awareness in relation to clinical practice and it seems that one means of achieving high quality care with early discharge from hospital after surgery is by the effective recognition and management of pain.

The conclusions of this study have generated a series of implications for clinical practice. The implications may be construed in terms of the following desirable actions and requirements for health care professionals:

Recognition of pain

- Increased awareness of factors, such as the cultural context, which influence pain;
- Consideration of each child's language and comprehension skills, by talking at their level and listening closely to what they are saying;
- Recognition that observation of the behaviour of children who may be in pain may be beneficial with the reservation that what is observed is not necessarily what is felt;
- Establishment of the customary pain language used by each child;
- Preoperative explanation matched to language and comprehension skills, taking into consideration their wishes and consent;
- Enhanced reliance on research findings; for example by putting appropriate pain measures into practical use. The coloured analogue scale has been developed and manufactured by Reckitt and Colman Products Ltd in conjunction with the University of Glasgow. Now known as the Junior Disprol Pain Indicator (Appendix 24), it is being utilised in further research at present and its application is also being considered by the Royal Hospital for Sick Children, Glasgow.

Pain management

- Development of regular documentation about pain issues in day-to-day practice;
- Regular administration of pain relieving drugs, for a specified time postoperatively, with planned continuity between hospital and home;
- Appraisal of pain relief policy at the time of discharge;
- Attempts to enhance children's understanding of what constitutes pain relief, taking age-related beliefs into consideration;
- Further investigation of the use of complementary therapies; for example, the use of TENS, in conjunction with analgesic medication.

Overall

- Improved communication between professional groups of staff, between staff and mothers and between adults and children to improve pain assessment and management.
- Increased involvement of mothers in the care of their child, including pain assessment and management;
- Predetermining standards of care, against which quality can be measured clinically and used for audit purposes. A standard of care on the assessment of pain in

children has been drafted at the Royal Hospital for Sick Children, Glasgow, as a result of this research. It is also proposed that a standard of care on the management of pain in children should be developed.

6.1.2 Education

There can be no doubt that children's pain is difficult to deal with, both theoretically and practically, because of its subjective nature. Lack of knowledge about pain in children, in nurses and doctors, could be addressed by including the concept of pain as a separate subject in education curricula; while in-service training on a regular basis could update professionals who are currently in practice. For instance, all staff should know about alternative methods of pain relief, such as TENS, and some could be trained in their use. The suggested changes to education could provide the opportunity for incorporating research-based knowledge about postoperative pain and its management for all staff dealing with children and could help to refocus practice. Continuing research into the unclear and rarely investigated areas about pain in children would enhance knowledge even further.

6.1.3 Research

Three areas for further research have emerged from this study.

Assessment of pain in children of 5-7 years

A continuing problem exists with the measurement of pain in children aged 5-7 years. Further research using the Eland Color Tool may reveal why so many children, in the present study, failed to understand the link between colour and pain. However, it is likely that there are still a number of children who could never use this tool because of colour-blindness and this makes the applicability of colour tools questionable. It is reported in the literature that visual analogue scales are of use in children as young as five years; consequently, testing the hypothesis that a VAS could measure pain in this age-group would be of value. In this context, a small-scale survey is being undertaken, currently, using the Junior Disprol Pain Indicator.

Assessment of pain in adolescents

The needs of adolescents are not always recognised in hospital (Gillies and Parry-Jones, 1990) and there continues to be a need for the study of postoperative pain in young adolescents. The special needs and difficulties which many adolescents experience because of maturational changes may cause further problems when trying to cope with

pain (Favaloro, 1988; Favaloro and Touzel, 1990). Communication difficulties often arise in this age-group and the potential difficulty of admitting to pain may perpetuate a vicious circle. Research which examines the experience of pain in adolescents in relation to their maturational stage is underway currently (Parry-Jones, Smith and Gillies, 1993-1996).

Non-pharmacological relief of pain

Non-pharmacological methods of relieving pain, such as transcutaneous electrical nerve stimulation, have been used in paediatrics in North America (Eland, 1991 and 1993). In Britain, these methods are used in adult patients but rarely in children. Reasons for this include limited knowledge about such methods, lack of scientific research supporting such practice, and restricted resources. Research into the practical applicability of non-pharmacological methods of pain relief in children could provide the necessary support for expanding the use of these methods in the relief of pain.

Abbreviations

CAS	Coloured Analogue Scale
CHEOPS	Children's Hospital of Eastern Ontario Pain Scale
DEGR ^R	Gustave Roussy Pain Scale
EN	Enrolled Nurse
IASP	International Association for the Study of Pain
JHO	Junior House Officer
NBS	National Board for Nursing, Midwifery and Health Visiting for Scotland
OPS	Objective Pain Scale
PCA	Patient controlled analgesia
RCS and CA	Royal College of Surgeons and College of Anaesthetists
RECT	Revised Eland Color Tool
ROPS	Revised Objective Pain Scale
RSCN	Registered Sick Children's Nurse
SHO	Senior House Officer
TENS	Transcutaneous electrical nerve stimulation
TPPPS	Toddler Preschooler Postoperative Pain Scale
UKCC	United Kingdom Central Council for Nursing, Midwifery and Health Visiting
VAS	Visual Analogue Scale
yc	Yates corrected

Appendix 1

<u>PATIENT INTERVIEW</u> <u>(5-7 years)</u>
<u>STUDY NO.</u>
<u>WARD</u>
<u>DATE</u>
<u>TIME</u>
<u>D.O.B.</u>

Interview schedule: children 5-7 years

Thank you for helping me. I'm going to ask you some questions and, once I'll ask you to help me to fill in the answers, but I'll tell you when. The questions come in 5 parts. Remember, I won't tell anyone what you have told me. If you don't feel well and want to stop, just tell me.

Section 1 - Personal Details

First, I want to ask some things about yourself.

- | | | | |
|--|---|------------|---------|
| 1. Sex | male [] | female [] | c3 [] |
| 2. Age | years [] | months [] | c4 [] |
| 3. Why are you in hospital? | | | |
| | (looking for operation, why needed, what done) | | c5 [] |
| | | | c6 [] |
| | | | c7 [] |
| 4. Is your mum/dad staying in hospital with you? | | | |
| | yes [] | no [] | c8 [] |
| 5. Were you able to sleep all night last night? | | | |
| | yes [] | no [] | c9 [] |
| | If not, why not? | | c10 [] |
| 6. Did you eat all your breakfast this morning? | | | |
| | yes [] | no [] | c11 [] |
| | If not, why not? | | c12 [] |
| 7. Now, tell me something. | | | |
| | If I fall and bump my head, I say that my head hurts or it is sore. | | |
| | If you fall and bump your head, what do you say? | | c13 [] |
| | Would you ever use any other words for _____? | | c14 [] |

Section 2 - Past Pain

Now I'm going to ask you about things that have happened to you before you came into hospital.

1. Can you tell me about any things that hurt ()
you before you came into hospital? c15 []
2. Has anything hurt () you since you came into
hospital? yes [] no [] c16 []
If yes, what? c17 []
3. What was the worst hurt you have ever had? c18 []
4. How did it feel? (when I am () I feel _____) c19 []
5. What makes you better when you hurt ()? c20 []
6. Think back to the worst hurt () you have had.

(Show selection of coloured pencils:

Red, green, purple, blue, black, brown, yellow, orange)

Can you tell me which colour this was most like?

(worst = 1; no hurt = 4)

The worst hurt _____ c21 []

The next worst _____ c22 []

A little hurt _____ c23 []

No hurt at all _____ c24 []

Section 3 - Pre-operative information

This is the 3rd part and I'm going to ask you about coming into hospital.

1. Who said that you were coming into hospital?
a) mummy/daddy [] b) doctor []
c) someone else (specify) _____ c25 []
2. Were you told about what would happen to you in hospital? yes [] no [] c26 []
What were you told? c27 []
3. Did anyone say that your _____ would hurt ()
after your operation? yes [] no [] c28 []
If yes, who said to you?
a) mummy/daddy [] b) a nurse []
c) a doctor [] d) other (specify) _____ [] c29 []
4. Can you tell me how you felt when you woke up after your operation? c30 []
5. How do you feel today? c31 []
6. Did you think you would be:
a) not sore at all []
b) not so sore []
c) much sorer [] c32 []
7. Do you like to know if something is going to hurt ()?
yes [] no [] c33 []

Section 4 - Anxiety

In the 4th part, I'm going to ask you about things you think about in hospital.

1. Do you wonder what will happen to you in hospital?
yes [] no [] c34 []
If yes, do you worry about it? yes [] no [] c35 []
2. How could you stop worrying? c36 []
3. Are you scared of anything in hospital?
yes [] no [] c37 []
If yes, what scares you? c38 []
4. What scares you most about hospital? c39 []
5. Did you think alot about having your operation before
you had it? yes [] no [] c40 []

Section 5 - Present Pain

This is the last part and I'm going to ask about how you have been since your operation

1. Do you hurt () anywhere now? yes [] no [] c44 []
2. Why do you hurt ()? c45 []
3. Where do you hurt ()? c46 []
Show me. a) operation site []
b) other site [] c47 []
4. Do you hurt () there all the time? c48 []
yes [] no []
If no, does it hurt () there some of the time? c49 []
yes [] no []
5. Can you tell me what your hurt () feels like? c50 []
(If not understood: if I asked you what a house was could you tell me? Now, can you tell me what your hurt () is like?
6. Now I'd like you to show me how bad your hurt () is.
Remember the colours we talked about/ You told me that
_____ was the worst hurt
_____ hurt alot
_____ hurt a little
_____ did not hurt at all

Will you colour this picture of you to show me where your hurt () most. c51 []
Do you hurt () anywhere else? Will you colour it in using these crayons.
7. Will you show me on this ladder, where my friend 'Sunny' is, how much hurt () you have. c52 []
(bottom of ladder = no hurt; top of ladder = worst hurt)
8. Which did you like doing better? c53 []
a) Colouring []
b) moving 'Sunny' []

Why did you like _____ better? c54 []
9. What helps your hurt () to go away? c55 []

10. Do you do anything like watching TV to try to make
your hurt () go away? yes [] no [] c56 []
If yes, what do you do? c57 []
11. Would you get up to play when you hurt ()?
yes [] no [] c58 []
If yes, why? c59 []
12. Do the nurses always know when you hurt ()?
yes [] no [] c60 []
13. Do you tell anyone if you hurt ()?
yes [] no [] c61 []
If yes, who do you tell? c62 []
If not, why not? c63 []
14. Do you think grown-ups always understand you when
you tell them you hurt ()? yes [] no [] c64 []
15. When you're in hospital, who knows the best when you
hurt()? a) mummy/daddy []
b) a nurse []
c) a doctor [] c65 []
16. Would you ever say that you don't hurt () when
you do? yes [] no [] c66 []
17. Do you mind having jags? yes [] no [] c67 []
18. Would you ever tell the nurses or doctors that you
don't hurt () so that you don't have to have a
jag? yes [] no [] c68 []
19. Has anyone asked if you want anything to help your
hurt () go away? yes [] no [] c69 []
If yes, who?
a) a nurse []
b) a doctor [] c70 []
20. Have you had any medicine/jags to help your hurt go away?
yes [] no [] c71 []
If yes, did it:
a) take all your hurt () away []
b) take some of your hurt () away []
c) take none of your hurt () away [] c72 []

21. Do you ever feel like crying when you hurt ()?

yes [] no []

c75 [1]

If yes, do you cry?

yes [] no []

c76 []

If you feel like crying but don't,
why don't you?

c77 [1]

22. Do you feel you have to be brave and not cry?

yes [] no []

c78 []

23. Has anyone said to you that your _____

shouldn't hurt?

yes [] no []

c79 [1]

If yes, was it: a) a nurse []

b) a doctor []

c) someone else (specify)

c80 [1]

(SOCIAL)

What are you going to do/ who is going to visit you today?

Thank you for being so helpful to me

Section 6 - Observation

1. At the end of the interview, the patient

a) appears to have the following amount of pain:

no pain

severe pain

c81 []

a) smiling [1]

groaning []

crying []

c82 f 1

b) relaxed []

flinching	[ɪ]
-----------	-------

rigid []

c83 []

c) active []

limited mobility [1]

immobile [ɪˈmɒbiəl]

c84 []

Analgesia Details

1. Diagnosis:
2. Operation:
3. Date of Surgery:
4. Approximate time of surgery:

5. Premedication

	<u>Drug(s) & Dose(s)</u>	<u>Route</u>	<u>Time Given</u>	<u>Comments</u>
1				
2				
3				
4				

6. Analgesia given in theatre

	<u>Drug(s) & Dose(s)</u>	<u>Route</u>	<u>Time Given</u>	<u>Comments</u>
1				
2				
3				
4				

7. Post-operative analgesia

	<u>Drug(s) & Dose(s)</u>	<u>Route</u>	<u>Time Given</u>	<u>Comments (eval)</u>
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

Appendix 2

<u>PATIENT INTERVIEW</u> <u>(8-11 years)</u>
<u>STUDY NO.</u>
<u>WARD</u>
<u>DATE</u>
<u>TIME</u>
<u>D.C.S.</u>

Interview schedule: children 8-11 years

Thank you for helping me. I'm going to ask you some questions and once I'll ask you to help me, but I'll tell you when. The questions are divided into 5 parts. Remember, I won't tell anyone what you have told me. If you don't feel well and want to stop, just tell me.

Section 1 - Personal Details

First, I want to ask some things about yourself.

- | | | |
|--|---|---------|
| 1. Sex | male [] female [] | c3 [] |
| 2. Age | years [] months [] | c4 [] |
| 3. Why are you in hospital? | | |
| | (looking for operation, why needed, what done) | c5 [] |
| | | c6 [] |
| | | c7 [] |
| 4. Is your mum/dad staying in hospital with you? | | |
| | yes [] no [] | c8 [] |
| 5. Were you able to sleep all night last night? | | |
| | yes [] no [] | c9 [] |
| | If not, why not? | c10 [] |
| 6. Did you eat all your breakfast this morning? | | |
| | yes [] no [] | c11 [] |
| | If not, why not? | c12 [] |
| 7. Now, tell me something. | | |
| | If I fall and bump my head, I say that my head hurts or it is sore. | |
| | If you fall and bump your head, what do you say? | c13 [] |
| | Would you ever use any other words for _____? | c14 [] |

Section 2 - Past Pain

Now I'm going to ask you about things that have happened to you before you came into hospital.

1. Can you tell me about things which hurt you or were sore() before you came into hospital? c15[]

2. Has anything been sore() in hospital?
yes [] no [] c16[]

If yes, what? c17[]

3. What's the sorest thing that's ever happened to you? c18[]

4. How did it feel? (when I am () I feel _____) c19[]

5. What makes you better when you are sore? c20[]

Section 4 - Anxiety

In this part I'm going to ask you about things you think about in hospital.

1. Do you wonder what will happen to you in hospital?
yes [] no [] c34[]
If yes, do you worry about it? yes [] no [] c35[]
If yes, what would help you to stop worrying? c36[]
2. Does anything in hospital scare you?
yes [] no [] c37[]
If yes, what? c38[]
If yes, what scares you most about hospital? c39[]
4. Did you worry about having your operation?
yes [] no [] c40[]
5. Which would you rather be told about?
a) everything that will happen to you []
b) some of what will happen to you []
c) nothing [] c41[]

Section 5 - Present Pain

This is the last part and I'm going to ask you about how you have been since your operation.

- | | | | |
|-----|--|---|----------------------|
| 1. | Are you sore()anywhere now? | yes [] no [] | c44[] |
| 2. | Why are you sore()? | | c45[] |
| 3. | Where are you sore()?
Show me. | a) operation site []
b) other site
_____ [] | c46[]

c47[] |
| 4. | Is it sore there all the time? | yes [] no [] | c48[] |
| | If no, is it sore some of the time? | yes [] no [] | c49[] |
| 5. | Can you tell me what your sore _____ feels like? | | c50[] |
| 6. | Now I'd like you show me how sore you are, using this (VAS) | | c 5 1 [] |
| 7. | Can you do the same using this one? (MY SCALE) | | c52[] |
| 8. | Which one did you like doing better? | | |
| | a) the first | [] | |
| | b) the second | [] | c53[] |
| | Why this one? | | c54[] |
| 9. | What helps your _____ to get less sore()? | | c55[] |
| 10. | Do you do things like watching TV to try to make you
not so sore? | yes [] no [] | c56[] |
| | If yes, what do you do? | | c57[] |
| 11. | Would you get up to play when you were sore()? | | |
| | | yes [] no [] | c58[] |
| | If yes, why? | | c59[] |
| 12. | Do the nurses always know when you are sore()? | | |
| | | yes [] no [] | c60[] |
| 13. | Do you tell anyone if you are sore()? | | |
| | | yes [] no [] | c61[] |
| | If yes, who do you tell? | | c62[] |
| | If not, why not? | | c63[] |

14. Do you think grown-ups always understand you when you tell them you are sore()? yes [] no [] c64[]
15. When you're in hospital, who knows best when you're sore?
 a) your mum/dad []
 b) a nurse []
 c) a doctor [] c65[]
16. Would you ever say that you are not sore() when you are? yes [] no [] c66[]
17. Do you mind having jags? yes [] no [] c67[]
18. Would you ever tell the nurses or doctors that you're not sore () so that you don't have to have a jag? yes [] no [] c68[]
19. Has anyone asked if you want anything like medicine to make you not so sore? yes [] no [] c69[]
 If yes, who?
 a) a nurse []
 b) a doctor [] c70[]
20. Have you had any medicine/jags to make you not so sore()? yes [] no [] c71[]
 If yes, did the medicine/jag:
 a) stop you from being sore() []
 b) make you a little less sore() []
 c) not help at all [] c 7 2 []
21. Do you ever feel like crying when you are sore()? yes [] no [] c75[]
 If yes, do you cry? yes [] no [] c76[]
 If you feel like crying but don't, why don't you? c77[]
22. Do you feel you have to be brave and not cry? yes [] no [] c78[]
23. Has anyone said to you that your _____ shouldn't be sore() yes [] no [] c79[]
 If yes, was it: a) a nurse []
 b) a doctor []
 c) someone else [] c80[]
- (SOCIAL) So, what are you doing today/ who is visiting you?
You've been a great help to me - thank you

Section 6 - Observation

1. At the end of the interview, the patient

a) appears to have the following amount of pain:

no pain

severe pain

c81[]

b) exhibits the following:

a) smiling [] groaning [] crying []

c82[]

b) relaxed [] flinching [] rigid []

c83[]

c) active [] limited mobility [] immobile []

c84[]

Analgesia Details

1. Diagnosis:
2. Operation:
3. Date of surgery:
4. Approximate time of surgery:

5. Premedication

	<u>Drug(s) & Dose(s)</u>	<u>Route</u>	<u>Time Given</u>	<u>Comments</u>
1				
2				
3				
4				

6. Analgesia given in theatre

	<u>Drug(s) & Dose(s)</u>	<u>Route</u>	<u>Time Given</u>	<u>Comments</u>
1				
2				
3				
4				

7. Post-operative analgesia

	<u>Drug(s) & Dose(s)</u>	<u>Route</u>	<u>Time Given</u>	<u>Comments(eval)</u>
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

Appendix 3

<p><u>PATIENT INTERVIEW</u> <u>(12-15 years)</u></p> <p><u>STUDY NO.</u> _____</p> <p><u>WARD</u> _____</p> <p><u>DATE</u> _____</p> <p><u>TIME</u> _____</p> <p><u>D.O.B.</u> _____</p>
--

Interview schedule: adolescents 12-15years

Section 2 - Past Pain

In the second section I'm going to ask you about things that have hurt
() in the past.

1. Can you tell me about things that have been sore ()
in the past? c15 []
2. Has anything been sore () in hospital?
yes [] no [] c16 []
If yes, what is it? c17 []
3. What was the worst pain () you have had? c18 []
4. How did it feel? c19 []
5. What helps when you are in pain? c20 []

Section 3 - Pre-operative information

In this section, I'm going to ask you about coming into hospital.

1. Who told you that you had to come into hospital?
a) mum/dad [] b) doctor []
c) someone else (specify) _____ c25 []

2. Were you told what would happen to you in hospital?
yes [] no [] c26 []
If yes, what were you told? c27 []

3. Did anyone say that you would be sore after your
operation? yes [] no [] c28 []
If yes, who?
a) mum or dad [] b) a nurse []
c) a doctor [] d) other (specify)
_____ [] c29 []

4. Can you remember how you felt when you woke up after
your operation? c30 []

5. How do you feel today? c31 []

6. Did you expect to be:
a) in no pain () at all []
b) in less pain () than you are []
c) in more pain () than you are [] c32 []

7. Do you think you should always be told if something
is going to be painful ()?
yes [] no [] c33 []

Section 4 - Anxiety

In the 4th part, I'm going to ask you about things you think about in hospital.

1. Do you wonder what will happen to you in hospital?
yes [] no [] c34 []
If yes, do you worry about it? yes [] no [] c35 []
If yes, what would make you less worried? c36 []
2. Are you afraid of anything in hospital?
yes [] no [] c37 []
If yes, what are you afraid of ? c38 []
What frightens you most about hospitals? c39 []
3. Did you worry about having your operation?
yes [] no [] c40 []
4. Which would you rather be told about?
a) everything that will happen to you []
b) some of what will happen to you []
c) nothing [] c41 []
5. Do you worry that you will not be given any
painkillers if you need them? yes [] no [] c42 []
6. Do you worry about becoming addicted to painkillers?
yes [] no [] c43 []

Section 5 - Present Pain

In this last section I'm going to ask about how you have been since your operation.

1. Do you have any pain () now? yes [] no [] c44 []
2. Why do you have pain ()? c45 []
3. Where is your pain ()? c46 []
 Show me. a) operation site []
 b) other site [] c47 []
4. Is it painful () all the time? yes [] no [] c48 []
 If no, is it painful () some of the time?
 yes [] no [] c49 []
5. Can you describe your pain ()? c50 []
6. Now I'd like you to show me how much pain () you
 have, using this. (VAS) c51 []
7. Can you do the same using this one? (my scale) c52 []
8. Which one did you prefer?
 a) the first []
 b) the second [] c53 []

 Why did you prefer this one? c54 []
9. What helps the pain () to get less? c55 []
10. Do you do things like read or watch TV to try to
 make your pain () go away? yes [] no [] c56 []
 If yes, what do you do? c57 []
11. Would you get up to eg. go and watch a video when
 you were in pain ()? yes [] no [] c58 []
 If yes, why? c59 []
12. Do the nurses always know when you are in pain ()?
 yes [] no [] c60 []
13. Do you tell anyone if you are in pain ()? yes [] no [] c61 []
 If yes, who do you tell? c62 []
 If not, why not? c63 []

14. Do you think adults always understand you when you tell them you are in pain ()? yes [] no [] c64 []

15. When in hospital, who knows best when you are in pain?

- a) parent []
b) a nurse []
c) a doctor [] c65 []

16. Would you ever say that you are not in pain () when you are? yes [] no [] c66 []

17. Do you mind having injections? yes [] no [] c67 []

18. Would you ever tell the nurses or doctors that you're not in pain () so that you don't have to have an injection? yes [] no [] c68 []

19. Have you been offered painkillers? yes [] no [] c69 []

If yes, who by?

- a) a nurse []
b) a doctor []
c) both [] c70 []

20. Have you had any painkillers? yes [] no [] c71 []

If yes, did it:

- a) take your pain away completely []
b) take some of your pain away []
c) not help at all [] c72 []

21. Have you ever refused to take painkillers? yes [] no [] c73 []

Why? c74 []

22. Do you ever feel like crying when you are in pain ()? yes [] no [] c75 []

If yes, do you cry? yes [] no [] c76 []

If you feel like crying but don't, why don't you? c77 []

23. Do you feel you have to be brave and not cry? yes [] no [] c78 []

24. Has anyone said to you that you shouldn't have pain ()? yes [] no [] c79 []

- If yes, was it: a) a nurse [] c) someone else [] c80 []
b) a doctor []

(SOCIAL)

What are you going to do today/ who is going to visit you?

You've been a great help - thank you

Section 6 - Observation

1. At the end of the interview, the patient

a) appears to have the following amount of pain:

no pain		severe pain		c81 []		
a) smiling	[]	groaning	[]	crying []	c82 []	
b) relaxed	[]	flinching	[]	rigid	[]	c83 []
c) active	[]	limited mobility	[]	immobile	[]	c84 []

Analgesia Details

1. Diagnosis:
2. Operation:
3. Date of Surgery:
4. Approximate time of surgery:

5. Premedication

	<u>Drug(s) & Dose(s)</u>	<u>Route</u>	<u>Time Given</u>	<u>Comments</u>
1				
2				
3				
4				

6. Analgesia given in theatre

	<u>Drug(s) & Dose(s)</u>	<u>Route</u>	<u>Time Given</u>	<u>Comments</u>
1				
2				
3				
4				

7. Post-operative analgesia

	<u>Drug(s) & Dose(s)</u>	<u>Route</u>	<u>Time Given</u>	<u>Comments (eval)</u>
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

Appendix 4



Visual analogue scale used by mothers and researcher

Appendix 5

INTERVIEW FOR MOTHERS

STUDY NO. _____

WARD _____

DATE _____

TIME _____

Interview schedule: mothers of children 5-15 years

Thank you for agreeing to see me. The questions are in 5 sections. All your answers will be kept confidential.

Section 1 - General

First, I'd like to ask you some general questions.

1. What is your relationship with _____?
mother [] other (specify) [] c3 []
2. What age is he/she? years [] months [] c4 []
3. Why is he/she in hospital? c5 []
4. What operation did he/she have? c6 []
5. Are you staying in hospital with him/her?
yes [] no [] c7 []
If yes, did he/she sleep all night last night?
yes [] no [] c8 []
If not, why not? c9 []
6. Did he/she eat all of his/her breakfast this morning?
yes [] no [] c10 []
If not, why not? c11 []
7. If you are asking him/her about something which
hurts, what would you say?
a) sore [] b) hurt []
c) painful [] d) other (specify) []
_____ c12 []

Section 2 - Past pain

Now I'd like to ask you briefly about your experience of pain.

- ```

1. Have you ever had pain? yes [] no [] c12[]
 If yes, can you describe it? c14[]

2. Have you ever had an operation? yes [] no [] c15[]
 If yes, did you have pain? yes [] no [] c16[]

 If yes, were you surprised that you had pain?
 yes [] no [] c17[]
 If yes, was it a) worse than you expected[]
 b) less than you expected [] c18[]

```

## Section 3 - Anxiety

In this section, I'd like to ask you about things that might worry children or their families about having an operation.

1. Does your son/daughter worry about what will happen to him/her in hospital?    yes [ ]    no [ ]    c19[ ]
2. Do you worry about what will happen to your son/daughter in hospital?    yes [ ]    no [ ]    c20[ ]
3. Do you think that telling children (or adolescents) the truth, about what is going to happen, makes them:  
    a) worry more    [ ]  
    b) no different [ ]  
    c) worry less    [ ]    c21[ ]
4. Which would your son/daughter rather be told about?  
    a) everything that will happen [ ]  
    b) some of what will happen    [ ]  
    c) nothing    [ ]    c22[ ]



## Section 4 - Pre-operative information

In this section I'd like hear about what you knew before the operation.

1. Who told your son/daughter that he/she was to have  
an operation?  
a) mother/father [ ] b) doctor [ ] c34[ ]  
c) someone else (specify) \_\_\_\_\_ [ ]
2. Was your son/daughter told that he/she would be sore  
after the operation? yes [ ] no [ ] c35[ ]  
  
If yes, who told him/her?  
a) you [ ] b) a nurse [ ]  
c) surgeon [ ] d) anaesthetist [ ]  
e) no-one [ ] h) other (specify) [ ]  
\_\_\_\_\_ [ ] c36[ ]
3. Were you told that he/she would have pain?  
yes [ ] no [ ] c37[ ]  
  
If yes, who by? c38[ ]
4. Who do you think should tell children/adolescents and  
their families about pain after operations?  
a) surgeons [ ] b) anaesthetists [ ]  
c) nurses [ ] d) other (specify)  
\_\_\_\_\_ [ ] c39[ ]
5. How was \_\_\_\_\_ immediately after his/her operation?  
a) not upset and in no pain [ ]  
b) not upset but in slight pain [ ]  
c) slightly upset and in some pain [ ]  
d) upset and in moderate pain [ ]  
e) very upset and in severe pain [ ] c40[ ]
6. How is he/she this morning?  
a) active but not in pain [ ]  
b) activity is limited and in moderate pain [ ]  
c) unable to get up and in severe pain [ ]  
d) on bedrest but not in pain [ ] c42[ ]
7. Is your son/daughter's pain:  
a) less than you expected [ ]  
b) more than you expected [ ]  
c) about what you expected [ ]  
d) he/she has no pain [ ] c43[ ]
8. Do you think that children (adolescents) should always  
be told beforehand if something will hurt ?  
yes [ ] no [ ] c44[ ]

9. Now I'm going to make 5 statements to you, and I'd like you tell me if you have heard of them.

- |                                                 |        |
|-------------------------------------------------|--------|
| a) Children experience less pain than adults    |        |
| yes [ ] no [ ]                                  | c45[ ] |
| b) Active children cannot be in pain            |        |
| yes [ ] no [ ]                                  | c46[ ] |
| c) Injection is best method of relieving pain   |        |
| yes [ ] no [ ]                                  | c47[ ] |
| d) Pain after an operation cannot be prevented. |        |
| yes [ ] no [ ]                                  | c48[ ] |
| e) Children cry because they are homesick,      |        |
| rather than because they are in pain.           |        |
| yes [ ] no [ ]                                  | c49[ ] |

|                                                      |        |
|------------------------------------------------------|--------|
| If yes to any of the above, where did you hear this? | c50[ ] |
|------------------------------------------------------|--------|

Section 5 - Child/adolescent's present pain

In the last section I'd like to hear about how your son/daughter is now.

1. Does your son/daughter have any pain?

yes [ ] no [ ]

c51[ ]

If yes, where is his/her pain?

a) wound site [ ]

b) related to anaesthetic [ ]

c) unrelated to operation at all [ ]

c52[ ]

2. Does he/she complain of wound pain:

a) constantly [ ]

b) sometimes [ ]

c) never [ ]

c53[ ]

If (a) or (b), could you mark on this line how bad you think his/her pain is.

no pain

severe pain

c54[ ]

3. What helps your son/daughter if he/she is in pain?

c55[ ]

4. Are you able to do anything to help your son/

daughter cope with the pain? yes [ ] no [ ]

c56[ ]

If yes, what would you do?

c57[ ]

5. Do children (adolescents) distract themselves

from pain by eg watching tv? yes [ ] no [ ]

c58[ ]

6. Do you always know when your son/daughter is in pain?

yes [ ] no [ ]

c59[ ]

7. Who do you think is the best judge of children's (adolescents') pain?

a) parent [ ] b) nurse [ ]

c) doctor [ ]

c60[ ]

8. In hospital, who do you think most children/adolescents would admit pain to?

a) parents [ ] b) nurses [ ]

c) doctors [ ] d) other(specify) \_\_\_\_\_ [ ]

c61[ ]

9. Would your son/daughter tell staff that he/she had pain?  
yes [ ] no [ ] c62[ ]
10. Do you think adults have difficulty in understanding children's descriptions of pain? yes [ ] no [ ] c63[ ]
11. Who do you think is responsible for relieving pain after an operation?  
a) nurses [ ] b) doctors [ ]  
c) other(specify) \_\_\_\_\_ [ ] c64[ ]
12. Now I'm going to ask you the same question 3 times, but about adults, then adolescents, then children.
- After an operation should a) adults [ ] c65[ ]  
b) adolescents [ ] c66[ ]  
c) children [ ] c67[ ]
- expect to have to put up with:  
a) severe pain  
b) bad pain  
c) moderate pain  
d) a little pain  
e) no pain
13. Should painkillers which are given after an operation:  
a) completely relieve the pain [ ]  
b) mainly relieve the pain [ ]  
c) slightly relieve the pain [ ] c68[ ]
14. Does your son/daughter mind having injections?  
yes [ ] no [ ] c69[ ]
15. Has your son/daughter refused to take painkillers (medicine or tablets)? yes [ ] no [ ] c70[ ]
16. Has your son/daughter's pain always been completely relieved by the medicine/drugs he/she has been given?  
yes [ ] no [ ] c71[ ]  
If not, what did you do? c72[ ]
17. Would your son/daughter ask for painkillers him/herself?  
yes [ ] no [ ] c73[ ]
18. In hospital, do you ever ask for painkillers for your son/daughter?  
yes [ ] no [ ] c74[ ]

19. Are painkillers offered to your son/daughter by staff:

- a) regularly ☐
- b) sometimes ☐
- c) never ☐
- d) do not know ☐

c75[ ]

20. Does your son/daughter cry when he/she has pain?

yes ☐ no ☐

c76[ ]

If yes, is this a) sometimes ☐

b) always ☐

c77[ ]

21. Do you think that children (adolescents) try to hide their pain by being brave and not crying?

yes ☐ no ☐

c78[ ]

If yes, is this equal for girls and boys?

yes ☐ no ☐

c79[ ]

If no, which hides their pain more?

boys ☐ girls ☐

c80[ ]

22. Do you have any painkillers for your son/daughter once he/she is home?

yes ☐ no ☐

c81[ ]

If no, do you:

a) expect to be given some from the hospital ☐

b) plan to buy some ☐

c) think painkillers will not be needed ☐

c82[ ]

THANK YOU VERY MUCH FOR YOUR TIME



## Appendix 6

### INTERVIEW FOR STAFF

STUDY NO. \_\_\_\_\_

WARD \_\_\_\_\_

DATE \_\_\_\_\_

Interview schedule: staff (Phase 1)

Thank you for agreeing to see me. I am going to ask you about postoperative pain in children, aged 5-11 years, and adolescents, aged 12-15 years, separately. All your answers will be kept confidential.

Section 1 - Personal details

1. Type of staff:

| <u>Nurses</u>   |     | <u>Surgeons/Anaesthetists</u> |     |
|-----------------|-----|-------------------------------|-----|
| Sisters         | [ ] | Consultant                    | [ ] |
| Staff Nurses    | [ ] | Senior Registrar              | [ ] |
| Enrolled Nurses | [ ] | Registrar                     | [ ] |
| Learners        | [ ] | Senior House Officer          | [ ] |
|                 |     | Junior House Officer          | [ ] |

c4 [ ]

2. How long have you been working with children and

adolescents: a) less than 1 year [ ]  
b) 1-2 years [ ]  
c) over 2 years [ ]

c5 [ ]

3. Have you had any formal training in the management of pain?

yes [ ] no [ ]

c6 [ ]

If yes, was this:

Nurses  
a) part of your RGN training [ ]  
b) part of your RSCN training [ ]  
c) other [ ]

c7 [ ]

Doctors  
d) part of your medical student training [ ]  
e) part of your post-registration training [ ]  
f) other [ ]

c8 [ ]

If yes, where did you have the training?

c9 [ ]

Section 2 - Pre-operative information for in-patients

1. Do you explain to children/adolescents about what to expect when they have an operation?
- |                |         |        |        |
|----------------|---------|--------|--------|
| a) Children    | yes [ ] | no [ ] | c10[ ] |
| b) Adolescents | yes [ ] | no [ ] | c11[ ] |
2. Do you tell patients and families about post-operative pain?
- |  |         |        |        |
|--|---------|--------|--------|
|  | yes [ ] | no [ ] | c12[ ] |
|--|---------|--------|--------|
3. Whose role is it to tell patients about post-operative pain?
- |                  |     |                   |     |        |
|------------------|-----|-------------------|-----|--------|
| a) nurses        | [ ] | b) surgeons       | [ ] |        |
| c) anaesthetists | [ ] | d) other(specify) |     |        |
|                  |     | _____             | [ ] | c13[ ] |
4. Should children/adolescents always be told in advance if a procedure will cause pain?
- |                |         |        |        |
|----------------|---------|--------|--------|
| a) Children    | yes [ ] | no [ ] | c14[ ] |
| b) Adolescents | yes [ ] | no [ ] | c15[ ] |
5. Have you ever told a child/adolescent that he/she does not need to be brave?
- |                |         |        |        |
|----------------|---------|--------|--------|
| a) Children    | yes [ ] | no [ ] | c16[ ] |
| b) Adolescents | yes [ ] | no [ ] | c17[ ] |

### Section 3 - Patients' Anxiety

1. Do children/adolescents worry about what will happen to them in hospital?
  - a) Children            yes [ ]    no [ ]            c18[ ]
  - b) Adolescents        yes [ ]    no [ ]            c19[ ]
2. Do children/adolescents worry about having operations?
  - a) Children            yes [ ]    no [ ]            c20[ ]
  - b) Adolescents        yes [ ]    no [ ]            c21[ ]
3. What are children/adolescents most afraid of when in hospital?
  - a) injections
  - b) what might happen to them
  - c) that no-one will visit them
  - d) that something hurt them
  - e) other(specify)
  - a) Children            [ ]            c22[ ]
  - b) Adolescents        [ ]            c23[ ]
4. Do you think that fear:
  - a) increases pain            [ ]
  - b) reduces pain            [ ]
  - c) does not affect pain      [ ]            c24[ ]
5. Do you think that fatigue:
  - a) increases pain            [ ]
  - b) reduces pain            [ ]
  - c) does not affect pain      [ ]            c25[ ]
6. In your opinion, will reducing anxiety promote recovery, postoperatively?    yes [ ]    no [ ]            c26[ ]
7. Can regressive behaviour, such as bedwetting, be related to pain?            yes [ ]    no [ ]            c27[ ]
8. Do you think that anxious mothers transfer anxiety to their children?            yes [ ]    no [ ]            c28[ ]
9. Does pre-operative information, which is understood:  
Children    a) reduce anxiety      [ ]  
              b) increase anxiety    [ ]  
              c) not affect anxiety[ ]            c29[ ]  
Adolescents a) reduce anxiety      [ ]  
              b) increase anxiety    [ ]  
              c) not affect anxiety[ ]            c30[ ]
10. Who do you think most children would confide their pain in?
  - a) their parents [ ]    b) a nurse                            [ ]
  - c) a doctor        [ ]    d) other(specify)\_\_\_\_\_ [ ]            c31[ ]

11. Do parents worry about their child becoming addicted to drugs which they are given in hospital?

yes [ ] no [ ]

c32[ ]

12. Do adolescents worry about becoming addicted to drugs which they are given in hospital?

yes [ ] no [ ]

c33[ ]

#### Section 4 - Personal pain

1. Have you ever had an operation? yes [ ] no [ ]

c34[ ]

If not, go on to Q3.

If yes, did you experience pain?

yes [ ] no [ ]

c35[ ]

If yes, were you surprised that you had pain?

yes [ ] no [ ]

c36[ ]

2. If you did experience pain, was it:

a) worse than you expected [ ]

b) less than you expected [ ]

c37[ ]

3. Do you think that a nurse or a doctor's personal experience of pain could influence their management of pain in their patients? yes [ ] no [ ]

c38[ ]

If yes, in what way?

c39[ ]

Section 5 - Current practice

Remembering that children are 5-11 years, and adolescents are 12-15 years:

ASSESSMENT

1. Do you think that you always know when children or adolescents are in pain?
  - a) children            yes [ ]    no [ ]            c40[ ]
  - b) adolescents       yes [ ]    no [ ]            c41[ ]
2. How do you decide whether patients are/are not in pain?            c42[ ]
3. Would you assess all patients in the same way?
  - yes [ ]    no [ ]            c43[ ]
  - If no, what differences would you make?            c44[ ]
4. What factors might influence the amount of pain experienced by patients?            c45[ ]
5. Do you think that young schoolage children see pain as a punishment for being bad?    yes [ ]    no [ ]            c46[ ]
6. Do you always believe a child who complains of pain?
  - yes [ ]    no [ ]            c47[ ]
7. Are all children/adolescents able to:
  - a) localise their pain:
    - a) Children            yes [ ]    no [ ]            c48[ ]
    - b) Adolescents        yes [ ]    no [ ]            c49[ ]
    - If not, why not?            c50[ ]
  - b) describe their pain:
    - a) Children            yes [ ]    no [ ]            c51[ ]
    - b) Adolescents        yes [ ]    no [ ]            c52[ ]
    - If not, why not?            c53[ ]
8. How many patients do you think experience moderate-severe pain, 16-24 hours post-operatively?
  - none [ ]    25% [ ]    50% [ ]    75% [ ]    100% [ ]            c54[ ]
9. Have you heard of pain assessment tools?
  - yes [ ]    no [ ]            c55[ ]
  - If not, go on to Q13.
10. What different means of assessing pain are there?            c56[ ]

11. Have you ever assessed a patient's pain using a pain assessment tool?      yes [ ] no [ ]      c57[ ]  
     If yes, what did you use?      c58[ ]
- Did you find it useful?      yes [ ] no [ ]      c59[ ]
12. Which method of assessing pain do you prefer?      c60[ ]
13. Who of the following is the best person to assess a patient's pain?  
     a) parent      [ ]  
     b) nurse      [ ]  
     c) doctor      [ ]      c61[ ]
14. Do you think that children/adolescents deny pain?  
     a) Children      yes [ ] no [ ]      c62[ ]  
     b) Adolescents      yes [ ] no [ ]      c63[ ]
15. Which of the following operations would you rank as being the sorest, in terms of quantity of pain relief drugs which are given?  
     (1=most sore and 5=least sore: use each number once only)
- a) bat ear correction [ ]  
     b) circumcision      [ ]  
     c) hernia repair      [ ]  
     d) hypospadias repair [ ]  
     e) orchidopexy      [ ]      c64[ ]

#### MANAGEMENT

In the first question I'm going to ask you the same thing 3 times, but about adults, adolescents and children.

1. After an operation, should  
     a) adults      [ ]      c65[ ]  
     b) adolescents      [ ]      c66[ ]  
     c) children      [ ]      c67[ ]  
     expect to have to tolerate:  
         a) severe pain  
         b) bad pain  
         c) moderate pain  
         d) a little pain  
         e) no pain
2. What methods of relieving pain do you know of, apart from drugs?      c68[ ]

If none, go on to Q6.

3. Which of these have you had clinical experience of? c69[ ]
4. Where did you have this experience? c70[ ]
5. Was this with   a) Children       yes [ ]   no [ ]       c71[ ]  
                      b) Adolescents   yes [ ]   no [ ]       c72[ ]
6. What do you aim for when giving pain relieving drugs?  
   a) complete pain relief       [ ]  
   b) relief of most pain       [ ]  
   c) minimal relief of pain     [ ]       c73[ ]
7. Do you have any concerns about giving pain relieving drugs to:  
   a) children (5-11years)       yes [ ]   no [ ]       c74[ ]  
   b) adolescents               yes [ ]   no [ ]       c75[ ]
- If yes, what are they?  
      a) children               c76[ ]  
      b) adolescents           c77[ ]
8. Do children/adolescents normally ask for pain relieving drugs?  
   a) Children       yes [ ]   no [ ]       c78[ ]  
   b) Adolescent?   yes [ ]   no [ ]       c79[ ]
9. NURSES  
Do you offer prophylactic drugs for pain relief to postoperative patients:  
   a) regularly       [ ]  
   b) not regularly   [ ]  
   c) never           [ ]       c80[ ]
- DOCTORS  
Do you prescribe prophylactic drugs for pain relief to postoperative patients:  
   a) regularly       [ ]  
   b) not regularly   [ ]  
   c) never           [ ]       c81[ ]
10. If a child did not want to take pain relieving drugs, would you let him/her talk you out of it?  
      yes [ ]   no [ ]  
      sometimes [ ]       c82[ ]
11. Do you ever not give injections because you think that you will hurt the child?   yes [ ]   no [ ]       c83[ ]



12. How long do you think opioid drugs for pain relief should be maintained after minor surgery eg inguinal herniotomy?
- a) as long as the patient needs it [ ]
  - b) 48 hours after surgery [ ]
  - c) 24 hours after surgery [ ]
  - d) once only dose [ ]
- c84[ ]
13. How long do you think opioid drugs for pain relief should be maintained after major surgery eg major abdominal surgery?
- a) as long as the patient needs it [ ]
  - b) 48 hours after surgery [ ]
  - c) 24 hours after surgery [ ]
  - d) once only dose [ ]
- c85[ ]
14. Do you think that children actively distract themselves from pain eg by watching TV ?    yes [ ]    no [ ]
- c86[ ]
15. Do parents ask for pain relieving drugs for their children:
- a) often [ ]
  - b) occasionally [ ]
  - c) never [ ]
- c87[ ]

#### EVALUATION

1. Do you always evaluate pain relief after giving pain relieving drugs?    yes [ ]    no [ ]
- c88[ ]
- If yes, how do you do this?    c89[ ]
2. Do you normally note any of the following in the drug kardex or nursing/medical notes:
- a) presence of pain [ ]    c90[ ]
  - b) severity of pain [ ]    c91[ ]
  - d) effectiveness of pain relieving drugs [ ]    c92[ ]
  - e) side-effects from pain relieving drugs which the patient has had [ ]    c93[ ]
3. Do you always do this?    yes [ ]    no [ ]
- c94[ ]
- If not, how often do you do it?
- 90% [ ]    50% [ ]    10% [ ]    c95[ ]
4. In your experience, are analgesics generally:
- a) totally effective [ ]
  - b) mostly effective [ ]
  - c) effective for some of the time [ ]
  - d) rarely effective [ ]
  - e) totally ineffective [ ]
- c96[ ]

Section 6 - General

1. In the first question I'm going to put 6 statements to you. I'd like you to tell me if you think that they are true:

- a) Children in hospital easily become addicted to opioids.                      yes [ ]    no [ ]                      c97[ ]
- b) Children do not experience as much pain as adults.                      yes [ ]    no [ ]                      c98[ ]
- c) Post-operative pain cannot be prevented.                      yes [ ]    no [ ]                      c99[ ]
- d) Active children cannot be in pain.                      yes [ ]    no [ ]                      c100[ ]
- e) Children always say if they are in pain.                      yes [ ]    no [ ]                      c101[ ]
- f) Injection is best method of relieving pain                      yes [ ]    no [ ]                      c102[ ]

2. Does a child's age and maturity affect how he/she responds to/communicates pain?    yes [ ]    no [ ]                      c103[ ]

    If yes, in what way?                      c104[ ]

3. Do adolescents complain of pain more than children?                      yes [ ]    no [ ]                      c105[ ]

    If yes, why do they do this?                      c106[ ]

4. Do you think that children/adolescents try to be brave when they are sore, by not crying?
- a) children                      yes [ ]    no [ ]                      c107[ ]
- b) adolescents                      yes [ ]    no [ ]                      c108[ ]

    If yes, is this equal for girls and boys?

        a) children                      yes [ ]    no [ ]                      c109[ ]

        b) adolescents                      yes [ ]    no [ ]                      c110[ ]

    If no, which hides their pain more?

        a) Children                      boys[ ]    girls[ ]                      c111[ ]

        b) Adolescents                      boys[ ]    girls[ ]                      c112[ ]

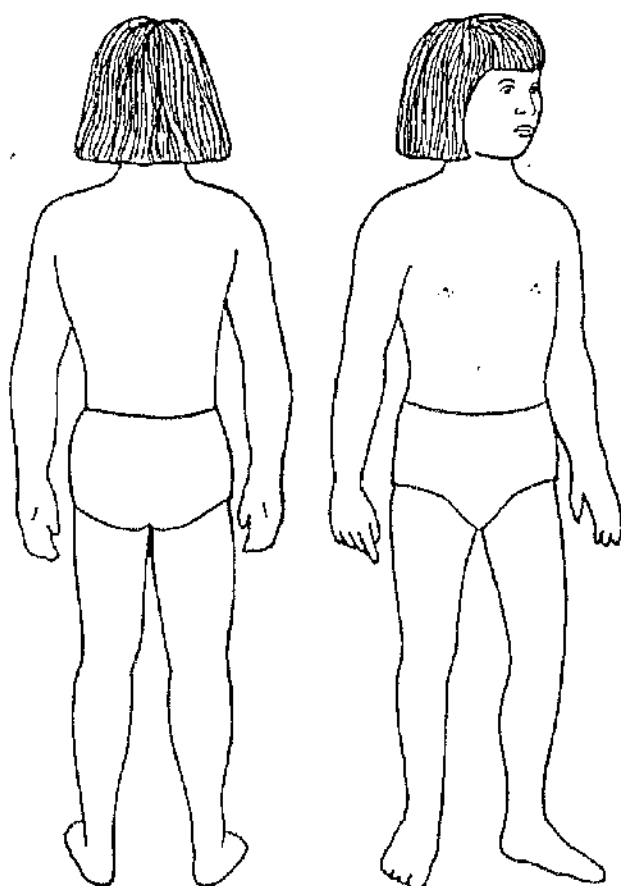
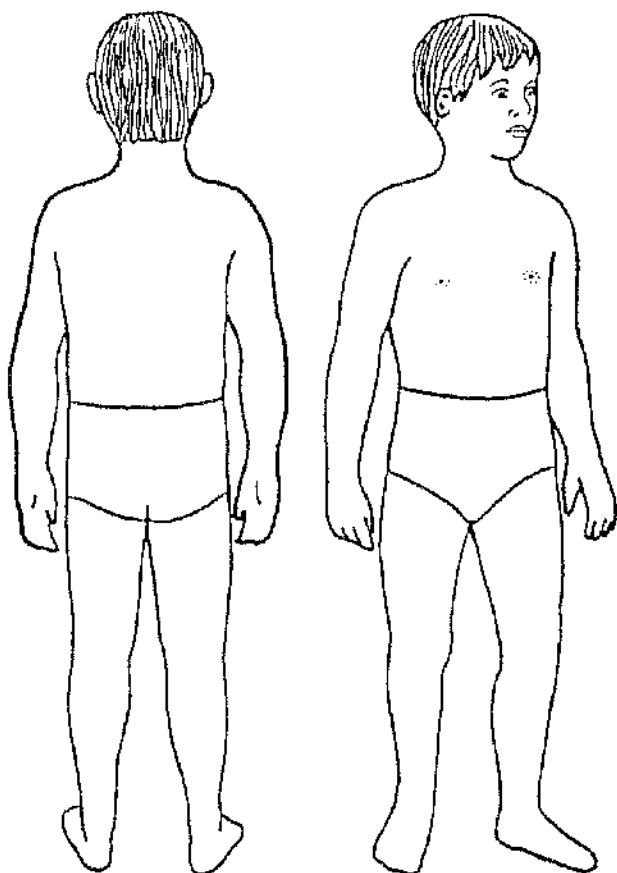
5. Do you worry about patients becoming addicted to drugs given to relieve pain?                      yes [ ]    no [ ]                      c113[ ]

C 1 7 4 |

Thank you very much for your time and co-operation

## **Appendix 7**

### **Revised Eland Color Tool (body outline)**



# COLOUR CODE

- 1 = Worst hurt
- 2 = Hurting a lot
- 3 = Hurting a little
- 4 = Not hurting at all

1

2 N/A

3

205

4

## Appendix 8



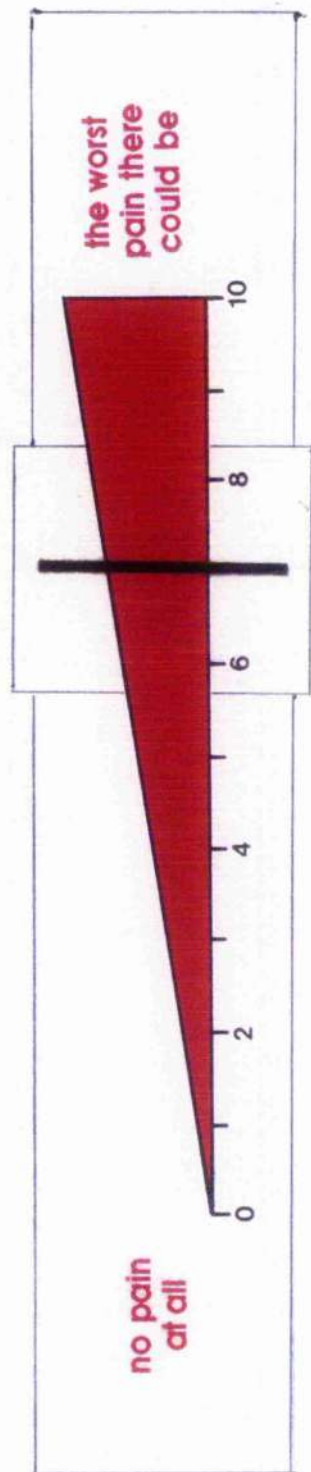
Visual analogue scale: children 8-11 years

## Appendix 9



Visual analogue scale: adolescents 12-15 years

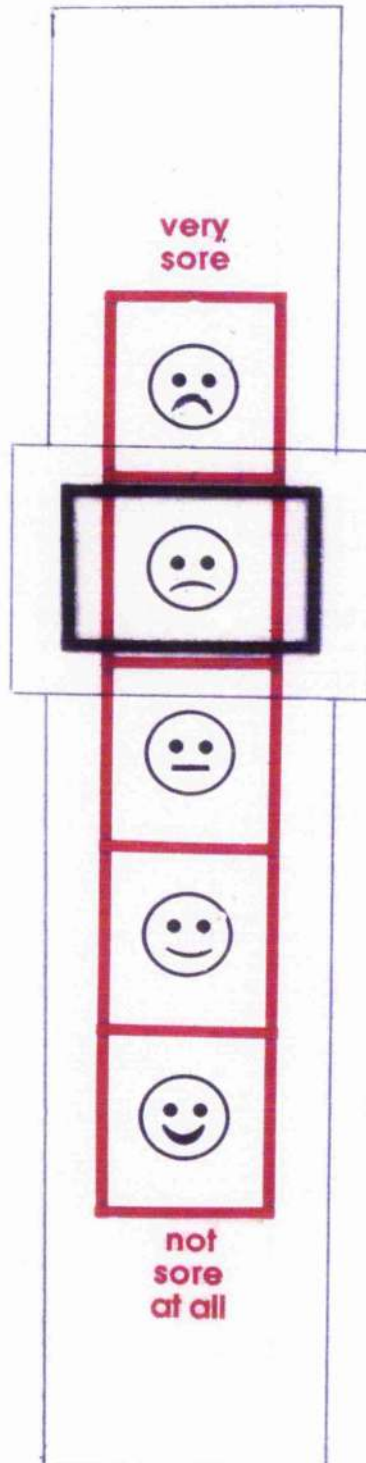
## Appendix 10



Coloured analogue scale (horizontal)



## Appendix 11



5-7 years: Faces scale

## Appendix 12

Consent form (Phase 1)

UNIVERSITY OF GLASGOW

DEPARTMENT OF CHILD AND ADOLESCENT PSYCHIATRY

ROYAL HOSPITAL FOR SICK CHILDREN, GLASGOW

Dear Parent,

We are interested in the experiences of children and young people who have an operation in this hospital. During February, March and April, 1991, I am carrying out a study of patients aged 5-15 years, which involves asking the children or young people and their parents some simple questions. This will take approximately 20-30 minutes for each person, and the answers will, of course, be kept confidential.

As your son/daughter is under 16 years of age, I require your permission to ask the questions of him/her. Please read the sentence below, and if you agree, sign and date the form.

I shall, of course, ask for your son/daughter's agreement as well. Should either you or your son/daughter not wish to take part in the study, this will in no way affect the care that he/she receives.

Yours faithfully,

M L Gillies  
Research Nurse

I agree to my son/daughter \_\_\_\_\_ taking part in the above study.

SIGNED: \_\_\_\_\_

DATE: \_\_\_\_\_

WITNESS: \_\_\_\_\_

DATE: \_\_\_\_\_

---

YOUNG PERSON'S CONSENT

I \_\_\_\_\_ agree to take part in the above study, and have had it explained to me.

SIGNED: \_\_\_\_\_

DATE: \_\_\_\_\_

WITNESS: \_\_\_\_\_

DATE: \_\_\_\_\_

### Appendix 13

| Category      | Description                                                  | Children<br>(n=67) | Total<br>n (%) |
|---------------|--------------------------------------------------------------|--------------------|----------------|
| Pain          | sore                                                         | 12                 | 25(39)         |
|               | very sore                                                    | 4                  |                |
|               | painful                                                      | 4                  |                |
|               | a bit sore                                                   | 5                  |                |
| Sensation     | nippy                                                        | 3                  | 14 (22)        |
|               | cut                                                          | 1                  |                |
|               | pin/injection                                                | 1                  |                |
|               | sting                                                        | 1                  |                |
|               | electric shock                                               | 1                  |                |
|               | scratch                                                      | 2                  |                |
|               | sharp and ticklish                                           | 1                  |                |
|               | itching                                                      | 1                  |                |
|               | tight                                                        | 1                  |                |
|               | hitting with a rock and<br>bouncing off                      | 1                  |                |
|               | something being pressed<br>against you and not taken<br>away | 1                  |                |
| Blood related | bleeding                                                     | 2                  | 4 (6)          |
|               | bleeding and salt in it                                      | 1                  |                |
|               | bruised                                                      | 1                  |                |
| Other         | a bit better                                                 | 1                  | 10 (16)        |
|               | very bad                                                     | 3                  |                |
|               | awful                                                        | 1                  |                |
|               | dead funny                                                   | 1                  |                |
|               | fallen                                                       | 2                  |                |
|               | strawberry                                                   | 1                  |                |
|               | brown colour                                                 | 1                  |                |
| Did not know  |                                                              | 12                 | 15 (23)        |
| No answer     |                                                              | 3                  |                |

**Pain descriptions on first postoperative day (Groups B and C)**

## Appendix 14

|                                                |
|------------------------------------------------|
| <u>PATIENT INTERVIEW</u><br><u>(3-4 years)</u> |
| <u>STUDY NO.</u>                               |
| <u>WARD</u>                                    |
| <u>DATE</u>                                    |
| <u>TIME</u>                                    |
| <u>D.O.B.</u>                                  |

Interview schedule: children 3-4 years

Section 1 - Personal Details

|        |                           |           |        |
|--------|---------------------------|-----------|--------|
|        |                           | study no. | c1 [ ] |
|        |                           | ward      | c2 [ ] |
| 1. Sex | male [ ]      female [ ]  |           | c3 [ ] |
| 2. Age | years [ ]      months [ ] |           | c4 [ ] |

Operation yesterday - good boy/girl

3. Can you tell me what your \_\_\_\_\_ feels like just now?  
(If not understood: if I asked you what a house was could  
you tell me? Now, can you tell me what your hurt(      )  
\_\_\_\_\_ is like? c5 [ ]

4. Is your \_\_\_\_\_ sore?      yes [ ]      no [ ] c6 [ ]  
If yes, what does it feel like? c7 [ ]

5. Where is it sore?  
Show me.      a) operation site [ ]  
                 b) other site  
                 \_\_\_\_\_ [ ] c8 [ ]

6. At the end of the interview, the patient  
a) appears to have the following amount of pain:  
  
no pain \_\_\_\_\_ severe pain c9 [ ]

b) exhibits the following:

|               |     |               |     |             |     |         |
|---------------|-----|---------------|-----|-------------|-----|---------|
| a) smiling    | [ ] | groaning      | [ ] | crying      | [ ] | c10 [ ] |
| b) relaxed    | [ ] | flinching     | [ ] | rigid       | [ ] | c11 [ ] |
| c) not clingy | [ ] | little clingy | [ ] | very clingy | [ ] | c12 [ ] |

## Analgesia Details

- |                                 |        |
|---------------------------------|--------|
| 1. Diagnosis:                   |        |
| 2. Operation:                   | c13[ ] |
| 3. Date of surgery:             |        |
| 4. Approximate time of surgery: | c14[ ] |

## 5. Premedication

|   | <u>Drug(s) &amp; Dose(s)</u> | <u>Route</u> | <u>Time Given</u> | <u>Comments</u> |
|---|------------------------------|--------------|-------------------|-----------------|
| 1 |                              |              |                   |                 |
| 2 |                              |              |                   |                 |
| 3 |                              |              |                   |                 |

## 6. Analgesia given in theatre

| <u>Drug(s) &amp; Dose(s)</u> | <u>Route</u> | <u>Time Given</u> | <u>Comments</u> |
|------------------------------|--------------|-------------------|-----------------|
| 1                            |              |                   | c13[ ]          |
| 2                            |              |                   |                 |
| 3                            |              |                   | c16[ ]          |
| 4                            |              |                   |                 |

## 7. Post-operative analgesia

| <u>Drug(s) &amp; Dose(s)</u> | <u>Route</u> | <u>Time Given</u> | <u>Comments(eval)</u> |
|------------------------------|--------------|-------------------|-----------------------|
| 1                            |              |                   | c17[ ]                |
| 2                            |              |                   | c18[ ]                |
| 3                            |              |                   |                       |
| 4                            |              |                   |                       |
| 5                            |              |                   |                       |
| 6                            |              |                   | c19[ ]                |
| 7                            |              |                   | c20[ ]                |
| 8                            |              |                   |                       |
| 9                            |              |                   | c21[ ]                |
| 10                           |              |                   | c22[ ]                |
| 11                           |              |                   |                       |
| 12                           |              |                   |                       |

Regularity of analgesia administration:

|            |     |
|------------|-----|
| once a day | [ ] |
| 4 hourly   | [ ] |
| > 4 hourly | [ ] |

c23[ ]

8. Age-group c24[ ]

## Appendix 15

|                                                               |
|---------------------------------------------------------------|
| <u>BASIC DATA SHEET</u><br>(for patients of<br>1month-2years) |
| <u>STUDY NO.</u>                                              |
| <u>WARD</u>                                                   |
| <u>DATE</u>                                                   |
| <u>TIME</u>                                                   |
| <u>D.C.B.</u>                                                 |

Data collection sheet: children 1 month - 2 years 11 months



Section 1 - Personal Details

study no. c1 [ ]  
ward c2 [ ]  
c3 [ ]  
1. Sex male [ ] female [ ]  
2. Age years [ ] months [ ] c4 [ ]  
[not used c5-c8]

3. At the end of the interview, the patient

a) appears to have the following amount of pain:

no pain \_\_\_\_\_ severe pain c9 [ ]

b) exhibits the following:

a) smiling [ ] groaning [ ] crying [ ] c10 [ ]  
b) relaxed [ ] flinching [ ] rigid [ ] c11 [ ]  
c) not clingy [ ] little clingy [ ] very clingy [ ] c12 [ ]

### Analgesia Details

1. Diagnosis:

2. Operation:

c13[ ]

3. Date of surgery:

4. Approximate time of surgery:

c14[ ]

5. Premedication

| <u>Drug(s) &amp; Dose(s)</u> | <u>Route</u> | <u>Time Given</u> | <u>Comments</u> |
|------------------------------|--------------|-------------------|-----------------|
| 1                            |              |                   |                 |
| 2                            |              |                   |                 |
| 3                            |              |                   |                 |

6. Analgesia given in theatre

| <u>Drug(s) &amp; Dose(s)</u> | <u>Route</u> | <u>Time Given</u> | <u>Comments</u> |
|------------------------------|--------------|-------------------|-----------------|
| 1                            |              |                   | c15[ ]          |
| 2                            |              |                   |                 |
| 3                            |              |                   | c16[ ]          |
| 4                            |              |                   |                 |

7. Post-operative analgesia

| <u>Drug(s) &amp; Dose(s)</u> | <u>Route</u> | <u>Time Given</u> | <u>Comments(eval)</u> |
|------------------------------|--------------|-------------------|-----------------------|
| 1                            |              |                   | c17[ ]                |
| 2                            |              |                   | c18[ ]                |
| 3                            |              |                   |                       |
| 4                            |              |                   |                       |
| 5                            |              |                   |                       |
| 6                            |              |                   | c19[ ]                |
| 7                            |              |                   | c20[ ]                |
| 8                            |              |                   |                       |
| 9                            |              |                   | c21[ ]                |
| 10                           |              |                   | c22[ ]                |
| 11                           |              |                   |                       |
| 12                           |              |                   |                       |

Regularity of analgesia administration:

once a day [ ]

4 hourly [ ]

> 4 hourly [ ]

c23[ ]

8. Age-group

c24[ ]

## Appendix 16

INTERVIEW FOR MOTHERS  
(of children aged 3-4 years)

STUDY NO. \_\_\_\_\_

WARD \_\_\_\_\_

DATE \_\_\_\_\_

TIME \_\_\_\_\_

Interview schedule: mothers of children 3-4 years

Thank you for agreeing to see me. The questions are in 5 sections, and when I talk about 'young' children I mean under 5 years. All your answers will be kept confidential.

### Section 1 - General

First, I'd like to ask you some general questions.

- |                                                                               |           |         |
|-------------------------------------------------------------------------------|-----------|---------|
|                                                                               | study no. | c1 [ ]  |
|                                                                               | ward      | c2 [ ]  |
| 1. What is your relationship with _____?                                      |           |         |
| mother [ ]    other (specify) [ ]                                             |           | c3 [ ]  |
| 2. What age is he/she?            years [ ]    months [ ]                     |           | c4 [ ]  |
| date of birth _____                                                           |           |         |
| 3. Why is he/she in hospital?                                                 |           | c5 [ ]  |
| 4. What operation did he/she have?                                            |           | c6 [ ]  |
| 5. Are you staying in hospital with him/her?                                  |           |         |
| yes [ ]    no [ ]                                                             |           | c7 [ ]  |
| If yes, did he/she sleep all night last night?                                |           |         |
| yes [ ]    no [ ]                                                             |           |         |
| does not normally [ ]                                                         |           | c8 [ ]  |
| If not, why not?                                                              |           | c9 [ ]  |
| 6. If you are asking him/her about something which hurts, what would you say? |           |         |
| a) sore [ ]                      b) hurt [ ]                                  |           |         |
| c) painful [ ]                    d) other (specify) [ ]                      |           |         |
| _____                                                                         |           | c10 [ ] |

### Section 2 - Past pain

Now I'd like to ask you briefly about your experience of pain.

- |                                               |                                |         |
|-----------------------------------------------|--------------------------------|---------|
| 1. Have you ever had pain?                    | yes [ ]    no [ ]              | c11 [ ] |
| If yes, can you describe it?                  |                                | c12 [ ] |
| 2. Have you ever had an operation?            | yes [ ]    no [ ]              | c13 [ ] |
| If yes, did you have pain?                    | yes [ ]    no [ ]              | c14 [ ] |
| If yes, were you surprised that you had pain? |                                |         |
| yes [ ]    no [ ]                             |                                | c15 [ ] |
| If yes, was it                                | a) worse than you expected [ ] |         |
| b) less than you expected [ ]                 |                                | c16 [ ] |

### Section 3 - Anxiety

In this section, I'd like to ask you about things that might worry young children or their families about the child having an operation.

1. Does your son/daughter worry about what will happen to him/her in hospital?    yes [ ]    no [ ]    c17[ ]

2. Do you worry about what will happen to your son/daughter in hospital?    yes [ ]    no [ ]    c18[ ]

3. Do you think that telling young children the truth, about what is going to happen, makes them:  
a) worry more    [ ]  
b) no different [ ]  
c) worry less    [ ]    c19[ ]

4. Which would your son/daughter rather be told about?  
a) everything that will happen [ ]  
b) some of what will happen    [ ]  
c) nothing    [ ]    c20[ ]

5. Does your son/daughter worry in particular about having an operation?    yes [ ]    no [ ]    c21[ ]

If yes, does anything help to relieve this worry?  
yes [ ]    no [ ]    c22[ ]

If yes, what will do this?    c23[ ]

7. What do you think young children are most afraid of, in hospital?    c24[ ]

8. In hospital, does \_\_\_\_\_ ever answer a question by saying what he/she thinks the answer should be, rather than what it really is?    yes [ ]    no [ ]    c25[ ]

If yes, why?    c26[ ]

9. When painkillers are asked for, what happens:  
a) they are brought immediately    [ ]  
b) it is a long time before they appear    [ ]  
c) they have to be asked for again    [ ]  
d) they have not been asked for    [ ]    c27[ ]

11. Do you worry about your child becoming addicted to any of the drugs he/she is given in hospital?  
yes [ ]    no [ ]    c28[ ]

Section 4 - Pre-operative information

In this section I'd like hear about what you knew before the operation.

1. Who told your son/daughter that he/she was to have an operation?  
a) mother/father ☐ b) doctor ☐  
c) someone else (specify) \_\_\_\_\_ ☐ c29[ ]
2. Was your son/daughter told that he/she would be sore after the operation? yes ☐ no ☐ c30[ ]  
  
If yes, who told him/her?  
a) you ☐ b) a nurse ☐  
c) surgeon ☐ d) anaesthetist ☐  
e) no-one ☐ h) other (specify) ☐  
\_\_\_\_\_ ☐ c31[ ]
3. Were you told that he/she would have pain? yes ☐ no ☐ c32[ ]  
If yes, who by? c33[ ]
4. Who do you think should tell young children and their families about pain after operations?  
a) surgeons ☐ b) anaesthetists ☐  
c) nurses ☐ d) other (specify) \_\_\_\_\_ ☐ c34[ ]
8. Do you think that young children should always be told beforehand if something will hurt? yes ☐ no ☐ c35[ ]
9. Now I'm going to make 5 statements to you, and I'd like you tell me if you have heard of them.  
  
a) Children experience less pain than adults yes ☐ no ☐ c36[ ]  
b) Active children cannot be in pain yes ☐ no ☐ c37[ ]  
c) Injection is best method of relieving pain yes ☐ no ☐ c38[ ]  
d) Pain after an operation cannot be prevented. yes ☐ no ☐ c39[ ]  
e) Children cry because they are homesick, rather than because they are in pain. yes ☐ no ☐ c40[ ]  
  
If yes to any of the above, where did you hear this? c41[ ]

Section 5 - Child/adolescent's present pain

In the last section I'd like to hear about how your son/daughter is now.

1. How was \_\_\_\_\_ immediately after his/her operation?

- a) not upset and in no pain [ ]
- b) not upset but in slight pain [ ]
- c) slightly upset and in some pain [ ]
- d) upset and in moderate pain [ ]
- e) very upset and in severe pain [ ]

c42[ ]

2. How is he/she this morning?

- a) active but not in pain [ ]
- b) activity is limited and in moderate pain [ ]
- c) unable to get up and in severe pain [ ]
- d) on bedrest but not in pain [ ]

c43[ ]

3. Does your son/daughter have any pain now?

yes [ ] no [ ]

c44[ ]

If yes, where is his/her pain?

- a) wound site [ ]
- b) related to anaesthetic [ ]
- c) unrelated to operation at all [ ]

c45[ ]

4. Is your son/daughter's pain:

- a) less than you expected [ ]
- b) more than you expected [ ]
- c) about what you expected [ ]
- d) he/she has no pain [ ]

c46[ ]

5. Does he/she complain of wound pain:

- a) constantly [ ]
- b) sometimes [ ]
- c) never [ ]

c47[ ]

If (a) or (b), could you mark on this line how bad you think his/her pain is.

no pain

severe pain

c48[ ]

6. What helps your son/daughter if he/she is in pain?

c49[ ]

7. Are you able to do anything to help your son/daughter cope with the pain?

yes [ ] no [ ]

c50[ ]

If yes, what would you do?

c51[ ]

8. Do young children distract themselves from pain by eg watching tv?

yes [ ] no [ ]

c52[ ]

9. Do you always know when your son/daughter is in pain?  
yes [ ] no [ ] c53[ ]
10. Who do you think is the best judge of young children's pain?  
a) parent [ ] b) nurse [ ]  
c) doctor [ ] c54[ ]
11. In hospital, who do you think most young children would admit pain to?  
a) parents [ ] b) nurses [ ]  
c) doctors [ ] d) other(specify) \_\_\_\_\_ [ ] c55[ ]
12. Would your son/daughter tell staff that he/she had pain?  
yes [ ] no [ ] c56[ ]
13. Do you think adults have difficulty in understanding children's descriptions of pain? yes [ ] no [ ] c57[ ]
14. Who do you think is responsible for relieving pain after an operation?  
a) nurses [ ] b) doctors [ ]  
c) other(specify) \_\_\_\_\_ [ ] c58[ ]
15. Should painkillers which are given after an operation:  
a) completely relieve the pain [ ]  
b) mainly relieve the pain [ ]  
c) slightly relieve the pain [ ] c59[ ]
16. Does your son/daughter mind having injections?  
yes [ ] no [ ] c60[ ]
17. Has your son/daughter refused to take painkillers (medicine)?  
yes [ ] no [ ] c61[ ]
18. Has your son/daughter's pain always been completely relieved by the medicine/drugs he/she has been given?  
yes [ ] no [ ] c62[ ]  
If not, what did you do? c63[ ]
19. Would your son/daughter ask for painkillers him/herself?  
yes [ ] no [ ] c64[ ]
20. In hospital, do you ever ask for painkillers for your son/daughter?  
yes [ ] no [ ] c65[ ]
21. Are painkillers offered to your son/daughter by staff:  
a) regularly [ ]  
b) sometimes [ ]  
c) never [ ]  
d) do not know [ ] c66[ ]



22. Does your son/daughter cry when he/she has pain?  
yes [ ] no [ ] c67[ ]
23. Do you think that young children try to hide their pain  
by being brave and not crying? yes [ ] no [ ] c68[ ]
- If yes, is this equal for girls and boys?  
yes [ ] no [ ] c69[ ]
- If no, which hides their pain more?  
boys[ ] girls[ ] c70[ ]
24. Do you have any painkillers for your son/daughter  
once he/she is home? yes [ ] no [ ] c71[ ]
- If no, do you:
- a) expect to be given some from the hospital [ ]
  - b) plan to buy some [ ]
  - c) think painkillers will not be needed [ ] c72[ ]

THANK YOU VERY MUCH FOR YOUR TIME

## Appendix 17

INTERVIEW FOR MOTHERS  
(of children aged  
1month-2years)

STUDY NO. \_\_\_\_\_

WARD \_\_\_\_\_

DATE \_\_\_\_\_

TIME \_\_\_\_\_

Interview schedule: mothers of children 1 month - 2 years 11 months

Thank you for agreeing to see me. The questions are in 5 sections, and when I talk about 'young' children I mean under 5 years. All your answers will be kept confidential.

Section 1 - General

First, I'd like to ask you some general questions.

- |                                                                               |           |         |
|-------------------------------------------------------------------------------|-----------|---------|
|                                                                               | study no. | c1 [ ]  |
|                                                                               | ward      | c2 [ ]  |
| 1. What is your relationship with _____?                                      |           |         |
| mother [ ]      other (specify) [ ]                                           |           | c3 [ ]  |
| 2. What age is he/she?      years [ ]      months [ ]                         |           | c4 [ ]  |
| date of birth _____                                                           |           |         |
| 3. Why is he/she in hospital?                                                 |           | c5 [ ]  |
| 4. What operation did he/she have?                                            |           | c6 [ ]  |
| 5. Are you staying in hospital with him/her?                                  |           |         |
| yes [ ]      no [ ]                                                           |           | c7 [ ]  |
| If yes, did he/she sleep all night last night?                                |           |         |
| yes [ ]      no [ ]                                                           |           |         |
| does not normally [ ]                                                         |           | c8 [ ]  |
| If not, why not?                                                              |           | c9 [ ]  |
| 6. If you are asking him/her about something which hurts, what would you say? |           |         |
| a) sore [ ]      b) hurt [ ]                                                  |           |         |
| c) painful [ ]      d) other (specify) [ ]                                    |           |         |
| _____                                                                         |           | c10 [ ] |

Section 2 - Past pain

Now I'd like to ask you briefly about your experience of pain.

- |                                               |                                |         |
|-----------------------------------------------|--------------------------------|---------|
| 1. Have you ever had pain?                    | yes [ ]      no [ ]            | c11 [ ] |
| If yes, can you describe it?                  |                                | c12 [ ] |
| 2. Have you ever had an operation?            | yes [ ]      no [ ]            | c13 [ ] |
| If yes, did you have pain?                    | yes [ ]      no [ ]            | c14 [ ] |
| If yes, were you surprised that you had pain? |                                |         |
| yes [ ]      no [ ]                           |                                | c15 [ ] |
| If yes, was it                                | a) worse than you expected [ ] |         |
| b) less than you expected [ ]                 |                                | c16 [ ] |

Section 3 - Anxiety

In this section, I'd like to ask you about things that might worry young children or their families about the child having an operation.

(c17 not used)

1. Do you worry about what will happen to your  
son/daughter in hospital?      yes [ ]    no [ ]      c18[ ]

2. Do you think that telling young children the truth,  
about what is going to happen, makes them:

- a) worry more    [ ]
- b) no different [ ]
- c) worry less    [ ]      c19[ ]

(c20 not used)

3. Was your son/daughter worried/frightened in particular  
about the operation?      yes [ ]    no [ ]      c21[ ]

If yes, does anything help to relieve this worry/fear?  
yes [ ]    no [ ]      c22[ ]

If yes, what will do this?      c23[ ]

4. What do you think young children are most afraid of, in  
hospital?      c24[ ]

(c25/26 not used)

5. When painkillers are asked for, what happens:

- a) they are brought immediately    [ ]
- b) it is a long time before they appear    [ ]
- c) they have to be asked for again    [ ]
- d) they have not been asked for    [ ]      c27[ ]

6. Do you worry about your child becoming addicted  
to any of the drugs he/she is given in hospital?  
yes [ ]    no [ ]      c28[ ]

Section 4 - Pre-operative information

In this section I'd like hear about what you knew before the operation.

1. Who told your son/daughter that he/she was to have an operation?  
a) mother/father [ ] b) doctor [ ]  
c) someone else (specify) \_\_\_\_\_ [ ] c29[ ]

2. Was your son/daughter told that he/she would be sore after the operation? yes [ ] no [ ] c30[ ]

If yes, who told him/her?

- a) you [ ] b) a nurse [ ]  
c) surgeon [ ] d) anaesthetist [ ]  
e) no-one [ ] h) other (specify) [ ]  
\_\_\_\_\_ [ ] c31[ ]

3. Were you told that he/she would have pain? yes [ ] no [ ] c32[ ]

If yes, who by? c33[ ]

4. Who do you think should tell young children and their families about pain after operations?  
a) surgeons [ ] b) anaesthetists [ ]  
c) nurses [ ] d) other (specify) \_\_\_\_\_ [ ] c34[ ]

8. Do you think that young children should always be told beforehand if something will hurt? yes [ ] no [ ] c35[ ]

9. Now I'm going to make 5 statements to you, and I'd like you tell me if you have heard of them.

- a) Children experience less pain than adults yes [ ] no [ ] c36[ ]  
b) Active children cannot be in pain yes [ ] no [ ] c37[ ]  
c) Injection is best method of relieving pain yes [ ] no [ ] c38[ ]  
d) Pain after an operation cannot be prevented. yes [ ] no [ ] c39[ ]  
e) Children cry because they are homesick, rather than because they are in pain. yes [ ] no [ ] c40[ ]

If yes to any of the above, where did you hear this? c41[ ]

Section 5 - Child/adolescent's present pain

In the last section I'd like to hear about how your son/daughter is now.

1. How was \_\_\_\_\_ immediately after his/her operation?
- a) not upset and in no pain ☐
  - b) slightly upset and in some pain ☐
  - c) very upset and in severe pain ☐ c42[ ]

2. How is he/she this morning?
- a) active but not in pain ☐
  - b) not as active as usual, in some pain ☐
  - d) stiff, in severe pain ☐ c43[ ]

3. Does your son/daughter have any pain now?
- yes ☐ no ☐ c44[ ]

If yes, where is his/her pain?

- a) wound site ☐
- b) related to anaesthetic ☐
- c) unrelated to operation at all ☐ c45[ ]

4. Is your son/daughter's pain:
- a) less than you expected ☐
  - b) more than you expected ☐
  - c) about what you expected ☐
  - d) he/she has no pain ☐ c46[ ]

5. Could you mark on this line how bad you think his/her pain is.

no pain \_\_\_\_\_ severe pain c48[ ]

6. What helps your son/daughter if he/she is in pain? c49[ ]

7. Are you able to do anything to help your son/daughter cope with the pain? yes ☐ no ☐ c50[ ]

If yes, what would you do? c51[ ]

(c52 not used)

9. Do you always know when your son/daughter is in pain? yes ☐ no ☐ c53[ ]

10. Who do you think is the best judge of young children's pain?

- a) parent ☐
- b) nurse ☐
- c) doctor ☐ c54[ ]

(c55/56 not used)

13. Do you think adults have difficulty in understanding children's descriptions of pain? yes [ ] no [ ] c57[ ]
14. Who do you think is responsible for relieving pain after an operation?  
 a) nurses [ ] b) doctors [ ]  
 c) other(specify) \_\_\_\_\_ [ ] c58[ ]
15. Should painkillers which are given after an operation:  
 a) completely relieve the pain [ ]  
 b) mainly relieve the pain [ ]  
 c) slightly relieve the pain [ ] c59[ ]
16. Does your son/daughter mind having injections?  
 yes [ ] no [ ] c60[ ]
17. Has your son/daughter refused to take painkillers (medicine or tablets)? yes [ ] no [ ] c61[ ]
18. Has your son/daughter's pain always been completely relieved by the medicine/drugs he/she has been given?  
 yes [ ] no [ ] c62[ ]  
 If not, what did you do? c63[ ]  
 (c64 not used)
20. In hospital, do you ever ask for painkillers for your son/daughter? yes [ ] no [ ] c65[ ]
21. Are painkillers offered to your son/daughter by staff:  
 a) regularly [ ]  
 b) sometimes [ ]  
 c) never [ ]  
 d) do not know [ ] c66[ ]
22. Does your son/daughter cry when he/she has pain?  
 yes [ ] no [ ] c67[ ]
23. Do you think that young children try to hide their pain by being brave and not crying? yes [ ] no [ ] c68[ ]  
 If yes, is this equal for girls and boys?  
 yes [ ] no [ ] c69[ ]  
 If no, which hides their pain more?  
 boys [ ] girls [ ] c70[ ]
24. Do you have any painkillers for your son/daughter once he/she is home? yes [ ] no [ ] c71[ ]  
 If no, do you:  
 a) expect to be given some from the hospital [ ]  
 b) plan to buy some [ ]  
 c) think painkillers will not be needed [ ] c72[ ]

THANK YOU VERY MUCH FOR YOUR TIME

## Appendix 18

|                            |
|----------------------------|
| <u>INTERVIEW FOR STAFF</u> |
| Part 2 - new data          |
| (all staff)                |
| <u>STUDY NO.</u>           |
| <u>WARD</u>                |
| <u>DATE</u>                |
| <u>PREVIOUS STUDY NO.</u>  |

Interview schedule: all staff (Phase 2)



Thank you for agreeing to see me again. This time I'd like to ask you about postoperative pain in children under 5. All your answers will be kept confidential.

### Section 1 - Personal details

#### 1. Type of staff:

| <u>Nurses</u>   |     | <u>Surgeons/Anaesthetists</u> |     |
|-----------------|-----|-------------------------------|-----|
| Sisters         | [ ] | Consultant                    | [ ] |
| Staff Nurses    | [ ] | Senior Registrar              | [ ] |
| Enrolled Nurses | [ ] | Registrar                     | [ ] |
| Learners        | [ ] | Senior House Officer          | [ ] |
|                 |     | Junior House Officer          | [ ] |

study no. c1 [ ]

ward c2 [ ]

c3 [ ]

(c59/60 not used)

### Section 2 - Pre-operative information for in-patients

1. Do you explain to young children about what to expect when they have an operation? yes [ ] no [ ]

c61[ ]

2. Do you tell young children about post-operative pain? yes [ ] no [ ]

c62[ ]

3. Should young children be told in advance if a procedure will cause pain? yes [ ] no [ ]

c63[ ]

4. Have you ever told a young child that he/she does not need to be brave, ie it's OK to cry?

Yes [ ] no [ ]

c64[ ]

### Section 3 - Patients' Anxiety

1. Do young children worry about what will happen to them in hospital? yes [ ] no [ ]

c65[ ]

2. Do young children worry about having operations? yes [ ] no [ ]

c66[ ]

3. What are young children most afraid of when in hospital?

c67[ ]

(c68 not used)

4. Does pre-operative information, which is understood by young children:

- a) reduce anxiety [ ]
- b) increase anxiety [ ]
- c) not affect anxiety [ ]

c69[ ]

5. Who do you think most young children would confide their pain in?

- a) their parents [ ]      b) a nurse [ ]  
c) a doctor [ ]      d) other(specify)\_\_\_\_\_ [ ]      c70[ ]

Section 5 - Current practice

ASSESSMENT

1. Do you think that you always know when young children are in pain?      yes [ ]    no [ ]      c71[ ]

2. How do you decide whether young children are/are not in pain?      c72[ ]

3. Would you assess all pre-school children in the same way?      yes [ ]    no [ ]      c73[ ]

If no, what differences would you make?      c74[ ]

4. Are pre-school children able to localise their pain?      yes [ ]    no [ ]      c75[ ]

(c76/77 not used)

5. Are 3 and 4 year olds able to describe their pain:      yes [ ]    no [ ]      c78[ ]

(c79 not used)

6. Who of the following is the best person to assess a young child's pain?

- a) parent [ ]  
b) nurse [ ]  
c) doctor [ ]      c80[ ]

7. Do you think that young children deny pain?      yes [ ]    no [ ]      c81[ ]

8. Which of the following operations would you rank as being the sorest, in terms of quantity of pain relief drugs which are given?

(1=most sore and 4=least sore: use each number once only)

- a) circumcision [ ]  
b) hernia repair [ ]  
c) hypospadias repair [ ]  
d) orchidopexy [ ]      c82[ ]

## MANAGEMENT

1. What do you aim for when giving pain relieving drugs to young children?
  - a) complete pain relief ☐
  - b) relief of most pain ☐
  - c) minimal relief of pain ☐c83[ ]
2. Do you have any concerns about giving pain relieving drugs to children under 5 years? yes ☐ no ☐ c84[ ]

If yes, what are they? c85[ ]
3. Do children aged 3 or 4 years normally ask for pain relieving drugs? yes ☐ no ☐ c86[ ]
4. When considering children under 5 years, how long do you think opiate drugs for pain relief should be maintained after minor surgery eg inguinal herniotomy?
  - a) as long as the patient needs it ☐
  - b) 48 hours after surgery ☐
  - c) 24 hours after surgery ☐
  - d) once only dose ☐c87[ ]
5. When considering children under 5 years, how long do you think opiate drugs for pain relief should be maintained after major surgery eg major abdominal surgery?
  - a) as long as the patient needs it ☐
  - b) 48 hours after surgery ☐
  - c) 24 hours after surgery ☐
  - d) once only dose ☐c88[ ]
6. Do you think that children aged 3 and 4 years actively distract themselves from pain eg by watching TV ?  
yes ☐ no ☐ c89[ ]
7. Do you think that young children try to be brave when they are in pain, by not crying?  
yes ☐ no ☐ c90[ ]

If yes, is this equal for girls and boys?  
yes ☐ no ☐ c91[ ]

If no, which hides their pain more?  
boys ☐ girls ☐ c92[ ]
8. Do you worry about young children becoming addicted to drugs given to relieve pain? yes ☐ no ☐ c93[ ]

IS THERE ANYTHING ELSE WHICH YOU WOULD LIKE TO ADD?

## Appendix 19

|                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><u>INTERVIEW FOR STAFF</u><br/>Part 1 - basic data<br/>(new staff only)</p> <p><u>STUDY NO.</u> _____</p> <p><u>WARD</u> _____</p> <p><u>DATE</u> _____</p> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|

Interview schedule: new staff (Phase 2)

Thank you for agreeing to see me. I am going to ask you about postoperative pain in children under 5 years (not neonates), using 2 short interviews. When I speak of 'young' children I mean children under 5 years. All your answers will be kept confidential.

### Section 1 - Personal details

study no.c1 [ ]  
ward c2 [ ]

#### 1. Type of staff:

| <u>Nurses</u>   |     | <u>Surgeons/Anaesthetists</u> |     |        |
|-----------------|-----|-------------------------------|-----|--------|
| Sisters         | [ ] | Consultant                    | [ ] |        |
| Staff Nurses    | [ ] | Senior Registrar              | [ ] |        |
| Enrolled Nurses | [ ] | Registrar                     | [ ] |        |
| Learners        | [ ] | Senior House Officer          | [ ] |        |
|                 |     | Junior House Officer          | [ ] | c3 [ ] |

#### 2. How long have you been working with children?

a) less than 1 year [ ]  
b) 1-2 years [ ]  
c) over 2 years [ ] c4 [ ]

#### 3. Have you had any formal training in the management of pain?

yes [ ] no [ ] c5 [ ]

If yes, was this:

Nurses  
a) part of your RGN training [ ]  
b) part of your RSCN training [ ]  
c) other [ ] c6 [ ]

Doctors  
d) part of your medical student training [ ]  
e) part of your post-registration training [ ]  
f) other [ ] c7 [ ]

### Section 2 - Pre-operative information for in-patients

#### 1. Whose role is it to tell patients about post-operative pain?

a) nurses [ ] b) surgeons [ ]  
c) anaesthetists [ ] d) other(specify) [ ]  
\_\_\_\_\_ [ ] c8 [ ]

### Section 3 - Patients' Anxiety

#### 1. Do you think that fear:

a) increases pain [ ]  
b) reduces pain [ ]  
c) does not affect pain [ ] c9 [ ]

2. Do you think that fatigue:
  - a) increases pain [ ]
  - b) reduces pain [ ]
  - c) does not affect pain [ ]c10[ ]
3. In your opinion, will reducing anxiety promote recovery, postoperatively?      yes [ ]    no [ ] c11[ ]
4. Can regressive behaviour, such as bedwetting, be related to pain?      yes [ ]    no [ ] c12[ ]
5. Do you think that anxious mothers transfer anxiety to their children?      yes [ ]    no [ ] c13[ ]
6. Do parents worry about their child becoming addicted to drugs which they are given in hospital?      yes [ ]    no [ ] c14[ ]

#### Section 4 - Personal pain

1. Have you ever had an operation?    yes [ ]    no [ ] c15[ ]
  - If not, go on to Q3.
  - If yes, did you have pain?      yes [ ]    no [ ] c16[ ]
  - If yes, were you surprised that you had pain?      yes [ ]    no [ ] c17[ ]
2. If you did have pain, was it:
  - a) worse than you expected [ ]
  - b) less than you expected [ ]c18[ ]
3. Do you think that a nurse or a doctor's personal experience of pain could influence their management of pain in their patients?      yes [ ]    no [ ] c19[ ]
  - If yes, in what way? c20[ ]

#### Section 5 - Current practice

Remembering that we're talking about children under 5 years:

##### ASSESSMENT

1. What factors might influence the amount of pain experienced by patients? c21[ ]
2. Do you always believe a child who complains of pain?      yes [ ]    no [ ] c22[ ]

3. How many patients do you think experience moderate-severe pain, 16-24 hours post-operatively?  
 none [ ] 25% [ ] 50% [ ] 75% [ ] 100% [ ] c23[ ]
4. Have you heard of pain assessment tools?  
 yes [ ] no [ ] c24[ ]  
 If not, go on to MANAGEMENT.
5. What different means of assessing pain are there? c25[ ]
6. Have you ever assessed a patient's pain using a pain assessment tool? yes [ ] no [ ] c26[ ]  
 If yes, what did you use? c27[ ]  
 Did you find it useful? yes [ ] no [ ] c28[ ]
7. Which method of assessing pain do you prefer? c29[ ]

#### MANAGEMENT

In the first question I'm going to ask you the same thing 3 times, but about adults, adolescents and children.

1. After an operation, should a) adults [ ] c30[ ]  
 b) adolescents [ ] c31[ ]  
 c) children [ ] c32[ ]  
 expect to have to tolerate:  
 a) severe pain  
 b) bad pain  
 c) moderate pain  
 d) a little pain  
 e) no pain
2. What methods of relieving pain do you know of, apart from drugs? (If none, go on to Q5.) c33[ ]
3. Which of these have you had clinical experience of? c34[ ]
4. Was this with young children? yes [ ] no [ ] c35[ ]
5. NURSES  
 Do you offer prophylactic drugs for pain relief to postoperative patients:  
 a) regularly [ ]  
 b) not regularly [ ]  
 c) never [ ] c36[ ]

5. (cont)

DOCTORS

Do you prescribe prophylactic drugs for pain relief to postoperative patients:

- a) regularly [ ]  
b) not regularly [ ]  
c) never [ ]

c37[ ]

6. If a child did not want to take pain relieving drugs, could you be persuaded you out of giving the drug?

- yes [ ] no [ ]  
sometimes [ ]

c38[ ]

7. Do you ever not give injections because you think that you will hurt the child?

- yes [ ] no [ ]

c39[ ]

8. Do parents ask for pain relieving drugs for their children:

- a) often [ ]  
b) occasionally [ ]  
c) never [ ]

c40[ ]

EVALUATION

1. Do you always evaluate pain relief after giving pain relieving drugs?

- yes [ ] no [ ]

c41[ ]

If yes, how do you do this?

c42[ ]

2. Do you normally note any of the following in the drug kardex or nursing/medical notes:

- a) presence of pain [ ]  
b) severity of pain [ ]  
c) effectiveness of pain relieving drugs [ ]  
d) side-effects from pain relieving drugs which the patient has had [ ]

c43[ ]

c44[ ]

c45[ ]

c46[ ]

3. Do you always do this?

- yes [ ] no [ ]

c47[ ]

If not, how often do you do it?

- 90% [ ] 50% [ ] 10% [ ]

c48[ ]

4. In your experience, are analgesics generally:

- a) totally effective [ ]  
b) mostly effective [ ]  
c) effective for some of the time [ ]  
d) rarely effective [ ]  
e) totally ineffective [ ]

c49[ ]



## Section 6 - General

1. In the first question I'm going to put 6 statements to you. I'd like you to tell me if you think that they are true. Is it true that:
- a) Children in hospital easily become addicted to opioids.                      yes [ ] no [ ]                      c50[ ]
- b) Children do not experience as much pain as adults.                      yes [ ] no [ ]                      c51[ ]
- c) Post-operative pain cannot be prevented.                      yes [ ] no [ ]                      c52[ ]
- d) Active children cannot be in pain.                      yes [ ] no [ ]                      c53[ ]
- e) Children, who can speak, always say if they are in pain.                      yes [ ] no [ ]                      c54[ ]
- f) Injection is best method of relieving pain                      yes [ ] no [ ]                      c55[ ]
2. Does a child's age and maturity affect how he/she responds to/communicates pain?    yes [ ] no [ ]                      c56[ ]
- If yes, in what way?                      c57[ ]
3. Whose responsibility should the prescribing of pain relieving drugs be?    a) anaesthetists [ ]  
                                                b) surgeons                      [ ]                      c58[ ]

## Appendix 20

Revised objective pain scale and scoring criteria

## REVISED OBJECTIVE PAIN SCALE

### BEHAVIOUR

|      |                |   |         |
|------|----------------|---|---------|
| Apex |                |   |         |
|      | <= 10% pre-op  | 0 |         |
|      | >10-20% pre-op | 1 |         |
|      | >20% pre-op    | 2 | c25 [ ] |

### FACIAL EXPRESSION

|                            |   |         |
|----------------------------|---|---------|
| Smiling                    | 0 |         |
| Blank expression, frowning | 1 |         |
| Crying                     | 2 | c26 [ ] |

### CRYING

|                                 |   |         |
|---------------------------------|---|---------|
| Not crying                      | 0 |         |
| Crying, but responds to TLC     | 1 |         |
| Crying, does not respond to TLC | 2 | c27 [ ] |

### MOVEMENT

|           |   |         |
|-----------|---|---------|
| None      | 0 |         |
| Restless  | 1 |         |
| Thrashing | 2 | c28 [ ] |

### AGITATION

|                |   |         |
|----------------|---|---------|
| Asleep or calm | 0 |         |
| Mild           | 1 |         |
| Hysterical     | 2 | c29 [ ] |

### VERBAL EVALUATION or BODY LANGUAGE

|                              |   |         |
|------------------------------|---|---------|
| Asleep or no special posture | 0 |         |
| Flexing extremities          | 1 |         |
| Holding location of pain     | 2 | c30 [ ] |

Total c31 [ ]

## REVISED OBJECTIVE PAIN SCALE CRITERIA

APEX            < /= 10% pre-operative value  
                      > 10-20% pre-operative value  
                      > 20% pre-operative value

### FACIAL EXPRESSION

|                            |                                                              |
|----------------------------|--------------------------------------------------------------|
| Smiling                    | obviously relaxed and happy                                  |
| Blank expression, frowning | not relaxed or happy, in some distress, pouting lip / asleep |
| Crying                     | crying and in obvious distress unhappy                       |

### CRYING

|                                 |                                                                            |
|---------------------------------|----------------------------------------------------------------------------|
| Not crying                      | awake and not crying / asleep                                              |
| Crying, but responds to TLC     | crying is controlled by being touched, reassured or held by nurse / parent |
| Crying, does not respond to TLC | crying uncontrollably. Measures to comfort child are unsuccessful.         |

### MOVEMENT

|           |                                                                                                                |
|-----------|----------------------------------------------------------------------------------------------------------------|
| None      | asleep / if awake, lying or playing quietly / fully mobile                                                     |
| Restless  | child unable to sit or lie still. Frequent position changes. No threat of self-harm. Mobility self-restricted. |
| Thrashing | child kicking and / or squirming. Potential for self-harm. Has to be protected or restrained for safety.       |

## AGITATION

|                |                                                                                                                  |
|----------------|------------------------------------------------------------------------------------------------------------------|
| Asleep or calm | asleep or awake and calm                                                                                         |
| Mild           | tense, voice quivering. Responds rationally to questions and / or responds to attempts to console.               |
| Hysterical     | does not appear rational, eyes wide. May be clinging to nurse / parent. Does not respond to attempts to console. |

## VERBAL EVALUATION or BODY LANGUAGE

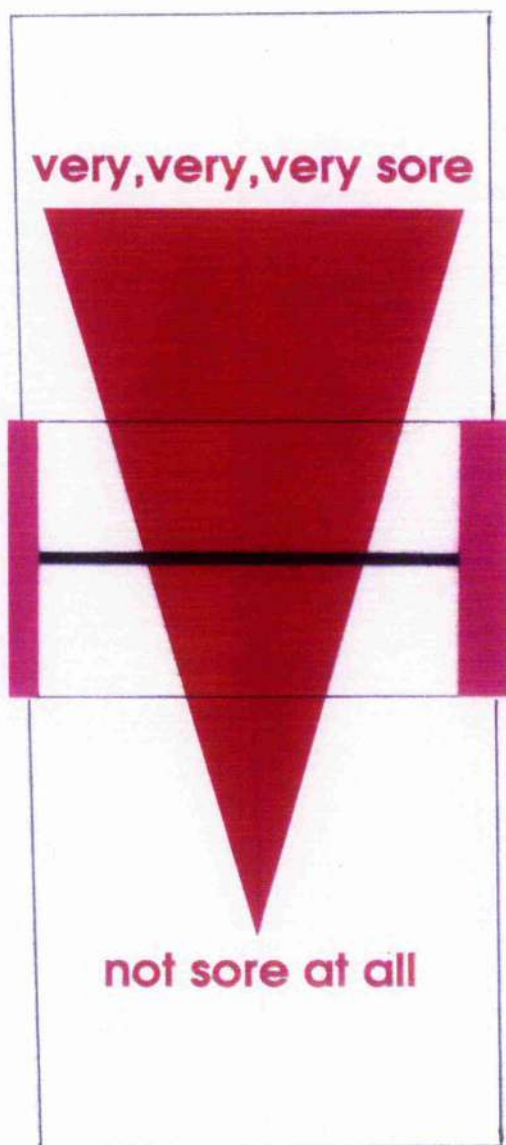
### Verbal child

|                                |                                                                                                                      |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Asleep or states no pain       |                                                                                                                      |
| mild pain or cannot localise   | complains of general feeling of discomfort but unable to describe location of pain or states pain is mild in nature. |
| Moderate pain and can localise | complains of pain that is bothersome and is able to point to or describe location of pain.                           |

### Pre-verbal child

|                          |                                                                                             |
|--------------------------|---------------------------------------------------------------------------------------------|
| No special posture       |                                                                                             |
| Flexing extremities      | legs drawn up. arms may be folded across body.                                              |
| Holding location of pain | Holding, guarding or touching location of pain. Infants with legs drawn up, fists clenched. |

## Appendix 21



Coloured analogue scale (vertical)

## Appendix 22

Consent form (Phase 2)

UNIVERSITY OF GLASGOW  
DEPARTMENT OF CHILD AND ADOLESCENT PSYCHIATRY  
ROYAL HOSPITAL FOR SICK CHILDREN, GLASGOW

Dear Parent,

I am a children's nurse and am interested in the experiences of young children who have an operation in this hospital. During December 1991 and January 1992, I am carrying out a study examining how children under 5 years cope with pain after an operation. This involves asking the children (if they are old enough) and their parents some simple questions. It will take approximately 20 minutes for each parent, and less for each child. The answers will be kept confidential.

Before I see your son/daughter, I would like to ask your permission to talk to him/her. Please read the sentence below and if you agree, sign and date the form.

Should either you or your son/daughter not wish to take part, this will in no way affect the care that he/she receives.

Yours faithfully,

M L Gillies  
Research Nurse

I agree to my son/daughter \_\_\_\_\_ taking part in the above study.

SIGNED: \_\_\_\_\_

DATE: \_\_\_\_\_

WITNESS: \_\_\_\_\_

DATE: \_\_\_\_\_



## Appendix 23

| Operation<br>(no. of children)    | Pain rated by | Degree of pain | Proportion % |
|-----------------------------------|---------------|----------------|--------------|
| Orchidopexy<br>(n=32)             | children      | severe         | 34           |
|                                   | mothers       | mild           | 43           |
|                                   | researcher    | moderate       | 59           |
| Hernia/hydrocele<br>repair (n=15) | children      | severe         | 67           |
|                                   | mothers       | mild           | 60           |
|                                   | researcher    | mild           | 40           |
| Circumcision<br>(n=11)            | children      | mild           | 30           |
|                                   |               | severe         | 30           |
|                                   | mothers       | mild           | 57           |
|                                   |               | moderate       | 55           |
| Hypospadias<br>repair (n=5)       | children      | severe         | 60           |
|                                   | mothers       | mild           | 50           |
|                                   |               | severe         | 50           |
|                                   | researcher    | moderate       | 40           |
| Bat ear repair<br>(n=4)           | children      | moderate       | 50           |
|                                   |               | severe         | 50           |
|                                   |               | none           | 33           |
|                                   | mothers       | mild           | 33           |
|                                   |               | moderate       | 33           |
|                                   |               | mild           | 50           |
|                                   |               | severe         | 50           |

**Most common ratings of pain severity, by operation:  
Groups B & C (n=67), mothers (n=50), researcher.**

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## The Chief Scientist Reports . . .

# Postoperative Pain in Children under Five Years

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### Introduction

Research concerning young children's pain has tended to focus upon neonates, and postoperative pain has received little attention.<sup>1,2</sup> Language and comprehension skills develop as children mature,<sup>3,4</sup> but until they do, young children are less able to communicate pain than older children.<sup>5,6</sup> Consequently, young children's pain is not always recognised and is undertreated.<sup>7-10</sup>

This paper reports the findings of a descriptive study of the experience of postoperative pain in under five year-olds, admitted for minor surgery to a children's hospital. The aims were: (1) to establish whether this group experienced pain postoperatively and how they reacted to it; (2) to examine the mother's expectations and responses to her child's pain; and (3) to determine whether nursing and medical staff recognised pain in young children and if so, how they managed it.

A pilot study highlighted the inevitable difficulties in interviewing young children under five years of age. Unlike children aged five years or more, the younger group was unable to cope with formal questioning and needed the presence of a parent for reassurance. Two alterations to the Objective Pain Scale (OPS) were necessary: the physiological measure was changed from blood pressure to pulse rate and a record of facial expression was added. The data were analysed using minitab.

Descriptive data were collected from children, their mothers and staff, from four surgical wards. Forty children (39 males) under five years of age were assessed, 16-24 hours postoperatively. Most (88%) had had orchidopexy, circumcision, hernia or hydrocele repair or hypospadias repair. A total of 36 mothers participated while there was a response from 67% of staff who had been invited to participate—nurses (33), surgeons (15) and anaesthetists (9).

The presence and severity of pain in each child was measured by the researcher using a 10 cm analogue scale and an adapted version of the OPS.<sup>11</sup> Children aged three and

four years were interviewed using semi-structured conversations and were asked to provide a self-report of their pain using a red, vertical, analogue scale. Mothers measured their child's pain with a 10 cm analogue scale. Finally, mothers and staff were interviewed using semi-structured questionnaires.

## Results

Eliciting information about pain from three and four year olds was time-consuming. Only four children were able to describe their pain using phrases like 'sore' and 'a bit better' and two (aged three years) said that they did not know how to do this. Although describing pain was difficult for children, almost half of all staff (48%) failed to recognise this. Interestingly, most children (75%) understood the concept of localising their pain and yet less than half the staff (41%) thought that young children could do this.

The OPS and Visual Analogue Scale (VAS) findings were very similar, in that 87% and 93% respectively of children were found to be in pain. However, because the design of the OPS involves six specific measures with set criteria, it may be more sensitive. Older children were more likely to have pain ( $\chi^2 = 4.90$ ,  $df = 1$ ,  $p = 0.025$ ). Attempts at self-report using a coloured analogue scale were unsuccessful. Only two children aged four years managed to do so, the remainder appearing not to understand what was wanted.

Less than half the mothers (46%) said that their child was in pain, although, using the analogue scale, most mothers (94%) indicated that their child had pain. Ten mothers (28%) stated that their child was awake with pain during the first postoperative night; four (11%) did not inform staff of their child's continuing pain after analgesic administration.

Mothers and staff expressed strikingly different views about whether young children worried about hospitalisation (mothers 24%, staff 91%) and operations (mothers 22%, staff 79%). Both groups (mothers 67% and staff 83%) believed that children should be prepared for painful procedures. Some mothers (29%) said that their children had been warned about the possibility of postoperative pain, usually by themselves, occasionally by doctors, but never by nurses. Most staff (69%) claimed they informed parents about postoperative pain but, in practice, few mothers (31%) said that they had been prepared.

Staff usually assessed pain in children under five years by speaking to the children (57%), observing their behaviour (52%) or from clinical impression (31%), rather than using formal measures. Less than half (47%) of the staff took developmental stage into consideration when assessing pain in children who were likely to possess the least ability to comprehend and communicate. Fewer nurses (25%) than doctors (50%) reported that they had received specific training in pain management.

Although 90% of the children had had regional blocks or skin infiltration while anaesthetised, most mothers (69%) said that, on return from theatre, their child was either upset and/or in pain. Paracetamol was prescribed for all children and was administered to 70% but none received it regularly. Children under three years were more likely to be given paracetamol than those over three years ( $\chi^2 = 5.00$ ,  $df = 1$ ,  $p = 0.025$ ). Five



children were prescribed either papaveretum or morphine but none was given. Overall, 25% of children received no analgesics. Forty-one per cent of staff (doctors > nurses) were concerned about giving analgesics to young children, primarily because of adverse side-effects (71%), but also because of concerns relating to drug dependency (16%).

## Conclusions

Young children's pain after minor surgery was often poorly recognised and, consequently, undertreated. Analgesics were not given routinely and the child's age influenced drug administration. Accurate assessment and effective management of pain requires consideration of each child's developmental stage. Self-report measures were of no value in children under five years, and it follows that pain measurement has to be made by other individuals. The modified OPS may be useful for assessing pain in this age-group but requires further validation. All children should be given analgesics regularly, particularly if doubt exists about the presence of pain and where language skills are limited. As safe methods of pain relief using medication do exist for children of all ages,<sup>12</sup> concerns could be relieved.

Mothers also have an important role. However, staff should be aware that the wording of their questions can influence mothers' responses. Training for health care staff is essential and should include the assessment and management of pain.

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## Research Notes

### HEALTH SERVICES AND PUBLIC HEALTH RESEARCH GRANTS AWARDED DURING THE PERIOD OCTOBER-DECEMBER 1993

**Dr W O Tarnow-Mordi** (University of Dundee) and **Professor N McIntosh** (University of Edinburgh): 'A Prospective Comparison of Performance in Relation to Staffing Policy and Organisation in Neonatal Units in Scotland'—a grant of up to £95,516 over 36 months.

**Professor L N Smith**, **Ms M Lalt** (University of Glasgow) and **Ms I A MacKinlay** (Glasgow Royal Infirmary): 'The Improvement of Wound Management in Surgical Patients Using an Action Research Approach'—a grant of up to £5,954 over 12 months.

**Dr D Bell** (Tayside Health Board), **Ms S Haw** and **Dr A Richardson** (City Hospital): 'Dundee HIV Behavioural and Seroprevalance Study'—a grant of up to £67,318 over 36 months.

**Dr A Glasier** and **Professor D T Baird** (University of Edinburgh): 'Should Emergency Contraception be Easier to Obtain?'—a grant of up to £108,922 over 36 months.

**Professor N B Platts**, **Dr C Longbottom**, **Dr J R Radford** (University of Dundee), **Ms M Robertson** (Hillbank Health Centre, Dundee) and **Dr D Beighton** (King's College Dental School, London): 'Use of Health Visitors to Identify High Caries-Risk Scottish Infants Using Microbiological, Dental and Social Factors (to Facilitate the Development and Targeting of NHS Services)'—a grant of up to £233,428 over 54 months.

**Dr S C Abraham** (Ninewells Hospital and Medical School), **Dr D Bell** (Tayside Health Board) and **Ms A Tait** (Tayside Health Education Centre): 'Design and Evaluation of a Community Based HIV-Prevention Education Programme for Sexually Active Teenagers'—a grant of £110,539 over 24 months.

**Dr G Watt**, **Mr P McLoone**, **Dr G Dickinson**, **Dr F A Boddy** (University of Glasgow), **Dr C Morrison** (Royal Infirmary, Glasgow) and **Ms J Brooke** (Housing Department, Lomond House, Glasgow): 'Climate-Related Morbidity and Mortality in Scotland'—a grant of up to £103,001 over 36 months.

### DISABILITY RESEARCH GRANTS AWARDED DURING THE PERIOD JUNE-NOVEMBER 1993

**Professor L J Whalley** (Department of Mental Health, Aberdeen) and **Professor J Lishman** (School of Applied Social Studies, Aberdeen): 'An Evaluation of Voluntary Services for Disabled People in Grampian'—a grant of up to £53,845 over 24 months.

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## Review

# Post-operative pain in children: a review of the literature

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### Summary

- Post-operative pain has been increasingly reported over the last 40 years.
- Literature reporting pain in children is increasing.
- Although methods of assessing pain in children have been developed over the last 15 years, difficulties still exist.
- The long-standing problems of managing pain persist because practice is often based on misconceptions rather than research.
- This failure to base practice on research is caused, in part, by the fact that neither medical nor nurse training recognizes pain as a specific subject area in its own right.
- Until training changes and practice improves, post-operative pain in children is likely to remain poorly recognized and undertreated.

*Keywords:* assessment, children, management, post-operative pain, training.

### Introduction

Pain is difficult to define because of the many contributory factors associated with it, e.g. anxiety or culture. However, the following definition by the International Association for the Study of Pain provides a useful basis:

'an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage' (Merksey, 1979).

Pain has numerous causes, including accidents, disease, surgery and treatment. The level at which pain is felt (pain

threshold) varies between individuals, and can also vary within the same person at different times. This is further complicated by factors such as emotion, culture and previous experience, the end result of which is a unique experience for that individual. Therefore, pain should be regarded as a subjective phenomenon (McGrath & Unruh, 1987; Devine, 1990).

In 1952, Papper, Brodie and Rovenstine carried out the first evaluative study of post-operative pain (McCaffrey & Hart, 1976), finding that there were fears of creating drug dependency and a lack of knowledge about the assessment and management of pain. In 1989, Burke & Jerrett suggested both that there is a relationship between previous experience of pain and behaviour and that nurses need to understand this relationship, which should be derived

*This article was written when Marjorie Gillies was a Scottish Home and Health Department Research Training Fellow attached to the Department of Child and Adolescent Psychiatry and the Department of Nursing Studies, University of Glasgow.*



from education, specifically relating the assessment and management of pain to behaviour.

At the same time, Holm *et al.* (1989) and Rutter (1989) suggested that empathy, derived from personal experience of pain, may contribute to the manner in which staff respond to and manage pain in their patients. In the 1990s there is a growing interest in pain but the training of nurses and doctors with regard to the management and treatment of pain remains deficient (Weiss *et al.*, 1983; Watt-Watson, 1987; Royal College of Surgeons and College of Anaesthetists, 1990). Staff appear unclear as to whether they or the patients are best placed to assess pain, and lack of knowledge about pain may lead to inadequate prescribing and inconsistent administration of strong analgesia. The problems remain unchanged, and so the aim of this review is to establish the most recent views about post-operative pain in children prior to a prospective study.

### Post-operative pain

Pain occurs after most operations for adults (Rutter, 1989) and children (Radford, 1990), and in the UK, pain relief has been taught as part of post-operative care. Pain is expected by patients undergoing surgery, as well as by the medical and nursing staff involved in their care. This expectancy, coupled with inadequate pre-operative information described by Cohen (1980), Hayward (1987) and Kuhn *et al.* (1990) and specific lack of staff education, generates several problems for adults; first, the assessment of pain appears unreliable; second, the strength and quantity of analgesia are underestimated (Kuhn *et al.*, 1990); and third, misconceptions persist, e.g. about the potential for creating dependency on opiates (Cohen, 1980; Sriwatanakul *et al.*, 1983). Cohen (1980) argued that this has resulted in many adults suffering moderate to severe post-operative pain.

Children are also said to 'suffer pain in the same way that adults do' (Bray, 1988), and like adults, their pain involves physiological, psychological, cultural and social aspects (Rana, 1987; Alder, 1990). Not only has the undertreatment of children's pain been highlighted in several reports (Swafford & Allan, 1968; Fland & Anderson, 1977; Burokas, 1985), but there is also evidence to suggest that children have a higher chance than adults of experiencing moderate to severe post-operative pain (Mather & Mackie, 1983) and that, in spite of this, they receive less analgesia, less frequently, than adults.

Booker & Nightingale (1985) and Williams (1987) believed that pain and anxiety are linked, each having the ability to influence the other: pain contributes to anxiety, which, in turn, increases the awareness of pain. Pakoulas *et al.* (1984) suggested that lack of information encourages

anxiety in children requiring treatment, and many reports confirmed that providing information reduces stress (Melamed & Siegal, 1975; Siegal, 1981; Melamed *et al.*, 1983; Glasper & Stradling, 1989; Collis, 1990). The importance of giving truthful information to children, to promote trust and reduce anxiety, was emphasized by Rodin (1983) and Bielby (1984). In addition, Parish (1986) and Save the Children (1989) have both recommended the use of constructive play in reducing anxiety.

The reduction of parental anxiety is thought to have beneficial effects on reducing anxiety in children (Vistainer & Wolfer, 1975; Glasper, 1990). For example, by giving as much pre-operative information as possible to parents in out-patient clinics, in pre-admission programmes and on admission, parents should be able to achieve a higher level of understanding about what is to happen to their child. This should reduce their anticipatory anxiety and fears and they should be able to give relevant understandable explanations to their children. The assumption is that children who know that they will be sore after an operation will not lose their trust in their parents and will also have more trust in the staff caring for them.

### Children and pain

Communication plays a vital role in the management of pain. Children's ability to communicate verbally depends on the stage of their cognitive development. For example, both Gaffney & Dunne (1986) and Swanwick (1990) described how children aged 2–6 years often fail correctly to identify the site of their pain, instead giving a general description such as 'my tummy's sore'.

Effective communication with children is not always easy to achieve (Parish, 1986). For example, Alder (1990) suggested that some nurses readily believe the child who denies pain to avoid having to give an injection, and Jerret & Evans (1986) suggested that adults often have difficulty interpreting children's verbal descriptions of pain. Nevertheless, as Dilworth & MacKellar (1987) argued, this is no reason to deprive children of pain relief. The critical factor is ensuring that communication with children is at their level of understanding (Rodin, 1983; Bielby, 1984); otherwise, as Beales (1986) pointed out, 'what a child does not understand he will misunderstand'.

The age-related changes in the cognitive abilities of children have been related to their experiences and descriptions of pain (Savendra *et al.*, 1982; Reissland, 1983; Gaffney & Dunne, 1986, 1987; Beales, 1986; Alder, 1990). However, Ross & Ross (1984) disputed this theory, claiming that there was no association between age and the perception of, or cause of pain. In the author's experience,

however, the younger the child is the less able they are to understand the reason for pain and the possibility of its relief. If children believe, mistakenly, that the treatment will be worse than the pain, then some will absolutely deny its presence even although it is obvious that the child is suffering. However, Bray (1988) and Abu-Saad *et al.* (1990) suggested that older children are able to describe different aspects of pain, while Campbell (1975), Bibace & Walsh (1980) and Perrin & Gerrity (1981) have all argued that understanding about pain and illness increases with age. This relationship with age has since been corroborated by Alder (1990) and Eland (1985a) who pointed out that younger children are able to locate their pain on a body outline, even although they cannot name the site, whereas older children could name the site.

### Misconceptions

In order to provide the optimum information to children and their parents, nursing and medical staff need detailed knowledge about post-operative pain and its effects. This involves convincing some staff that misconceptions about pain in children are myths, rather than scientifically confirmed facts.

Some of the myths mentioned in relation to post-operative pain in general also apply to the management of pain in children. These include the potential of dependency on opiates (Eland & Anderson, 1977; Cohen, 1980; Weiss *et al.*, 1983; Burokas, 1985; Alder, 1990), erratic prescribing by doctors, and possible misinterpretation of these prescriptions by nurses (Mather & Mackie, 1983; Abu-Saad, 1984). As an example, the concurrent prescribing of strong and mild analgesics along with the use of 'as necessary' doses will often result in the patient being given the milder analgesic infrequently. In particular, misconceptions relating to children include:

- the view that intramuscular analgesia is the most effective method of relieving pain (Eland, 1985b), despite the fact that children are said to fear injections more than anything else in hospital (Mather & Mackie, 1983);
- withdrawn children are coping with their pain, when in fact they are likely to be not admitting to pain (Mather & Mackie, 1983);
- nursing and medical staff are more able to recognize the existence and severity of pain than the child (Burokas, 1985); and
- nursing and medical staff feel that the intramuscular injection is worse than the pain, so injections are avoided (Alder, 1990).

To dispel these myths, enhanced levels of education are required to ensure that nursing and medical staff have an

adequate knowledge base about post-operative pain and its management (Bradshaw & Zeanah, 1986; Dilworth & McKellar, 1987; Holm *et al.*, 1989). In addition, Mather & Mackie (1983) felt that emphasis on improved communication with the patients and their families would contribute to more effective post-operative pain relief in children.

### Assessment

The effective management of pain calls for its prompt recognition and reliable assessment. This is relatively easy in adults, who are able to describe the location and severity of their pain. However, this is not always the case with children, who are at different cognitive and emotional stages of maturity, and who may have limited vocabulary (Ault, 1977; Bibace & Walsh, 1980). Toddlers and babies are particularly difficult to assess and the problems related to measuring their pain are not addressed in this article.

Frequently, children's pain is assessed by observing their behaviour or from measuring their vital signs. Physiological measures alone, are of limited use in assessing children's pain because factors other than pain alter vital signs (Alder, 1990) and observation has been shown to be unreliable as a means of pain assessment (Alder, 1990; Eland, 1990; Lloyd-Thomas, 1990); more specific assessment is recommended.

There are various methods of assessing pain in children, including rating scales (some self-reporting), colour and verbal tools. Visual analogue scales have been described as effective measures (Abu-Saad, 1984; Eland, 1985a; Broadman *et al.*, 1988). Typically, these involve a 10-cm line from 'no pain' to 'severe pain', on which the degree of pain is indicated. Although Maunukela *et al.* (1987) reported that a simple analogue scale was unsuitable for measuring post-operative pain because of its small size, Savedra *et al.* (1989) argued that analogue scales were sensitive, although least liked by children.

Colour tools are considered particularly effective for children of 4–7 years (Eland & Anderson, 1977; Scott, 1978; Eland, 1985a; Latham, 1987; Maunukela *et al.*, 1987), because this group associate colour with sensation; however, the association decreases as age increases. Savedra *et al.* (1989) concluded that colouring body outlines, as described by Eland & Anderson (1977), accurately measured pain with no significant differences in age, gender or ethnicity, but the accuracy of measuring pain using colour is now questioned by Watt-Watson (1992).

Hester (1979) observed 4–7-year-old children's verbal behaviour and facial expression during painful procedures, and compared two methods of assessment. She found that when compared with a series of pictures representing pain,

her Poker Chip Tool (a scale of four poker chips of 'hurt') correlated highly with verbal and motor behaviour.

Generally, verbal scales or pain descriptions are not particularly useful for children (Alder, 1990) who may have limited vocabulary. Developmental differences in pain descriptions were highlighted by Savedra *et al.* (1982). For example, young children relate their pain to physiological cause, whereas older children, who are more capable of abstract thinking, may look for other reasons for their pain. Nevertheless, many children can describe pain (Abu-Saad & Holzemer, 1981; Abu-Saad *et al.*, 1990), but adults may have difficulty in understanding them (Jerrett & Evans, 1986). It should also be remembered that children often respond differently to the same question from their mother compared with a staff member (Savedra *et al.*, 1989).

Facial scales (a series of faces representing 'no pain'-'severe pain') have been reviewed regularly (Beyer & Aradine, 1986; Baker & Wong, 1987; Wong & Baker, 1988; Savedra *et al.*, 1989). Beyer & Aradine (1986) stated that faces were reliable with children aged 4-7 years. However, in 1987, Baker & Wong reviewed several scales including analogue scales, the Poker Chip Tool and faces scales and concluded that the Poker Chip Tool was the most reliable, but that different tools were preferred by different age-groups.

Formal assessment is still not common practice (Eland, 1990) and, although it involves decisions about aspects such as the environment, child's age and type of pain (Lloyd-Thomas, 1990), more than one method of assessment should be used (Savedra *et al.*, 1989). It should be remembered that reported difficulties with tools include potential staff bias caused by, for example, personal experience of pain (Mather & Mackie, 1983). Regardless of the method, Maunuksele *et al.* (1987) clearly stated that when self-report is involved the child must understand the concept, before the tool is used.

## Management

The management of pain in children depends on its accurate assessment and evaluation. Although analgesia plays an important role in the relief of pain, the drugs used and the method of administration are critical. Intramuscular injections can be an effective method but create their own problems, such as fear of receiving or giving injections. Intravenous opiates take effect quickly but cause great concern to both doctors and nurses about overdosage. This, and worry about dependency, results in inadequate dosage and incomplete relief. The use of patient-controlled analgesia in children is a relatively new concept in Britain, but Gillespie & Morton (1992) have used it successfully in patients as young as 5 years.

Other measures used to relieve pain in adults include hypnosis, acupuncture and transcutaneous nerve stimulation (TENS), but there are few reports describing their use post-operatively in children. The successful use of TENS was described by Eland (1991) in patients with phantom pain following amputation and in haematology patients having repeated venepunctures.

The relief of anxiety and related pain by explanation, distraction and constructive play (e.g. puppetry) are more widely recognized. However, little is known about how much children will attempt to distract themselves from pain, if at all, and this is one area which could be investigated further. The benefits of treating post-operative pain effectively have been summarized by the Royal College of Surgeons and the College of Anaesthetists (1990). These benefits included less anxiety and fatigue, fewer admissions, more day care and financial savings as a result of, for example, early discharge.

## Conclusion

The problem of post-operative pain in children is becoming more widely recognized (Alder, 1990). In North America and Australia, pain has been researched on a wider scale than in the UK (Royal College of Surgeons and the College of Anaesthetists, 1990). However, during the 1980s, there has been evidence of increasing research interest in pain in the UK and other countries.

While there is scope for American research findings to be applied in the UK, there are limitations, particularly because of the importance of the socio-cultural differences. Therefore, more UK research is required in both the assessment and management of post-operative pain. As Johnston (1991) pointed out, this does not have to be innovative research; the validation of current assessment tools could result in more refined measurement while recent concepts about the management of pain could be developed. Evaluation of pain assessment tools is essential for maintaining standards of care.

The importance of pain could be emphasized by including it as a separate subject in both nursing and medical curricula. This would improve knowledge about all aspects of pain amongst the health-care workers responsible for its assessment and management. Consequently, it should be possible to enhance the quality of care of patients experiencing post-operative pain.

Finally, nurses are responsible and accountable for all aspects of their patients' care. With children, it is obvious from the literature that increasing information about pain is available and yet long-standing problems persist. There-

fore, we have no option but to acknowledge the literature and start basing our practice on research.

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