



<https://theses.gla.ac.uk/>

Theses Digitisation:

<https://www.gla.ac.uk/myglasgow/research/enlighten/theses/digitisation/>

This is a digitised version of the original print thesis.

Copyright and moral rights for this work are retained by the author

A copy can be downloaded for personal non-commercial research or study, without prior permission or charge

This work cannot be reproduced or quoted extensively from without first obtaining permission in writing from the author

The content must not be changed in any way or sold commercially in any format or medium without the formal permission of the author

When referring to this work, full bibliographic details including the author, title, awarding institution and date of the thesis must be given

Enlighten: Theses

<https://theses.gla.ac.uk/>
research-enlighten@glasgow.ac.uk

FEMALE STERILISATION

THE VIEW FROM A GENERAL PRACTICE.

ALASTAIR F. WRIGHT, M.B. Ch.B.

M.D.

UNIVERSITY OF GLASGOW.

Glenwood Health Centre, Glenrothes.

April, 1981.

ProQuest Number: 10647717

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent upon the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



ProQuest 10647717

Published by ProQuest LLC (2017). Copyright of the Dissertation is held by the Author.

All rights reserved.

This work is protected against unauthorized copying under Title 17, United States Code
Microform Edition © ProQuest LLC.

ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 – 1346

Thesis
6380
(copy 2)

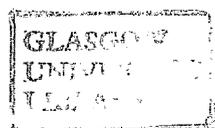


TABLE OF CONTENTS.

LIST OF SUBSECTIONS AND TABLES.	3
ACKNOWLEDGEMENTS.	14
SUMMARY.	15
<u>Part I - INTRODUCTION AND LITERATURE REVIEW.</u>	
Chapter 1. The Town.	21
The Practice.	22
The Practice Population.	24
Aims.	25
Chapter 2. Introduction.	29
List of Papers Surveyed.	31
General & Psychiatric Studies from the 1960's.	38
Laparoscopic Sterilisation.	63
General & Psychiatric Studies from the 1970's.	66
The Timing of Sterilisation.	80
Subsequent Pelvic Disease.	86
Menstruation after Sterilisation.	90
Sterilisation Failure & Tubal Pregnancy.	108
Sterilisation Reversal.	114
Summary of Literature Review.	121
Plan for the Study.	130
<u>Part II PRACTICE STUDIES.</u>	
Chapter 3. The Preliminary Records Search.	135
Chapter 4. The Random Sample of Married Women in the Practice.	140
Chapter 5. Follow-up of 375 Sterilised Women.	186
Chapter 6. Comparison with Matches.	206
Chapter 7. How Patients Felt about their Sterilisation.	239
<u>Part III CONCLUSIONS.</u>	
Chapter 8. Review of Methods.	276
Commentary on several aspects of Sterilisation.	281
Guidelines and Sterilisation Counselling.	304
Clinical Conclusions.	309
Personal Conclusions.	313
REFERENCES.	316
APPENDICES.	327

LIST OF SUBSECTIONS AND TABLES.

Chapter 1.

INTRODUCTION:

The Town.	21
The Practice.	22
The Practice Population.	24
Aims.	25
Fig. No. A1 Percentage Age-sex Distribution of Practice Patients - December 1976.	26
Fig. No. A2 Practice Age/sex Distribution 1966.	27
Table No. A1 Comparison of Women in the Practice with Women in Glenrothes Town (both December 1976).	28

Chapter 2.

REVIEW OF THE LITERATURE:

Introduction.	29
Classified List of Papers Reviewed.	31
General & Psychiatric Studies from the 1960's.	
Schwyhart & Kutner.	38
Barnes & Zuspan.	42
Adams.	45
Norris.	48
Barglow & Eisner.	50
Lu & Chun.	54
Thompson & Baird.	57
Black & Sclare.	59
Whitehouse.	61
Neill.	62

Laparoscopic Sterilisation.	
Steptoe (1967).	63
Steptoe (1970).	63
Thompson & Wheelless.	64
General & Psychiatric Studies from the 1970's.	
Sim, Emens & Jordan.	66
Campanella & Wolff.	67
Khorana & Vyas.	69
Ansari & Francis.	70
Kopit & Barnes.	71
Wig et al.	73
Teper.	74
Whitelaw.	75
Curtis.	77
Smith.	78
The Timing of Sterilisation.	
Mowat.	80
Emens & Olive.	82
Cheng et al.	84
Subsequent Pelvic Disease.	
Muldoon.	86
Scott.	87
Alderman.	88
Menstruation after Sterilisation.	
Neil et al.	90
Alderman.	91
Chamberlain & Foulkes.	92

Kasonde & Bonnar.	96
Radwanska et al.	99
Lieberman et al.	101
Edgerton.	104
Poma.	106
Sterilisation Failure & Tubal Pregnancy.	
Chakravarti & Shardlow.	108
Cheng et al.	110
Hughes. (1980)	112
Hughes. (1977)	113
Sterilisation Reversal.	
Winston.	115
Thomson & Templeton.	116
Alderman.	118
Dubuisson et al.	119
Summary of Literature Review.	121
Plan for the Study.	130

Chapter 3.

THE PRELIMINARY RECORDS SEARCH:

Method.	135
Results.	137
Discussion.	137

Table No. B1:- Corrected Figures from Search of Records done 12th December 1976.	139
---	-----

Chapter 4.

THE RANDOM SAMPLE OF MARRIED WOMEN IN
THE PRACTICE:

Method.	140
Response.	141
Composition of the Sample.	142
Results:-	
Prevalence of Sterilisation.	142
Social Class.	143
Origin of Patients (Born in Fife or not).	144
Marital Status.	144
Live Births.	144
Age at Delivery of First Surviving Child.	145
Indications of Psychiatric Illness.	145
Overdose or Attempted Suicide.	145
Consultation with a Psychiatrist.	146
Religious Belief or Conviction.	146
Further Education.	147
Cigarette Smoking.	147
Infertility Investigations.	147
Phlebitis or Thrombosis.	148
Ever-Use of Contraceptives.	148
Menstrual, Sexual and Family Problems.	149
Age at Operation.	150
Indications for Sterilisation.	150

Indicative Differences between Sterilised
Women and Others:

		Live Births.	151
		History of Therapeutic Abortion.	151
		Menstrual Problems.	152
		Sexual Problems.	152
		Family Problems.	153
		Other Characteristics of the Sample.	153
		Discussion.	154
Table No.	C1	Composition of the Sample.	160
"	"	C2 Prevalence of Elective Sterilisation in Random Sample of Practice.	161
"	"	C3 Social Class.	162
"	"	C4 Origin of Patients (Born in Fife or not).	163
"	"	C5 Marital Status.	164
"	"	C6 Live Births.	165
"	"	C7 Age at Delivery of First Surviving Child.	166
"	"	C8 Psychotropic Drugs.	167
"	"	C9 Patients who have taken an Overdose or Attempted Suicide.	168
"	"	C10 Patients who have Consulted a Psychiatrist.	169
"	"	C11 Religious Belief or Conviction.	170
"	"	C12 Further Education.	171
"	"	C13 Cigarette Smoking.	172
"	"	C14 Infertility Investigations.	173
"	"	C15 Phlebitis or Thrombosis.	174
"	"	C16 Ever-use of Contraceptives by Age Group.	175
"	"	C17 Patients with Menstrual Problems.	176
"	"	C18 Patients with Sexual Problems.	177

Fig. No. C1	Percentage of Whole Sample with Sexual Problems.	178
Table No. C19	Patients with Family Problems.	179
Fig. No. C2	Percentage of Whole Sample with Family Problems.	180
Table No. C20	Live Births.	181
" " C21	Therapeutic Abortion.	182
" " C22	Menstrual Problems.	183
" " C23	Sexual Problems.	184
" " C24	Some other Characteristics of the Sample.	185

Chapter 5.

FOLLOW-UP OF 375 STERILISED WOMEN:

	Method.	186
	The Postal Questionnaire.	186
Results:-	Response Rate.	189
	Operation Dates and Definitions.	189
	Type of Operation.	189
	Surgeons.	190
	Principal Indications for Operation.	190
	Age at Operation.	191
	Social Class.	191
	Reproductive Profile of the Sterilised Women.	
	Timing of Operations.	191
	Mean Number of Pregnancies and Live Births.	193
	Failure Rate.	193
Table No. D1	Response Pattern to Questionnaire.	196

Fig. No. D1	Distribution of Operation Dates of Study Population (375 patients).	197
Table No. D2	Indications for Operation.	198
" " D3	Age at Operation.	199
Fig. No. D2	Reproductive Profile of Sterilised Groups.	200
Table No. D4	Age at First Marriage.	201
" " D5	Age at Delivery of First Surviving Child.	202
" " D6	Age at Delivery of Last Surviving Child.	203
" " D7	Mean Number of Pregnancies.	204
" " D8	Mean Number of Live Births.	205

Chapter 6.

<u>COMPARISON WITH MATCHES:</u>		206
	Method of Choosing Matches.	207
Results:-	Response.	209
	Social Class.	209
	Age at Marriage and Age at Delivery of First Surviving Child.	209
	Parity.	210
	Present Menstrual Problems.	210
	Sexual Problems.	213
	History of Therapeutic Abortion.	213
	Past History of Gynaecological Illness.	213
	Psycho-social Factors.	214
	Contraceptive Ever-use.	216
	Remarriage and Divorce.	216
Table No. E1	Comparison with Matches - Social Class.	217

Table No.	E2	Comparison with Matches -- Age at First Marriage.	218
"	"	E3 Comparison with Matches -- Age at Delivery of First Surviving Child.	219
"	"	E4 Comparison with Matches -- Number of Pregnancies.	220
"	"	E5 Comparison with Matches -- Number of Live Births.	221
"	"	E6 Current Menstrual Problems in Whole Population of Sterilised Patients and Matches / Number of Births.	222
"	"	E7 Ditto / Number of Pregnancies.	223
"	"	E8 Matches -- Current Menstrual Problems / Number of Births.	224
"	"	E9 Matches -- Current Menstrual Problems / Number of Pregnancies.	225
"	"	E10 Oral Contraception & Menstrual Problems in Matches.	226
"	"	E11 Patients with Current Menstrual Problems.	227
"	"	E12 Reanalysis in Pairs of the same parity (Criterion - Births).	228
"	"	E13 Reanalysis in Pairs of the same parity (Criterion - Pregnancies).	229
"	"	E14 Patients with Current Sexual Problems.	230
"	"	E15 Gynaecological History.	231
"	"	E16 Psycho-social Factors.	232
"	"	E17 Psychotropic Drugs.	233
"	"	E17a Consulted Psychiatrist.	233
"	"	E17b Overdose or Suicide Attempt.	233
"	"	E18 Comparison with Matches -- Religious Belief or Conviction.	234
"	"	E19 Comparison with Matches -- Secondary Education beyond 15 years.	235

Table No. E20	Ever-use of Contraceptives.	236
" " E21	Comparison with Matches - Remarriage and Divorce.	237
" " E22	Comparison with Matches - Divorce and Separation.	238

Chapter 7.

HOW PATIENTS FELT ABOUT THEIR STERILISATION:

	Patients and Method.	239
Results:-	Operation to Interview Interval.	241
	Agency Suggesting.	241
	How Patients Felt about their Sterilisation - Regrets.	242
	Age at Operation and Parity.	243
	Timing of Operation.	243
	Regrets - Other Clinical Factors.	244
	Regrets - Social Factors.	244
	Regrets - Personality Indicators.	245
	Reasons given for Regret.	246
	Illustrative Cases:-	
	(a) Interval Sterilisation.	247
	(b) Puerperal Sterilisation.	250
	(c) Termination Sterilisation.	251
	Changes after Sterilisation - The Patient's View.	253
	Menstruation after Sterilisation.	253
	Sex Life after Sterilisation.	254
	Family Life after Sterilisation.	256

Table No.	F1	Interval between Operation and Interview.	259
"	"	F2 Agency Suggesting Sterilisation.	260
"	"	F3 Regrets after Sterilisation.	261
Fig. No.	F1	Definition of Groups.	262
Table No.	F4	Whether Patients would choose to have the Operation again (in the same circumstances).	263
"	"	F5 Regrets - Age at Operation.	264
"	"	F6 Regrets - Timing of Operation.	265
"	"	F7 Regrets - Other Clinical Factors.	266
"	"	F8 Regrets - Social Factors.	267
"	"	F9 Regrets - Personality Indicators.	268
"	"	F10 Reasons given for Regret.	269
"	"	F11 Menstruation, sex-life and family life after Sterilisation - Patients View of Change.	270
"	"	F12 Regrets - Patients View of Change in Menstruation.	271
"	"	F13 Laparoscopy - Menstruation after Sterilisation.	272
"	"	F14 Oral Contraception - Menstruation after Sterilisation.	273
"	"	F15 Regrets - Patients View of Change in Sex Life.	274
"	"	F16 Regrets - Patients View of Change in Family Life.	275

Chapter 8.

CONCLUSIONS:

Review of Methods	
Problems of Time.	276
The Questionnaire.	277
A Retrospective Observational Study.	278
The Choice of Matches.	279
Commentary	281
Indications - Contraceptive Problems.	282
Psychiatric Aspects of Sterilisation.	285
Life Events.	287
Emotional & Personality Factors.	289
Sex Life & Sterilisation.	292
Regret after Sterilisation.	294
Menstruation & Sterilisation.	297
Proposal for a Prospective Investigation.	300
Guidelines & Sterilisation counselling.	304
Fig. No. G1. A Scheme for Assessment.	308
Clinical Conclusions.	309
Personal Conclusions.	313

<u>REFERENCES:</u>	316
--------------------	-----

<u>APPENDICES:</u>	
Questionnaire and letters to Patients used in the Practice Studies.	327

ACKNOWLEDGEMENTS.

I am grateful to the Scientific Foundation Board of the Royal College of General Practitioners for financial support and to the Scottish General Practitioner Research Support Unit, Dundee, for continuing co-operation and practical help. It is also my pleasure to acknowledge my particular debt to Professor J. D. E. Knox, Professor of General Practice at Dundee University and Director of the Research Support Unit. Professor Knox has guided and encouraged these efforts from their beginning, giving generously of his time and experience and responding promptly and patiently to my many questions.

To my secretary, Mrs. S. Kilpatrick, I wish to express my thanks for her painstaking and accurate work. I am also indebted to my son, Graham who spent his summer vacation helping with the fieldwork and checking the analysis.

Finally, I am especially grateful to my wife, Barbara, for her patience and support and for her careful typing of the entire thesis and tables.

S U M M A R Y

The aim of this work is to present a descriptive survey of female sterilisation as seen in one general medical practice.

Introduction (Chapter 1).

The introductory chapter describes the New Town of Glenrothes and the author's practice. The practice population is defined in terms of age/sex distribution and the proportion of adult females contrasted with that in Glenrothes town and in Scotland.

Literature Review (Chapter 2).

The review of the literature is preceded by a list of papers surveyed, classified under the following subject headings:-

- (a) General and psychiatric studies from the 1960's.
- (b) Laparoscopic sterilisation.
- (c) General and psychiatric studies from the 1970's.
- (d) The timing of sterilisation.
- (e) Subsequent pelvic disease.
- (f) Menstruation after sterilisation.
- (g) Sterilisation failure and tubal pregnancy.
- (h) Sterilisation reversal.

An indication of the content of each paper is given with the list.

A separate summary, or overview, of the literature review is also provided and follows the review of individual papers.

After reviewing the literature, the plan for the study is outlined and the author's reasons for undertaking the investigation are discussed.

THE PRACTICE STUDIES.

(Chapters 3 - 7)

These are research projects within the practice aimed at identifying cases, enumerating and classifying the operations done and studying the indications. Outcome is assessed by interviewing patients. The clinical impression that sterilised women complain more frequently of gynaecological symptoms (in particular, menstrual problems) is also explored.

Record Search (Chapter 3).

The preliminary search, of the records of 2,123 women, both married and single, identified 272 patients (12.8%) noted to have had elective sterilisation and nine patients who were on the waiting list for operation. No single women were found among the sterilised women identified.

Random Sample (Chapter 4).

A one in ten random sample of married women was drawn from the practice age/sex register to provide a more accurate estimate of the prevalence of female sterilisation and to determine/

determine rates for some of the variables to be examined in the main study. Two hundred and ten women (97.2%) responded to the postal questionnaire. The prevalence of elective female sterilisation in the sample of married women was found to be 18.6% and at least 21.9% of couples were known to have chosen surgical contraception. When the sterilised women were compared with the "others", they were found, on average, to have slightly larger families and to be more likely to complain of menstrual and sexual problems. The principal indication for operation was "own wish" in 26 patients (66.7%) and 15 (38.5%) gave difficulty with contraception as a subsidiary indication.

The sampling also established contact with many patients seen infrequently if at all and showed, for example, a greater prevalence of menstrual and sexual problems (28.0% and 15.7% respectively) than was evident either from consultations or from the practice disease index. Twelve patients (5.8%) had never used contraceptives. An oral contraceptive had been taken by 144 patients (69.2%) and the ever-use of oral contraception varied from 22% of the oldest group to 100% of the youngest. The condom had been used by 111 (53.4%) while an occlusive cap had been used by only 23 patients (11.1%) and an intra-uterine device by 14 patients (6.7%).

Follow-up of 375 Sterilised Women (Chapter 5).

In chapter 5, a group of 375 identified sterilised women are examined from the demographic viewpoint of a general practice population./

population. Two hundred and fifty-three patients (67.5%) had no medical or obstetric reason for operation, choosing sterilisation simply for convenient and permanent contraception. The distribution of operation dates is illustrated in Fig. D1 and it is noted that relatively few operations were done before the Abortion Act (1967). Fifty-five sterilisation operations had been done in puerperium and 48 at the time of therapeutic abortion, leaving 272 interval operations unrelated to recent childbirth or termination of pregnancy. These three groups are contrasted and "reproductive profiles" are compared.

Comparison with Matches (Chapter 6).

A comparison of 347 sterilised patients with randomly determined matches is detailed in chapter 6. The sterilised women appear to marry (mean 20.6 years) and have their first child (22.6 years) earlier than their matches (21.4 years and 23.4 years respectively) and to be more often responsible for the couple's family planning. In the sterilised group, 33 (9.5%) had married more than once, compared with 16 (4.61%) of the matches ($p < 0.05$). Eleven (11.3%) of the termination and puerperal group were divorced or separated compared with four (4.1%) of their matches. They were more likely to have taken psychotropic drugs and to have attempted suicide and less likely to have religious belief or to have attended secondary education. The prevalence of menstrual problems was significantly higher in the sterilised after operation (44.8%) than in matches (18.8%) as was the prevalence of sexual problems (23.9% and 9.6% respectively).

Interviews (Chapter 7).

The outcome of sterilisation is examined in chapter 7 and is discussed broadly under the headings:-

(1) Regrets

(2) Changes after Sterilisation.

Three hundred and sixty-eight of the sterilised women were interviewed to assess how they felt about the choice they had made and in particular to examine the circumstances of those regretting the operation, with a view to improving the future management of patients coming for advice about sterilisation.

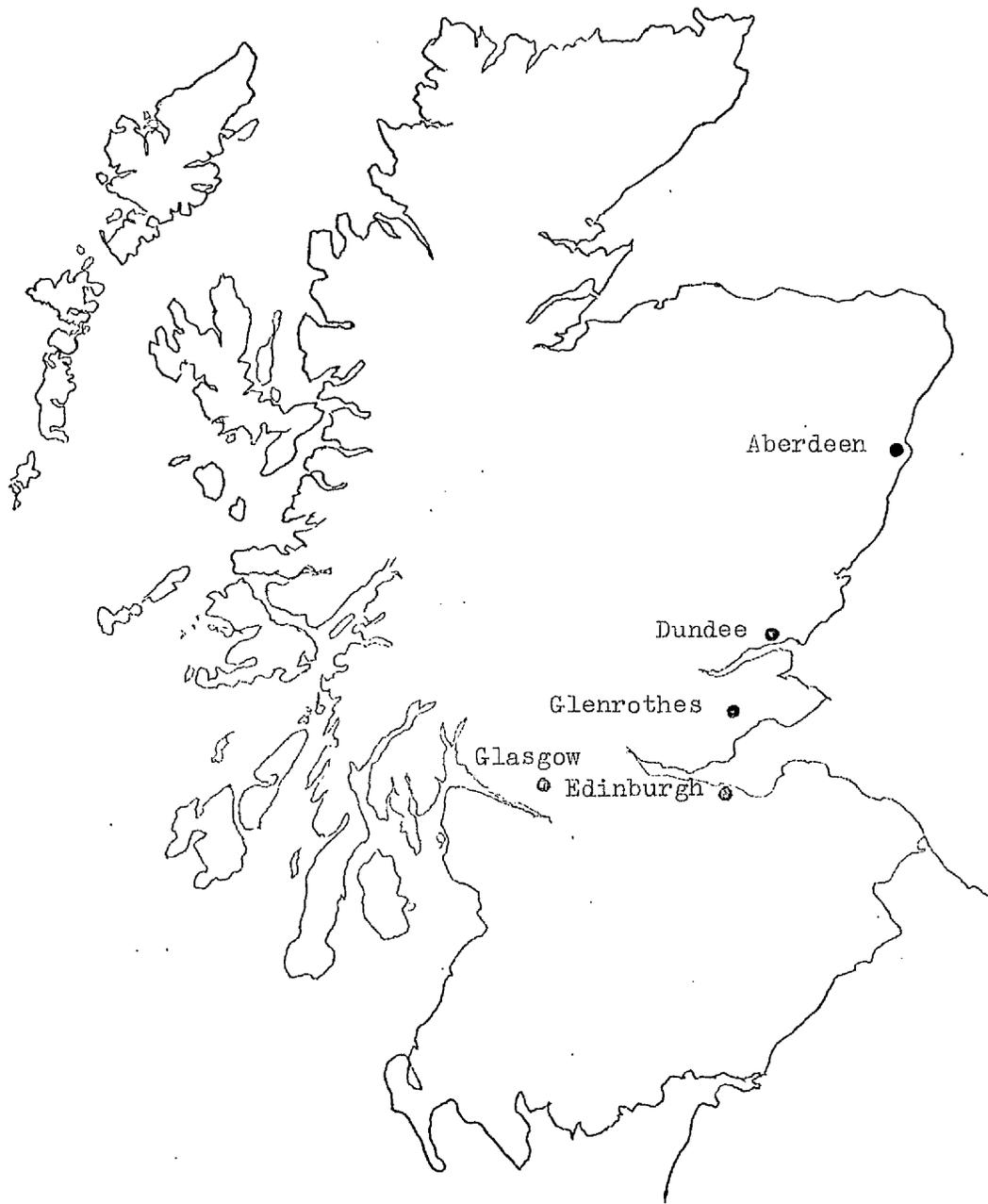
Two hundred and ninety-two (79.3%) were pleased with the operation and 76 (20.7%) expressed regrets, though more than half of these (56.6%) said they would have the operation again in the same circumstances. Sixty (20.6%) of the group without regrets were under thirty years at the time of operation compared with 38 (50.0%) of the regretful group ($p < 0.001$).

The regretful women were also more likely to have "clinical" indications for operation, to have major contraceptive problems before operation, to have a history of attempted suicide and less likely to have discussed vasectomy. The main changes reported after sterilisation were a worsening in menstruation for 154 (42.2%) and improvement in sex life for 133 (36.2%) and family life for 137 (37.2%).

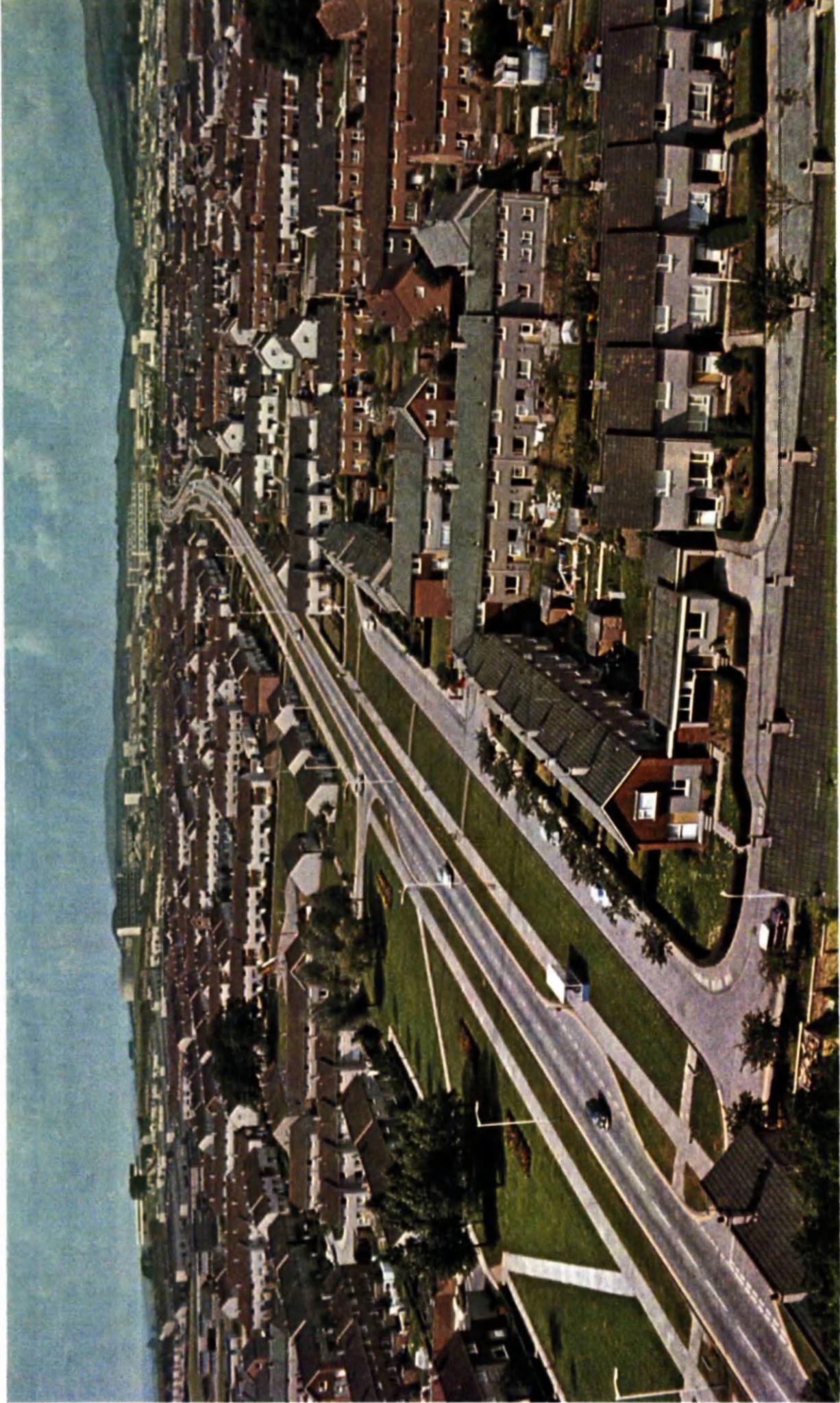
Conclusions (Chapter 8).

The final chapter comprises:-

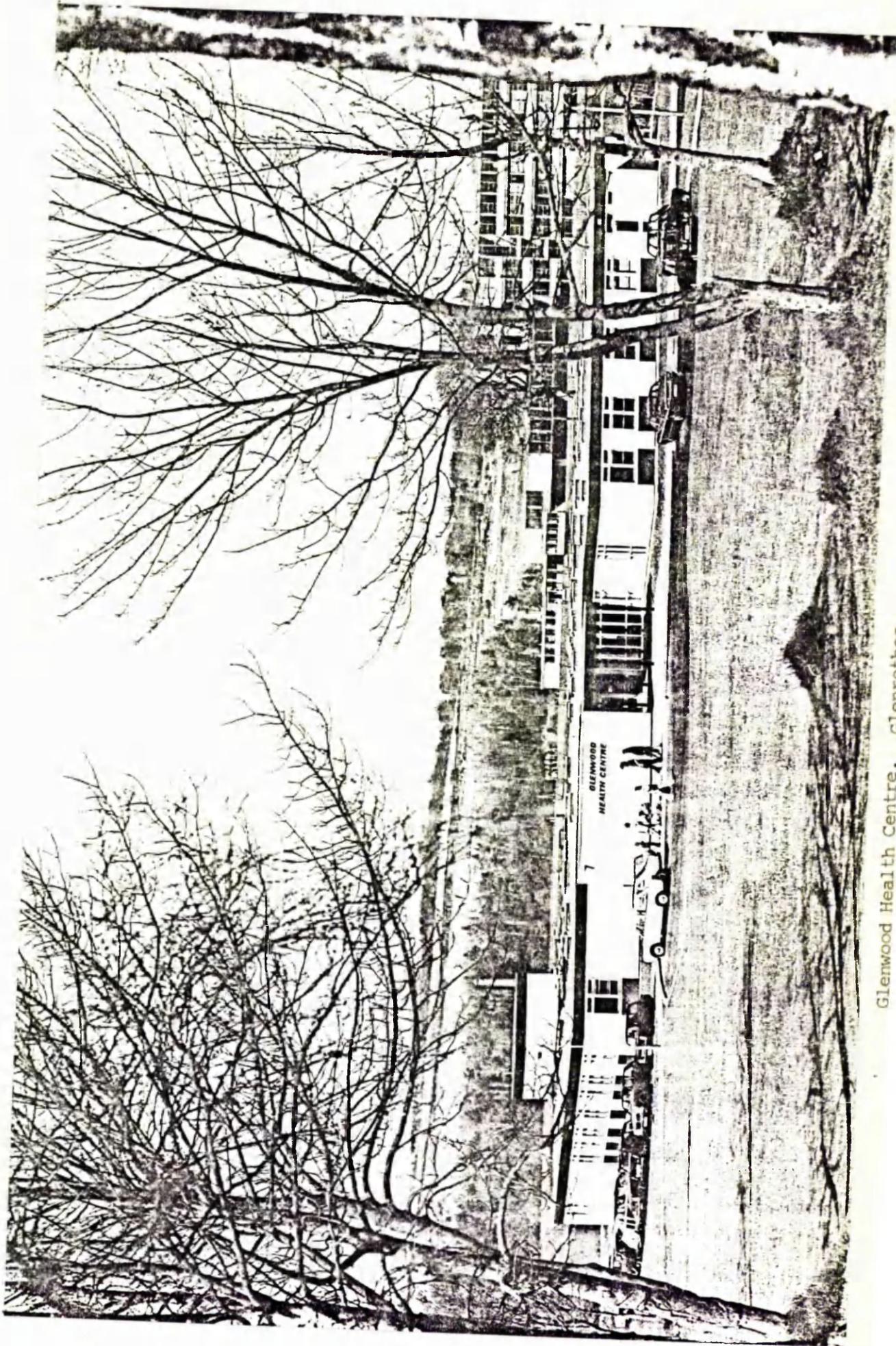
- (a) Critical review of the methods used with particular emphasis on the problems of validation and the choice of matches.
- (b) Commentary on the results in the context of other published work. This is followed by a suggestion how the work of the thesis might point the way to a prospective investigation of the possible association between tubal occlusion and menstrual disturbances.
- (c) Comment and suggestions on sterilisation counselling.
- (d) Clinical conclusions.
- (e) Personal conclusions.



SCOTLAND - SHOWING SITUATION OF GLENROTHES NEW TOWN.



VIEW OF GLENROTHES SHOWING PRACTICE AREA



Glenwood Health Centre, Glenrothes.

CHAPTER 1.INTRODUCTION.THE TOWN.

The groundwork for this study was carried out by me in my general practice in Glenrothes. The New Town, which lies between Edinburgh and Dundee, is set in a region which remains essentially rural and is close to the sea. There is great diversity of employment and local industries include paper making, whisky and engineering. Glenrothes is an international centre in the micro-electronics industry and is near the developing petro-chemical complexes on the Firth of Forth.

The New Town is built in precincts of one thousand houses, each with a primary school and a corner shop. Nearly all housing in Glenrothes is semi-detached or terraced, with gardens front and back and plenty of open space between. Apart from family homes, there is a special provision of bungalows for the elderly dispersed throughout the precincts. In addition there is sheltered housing and a residential home. A hospital is under construction, which will provide geriatric and some general practitioner beds. Acute hospital facilities are provided at Kirkcaldy, seven miles away, where there is also a maternity hospital with some general practitioner beds. The town has a technical college and good recreational, social and health facilities.

The population of the town is now about forty thousand and growing steadily. The townspeople come from all over Scotland with about ten per cent from the rest of the United Kingdom and a very small contingent (1.5%) from abroad.

THE PRACTICE.

The practice was set up "de novo" in 1959 and developed in a circumscribed area of the western segment of the New Town. A New Town is a planned development not only of housing but also of employment and social facilities. The circumstances and problems of practice are therefore not the same as when there is simple relocation of a population in a new housing scheme.

When a large proportion of a doctor's patients move from a decaying central urban area, to be re-located in a peripheral housing scheme, there is a tendency for a doctor to "follow" his patients. This may be by closing his central surgery and setting up practice in the new area, or by continuing to practise as before and setting up a branch surgery. Patients thus tend to retain the same family practice; urban transport links are used to keep the same employment and often to maintain family and other social connections.

This has not been my experience in Glenrothes. The New Town is neither a satellite nor a suburb. Even by 1976, only 19.8% of households had originated in Glenrothes or the surrounding villages (Glenrothes Development Corporation statistical survey, 1977, ref. 29). People moving to the town have generally had to find their work and recreation locally. Population growth has been comparatively slow, but steady, and new practices have corresponded to the geographical boundaries of/
of/

of the precincts. Thus practices are associated with particular areas of the town and the majority of patients in an area will be cared for by the same practice. Most of my patients live within walking distance of the Health Centre and home visiting, though important, occupies a relatively small portion of my working day.

The young doctor starting practice in the New Town has not fallen heir to the list of a colleague who is retiring, but tends himself to build up his list of "new" patients. Change is rapid and continuous. The doctor's patients find themselves in a new situation and, in this situation, may be less conservative in their expectations from medical care. For the doctor, the situation is one of challenge where there may be more opportunities for innovation than in a more traditional practice setting.

The practice work is based on a modern Health Centre and the medical staff of the group comprises four full-time male doctors, one woman doctor (part-time) and a trainee. The doctors are also involved in teaching final-year medical undergraduates from the University of Dundee. There is adequate receptionist and secretarial staff and a practice nurse. Close liason (but not attachment*) exists with district nurses and health visitors who are based at the Centre. Dental care for children, chiropody and physiotherapy facilities are available to patients.

* Attachment means that the nursing staff, although employed by the Health Board, owe their professional allegiance to the patients of the practice and not to a "District".

THE PRACTICE POPULATION.

The practice cares for over nine thousand patients. This total has remained fairly constant for several years, though there is a turnover of approximately eight per cent of this population each year.

The percentage age/sex distribution of practice patients is given in Fig. A1 and the age groups relevant to this study have been shaded. In New Towns, the younger age groups tend to be over represented in the population and the practice age/sex pyramid in 1966 (Fig. A2), showed the classical New Town pattern. At that time there was a very broad base of 32% of the practice under ten years of age, few teenagers, a substantial middle bulge representing young married couples and a very narrow apex accommodating the few old people on the practice list. The practice has, however, matured over nearly two decades and the distribution of age groups is steadily approaching that for the whole of Scotland. In 1976, females between 20 and 54 years represented 24.9% of the practice population and 21.9% of the whole population of Scotland. Table No. A1 shows a comparison of the relevant age group of women in the practice with that in Glenrothes town.

It was against this background that I observed the increasing numbers of sterilisation operations being performed on women in the practice.

AIMS.

I can recognise no single incident which led me to start this work. Interest came slowly from a number of small events in the course of daily contact with patients. There was the divorcee who wished reversal before her re-marriage and felt that, "Twenty-five is too young for sterilisation". Some women consulted because of heavy periods and "Felt better on the pill". Another patient became depressed after her termination/sterilisation as she wanted a girl. She felt that she had been, "Too young to be sterilised" (27 years) and that it was "Wrong to do two operations at the same time". These, and other unsatisfactory outcomes, emphasised to me some of the problems associated with female sterilisation. The rapid increase in demand for the operation highlighted deficiencies in my knowledge and in my techniques of counselling.

This thesis presents work carried out in a New Town general practice and is designed to:-

- (1) Calculate the incidence of, and classify the indications for female sterilisation in a general medical practice.
- (2) Assess outcome by interviewing patients.
- (3) Explore the clinical impression that sterilised women complain more frequently of gynaecological symptoms (especially menstrual problems) than do women who have not been sterilised.

Percentage Age-sex Distribution of

PRACTICE PATIENTS - December 1976.

Ages

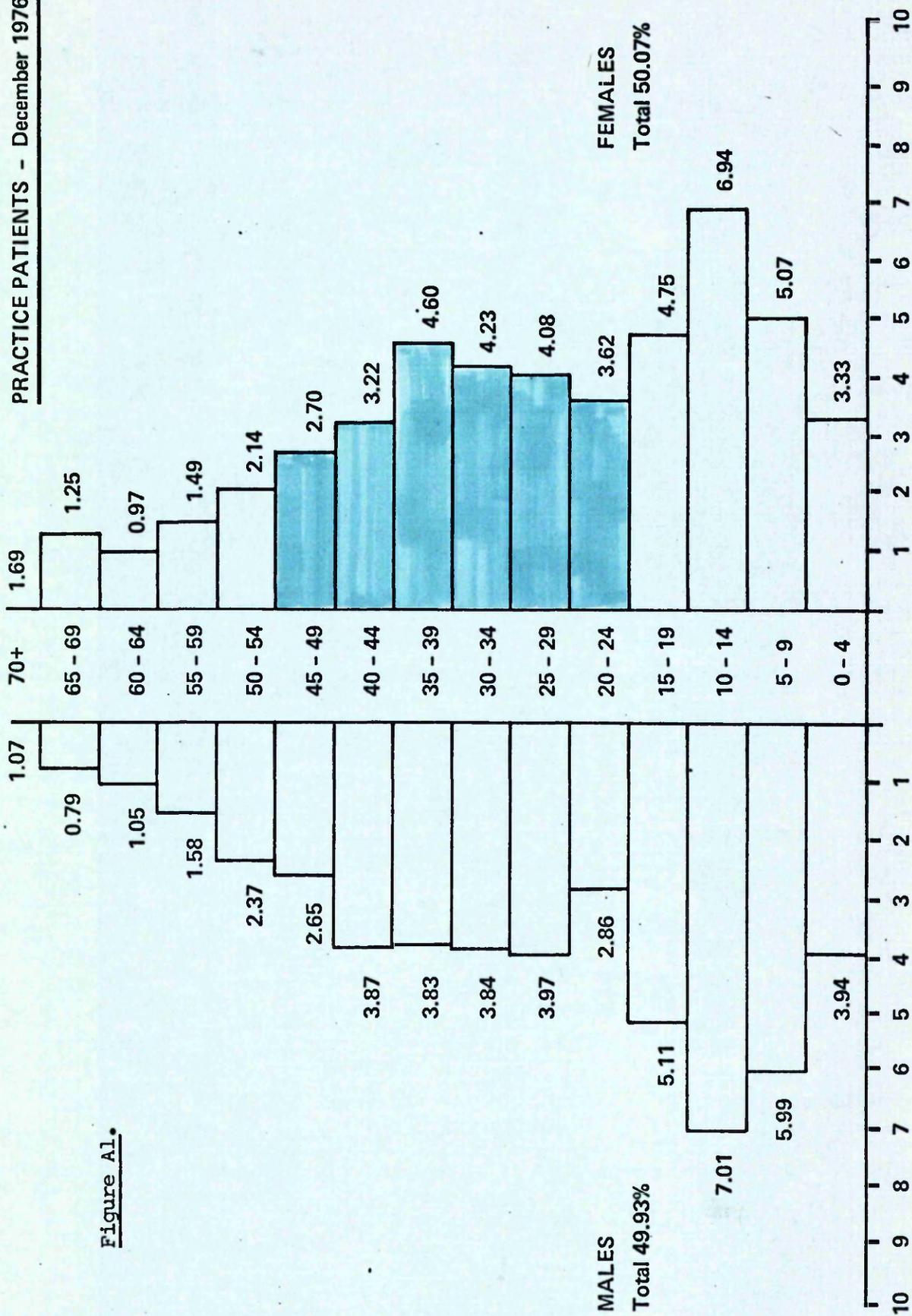


Figure A1.

PRACTICE AGE DISTRIBUTION

1966

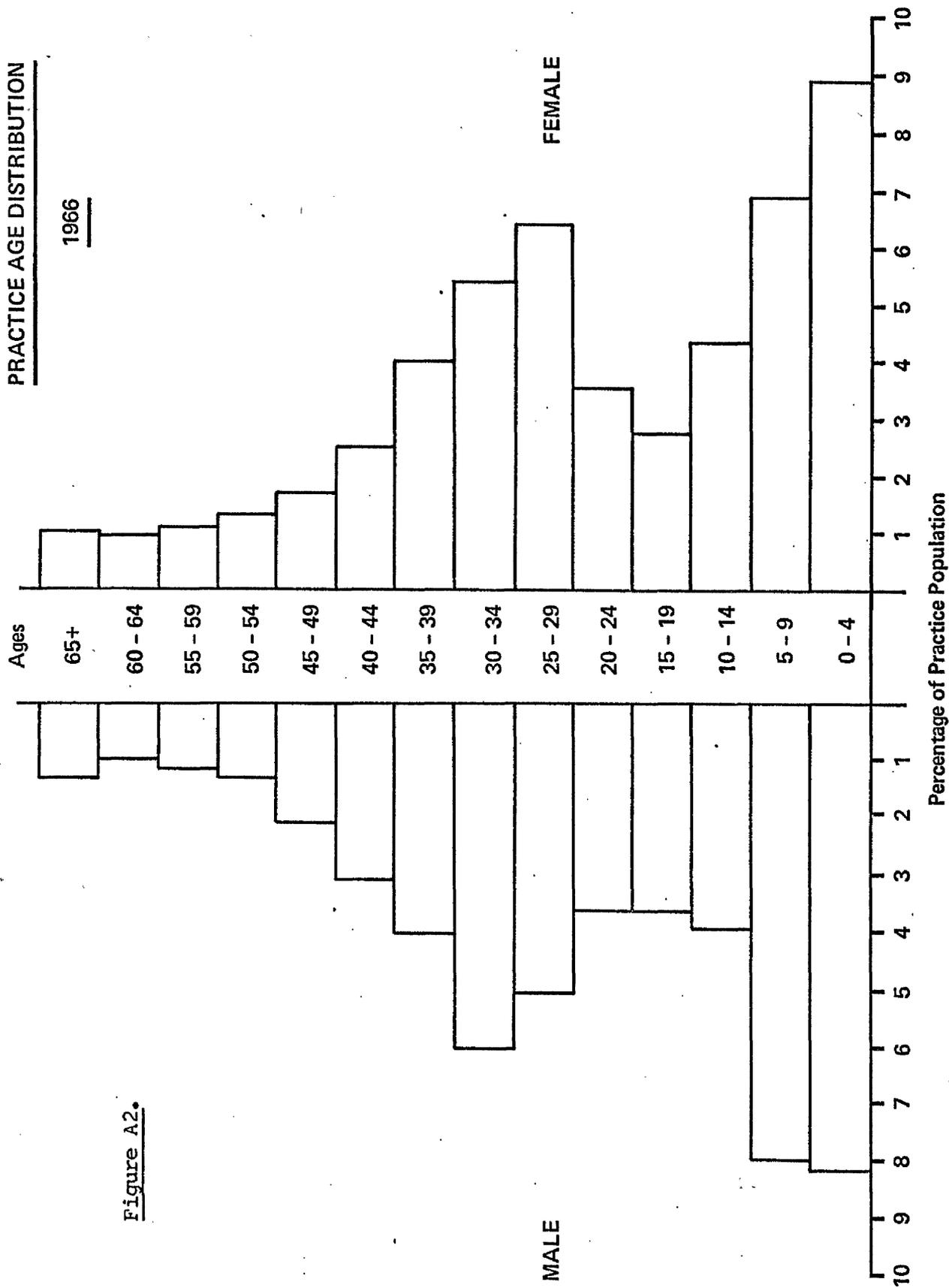


Figure A2.

MALE

FEMALE

Percentage of Practice Population

TABLE NO. A 1.

COMPARISON OF WOMEN IN THE PRACTICE WITH WOMEN IN
GLENROTHES TOWN (both December 1976).

Age Range & Group Mid-age	Glenrothes Town		Practice Population	
	Numbers	%	Numbers	%
50-54 (52yrs)	775	9.2	194	8.7
45-49 (47yrs)	910	10.7	245	11.0
40-44 (42yrs)	977	11.5	292	13.1
35-39 (37yrs)	1,112	13.1	417	18.7
30-34 (32yrs)	1,415	16.7	384	17.2
25-29 (27yrs)	1,651	19.4	370	16.6
20-24 (22yrs)	1,651	19.4	328	14.7
Totals	8,491	100	2,230	100

1. Figures for Glenrothes were taken from tables supplied by Glenrothes Development Corporation. The population coverage was 96.1% and the recorded totals were derived by applying the percentage breakdown to the known total.
2. Figures for the practice were taken from the age/sex register.

CHAPTER 2.

REVIEW OF THE LITERATURE.

The main points taken from the literature review in relation to this work are:-

- (1) Studies with low response rates bias results in favour of more satisfied women, leading to an underestimate of regret.

	<u>Regrets</u>	<u>Response</u>
Lu & Chun (1967)	1.3%	34%
Black & Sclare (1968)	4%	35%
Kopit & Barnes (1976)	15%	74%
Barglow & Eisner (1966)	15%	86%
Whitehouse (1969)	14%	86%
Present Study (1979)	21%	97%

- (2) Interval tubal sterilisation may be less likely to be associated with regret.

- (3) Women sterilised in their twenties may be more likely to have an unsatisfactory outcome, especially if they are of low parity or their marriage is in jeopardy.

INTERVAL - refers to elective operations unrelated to recent child-birth or therapeutic abortion.

TERMINATION - refers to sterilisation done at the same time as therapeutic abortion.

PUERPERAL - refers to sterilisation done within one month of delivery of a child.

- (4) Socio-economic indications for sterilisation may now be more important numerically than multiparity or obstetric or medical indications.

- (5) Sterilised women may complain more frequently of gynaecological symptoms (especially menstrual problems) than do women who have not been sterilised.

LIST OF PAPERS SURVEYED.

General & Psychiatric Studies from the 1960's.

- SCHWYHART & KUTNER - 1973. Critical review of 22 studies done between 1949 & 1969 to reanalyse female reactions to contraceptive sterilisation. 38
- BARNES & ZUSPAN - 1958. Review of sociological and psycho-sexual aspects of patient reaction to puerperal sterilisation. Interviews in patient's home by social worker. 42
- ADAMS - 1964. Report of 1,144 puerperal sterilisations and results of a questionnaire survey on the effects of sterilisation. 45
- NORRIS - 1964. Psychiatrists view of the effects of tubal ligation: Their implications for prediction. 48
- BARGLOW & EISNER - 1966. Classic evaluation of tubal ligation in Switzerland using psychiatric interviews and questionnaires with emphasis on emotional outcome. 50
- LU & CHUN - 1967. Long-term follow-up of 1,055 cases of post-partum tubal ligation from Hong Kong. 54
- THOMPSON & BAIRD - 1968. Follow-up of 186 sterilised women. 57

BLACK & SCLARE - 1968. Follow-up by a gynaecologist and a psychiatrist of 168 patients sterilised by tubal ligation. 59

WHITEHOUSE - 1969. Long-term follow-up of 95 women to investigate gynaecological effects and emotional outcome. 61

NEILL - 1969. Report of interviews of 100 sterilised women to assess patient reaction. 62

Laparoscopic Sterilisation.

STEPTOE - 1967. Textbook on laparoscopy in gynaecology. 63

STEPTOE - 1970. Report on 278 sterilised by laparoscopic diathermy. 63

THOMPSON & WHEELLESS - 1971. Retrospective series of 366 and prospective series of 300 laparoscopic sterilisations of which 479 were outpatient procedures. 64

General & Psychiatric Studies from the 1970's.

SIM, EMENS & JORDAN - 1973. Combined psychiatric/gynaecological study of 151 women followed-up 1-3 years after operation. 66

CAMPANELLA & WOLFF - 1975. 94 consecutive female patients who undersent sterilisation; interviewed before surgery and at scheduled intervals over a 2 year period. 67

- KHORANA & VYAS - 1975. Prospective investigation from India. 500 women and their husbands studied to assess psychological complications. 69
- ANSARI & FRANCIS - 1976. Prospective study of 49 sterilised females to determine psychiatric morbidity and factors associated with unhappy outcome. 70
- KOPIT & BARNES - 1976. 139 women interviewed to assess response to tubal division. 71
- WIG ET AL - 1977. Prospective study of psychiatric and gynaecological disturbances following tubal ligation from India. 73
- TEPER - 1977. A medical sociologist reviews broader ethical, medical and economic issues related to sterilisation. 74
- WHITELOW - 1979. 10-year gynaecological survey of 485 sterilisations to determine outcome and complications. 75
- CURTIS - 1979. Report by a general practitioner of 61 sterilised women and a control group from his practice. 77
- SMITH - 1979. Prospective study of 192 women on psychiatric aspects of sterilisation. 78

The Timing of Sterilisation.

MOWAT - 1974. Series of 75 women who had requested post-sterilisation. Discussion of delayed post-partum sterilisation and the importance of the timing of the operation. 80

EMENS & OLIVE - 1978. 85 women who had been sterilised at caesarean section compared with 151 who had interval sterilisation. Timing of sterilisation related to outcome and satisfaction with the operation. 82

CHENG ET AL - 1979. A large prospective controlled study from Singapore on sterilisation in relation to induced abortion. 84

Subsequent Pelvic Disease.

MULDOON - 1972. Follow-up of 374 women for at least 10 years after sterilisation to investigate the incidence of subsequent pelvic disease. 86

SCOTT - 1972. Letter to British Medical Journal commenting on Muldoon's paper. 87

ALDERMAN - 1972. Letter to British Medical Journal also commenting on Muldoon's findings. 88

Menstruation after Sterilisation.

- NEIL ET AL - 1975. Controlled study comparing a laparoscopic diathermy group and a tubal ligation group with 143 women whose husbands had had vasectomy. 90
- ALDERMAN - 1975. Letter to The Lancet commenting on the paper and Neil and his colleagues. 91
- CHAMBERLAIN & FOULKES - 1976. Follow-up of 324 patients who had laparoscopic sterilisation and 78 who had tubal ligation. Links post-operative menstrual disturbance to withdrawal of oral contraception. 92
- KASONDE & BONNAR - 1976. Measurements of blood loss before and after sterilisation to assess the effect of tubal ligation on menstrual function. 96
- RADWANSKA ET AL - 1979. Study of progesterone levels suggesting infertility after tubal reconstruction may be due to deficiency of ovarian hormone. 99
- LIEBERMAN ET AL - 1978. Prospective study of menstrual patterns before and after spring-clip sterilisation. 101
- EDGERTON - 1978. One surgeon compares personal series of 495 coagulation/division operations with personal series of 517 coagulation/resection technique. 104

POMA - 1980. Compares hospital admission experience of 514 sterilised women with 514 controls matched for age, parity and relevant demographic features. 106

Sterilisation Failure & Tubal Pregnancy.

CHAKRAVARTI & SHARDLOW - 1975. Clinical presentation and diagnostic difficulties in 12 cases of post-sterilisation tubal pregnancy. 108

CHENG ET AL - 1977. Investigation in Singapore of 10,174 female sterilisations to estimate pregnancy rates following different techniques. 110

HUGHES - 1980. Retrospective review of 24 cases of ectopic pregnancy after sterilisation. 112

HUGHES - 1977. Survey of 77 sterilised patients who later became pregnant. 113

Sterilisation Reversal.

WINSTON - 1977. Review of 103 women requesting reversal of sterilisation. 115

THOMSON & TEMPLETON - 1978. Study of 36 patients who requested sterilisation reversal. 116

- ALDERMAN - 1977. Letter to British Medical Journal
commenting on Winston's paper. 118
- DUBUISSON ET AL - 1980. Study from France of 46
patients requesting sterilisation reversal. 119

General & Psychiatric Studies from the 1960's.

Schwyhart & Kutner (1973, ref.60) in their "A Reanalysis of Female Reactions to Contraceptive Sterilisation", carried out a critical review of 22 studies done between 1949 and 1969, of women having tubal ligations. The authors present two tables which classify and compare first, fourteen sterilisation studies where the predominant indication was "contraception", (i.e., non-medical) and second, eight studies where the predominant indication was medical. The tabulations give detailed comparative data on the sample size, the percentage attrition, the average age at operation, average live children and the proportion of "contraceptive" to "medical" indications. Response rates are given together with the range of post-operative follow-up times. Results are compared in terms of percentage regrets, lower libido, menstrual problems and marital problems.

Studies with high attrition rates (low proportion of identified cases interviewed) showed a response bias in favour of more satisfied patients. Among the papers cited are, for example, the studies, from Switzerland, of Barglow & Eisner (1966, ref. 9). One is of 833 patients using a questionnaire and it quotes 4% regrets and 35% attrition. The other similar study of 162 patients using interview shows 15% regrets and 14% attrition. The trend is very clear in the studies analysed and leads to "the conclusion that the prevalence of regret over sterilisation had been underestimated." The authors postulate a real/

real prevalence, possibly as high as 25%, "which presents a clinical and social problem requiring extensive research". Problems encountered in comparing studies arose from lack of comparability due to the use of different criteria, evaluation techniques, types of patients and time intervals after sterilisation. There were no objective test data and the studies were often confounded by simultaneous therapeutic abortions or failure to separate hysterectomies from tubal ligations.

To ease difficulties from methodological problems of design and measurement, "future research, say the authors, "should attempt to exclude patients with concomitant abortions, psychopathology, hysterectomy, or who are over the age of forty-five. Objective psychological measurement and ratings of adjustment by spouse or physician should supplement patient report of regret as outcome criteria. Control groups of patients using other method of contraception should be included."

In addition to improving methodology, future research should "try to determine the true prevalence of adverse reaction to sterilisation, should compare couples switching from one method of birth control to another and should investigate the processes involved in deciding to seek sterilisation and in adjusting to it afterwards."

The reasons given by women dissatisfied with the operation were used to suggest contra-indications. These reasons include:-

- (1) unsatisfied maternal feelings;
- (2) moral or religious guilt;
- (3) physical problem;
- (4) marital problems, sometimes from change of mate;
- (5) psychological problems such as depression and feeling of inferiority from impaired body integrity.

Other contra-indications mentioned were sterilising women under thirty years, less than three living children, emotional instability, unhappy marriage, strong religious conviction, pressure from family or the physician or social authorities, misconceptions about the operation and insufficient time to make a stable decision.

In the papers studied, psychological measurement had been largely limited to self-report by the women of:-

- (1) regret or dissatisfaction (ranging from 1-18%),
- (2) lower libido or worse sexual adjustment (ranging from 2-25%),
- (3) menstrual problems (ranging from 7-45%).

The studies reviewed were similar in terms of patient age and parity, indications, measures and results. Notable differences in sampling and design were present.

Schwyhart & Kutner also analyse in this paper six studies of male reaction to vasectomy, including one study of female reaction to vasectomy. This review is comprehensive and reflects the psychological approach and interest of its authors. It is a scholarly work giving a balanced critical assessment and an extensive list of references to work done up to 1969.

Barnes & Zuspan (1958, ref. 10) survey the sociological and psychosexual aspects of patient reaction to puerperal surgical sterilisation. Early puerperal tubal ligation had been suggested in 1932 by Skajaa (ref. 64) and had been introduced into the U.S.A. by Adair & Brown (1939, ref. 1) before the second World War. The authors point out that a consideration only of the failure rate ignores the fate of "successful cases". "It is well for the obstetrician-gynaecologist to recognise the impact on the total emotional life of his patient and her family of the operation he performs".

The records of 457 women who had puerperal bilateral partial salpingectomy between 1952 and 1955 were examined and a trained social worker was engaged to contact the patients individually. This reliance on personal interview was an important departure from previous post-operative follow-up surveys based on written questionnaires. Interviews were carried out in the patient's home and 54% of private patients and 76% of "staff" patients were contacted, a total of 311 patients. The mean operation/interview interval was two and a half years.

The reasons for non-interview of the remaining 146 patients is discussed, and the authors admit "it is probably safe to assume that the majority had some degree of negative reaction to the procedure". At each interview various questions were re-phrased and repeated to check the validity of answers. The answers were not recorded in the presence of the patient, presumably accepting any bias due to forgetfulness in order to establish good rapport.

Most of the private patients were white and living in good housing, whereas most "staff" patients were negro and 30% lived in "crowded conditions in slum areas". However, the racial distribution, age and parity of the non-interviewed, "agreed with these same factors among the interviewed".

Indications are divided into three groups: organic medical, previous caesarean section or "multiparity". Each patient was asked if she "would have the operation repeated" and whether she "regretted the change in her reproductive status". These questions are not identical since "many women regret the finality of the procedure the minute it is over, but still, recalling their condition at the time of operation, might vote for its repetition".

Fifty six per cent of private and 68% "staff" patients expressed satisfaction with the operation and would, without qualification, have the operation again under the same circumstances. Ten per cent of both groups would definitely not have the operation again.

Relating dissatisfaction with indication for operation produced interesting contrasts. Of the caesarean section group (n = 65) 13.5% regretted operation compared with only 1.7% of the "parity" (n = 180) group and 3% of the group with organic illness (n = 66), though 30% of these were ambivalent. The authors conclude, from interviews, that the high percentage of ambivalent response/

response in those with organic disease is due to a desire for more children coupled with an awareness of the symptoms of their illness and the realisation of the dangers of a pregnancy. The post-caesarean patients were symptom free and felt that they had been "talked into" the operation. Dissatisfaction was sharpened by the fact that 7% of babies born at the time of sterilisation had subsequently died.

This paper is significant in that it reports the results of individual interviews in the patient's home. It reports the lowest expression of regret among women who themselves chose sterilisation on the basis of parity alone. Most regretful patients were found among those advised sterilisation for medical reasons especially post-caesarean section patients who were symptom free.

Adams (1964, ref. 2) reports, from the U.S.A., the review of 1,144 post-partum sterilisations done in one hospital (Wilcox Memorial) over nine years. He notes a "gradual but constant increase in the sterilisation rate" from 4.2% to 6.8% of all women delivered. Comment is made on "the progressive increase in socio-economic indications and the decrease in both the medical and repeat section indications". This "laudible" increase in the proportion of cases labelled "socioeconomic indications" he attributes to "a more honest appraisal of the 'true situation' and a reduced tendency to make a 'quasi-medical situation' serve as an indication for sterilisation". This comment, which I accept as valid, highlights the need to examine critically the published "indications" for sterilisation in the light of the prevailing moral and social attitudes. This seems to me particularly so when psychiatric indications are given, and especially when sterilisation is combined with therapeutic termination. It seems possible that a "quasi-medical situation" may on occasions be engineered by the referral of an emotionally distressed patient to a psychiatrist, even when no frank mental illness is thought to exist.

The second part of this paper reports the results of a questionnaire survey on the effects of sterilisation. Two hundred and sixty three women sterilised between 1954 and 1956 were sent questionnaires and 173 (68%) replies were received. Three years later a similar questionnaire was sent to the 173 respondents, of whom 107 (62%) replied a second time. The author reports/

reports on the findings of these questionnaire surveys and compares his results with several contemporary papers.

The replies received show little difference between the first questionnaire and the second. "Maternal health" and "sexual enjoyment" are reported better by 27% and 44% of patients respectively from the first questionnaire; the second yielded 23% and 41% respectively. Worse "maternal health" and "sexual enjoyment" were reported by only 1.2% and 3.5% respectively from the first questionnaire and by similar percentages from the second.

The relatively low response rate, the lack of interview validation and the general nature of the questions may have led to an underestimate of unfavourable outcome. Similarly, five patients (2.9%) "sorry" about their sterilisation from the first questionnaire and one (0.6%) at the second, is lower than all other contemporary papers quoted and much lower than Barnes & Zuspan (1958, ref. 10) who quote 9.5%.

Under "changes in menstrual periods following sterilisation", Adams reports, "more profuse" periods in 27.8% and "less profuse" in 14.1% from the first questionnaire and 24% and 20% respectively from the second. This suggests a clear tendency to heavier periods after sterilisation with this effect diminishing as time goes on.

This paper is noteworthy for an early observation of the progressive increase in numbers of women being sterilised and the increasing relative importance of socioeconomic indications. The data on outcome should be interpreted with caution, especially the very low reported prevalence of regret after sterilisation.

Norris (1964, ref. 51) from Iowa State University gives a psychiatrist's view in "An examination of the effects of tubal ligation: Their implications for prediction". As the author admits, "this is a preliminary report and the sample is small" but his approach is interesting and his presentation of "factors existing prior to operation" and "factors following operation" is helpful.

The paper begins with a comment on legal and moral considerations and attitudes. "As might be expected, the physician's attitude is conditioned not so much by his medical training as by his own religious background". These considerations aside, the doctor "wants to know whether the procedure will produce a happier patient or will she return in a few months or years feeling that it was a mistake and wanting 'something done'".

Of 150 questionnaires sent out, 88 were completed representing 59% of the whole sample, but 79% of all questionnaires which reached their destination after excluding those returned "address unknown". The "largest factor that distinguished between the nonparticipating and the respondent groups is the longer follow-up time".

Replies from the 88 respondents showed 73.9% had no regrets, 17% had occasional regrets but were happy with the sterilisation and 9.1% often regretted the procedure and all but one of these patients would have had a reversal operation had this been possible.

The three groups were compared in various ways to see if there were any identifying characteristics that differentiated them besides the degree of satisfaction with sterilization. The important differences were first summarised under the heading "factors existing prior to operation". Regret was more common in Catholics, those under 30 years at the time of operation and in indigent patients.

Under "factors following operation" the authors point out "since these responses are retrospective, they can mean that the sterilization produced these effects or that sterilization is regretted by people who already have problems. We feel the latter is more accurate". "Decline in health after surgery" was commoner in those who often regretted sterilisation as were disturbances in the menses. Only 12.5% of those who often regret the sterilisation reported their marriage better, whereas 62.5% stated that their marriage was worse. "Unhappiness about sterilization is also associated with sexual difficulties..... The most pronounced difference is in the divorce and separation rate". Seventy-five per cent of the "often regret" group had been divorced or separated since the sterilisation, whereas only 6% of those expressing no regret had parted.

Statements from those whose marriage had broken up "suggest that marital difficulties preceded sterilization and sterilization itself was often an effort to solve marital problems". "The actual regret appears to have followed the break-up of the marriage and the beginning of a new relationship with the wish to have the new husband's children".

In their classic, "An Evaluation of Tubal Ligation in Switzerland", Barglow & Eisner (1966, ref. 9) comment on the "Marked disagreement among various authors about the statistical incidence of poor emotional outcome of tubal ligation". They give three reasons to account for this:-

1. Several quite different evaluation techniques have been used and evaluation has been done at various time intervals following surgery.
2. Different criteria of "good" and "bad" outcome have been used and relatively objective medical evidence has not been distinguished from relatively subjective results using psychiatric data.
3. The characteristics of the patients sampled have differed widely between studies.

The authors attempted "To isolate the tubal ligation variable, and to make observations of a relatively homogeneous sample, which we hope can serve as a standard control group for further studies". Major evaluations of tubal ligation had been done in Switzerland as early as 1928 (Milt, ref.43) and the operation had been performed for decades and studied intensively. The Swiss women were also considered to be " 'tradition directed' and come from a fairly uniform culture that emphasises individual social responsibility, careful planning, and family stability". The authors "used both psychiatric interviews and questionnaires to evaluate tubal ligation". "All patients/

patients with caesarean deliveries or abortions immediately preceding sterilisation were eliminated from the study".

Psychiatric interviews were done with 162 patients all residing in Zurich and who had been sterilised at the Canton Hospital. Of the patients sterilised five years previously 93% responded; whereas only 65% of a sample of women sterilised in the previous year decided to take part. This was attributed, by the authors, to difficulties in finding someone to care for the infant.

Interviews were also conducted with 24 randomly selected women of comparable age and parity who had chosen not to have tubal ligation during 1957/58 and 1962/63. No important personality differences were found between the interviewed women who had had tubal ligation and those who chose not to have one.

The questionnaire survey was conducted on women who had had a post-partum tubal ligation in the Zurich Canton Hospital during the years 1956/61. Eight hundred and thirty three (64.5%) completed questionnaires were returned and this included patients who had been contacted previously in connection with the psychiatric interviews. The 833 patients were found to be representative of all the patients who had a tubal ligation during the six year period as far as age, number of living children, and indications were concerned.

Under "Indications"; the authors comment, "It is interesting to note that 95% of patients psychiatrically interviewed had not expected or desired the pregnancy that preceded the tubal ligation", and "the only exceptions were the few patients who had clear cut medical indications for tubal ligation".

The authors continue by defining their criteria for success of the sterilisation operation evaluated by the psychiatric interviews. On this basis an "excellent" outcome was achieved in 54.3% of patients while 30.9% were rated "good" and 14.8% "poor". Similarly the questionnaire group were rated "satisfied" 94%, "satisfaction uncertain" 1.7%, "dissatisfied" 4.2%. It should be noted that detailed psychiatric interview yielded 14.8% "poor" outcome while questionnaire inquiry showed only 4.2% "dissatisfied". The authors comment on the "high incidence (42%) of serious psycho-pathology in the "poor" group" and give this as an explanation for the "surprisingly large" number of patients in the "poor" group. They go on to discuss their assessment of the psychic mechanisms involved in patient response.

Sixty one per cent of the questionnaire patients had symptoms which they related to tubal ligation though the list includes such unlikely symptoms as "weight gain" and "early menopause". It is interesting that "presumptive evidence was found in the psychiatric interviews for a possible organic basis of some pelvic pain symptoms following tubal ligation". Two hundred and fifty two (30%) of the questionnaire patients reported new symptoms of menstrual disorders.

On the basis of questionnaire results, "no statistically significant relationships were found to exist between variables of age at the time of sterilisation, number of living children, indications for surgery, religious affiliation, and the outcome of tubal ligation".

This painstaking study of Barglow & Eisner provided important data from a relatively large group of patients and was a valuable evaluation of the long term outcome of post-partum tubal ligation in a developed country in the late fifties and early sixties.

Lu & Chun (1967, ref. 42), from Hong Kong, report a long-term follow-up of 1,055 cases of postpartum tubal ligation in a paper which witnesses considerable dedication and industry. In the 1960's, in the densely populated Crown Colony "surgical sterilization is the method of choice for permanent contraception" but "there is a solid core of patients who refuse sterilization because of the lay belief that it will lead to permanent physical or mental damage and disruption in the sexual, psychological and menstrual functions". This study was undertaken in 1965 from a 232 bed maternity hospital which served "mainly the poorer class of patients".

Of 5,968 patients sterilised between 1957 and 1962, many could not be traced because of widespread demolitions and "some patients lived in squatter areas with un-numbered huts and some in un-numbered boats". Letters were sent to 3,092 patients of whom 1,055 (34%) responded. Each patient was interviewed by one of the authors, who carried out a general, abdominal and pelvic examination including exfoliative cytology.

"Grand multiparity was the commonest indication for postpartum sterilization; 973 (93.2%) of the 1,055 patients had five or more children". One hundred and one patients had obstetric indications and 50 patients were sterilised on medical grounds. "Socio-economic reason per se was not an indication for sterilization" and patients with socio-economic reasons alone were referred to the family planning clinic for "temporary contraceptive measures". /

measures". Tubal sterilisation was done in most cases on the second or third day after vaginal delivery or at caesarean section using Pomeroy's technique.

Though every patient was weighed at the follow-up clinic and the weight compared with that recorded at the post-natal visit, only 516 patients had attended the post-natal clinic and had recorded post-natal weights. Of these, only 25 patients (4.8%) showed a marked change in weight thus tending to disprove the "lay belief that sterilization leads to adiposity".

Cervical smears were taken in all patients (1,052) except three who had hysterectomy prior to interview. In six patients (0.6%) intra-epithelial carcinoma of the cervix was diagnosed. This represents an incidence of 5.7 per 1,000 and "is not different from that among well women and gynaecological patients in general".

"Some menstrual changes were noted in 546 patients (51.8%) either in length of cycle, duration of flow or amount of loss" three to eight years after puerperal sterilisation. These changes were mostly "of mild degree" and hysterectomy for menorrhagia was required in only four patients. "Secondary dysmenorrhoea occurring only after sterilization was experienced by 177 patients (16.8%)".

"Every patient was asked whether she was happy to have/

to have had the sterilization. The great majority, 1,041 patients (98.7%), were glad they had the operation". All patients were asked, "Do you want your sterilization undone?" and 1,054 of the 1,055 patients said "no".

The authors conclude that their findings "do not confirm many widely-held beliefs on the after-effects of postpartum sterilization" and while this is so, they refer to a population of "poorer class" Chinese patients and are not necessarily applicable in a European context. The investigation was undertaken specifically to refute lay beliefs of the harmful effects of sterilisation.

The findings on menstrual changes are often quoted to support the view that sterilisation does not alter menstrual patterns but they cannot be accepted uncritically. The results are reported in a rather non-specific way, terms are not defined, and no controls were available. Likewise, interpretation of a satisfaction rate of 98.7% must take account of the relatively unsophisticated and uncomplaining population and the very low response rate of 34%.

In this country, a liberal policy towards sterilisation had been pioneered in Aberdeen and the "Follow-up of 186 Sterilised Women", by Thompson & Baird (1968, ref. 70) is of particular interest. The follow-up was not systematic and the population consisted of five heterogeneous groups of patients who had attended various clinics in the city and had been sterilised between 1948-1960. The interviews were by medical social workers or by a cytologist at a screening clinic. Some patients were interviewed at the clinic and some visited at home. The group included 49 sterilised at termination, 24 at caesarean section and 102 within a few days of delivery. Eleven women were re-admitted specifically for tubal ligation. The indications were mainly "medical" and in many cases, "debility and multiparity" was an important factor. Of the 186 women, eight regretted being sterilised and in contrast 15 regretted not being sterilised earlier.

While a milestone at its time, the paper has been superseded and can be criticised on the grounds that it is not known how far these heterogeneous groups are representative of sterilised women in Aberdeen. The study population is relatively small, mixed and includes sterilisations done in association with termination of pregnancy (mostly by hysterectomy), after caesarean section or after vaginal delivery. No control group was available and "contraceptive" (non-medical) sterilisation is not considered.

The conclusion that there was least satisfaction when the indications were medical is borne out by later papers, but not the conclusion that the age at sterilisation is unimportant in reactions. The authors found it "difficult to assess the significance of some of the (gynaecological) complaints" but found "that sterilisation was unrelated to the majority of post-operative gynaecological complaints". The contrary view is expressed in some later papers and in this present study it will be shown that the prevalence of menstrual problems was significantly higher in the sterilised after operation than in matches.

The follow-up study by Black & Sclare (1968, ref. 12) in Glasgow gave data on 480 patients sterilised by tubal ligation. "Eighty sterilizations were carried out at the time of Caesarean section (Section Group), 200 were performed within a few days of delivery (Postpartum Group), and 200 three months or more after confinement (Interval Group). There was no record of a pregnancy following sterilization". Post-operative complications were most frequent in the Caesarean section group (40%), less in the Postpartum group (22.5%) and least in the Interval group (7%). One hundred and sixty eight of these patients were assessed one to five years after operation by a gynaecologist and a psychiatrist.

Gynaecological follow-up assessment was thorough in the sample of 168 patients which was "statistically comparable with the total 480 patients". However, no comparison group was available to give substance to the conclusion that "The incidental gynaecological problems at late follow-up examination were those to be expected in patients of this age and parity, and there was no evidence that sterilization was followed by an increased incidence of gynaecological problems such as menstrual upsets".

Retrospective comparisons were made of mental status, marital adjustment, psycho-sexual adjustment and economic adjustment before and after operation. Thirty seven patients (22%) had psychiatric disorder some time before being sterilised, but in only two patients was psychiatric disorder given as indication for sterilisation./

sterilisation. Those with antecedent psychiatric disorders benefited less than the others from sterilisation and "sterilisation can be expected to improve socio-economic functioning but has little influence on any basic psychiatric problem". Late guilt or regret was found in only 3.6% of patients interviewed. This should be viewed in the light of Schwyhart & Kutner's observations (1973) on high attrition as only 168 of 480 patients were interviewed.

Like Thompson & Baird, Black & Sclare found no evidence that sterilisation was followed by an increased incidence of gynaecological problems. Unlike Thompson & Baird, they felt that sterilisation should not be advocated for younger patients, especially if they are of low parity or have a chronic neurosis. It is interesting that Black & Sclare comment on Steptoe's "laparoscopic technique for sterilization" and predict that "this may be the method of choice in the future".

Two papers appearing in 1969 are worthy of mention. Both deal with the outcome of sterilisation. Firstly, "Tubal Ligation. A Follow-up Study", by D. B. Whitehouse, (ref. 73). His object was to investigate the long-term effects of sterilisation of women (a) on their health, (b) their sex life and marital happiness and (c) to discover if they regretted the operation. He reviewed the cases of all women sterilised at the Wrexham Hospitals over the five year period 1961-65. Ninety-five were interviewed out of 110 patients identified. When patients were asked their reaction to the operation, thirteen (14%) had regrets and six (6.2%) would have liked reversal. This relatively high proportion of regrets associated with a relatively low attrition rate may be significant.

In the majority of women the long term effects appeared to be favourable but in a significant minority they were not. A high proportion (45.2%) developed functional menstrual disturbances of varying degree, leading in six patients (6.3%) to hysterectomy. Most marriages improved because of the removal of fear of pregnancy, but again in a significant minority sterilisation appeared to have an adverse effect. Some women became sexually frigid after sterilisation while others seemed less sexually attractive to their husbands. "These factors undoubtedly contributed to the breakdown of the marriage", though there may have been discord prior to the operation. Patients invariably blamed the operation for the deterioration.

Joyce G. Neill (ref. 48) in Belfast in 1969 interviewed 100 patients out of 130 who were written to. Her primary interest was not gynaecological but in patient reaction to sterilisation. Ninety-three of the 100 patients were pleased with the sterilisation, four regretted the operation and three were ambivalent. Sixteen patients had post-operative complications, including four who developed deep vein thrombosis. Only thirteen patients initiated the idea of sterilisation themselves, which is in marked contrast to the findings of studies ten years later.

Patients were questioned about any changes in personal and family health and in sex relations. General health was thought better by 36 patients and worse by seven. Sexual relations were thought improved by 40 and worse by 16. None of the women thought their family situation any worse, while 20 patients thought it had improved and some volunteered how much more patience they had with their children. Changes in menstruation were not great. Seventy per cent noted no change in menstrual frequency, regularity or pain. Loss was increased in 33 and decreased in 15 patients.

In the discussion, Neill records her impression that interval tubal ligations may be less likely to cause regrets, though it may be more convenient to do the operation in the puerperum. The numbers in this series were insufficient to substantiate this impression which nevertheless has received support in later papers.

Laparoscopic Sterilisation.

Steptoe, in his book "Laparoscopy in Gynaecology" (1967, ref. 67) illustrates the use in gynaecological endoscopy of this novel instrument made practicable by the introduction of the fibre-glass bundle into optical equipment in 1964. The laparoscope dispenses with the vulnerable electrical connections and heat producing lamps of earlier equipment. In Great Britain, the abdominal approach (laparoscopy) has been preferred, while in the U.S.A., the vaginal route (culdoscopy) has been widely used though laparoscopy is increasingly favoured.

The introduction of laparoscopic sterilisation techniques, which shorten operating times and hospital stays and can be used on outpatients (Thompson & Wheelless, 1971, ref. 71) has been the keystone in recent surgical advances in the control of fertility.

In his paper, "Recent advances in surgical methods of control of fertility and infertility", Steptoe (1970, ref. 68) reports a follow-up study of a large number of women sterilised by laparoscopic diathermy. A postal questionnaire was sent to 350 of his patients who "had been sterilised for twelve months or longer" and replies were received from 278 (79%). There were no uterine pregnancies and one ectopic pregnancy (0.2%).

Ninety eight per cent were "pleased" to have been sterilised and 93% said that their husbands were pleased. Heavier periods were reported by 33% of the women. Thirty per cent of patients had intercourse more often and 15% less often; intercourse was more enjoyable for 57% and less for 14%.

Thompson & Wheelless (1971, ref. 71) have reported from Baltimore their series of 666 laparoscopic sterilisations of which 479 (72%) were outpatient procedures. Two groups of patients were studied; a retrospective group of 366 and an additional group of 300 patients who were interviewed by one of the authors prior to the operation.

The surgical technique used involved, "using the cutting current of the surgical coagulation unit and excising a portion of the tube". Previous abdominal surgery had been done on 17.6% of patients but no patient was denied sterilisation by laparoscopy because of previous surgery or obesity.

The number of outpatient and inpatient cases was tabulated separately for the retrospective and the prospective groups. In the prospective group it was possible to evaluate all patients who had originally planned to have the outpatient procedure but were then admitted after operation. In the prospective group of 300 patients, there were 231 outpatient procedures planned and six (2.6%) patients had to be admitted after operation.

In the earlier (retrospective) group, five patients were pregnant when the sterilisation was performed and at least 30% of all patients were not using any form of contraception. A "concerted effort to achieve good pre-operative contraception" was made with the later (prospective) group and none was pregnant at sterilisation. The authors suggest "that curettage on patients who/

who are not using reliable contraception be performed during the luteal phase of the cycle prior to laparoscopic tubal fulguration".

The authors conclude that planned outpatient laparoscopic sterilisation can "be performed safely, with a low complication rate". Also, "It is less expensive, offers better utilisation of hospital facilities and patients return to full function in a shorter period of time".

General & Psychiatric Studies from the 1970's.

By 1973 laparoscopic sterilisation had become accepted and this form of sterilisation was the commonest gynaecological operation (apart from abortion) performed in Birmingham (Sim et al, ref. 63). More patients were requesting sterilisations simply as a contraceptive measure and criteria for acceptance by gynaecologists were becoming more liberal.

A combined psychiatric/gynaecological study of "Psychiatric Aspects of Female Sterilisation" was published in 1973 by Sim, Emens & Jordan (ref. 63) in Birmingham. One hundred and fifty one women were followed-up 1-3 years after operation and in many cases were interviewed with their husbands. The sterilisations were for social or gynaecological reasons and there were no termination/sterilisations. Thirty-eight per cent of patients contacted failed to attend for the follow-up, though 36 such "defaulters" were chosen at random and visited at home. None of the operations was done on psychiatric grounds and the previous history of psychiatric illness was not taken as a contra-indication. Only five patients (3.3%) were dissatisfied with the operation, but 25% of the patients quoted some menstrual upset, usually heavier periods.

The authors re-enforced the conclusion that adverse psychiatric sequelae can be minimised if the patient is over the age of thirty or, if younger, should have had two or more children. They concluded that puerperal and post-abortion sterilisation was inadvisable and that sterilisation should not be undertaken as a cure for psycho-sexual problems.

An interesting paper by Ruth Campanella and John Wolff (ref. 13) on the "Emotional Reaction to Sterilisation", appeared from Chicago in 1975. In this series of 94 consecutive female patients who underwent sterilisation, interview was done in hospital before surgery and then at scheduled intervals over a two year period. Some patients were interviewed face to face, others completed a postal questionnaire and, as in other American studies, some interviews were conducted by telephone. Although the sample is relatively small and biased towards the lower socio-economic groups, the paper is notable for the serial follow-ups and for the reporting of results under "younger" and "older" women. The younger women are more prone to complaints. "Ninety five per cent of the older group and seventy five per cent of the younger patients were completely satisfied with the sterilisation".

None of the patients sought treatment because of menstrual symptoms after sterilisation, though mild menorrhagia or menometrorrhagia was reported by 25% of the older group at some time during follow-up. With the passage of time, more of the younger patients noted menstrual irregularities: 40% at six months, 60% at one year and 65% at two years. As the authors say, this response may not be directly related to sterilisation, as no controls were available.

The answers of patients to questions on their general health showed an interesting trend. A rise is noted in complaints at the end of the first year with subsequent decrease at two years. The authors suggest that, having no pregnancies in twelve months, the realisation/

realisation of permanency may produce an anxiety reaction at one year which seems to be worked through by the end of the second year.

The authors agree with Barnes & Zuspan (1958, ref. 10) that younger patients are more apt to have post-operative psychological problems. They do not necessarily agree with them that patients who suggested sterilisation themselves (because of high parity etc.) were better satisfied than patients to whom the procedure was suggested for medical reasons.

There has been much experience in India of sterilisation programmes and published results of studies are fairly common. It is sometimes difficult, however, to evaluate these investigations as accurate follow-up is difficult in that country and there are important differences between Indian and British social life and culture.

Khorana & Vyas (ref. 38) reporting from Baroda in India in 1975, describe a prospective study of psychological complications in women undergoing voluntary sterilisation by salpingectomy. Five hundred women and their husbands were studied by means of structured interviews and questionnaires over periods of three months to two years, beginning before surgery. The post-operative follow-up was completed for 374 couples. A before-and-after comparison was therefore made of symptoms and behaviour, of changes in sexual functioning, emotional adjustment and marital satisfaction. In 65% sexual desire had declined and 29% had not resumed intercourse. The mean score of psychiatric symptoms based on clinical ratings showed a highly significant rise after operation. Paradoxically, satisfaction with the operation was expressed by 92% of the subjects.

In the discussion the authors state that the prevalence of psychological and sexual adverse changes is high, though this could be due to the fact that subjects generally express enthusiasm for salpingectomy after they have undergone it and that decline in sex drive is only observed if one looks for it. Persons making a difficult decision tend afterwards to reassure themselves by focusing primarily on favourable considerations, ignoring or rationalising contradictory evidence.

The sharp decline in sexual satisfaction after sterilisation and the very high proportion of couples who had not resumed intercourse is in marked contrast to the fairly uniform improvement in occidental studies. This may be due largely to cultural differences or perhaps the social circumstances under which the operations were undertaken. As an example of cultural differences, the authors mention that, among British soldiers in India, anxiety states were relatively common. Among Indian troops, on the other hand, hysterical reactions were much more likely. Anxiety states involved loss of face for Indians, whereas hysterical reactions were face saving.

A retrospective study of 49 sterilised females was published by Ansari & Francis (ref. 6) in 1976. They aimed to determine the psychiatric morbidity in sterilised women and the factors associated with an unhappy outcome. The patients, who had been sterilised for at least six months, were jointly examined by a gynaecologist and a psychiatrist. The personality of the subjects was assessed by the psychiatrist on the basis of relationship with their parents, school and job record, social interaction and present family life. Twenty two women (41%) were assessed as stable personality. Twenty eight women (57%) were satisfied and happy with the operation, 21 (43%) were unhappy and regretted the operation. Twenty five subjects (51%) considered that their mental state had got worse, the majority suffering from depression, headache/

headache, irritability and insomnia. This study shows that in about one third of all patients, physical as well as mental condition deteriorated while in at least 22% of cases the sex life was affected. The most significant factors in this study affecting prognosis were:-

(a) the difference in personality make-up of the two groups and
 (b) the reason for sterilisation; if the operation was performed for any reason other than parity, the outcome was unsatisfactory. Subjects who requested the operation to limit the size of their family were most satisfied but those who were persuaded on the grounds of parity were unsatisfied subjects. This study of only 49 cases shows a remarkably high prevalence of regret though only 22 (41%) were assessed as stable personalities so that high post-operative morbidity and dissatisfaction is not unexpected.

"Patients Response to Tubal Division", by American authors, Sandra Kopit & Ann Barnes (ref. 39) appeared in late 1976. Of the 189 women who underwent tubal division, 139 were interviewed in a follow-up study. The Majority (85.6%) were satisfied with their decision and reported similar or improved mental and physical health and sexual activity. Almost all (93.5%) said that they would make the same choice again, and more than half (54.7%) would have liked to have had the operation earlier. The ambivalent or regretful could not be readily identified by any pre-operative characteristic such as age, parity and marital status.

Note/

Note that only 51.1% were interviewed in person, 37.4% were interviewed by telephone and 11.5% answered a written set of questions. The most common reason given for having the operation was, "enough children". Those dissatisfied were more likely to be separated or divorced ($p < 0.001$). Their reasons were more often socio-economic and they were less willing to have made the same decision again. They had a higher incidence of minor menstrual disorders, worsening of general mood, decrease in sexual satisfaction or no sexual activity at all ($p < 0.001$).

Almost half (46.0%) of these women were having therapeutic abortions at the time of tubal division and some (7.2%) had had earlier terminations.

There was no substantial difference in the mean time to follow-up study between the satisfied and ambivalent or regretful. However, the range (2 to 36 months) is skewed towards the shorter period which would tend to obscure any discrepancy in follow-up time. The authors note that, in the months of adjustment after tubal division some women have a feeling of uneasiness similar to that felt by older women when their children leave home. These feelings change with time as already demonstrated in the paper of Campanella & Wolff.

The ambivalent and regretful women reported poor communication about the sterilisation with their partners. They were more likely to be 'clinic' patients, reflecting their lower economic status and they were more likely to give socio-economic pressures/

pressures rather than family size as their reason for sterilisation. These women felt coerced and resent the circumstances that forced them to modify their ideal goals. Such "anger against adversity" is discussed by Barnes & Zuspan (1958) in the case of sterilisation for medical reasons.

In their conclusion, the authors say, "As has been stated by Barnes & Zuspan, a patient who has the best chance of satisfaction is one who has made the decision freely and by herself on the basis of adequate family size alone".

A prospective study of psychiatric and menstrual disturbances following tubal ligation was published in India by Wig et al (ref. 76) in October 1977. They studied menstrual and psychological health pre-operatively and also post-operatively, at six months and 18 months. The majority of women were illiterate housewives. A follow-up rate of 88-93% was achieved by special efforts at different stages. Assessment of health and symptoms was done jointly by field workers and chief investigators. It appeared that most of the complaints after tubal ligation were probably a reflection of the general ill health and neurotic disturbance in the community. The survey, which was prospective, was methodically and carefully done, but again cultural differences probably make the conclusions inapplicable to European societies.

The view of a medical sociologist is given by Sue Teper (ref. 69) in "Sterilisation: The Aberdeen Experience, and Some Broader Implications". Published in 1977, this paper reviews some of the broader ethical, medical and economic issues related to sterilisation. She considers the Aberdeen experience from the viewpoint of the behaviour of a population and studies the fertility experience of a closed cohort of women in Aberdeen city. From projections, she estimates the ultimate levels of sterilisation in the population studied at 46% for females and 8% for males.

When considering sterilisation in the clinical situation, the borderline between the therapeutic and elective elements is sometimes unclear and social aspects are often important factors in the clinical decision. As the author points out, doctors often adopt a 'disease' model in relation to the management of sterilisation as they do in the management of pregnancy and abortion. Medical attitudes may vary from the one extreme when a doctor may use his personal moral standpoint to reinforce clinical judgement, to the other when he is merely a technician for sterilisation 'on demand'.

It is salutary to bear in mind the comments of a non-medical professional worker at a time of dramatic increase in non-therapeutic sterilisation.

Whitelaw (ref. 74) in Dunfermline has published in 1979 a two-part paper on his ten year survey of 485 sterilisations done to determine the outcome and complications. This paper is of particular interest to me as Dunfermline is only a short distance from my practice area. However, a very small number of the women in my series were operated on in Dunfermline. Most patients from Glenrothes are referred to the nearby Victoria Hospital in Kirkcaldy.

Altogether 547 women were sterilised by the modified Pommeroy method (excision of loop of Fallopian tube and ligation) and 485 (88.7%) were interviewed and examined. The proportion of postpartum sterilisations was high, 254 (52.4%) postpartum compared with 231 interval sterilisations. Several measures of gynaecological morbidity are given, mainly to support his contention that the wider use of sterilisation by hysterectomy is not called for. In the years after sterilisation, 57 women (11.8%) had been referred for gynaecological surgery, but "only 18 (3.7%) required hysterectomy". He goes on to say that, "although 46 women suffered menstrual disorders after sterilisation, 104 had done so at some time before the operation". The time scale before and after operations is not quite comparable but the post-operative range is fairly long as, "No patient was interviewed less than two years after operation and 79 were sterilised more than nine years earlier". He gives tables of operations performed after sterilisations and disorders of menstruation at any time before sterilisation but he makes no note of the effect of the "pill" in his series.

The proportion of his group (9.5%) suffering menstrual disturbances after operation is considerably lower than experience in my practice.

The second part of his paper deals with patients' views on their sterilisation. He finds that most women were pleased to have been sterilised (445 - 91.8% pleased, 24 regretting it and 16 having mixed feelings). He discussed libido, mental health, social relationships and stability of marriage and states that six patients regretted the operation because they now wanted to remarry. "None of the six believed that her sterilisation had contributed to the dissolution of her marriage". In the discussion he also emphasises how highly some women value their capacity to continue to bear children, even when there are substantial medical and economic contraindications.

The concluding paragraph states, "The evidence of this survey indicates that, if patients considered for sterilisation are carefully selected, the benefits to the women, both socially and psychologically, outweigh overwhelmingly any possible adverse effects".

In the Journal of The Royal College of General Practitioners, D. M. Curtis (1979, ref.19), a single-handed general practitioner, reports on a study of 61 sterilised women and a control group of women drawn from the alphabetical list of practice patients.

Though the series is small, it is interesting for a number of reasons. By scrutiny of all his case notes, he has identified all the women in his practice population recorded to have had a sterilisation operation. He has also established a randomised control group from the same population.

Twenty six sterilised women said that their periods had become heavier and 13 of the control group reported heavier periods since their last pregnancy, a comparable point in time since most of the sterilisations were done in the puerperium. Only nine of the sterilised, compared with six of the controls, had consulted their general practitioner, perhaps because some women believe that sterilisation is followed by heavier periods.

Of the 61 sterilised patients, 16 (26.2%) had some regrets, though only four (6.6%) were definitely dissatisfied. Twelve (19.7%) said that they occasionally wanted another baby and 17 controls (27.9%) also said 'yes', though almost all were using contraceptives to avoid another pregnancy. The author concludes that, "The occasional desire for pregnancy should not be regarded as an after-effect of sterilisation, but as an expression of normal maternal instincts".

A prospective survey has been published by Dr. Anne H. W. Smith (1979, ref. 65), on "Psychiatric Aspects of Sterilisation". Patients consecutively referred to Ninewells Hospital, Dundee, were examined at the time of referral and at two months and one year after operation. All referrals in the City of Dundee are directed through the Gynaecology Outpatient Department of this large teaching hospital.

Smith's aim was to examine an unselected sample of women at referral and after operation in order to assess their mental state and its relationship with a variety of personal and social factors.

Patients were asked at referral to complete a general questionnaire and were also screened for psychiatric morbidity using the sixty item General Health Questionnaire (Goldberg, 1972, ref. 31). Two months and one year after operation, all women were again sent this questionnaire (G.H.Q.). Patients obtaining a high score (i.e., 12 or over), were asked to co-operate in a standardised psychiatric interview (Goldberg et al, 1970, ref. 30) administered by the author. This serial follow-up is similar to that adopted by Campanella & Wolff (1975, ref. 13) in Chicago (already described in this review).

Initial response to the questionnaire in Smith's series was high at 96% and was well maintained at two months (79%) and one year (85%). The percentage of high scorers in the G.H.Q., who accepted the invitation to interview, fell from the initial level of 87% to 50% at two months and 45.8% at one year.

In Smith's sample of 192 women, 25% were identified as "psychiatric cases", using the G.H.Q., at the time of referral. This percentage is similar to that found by Black & Sclare (1968, ref. 12) and Sim et al (1973, ref. 63). This degree of psychiatric disturbance in the sample is comparable to that found, using the G.H.Q., in patients attending for care in general practice (Goldberg et al, 1976, ref. 32) and was higher than that found in the general population.

The rate of psychiatric disturbance had fallen in all sub-groups of Smith's sample by one year after operation. The incidence of new psychiatric disturbance was found by Smith to be similar to that in the community and not related to any of the groups of women, said in the literature to be at risk, apart from those divorced or separated at the time of referral. Only three per cent of women expressed feelings of regret and many reported improvement in marital and sexual relationships.

The Timing of Sterilisation.

Mowat (1974, ref. 45), from Glasgow, provides further data on the importance of the timing of sterilisation in his paper, "Delayed Postpartum Sterilization". A series of 75 women who were attending one antenatal clinic and who had requested postpartum sterilisation, were told that this would be carried out between eight and twelve months postpartum rather than after delivery. To avoid the possibility of pregnancy occurring before sterilisation was performed, patients were offered an injection of medroxyprogesterone (Depo-Provera) and all accepted.

The aims of the study were:-

- (1) To determine the number of patients who subsequently re-considered their original request for sterilisation.
- (2) To assess the acceptability of medroxyprogesterone as a temporary postpartum contraceptive.

Of the original 75 patients, three did not return for post-natal examination and booking for operation and could not be traced. "Eight patients said they no longer wanted sterilisation because they considered it was too drastic a form of contraception". Thus 64 patients were sterilised, four by Pomeroy ligation and the remainder by laparoscopy. Twenty-eight patients did not return for follow-up but information was obtained from their general practitioners. None of the patients deciding against sterilisation said on direct questioning that readmission to hospital would be a problem "either because of difficulties in looking after a new baby or for any other social or domestic reason".

Most women (69 out of 72) were happy with the contraceptive injection despite irregular and unpredictable bleeding known to occur with this product and "which was considerable in 19 of the patients".

None of the sterilised patients expressed any regrets but the follow-up time ("at least three months") was too short for proper assessment. Neither was there any evidence that the patients who decided against sterilisation would have had regrets. However, 11 of the 75 patients did not proceed with sterilisation as planned, though one subsequently decided again that she would like to be sterilised. This "cooling off period" afforded by delayed postpartum sterilisation would seem to be valuable by "allowing time for reflection before undergoing what is virtually an irreversible procedure".

Emens & Olive (1978, ref. 25) investigated whether the timing of sterilisation affected its outcome and also its relationship to satisfaction with the operation. One hundred and eighty five women who had been sterilised at caesarean section were followed up over 2-7 years after sterilisation and compared with 151 women who had interval sterilisation. "The patients were divided into three groups: those who were entirely satisfied with the operation, those who deeply regretted their original decision, and those who had significant regrets, which they related to sterilisation, but who basically stood by their decision".

Rates of dissatisfaction in the puerperal and caesarean section groups were 8.7% and 11.4% respectively, rising to 26.7% and 22.5% when the "relatively dissatisfied" were included. In contrast, only 3.3% of the interval group were dissatisfied and there were no "relatively dissatisfied" patients.

The authors point out that all of the seven "dissatisfied" patients in the caesarean section group and nine out of twelve "dissatisfied" in the puerperal group said that the operation had been suggested by a doctor. They conclude, "The greater the interval from any obstetric event the better the results of sterilisation" and "more regret is expressed by those to whom doctors recommend sterilisation".

The conclusions that caesarean and puerperal sterilisation should be avoided and that "more regret is expressed by/

by those to whom doctors recommend sterilisation" accord with my own experience. The work of Barnes and Zuspan (1958, ref. 10) has already been mentioned in this survey.

The authors go on to mention the increasing number of young women now being sterilised and comment, "There is no evidence of a disproportionate number among them who regret the operation". This has not been my experience and other authors, B. Alderman (1977 ref.5), Campanella & Wolff (ref. 13), Winston (ref. 78), among others, have observed that sterilisation performed at a younger age is more likely to lead to regret than it is in older women.

Cheng et al (1979, ref. 18) report from Singapore, "A prospective controlled study to determine whether sterilisation should be performed in relation to an induced abortion - simultaneously or after an interval". Four hundred and six women volunteered to be allocated randomly to either a concurrent induced abortion/sterilisation group or a group which was sterilised six weeks after abortion". These women represented about one-fifth of those requesting an induced abortion and sterilisation over a period of nearly three years.

The complication rates, both "abortion-attributable" and "sterilisation-attributable" were not significantly different between the immediate and interval sterilisation groups.

Of the 195 women allocated to the interval group, only 131 (67%) underwent sterilisation six weeks later. Of the 64 remaining patients, 51 were again contacted up to three years later; 40 (78%) remained unsterilised at the last contact. Twenty of the 195 patients maintained their decision not to undergo sterilisation, but probably considerably less than 10% of the women in fact would change their minds as "it is likely that there was less ambivalence towards sterilisation among the women who did not volunteer". "The estimated 2-10% of women who would have changed their minds must be set against the 4% of women who became pregnant again before being sterilised".

In considering complications attributable to abortion/

abortion, the authors comment on the slightly higher rate in the interval group. They attribute this to ascertainment bias: the tendency of both patient and physician to be more likely to perceive pain as normal after sterilisation than after abortion only. As they say, "It is not possible to eliminate such biases, even in a controlled study". Immediate sterilisation at abortion, "is preferred by most women in Singapore because of the inconvenience of a second hospital admission; a second anaesthetic is avoided and the number of hospital bed days is reduced".

This study is concerned with post-operative complications and not late sequelae. Emens & Olive (1978, ref. 25) investigating whether the timing of sterilisation affected its outcome, found more dissatisfaction in women sterilised at caesarean section than among women who had interval sterilisation. It appears that abortion/sterilisation is now much less commonly done in this country and in this present study (ref. Fig. D1) abortion/sterilisations ceased after 1978.

On balance, it seems, at least in this country, that considerations of increased ultimate regret should outweigh the convenience of concurrent abortion/sterilisation procedures. Most women are probably not in a suitable emotional state to make a definitive judgement on future fertility while facing the crisis of an unwanted pregnancy.

Subsequent Pelvic Disease.

M. J. Muldoon, Dundee (ref. 46), writing in British Medical Journal in 1972, described a follow-up of 374 patients for at least ten years after tubal ligation. He noted that many reports (Williams et al., 1951, ref. 77 : Powell, 1962, ref. 56) had indicated that there is a high incidence of subsequent pelvic disease, usually disorders of menstruation. He further commented that many young wives who have completed their family by the age of 25 years or even less were requesting sterilisation. The purpose of his study of case records from the two Dundee teaching hospitals was to, "Investigate the incidence of subsequent pelvic disease which required gynaecological treatment".

In his series of 374 patients, 43% required other gynaecological treatment. Major gynaecological surgery was needed by 25%. He thought there seemed a good case for a selective use of hysterectomy as a method of sterilisation.

One hundred and sixty two patients (43%) gave a history of subsequent gynaecological treatment. Seventy patients required hysterectomy, the main indication being severe menstrual disorders (mainly menorrhagia) in 49 (13.1%). Ninety two patients required gynaecological treatment other than hysterectomy. The commonest indication was menorrhagia requiring D&C in 24 (6.4%) patients, cervical erosion requiring cautery accounted for 20 (5.4%), repair for prolapse or stress incontinence 22 (5.9%) and menstrual disturbances/

disturbances not treated by D&C but by hormonal therapy 21 (5.6%). There were three oophorectomies for neoplasm and two repeat operations for failed sterilisation.

Of the 70 patients requiring hysterectomy subsequent to sterilisation, 50 were gravida five or more, 15 had had repeat caesarean section and sterilisation and three were sterilised at the time of hysterotomy. Of the 22 patients requiring repair of prolapse, 20 had four or more confinements.

It is thus clear that, "most patients requiring further major surgery were either highly parous or had had surgical wounds in the uterus either at caesarean section or hysterotomy". Muldoon goes on to advocate considering hysterectomy in highly parous patients and in those who have had previous menstrual disorders. In my practice, multiparity and repeat caesareans are now very much less common, but hysterectomy may well be advisable for those with bad gynaecological history before sterilisation.

Among the correspondence provoked by Muldoon's paper, is a letter to British Medical Journal from J. S. Scott (1972, ref. 61). Reviewing subsequent gynaecological illness in sterilised patients, he comments on Muldoon's series, "regardless of how many of these women would have presented with gynaecological conditions/

conditions over the past ten years without prior sterilization, the gynaecologist missed an opportunity to prevent these troubles".

He goes on to say that, "most women who come to have sterilization operations are ones at high risk of cancer of the cervix" and advocates selective vaginal hysterectomy. He refers to experience among his own patients undergoing gynaecological surgery and comments, "These women were not dissatisfied with their sterilization, but it was appreciated that with a different procedure, their further gynaecological trouble could have been prevented".

In this present study only two women were sterilised by hysterectomy and it must be remembered that, at the present day, sterilisation of younger women of low parity is more common than the sterilisation of highly parous patients with caesarean or hysterotomy scars, which justified Muldoon's advocacy of hysterectomy.

Alderman (1972, ref. 3), also in British Medical Journal, comments on Muldoon's paper, "Unfortunately, in common with most reports on the subject, no attempt was made to correlate the results against the incidence of similar gynaecological disease in non-sterilized women of similar age and parity". He emphasises again "the gross variations in reported incidences of menstrual dysfunction following tubal ligation" and the "failure to define/

to define the dysfunctions, retrospective studies, and absence of comparable control groups".

This present study contributes some general data on the prevalence of menstrual problems in a medical practice and offers a comparison of sterilised women with controls of the same age living in the same community.

Menstruation after Sterilisation.

In a controlled study by J. R. Neil et al (1975, ref. 47), 454 sterilised women patients, who were divided into a laparoscopic-diathermy group and a tubal ligation group, were compared with 143 controls whose husbands had had vasectomy. There were no sterilisations associated with termination of pregnancy. The follow-up period was 10 to 28 months and the response rate was 75.6%. There was no significant difference at the 1% level of mean values in age, number of children, years of marriage, or age of the youngest child in the study groups. Similarly there was no significant difference between the groups in symptomatology before the procedure or in the number who had been taking the contraceptive pill. In the control group there were 10% fewer women on the pill.

The combined sterilised group reported excessive menstrual loss and menstrual pain much more frequently than did the control ($p < 0.001$). The laparoscopic group was worse than the laparotomy group as regards menstrual loss and pain. These findings were independent of whether or not the women had been on the pill before the procedure. They are also at variance with the findings of Chamberlain & Foulkes which are described later.

An improvement in sex life was noted in 50% of the sterilised women and 74% of the women whose husbands had been sterilised. The findings of this control trial confirm that menstrual problems can be common and show that the frequency varies with the procedure - 39% diathermy and laparoscopy and 22% with tubal ligation. The improvement in sex life was surprisingly high, especially in the (vasectomy) control group. Ten of the operated group subsequently required hysterectomy and 1 in the control group but the follow-up period was too short to draw firm conclusions.

Alderman, (1975, ref. 4), in a letter to The Lancet, comments on the paper by Neil and his colleagues. "Menorrhagia is hard to define and its frequency in the "normal" non-sterilised population is difficult to determine. I should like to know how Dr. Neil and his colleagues defined "excessive" menstrual loss and how it was measured". He doubts the value of a control group of matched pairs and claims that, "The lack of a significant difference between the mean age, parity, time married, and age of youngest child within the groups studied by Dr. Neil's team does not necessarily make the groups comparable".

He goes on to detail his own (unpublished) study, "using each woman as her own control". This prospective study was undertaken on 596 women who had had elective tubal occlusion. "Before operation the details of each patient's menstrual pattern was recorded" including "a note of the total number of pads or tampons used per menstrual flow". The patients were seen again two to three and a half years after the operation.

"The total number of pads or tampons used per period had increased by more than 25% since the operations in 193 (32.4%) patients and by more than 50% in 97 (16.3%) patients". Similarly, "total number of pads or tampons used per period had fallen by more than 25% since operation in 113 (18.9%) patients and by more than 50% in 43 (7.2%) patients". He then proceeds to exclude patients "in whom a possible causative factor could be identified"./

identified". This done, he points out that "the difference between the number of women with increased and decreased menstrual loss is negligible" though it seems to me that there could be scope for significant observer bias in the process of exclusion which is not detailed.

In my opinion, Alderman is correct in pointing out the difficulty in defining "normal" menstruation and in emphasising the value of vulval pad counting, "a very crude method of measuring menstrual loss, but at least it is objective". Using the patient as her own control has advantages but the variable of time may become very important if the follow-up is long, as it should be, or if a significant proportion of the sterilised patients are near their menopause, as is often the case. The approach of Neil and his colleagues was worthwhile and has not been invalidated by Alderman's contribution.

A different view on the long term effects of laparoscopic sterilisation on menstruation was published in 1976 by Chamberlain & Foulkes (ref. 16). Altered menstrual loss after conventional sterilisation has been described often (Powell, 1962, ref.56 : Adams, 1964, ref. 2 : Whitehouse, 1969, ref. 73 : Neil et al, 1975, ref. 47).

During 1974 and the following year, 324 patients who had laparoscopic sterilisation in Chelsea Hospital in 1972 were contacted and asked to complete a pre-coded questionnaire. A further group of 78 tubal ligations were surveyed similarly. Two hundred of the former and 50 of the latter replied, representing 62% and 64% respectively.

The questionnaire sought information about the patient's menstrual periods for a year before and after the operation, enquiring specifically about:-

- (a) actual number of days of cycle,
- (b) days of bleeding,
- (c) days of heavy loss,
- (d) dysmenorrhoea,
- (e) previous contraception.

A normal range was apportioned to each facet of menstruation, e.g., days of cycle 25-31, days of bleeding 3-5, days of heavy loss 2-4. Numbers falling outside these ranges were considered as decreases or increases respectively. Since patients gave information about this both before and after operation, alterations could be determined with the patients acting as their own controls.

About half the women had no alteration in length, heaviness or cycle after the operation, while one fifth had shorter cycle or lighter loss. About one third of the patients after laparoscopy had longer and heavier periods, but those women who were using oral contraception before operation fared worst. The reason for the menstrual changes may not be due to operation alone. There/

There was no significant difference between laparoscopy and laparotomy in terms of increase in heavy bleeding or number of days bleeding. The laparotomy group, however, had very much increased length of cycle ($p < 0.005$).

The answers on period pains showed that 40% had pre-operative dysmenorrhoea while 49% reported it afterwards. This shift was made up almost entirely of the group who had taken oral contraceptives before operation. If these women are excluded, then those reporting dysmenorrhoea increased only from 56 to 59 in the 126 patients not using oral contraception before surgery.

The laparoscopic group was assessed for the effect of previous hormone therapy by comparing those who had been on oral contraceptives with women using an intrauterine device and those using no contraceptive pre-operatively. The oral contraceptive group had longer menstruation ($p < 0.001$) and more days of heavy bleeding than those using no contraceptive. The small group using an intrauterine device showed reduction in length and heaviness of bleeding ($p < 0.05$).

In summary, Chamberlain & Foulkes found that:-

1. Over a third of the sterilised women (both laparoscopy and laparotomy) had longer and heavier menses.
2. The laparotomy group alone had a very significantly increased length of cycle ($p < 0.005$).
3. In the laparoscopy group, increased dysmenorrhoea was found almost exclusively in those who had been using and had stopped oral contraception.

4. On average, the group previously using oral contraceptive had longer and heavier periods than those using no contraception ($p < 0.001$).
5. After removal of an intrauterine device, periods tended to be shorter and lighter.

While appreciating the thoroughness and value of this paper, one might question whether women can, in 1975, be expected to remember accurately and in detail their menstrual pattern from 1971 to 1973. In my experience, only a small minority of women, when asked retrospectively, are found to have kept detailed contemporaneous notes of their menstruation.

Kasonde & Bonnar (1976, ref.37) made measurements of blood loss before and after sterilisation in 25 women to assess the effect of tubal ligation on menstrual function. Menstrual blood loss was measured by the alkaline haematin method of Hallberg & Nilsson (1964, ref. 33). This involves extracting the blood from tampons and sanitary towels and measuring the amount of haemoglobin lost. The menstrual blood loss can then be estimated knowing the haemoglobin concentration of the patient's venous blood.

All 25 women in the study were menstruating regularly (cycle 21-35 days), multiparous and aged between 25 and 45 years. Patients who complained of excessive menstrual bleeding had been excluded, as had women who were lactating or had an abortion or delivery within the preceding three months. Sixteen of the 25 women had previously been on oral contraception and they were allowed two spontaneous menstrual periods before entering the study. Most of the women were sterilised by removal of a part of each tube and separate ligation of the ends; two patients had laparoscopic sterilisation by diathermy and one had a Pomeroy tubal ligation.

The women were followed for up to three months before and for six months after sterilisation and "the operation made no significant difference to menstrual blood loss".

This painstaking study provides important objective data on menstrual blood loss before and after sterilisation but/

but some reservations must be expressed:-

- (1) The method may not in fact measure, "total menstrual blood loss". The study design presumes all menstrual blood passed was recovered in tampons or towels and no loss occurred say at micturition. This seems unlikely.
- (2) "A patient's subjective estimate of menstrual loss is unreliable" (Hallberg & Nilsson, 1964, ref.33). "Total menstrual blood loss" is not a clinical criterion and may not be relevant to the clinical problems of initiating treatment and assessing progress. Though patients who complained of excessive bleeding were excluded, recorded loss varied from 2.6 to 263.4ml. The variation of loss between patients for each cycle was very large and variations in the monthly loss for the same patient were likewise very large.
- (3) Sterilisation was by excision and ligation. Extensive diathermy for sterilisation has been much used and may cause more damage than excision and have more effect.
- (4) The longest follow-up was nine cycles over twelve months after operation. The data are applicable only to the first year after sterilisation by ligation excision in a relatively small group of patients.

While this paper presents important new data, it does not answer the question whether or not tubal sterilisation causes menorrhagia. "Total menstrual loss" is an objective criterion capable of direct laboratory testing. It may be of limited/

limited clinical relevance in the same way that an electrocardiogram may be of less value in assessing angina than a simple exercise tolerance test, even though the latter is indirect, subjective and, like menstruation, dependent on the patient's mood and interest.

As part of preoperative evaluation, Radwanska et al (1979, ref. 57) studied progesterone levels in the midluteal phase (5-10 days before the next menstrual period). They found that reduced midluteal serum progesterone concentration "appears more common among women with prior tubal ligation or electrocoagulation than among a control population of apparently normal women".

These findings may be significant in two contexts. Impaired luteal function and defective ovulation are known to be important factors in human infertility. It seems to the authors that, in some cases, "The persistence of infertility, even after anatomic reconstruction of the falopian tube has been performed successfully, might be due to a deficiency of ovarian hormone".

The sterilised patients studied had normal menstrual cycles, no dysfunctional uterine bleeding and were all of proven past fertility, this last making the low progesterone levels even more remarkable. Radwanska and her colleagues thus concur with Neil et al by postulating, "It is possible that such operative procedures could interfere with the vascular supply to the ovaries and, thus impair the vascularisation of the corpus luteum".

Animal experiments (Niswender, 1976, ref. 50) have shown that blood flow to the corpus luteum appears to play an important/

important role in the regulation of luteal function. Surgical sterilisation interferes with the blood supply to the ovary and may limit the ability of arteries to dilate normally during the luteal phase, thus impairing corpus luteum function.

The second important context is that of post-sterilisation menstrual dysfunction. Reduced progesterone levels in sterilised patients may also be associated with the long term post-operative effects, such as dysfunctional uterine bleeding and menorrhagia reported to occur in five to 50% of patients, according to various authors.

The authors conclude that, "Perhaps in the future it will be possible to identify sterilisation techniques that are least likely to result in subsequent hormonal disorders".

Lieberman et al (1978, ref.41) in a prospective study, report on menstrual patterns after laparoscopic sterilisation using a spring-loaded clip. Data is presented from four hospitals in the United Kingdom. Details of the menstrual cycles in 504 women were recorded before laparoscopic sterilisation; 448 (89%) of these were followed up for six months after operation and 400 (79%) one year after operation.

Patients were asked to assess the amount of menstrual bleeding as scanty, normal or excessive and the degree of dysmenorrhoea as nil, mild, moderate or severe. The number of days of menstruation and the length of the cycle were also recorded.

"No changes were reported in the second six months after operation except by women who used an oral contraceptive", this suggesting that there is no causal relationships between this method of sterilisation and menstrual disturbances in the first year after operation.

Comparison between pre-operative and six month assessment did show a statistically significant relationship between previous method of contraception and subsequent menstrual patterns. Women previously using an intrauterine contraceptive device (IUCD) reported a decrease in the duration of menstrual bleeding and the amount of bleeding and also had less dysmenorrhoea. Previous oral contraceptive users reported a significant increase in duration of bleeding, length of cycle and estimated amount of bleeding. Only this/

this group (previous oral contraceptive users) reported an increase in dysmenorrhoea after operation. Patients who had used other contraceptive methods showed no significant differences between the initial, six month and one year assessments.

In summary, therefore, the operation did not appear to affect the length of the menstrual cycle, the duration of menstrual flow, the patients assessment of blood loss or the incidence of dysmenorrhoea. The previous method of contraception was significantly related to subsequent menstrual patterns.

This prospective study gives substantial support to the view that sterilisation alone, at least when using a spring-clip method, is not associated with significant menstrual changes in the year following operation. The alternative view is supported by the retrospective study of Neil et al (1975, ref. 47) which should be compared with this work of Lieberman and his colleagues. The earlier work of Neil et al had the advantage of a control group of women whose husbands had undergone vasectomy.

The question remains unsettled and in clinical surveys of this kind the patient's attitude to menstruation is an important variable, which is very difficult to define. Other important considerations are:-

- (1) Method of operation - ligation, clip or diathermy; this latter being particularly destructive.
- (2) Method of data collection.

- (3) Indications for operation and past gynaecological history.
- (4) Percentage of patients expressing dissatisfaction with their sterilisation.

A paper which sheds light on the effect of two different methods of sterilisation has been published by W. D. Edgerton (1978, ref. 22). It compares 495 patients sterilised by a coagulation and division technique involving minimal tissue destruction with a previously reported group of 517 patients who had tubal sterilisation by a coagulation and resection technique which caused marked tissue destruction.

The same surgeon (the author) performed all the operations and the post-operative follow-up time was the same in both groups (3.5 years). "The follow-up protocol was identical for each group; the only variable between the groups was the method of sterilization". The patients having the more destructive procedure "had approximately twice the volume of tube and four times the area of mesosalpinx coagulated".

In the coagulation/resection group (the more destructive), 115 patients were lost to follow-up leaving 517 (81.8%) available for study. In the group having coagulation and division, 193 were lost to follow-up leaving 495 (72.2%) available for study.

The subsequent hysterectomy rate was almost identical in both groups and there was no statistically significant difference between groups for incidence of abnormal uterine bleeding, pelvic pain or dysmenorrhoea. The commonest sequela was "abnormal uterine bleeding", the incidence being 17.0% for the excision group and 19.2% for the minimal coagulation group. The criteria for diagnosis/

diagnosis of "abnormal uterine bleeding" are not stated in this paper and types of dysfunctional bleeding are not differentiated.

Patients with abnormal uterine bleeding were divided by age at time of surgery and contraceptive method at time of sterilisation. None of the differences between the two groups was statistically significant. Patients with previous history of menstrual disorder requiring treatment had rates of 50% abnormal uterine bleeding in the excision/coagulation group and 63.2% in the minimal destruction group. For those without previous history of menstrual disorder, the rates were only 14.0% and 17.4% respectively.

The author alludes to the hypothesis of Neil and his colleagues who compared tubal ligation and laparoscopic sterilisation, that "the greater frequency of late complications in the laparoscopic group might be the result of increased tissue destruction and consequent disruption of the blood supply".

Edgerton concludes from his own figures that:-

"Since the destruction of 8 cm² rather than 2 cm² of mesosalpinx causes a greater disruption of the blood supply, and since there was no difference in the late symptoms between the two groups, it is questionable that the disruption of the blood supply was responsible for the subsequent abnormal uterine bleeding or dysmenorrhoea".

A different approach to the study of late effects of sterilisation is provided by a report by P. A. Poma (1980, ref. 54) to the American College of Surgeons. He compared "hospitalization experience" of 514 women sterilised between 1970 and 1971 with that of "514 other women, matched for age, parity and other relevant demographic features, who had given birth at the hospital during the same period".

Both groups were followed for seven years to determine:-

- (1) The number of admissions and
- (2) The reason for admissions.

Data was obtained by evaluation of hospital records which, the author admits, "may not be the best of all possible approaches" but gives a "fairly objective" assessment of the reason for admission and avoids the bias of studies using questionnaires.

While no information is given on the medical history of patients prior to sterilisation, there are striking differences in admission rates. Readmission rates for controls were higher than for the sterilised (31% and 22% respectively) as "a large proportion of the readmissions for the non-sterilised women were for delivery". When admissions for delivery were discounted, there was a "two to 10-fold preponderance of readmissions among the sterilized women" depending on age group.

Gynaecological complaints accounted for 32% of all/

all readmissions among the sterilised and 14% among the controls. Twenty-two (4.3%) of the sterilised women were re-admitted because of "menstrual irregularities" compared with only two (0.4%) of controls. In contrast, one (0.2%) sterilised woman was admitted for acute pelvic inflammatory disease compared with nine (2%) of the control women, suggesting that sterilisation "may offer some protection against salpingitis".

The number of re-admissions for hysterectomy was 36 (or 47% of the non-obstetric gynaecological admissions) for the sterilised group compared with 22 (14%) for the controls.

The author concluded, "The results of this study affirm the assertions of others that tubal sterilization is associated with later complications".

In a short paper, Chakravarti & Shardlow (1975, ref. 15) analysed 12 cases of tubal pregnancy after sterilisation and discussed pathogenesis. Though the number of cases is small, the paper is of general medical interest as they also discuss the clinical presentation of the tubal pregnancy and diagnostic difficulties.

Half of the patients came from a series of 50 cases of ectopic pregnancy operated on in hospital: tubal sterilisation was thus a factor in 12% of these. Information on the remaining six cases came from other hospitals. All but two of the sterilisations were puerperal or post-abortal "which may reflect the higher failure rate of the operation at these times". In seven of the 12 cases implantation was on the fimbrial side of the operation site and the authors postulate that the mechanism was a recanalization with a narrow lumen, sufficient to allow the passage of spermatozoa but not of a fertilized ovum. The other five patients showed implantation proximal to the operative site, suggesting tuboperitoneal fistula. Two of these "cases" refer to the same patient who was admitted eight years after sterilisation with a provisional diagnosis of ectopic pregnancy. One year later she was re-admitted with a provisional diagnosis of "ovarian cyst" but proved to have an ectopic pregnancy on the opposite side. For this reason the authors recommend bilateral salpingectomy for tubal pregnancy.

The only constant features in the clinical presentation were abdominal pain and abdominal and pelvic tenderness. Only/.

Only four had amenorrhoea, four had some vaginal bleeding and three a pelvic mass. Incorrect provisional diagnosis included "intestinal obstruction", "salpingitis", "appendicitis" and "ovarian cyst". The interval between first symptoms developing and admission is not given, but the "admission to operation interval" varied from four hours (provisional diagnosis "intestinal obstruction") to five days (provisional diagnosis "salpingitis"). "In six of the patients there was an interval of more than twelve hours between hospital admission and operative treatment and in eight the provisional diagnosis was incorrect".

From my own very limited experience of this condition, I endorse the authors' conclusions. "Delay and misdiagnosis were in some instances encouraged by the knowledge of the prior sterilisation, but the diagnosis of ectopic pregnancy should be considered seriously in all previously sterilised patients who present with lower abdominal pain and tenderness". It seems to me particularly important that this advice be propagated among general practitioners and others with no specialist gynaecological training as these are the doctors on whom the burden of provisional diagnosis falls. "The main danger lies in diagnosing a condition which does not require immediate laparotomy".

Cheng et al (1977, ref. 17) report a study from Singapore, "with the objectives of estimating the pregnancy rates for women who had had tubal ligation and, if possible, determining the factors responsible for the failures". The survey was done in a large hospital performing, "over 2,500 sterilizations, nearly 4,000 abortions, and around 9,000 deliveries annually".

In all, 10,174 female sterilisations done "during 1970-75" are reviewed, comprising:-

79% abdominal ligations

16% culdoscopic ligations

3% vaginal ligations (through the posterior fornix without an endoscope).

2% laparoscopic/cauterisations.

100%

Great care was taken to identify all failures though the authors recognise that "some women with ectopic pregnancies may have undergone emergency operations in another unit", or "a few women may have insisted on treatment at a different obstetrical unit".

Of a total of 51 pregnancies due to sterilisation failure, eight were ectopic and 43 intrauterine. A minimum crude failure rate was calculated for each method of sterilisation. "Failure rates were high for all procedures except the abdominal sterilizations (minilaparatomies). Most failures occurred 3-6 months after sterilisation and "only two occurred later than 24 months after the procedure".

A table showing markedly different failure rates for the same group when different methods of calculation are used, emphasises the importance of the length of follow-up period. For example, the crude failure rate for abdominal ligation was 0.19 whereas the cumulative failure rates were 0.23 at 12 months and 0.34 at 24 months. Similarly, for culdoscopic sterilisation, the crude failure rate was 1.21 whereas the cumulative failure rate at 12 months was 0.92 and at 24 months was 1.67.

As the authors point out, "the crude rate, which is merely a ratio of number of failures to the number of ligations, does not take into consideration the length of the follow-up period and therefore proves unsatisfactory as an index of effectiveness". They recommend using cumulative failure rates, "calculated by life-table procedures and reported per 100 women sterilized". Also emphasised is the importance of calculating failure rates for each method used rather than a simple overall rate. It is also difficult to compare published failure rates because of (1) different definitions of failure are used; (2) ascertainment of failures is often incomplete; (3) follow-up periods differ; and (4) a standard method for calculating failure rates has not been used by past investigators.

In conclusion, "the high failure rates found in this study demonstrate the need for a system of monitoring failures and for the development of more effective techniques of tubal occlusion". The experience of the survey suggests that failure rates should be calculated for each surgical technique separately and that cumulative life-table methods should be used.

In a short paper, G. J. Hughes (1980, ref. 36) describes his retrospective study of case notes of 24 cases of ectopic pregnancy after sterilisation; 14 patients had laparoscopic cautery and 10 had tubal ligation. The mean interval between sterilisation and ectopic pregnancy was more than three years. "Patients who had been sterilized by laparoscopic tubal cautery were more likely to have ruptured ectopic pregnancy with acute blood loss and shock than those who had open tubal ligation, which was associated with a more chronic form of this condition".

The author rightly draws attention to "the delay in diagnosis of ectopic pregnancy because of the history of previous sterilization" and its consequence: a relatively high maternal mortality. I refer to this problem from my own experience later in this work (page 193).

"Failure of the sterilization operation in females, once a rare phenomenon, is now a relatively common occurrence because there has been a dramatic increase in the number of sterilizations performed in the past 10 years". Since "16% of failures end up as ectopic pregnancy, the incidence of ectopic pregnancy after sterilization has increased". Previous sterilisation, far from excluding a diagnosis of ectopic pregnancy, "should be regarded as an important risk factor when a woman presents with lower abdominal pain". In this series, "general practitioners incorrectly diagnosed the condition in over 60% of patients and hospital doctors in over 40%".

In an earlier paper on a related subject, G. J. Hughes (1977, ref. 35) writes from Aberdeen on sterilisation failure. He surveys the case notes of all patients (77) sterilised in Aberdeen during 1969-76, who later became pregnant.

"The overall pregnancy rate was higher for laparoscopic sterilisation (1.2%) than for non-laparoscopic methods (0.23%)". In the earlier years pregnancy rates were high after laparoscopic sterilisation but improved markedly after 1973, largely due to the greater experience of the operators and to improved supervision and training of junior staff. "Inexperienced operators were responsible for over 80% of the failures". By 1976, the overall pregnancy rate had dropped to 0.13% from 0.7% in 1969.

The pregnancy rate was doubled if sterilisation was combined with therapeutic abortion. There were 12 tubal pregnancies in this series, three of which followed open tubal ligation. The ectopic pregnancy rate was 15.6%.

Of the 77 patients studied, 52% had become pregnant within one year of sterilisation and 73% within two years. "Only 9% of pregnancies occurred after three years". These figures are in accord with the findings of Cheng et al. (1977, ref. 17) who found that pregnancies were most likely in the first two years with a peak between three and six months.

Sterilisation Reversal.

Increased public awareness of improvements in sterilisation techniques and of adverse reports of oral contraceptives, seem to be resulting in younger women with smaller families now seeking sterilisation (Thomson & Templeton, 1978, ref. 72). This is certainly my own experience and that of consultant gynaecologists in my area. Until recently sterilisation has been considered irreversible and accepted as such by patients. Methods have now been developed for potentially reversible tubal sterilisation using metal clips (Hulka or Rocket), plastic (Hug) clips or silicone (Falope) rings. These techniques have the double advantage of minimal operating time and the shortest possible hospital stay. Such occlusive devices seem to give a better chance of successful reconstructive reversal surgery and are recommended for use in younger women (Wood, C., 1979, ref. 79).

Modern microsurgical methods for tubal reconstruction are now available and can raise the chance of intrauterine pregnancy as high as 70% in suitable selected cases (Winston, 1977, ref. 78). Henrion et al (1979, ref. 34), in France, observed that, "requests for re-permeabilisation surgery, previously rare, are becoming more common". The authors quote 60-75% of pregnancies going to term after microsurgical end-to-end anastomosis and more than 90% secondary permeability.

Mounting dissatisfaction with their sterilisation, in a minority of women, coupled with a new awareness of the possibility of tubal reconstruction, is leading to a demand for reversal.

Winston/

Winston (1977, ref. 78) observes in his survey of patients requesting reversal of sterilisation, "most of these women were desperate to try any attempt at reversal, however speculative. They generally made strenuous efforts to obtain hospital referral, sometimes against the inclination of their general practitioner. Some travelled from all over Britain to attend Outpatients ". During the course of this present study, a few of my patients, dissatisfied after their sterilisation, have contacted me to enquire about reversal. The reason was invariably a new relationship or a sexual problem.

R. M. L. Winston (ref. 78) at Hammersmith Hospital in 1975/76, reviewed 103 women requesting sterilisation reversal. Their average age at sterilisation was 26.7 years; sixty five (63.1%) had been sterilised immediately after pregnancy. The mean age of patient at the time of request for reversal operation was 32.8 years. A few patients came to the clinic within six months of sterilisation and most patients were remarkably young (89.3% under 30) when sterilised.

Seventy eight (75.7%) of patients were unhappily married and remarriage was the chief reason for the request for reversal. Thirty nine (37.8%) patients had been sterilised by irreversible methods and in only half the cases sterilised by tubal ligation were conditions technically suitable for reversal surgery. He concludes that it seems particularly unwise to sterilise women under 30, especially immediately after pregnancy or if their marriage is in jeopardy.

Patients were asked about contraceptive advice given before sterilisation. Twenty six patients (25.2%) claimed to have received no formal advice and only 18 patients (17.5%) had visited a Family Planning Clinic.

Some questions were asked about psychiatric history. Thirty two patients (31.1%) had taken "anti-depressants" before sterilisation and four (3.9%) had attempted suicide. After sterilisation, "anti-depressant drugs" were used by 39 patients (37.9%) and three (2.9%) had attempted suicide.

Thomson & Templeton (1978, ref. 72) studied the characteristics of 36 patients who requested reversal of sterilisation at the Royal Infirmary, Edinburgh, over a five year period. The authors point out that, despite technical advances, reversal of sterilisation remains "a major procedure, not without hazard", and that counselling would be facilitated by considering what sort of patient was most likely to return requesting reversal.

For the Edinburgh patients, the average age at sterilisation was 27.2 years and at request for reversal, 31.0 years. The mean interval between sterilisation and request for reversal was 3.8 years/

3.8 years (range one month to nine years). Ten patients (27.8%) had previous termination of pregnancy and in six (16.7%) sterilisation was performed in combination with a therapeutic abortion.

Most patients asked for reversal because of a new relationship. Half of the patients had unhappy marriages at the time of sterilisation, though none had a psychiatric indication for operation. Nine patients, a quarter of the group, had attended hospital for serious psycho-social problems after their sterilisation and seven of these had been admitted to the Royal Infirmary on at least one occasion with a drug overdose. As the authors say, they were dealing with "an unhappy and unstable group of women", who "not only bitterly regretted their decision, but also had serious problems adjusting to being sterilised".

These two papers of Winston and of Thomson & Templeton are important in the literature of female sterilisation. While, as Winston points out, "there is naturally a high degree of subjectivity and bias in a survey of this kind", these papers serve to reinforce the fact the full complexity of the psychological consequences of sterilisation is still poorly understood. Tubal occlusion is a simple procedure, which can be done on demand, but which may have, on occasion, disastrous consequences for the patient. Social and marital circumstances change and general psychiatric assessment before operation is no guarantee of subsequent satisfaction.

In a letter to the British Medical Journal, Alderman (1977, ref. 5) comments on R.M.L. Winston's paper. He points out that because of the nature of Winston's study, a control group is not possible and suggests that "Perhaps some of my own figures may be found acceptable for comparison".

Six hundred and fourteen (56.8%) of 1,081 consecutive sterilisations were followed up 24-42 months after operation. Fifty four (8.8%) of patients regretted the operation. "The commonest reason for regretting the operation was a desire to bear children to a new partner". He continues, "Although women who remained married to the same partner sometimes expressed transient yearnings for further children, none of them felt strongly enough about childbearing to regret having been sterilised".

He gives the age distribution at the time of operation of patients who subsequently regretted the procedure and comments that this "suggests that sterilisation performed at a young age is more likely to lead to regret than it is in older women". He continues, "It would be unwise to refuse them sterilisation simply because of their age", and concludes "Instead I would support Mr. Winston's plea for careful counselling of the very young before sterilisation, particularly with a view to predicting the likely divorce".

Dubuisson et al (1980, ref.21) have published in France the results of their study of 46 patients who requested sterilisation reversal between October 1977 and March 1980. I was pleased to have an opportunity to discuss this paper and general aspects of female sterilisation with Dr. Dubuisson at the Port-Royal Hospital in Paris. The authors estimate that, while female sterilisation has been less practised in France than in this country, sterilisation reversal is requested by about one per cent of patients, who are well informed of the improvement in results which have been obtained by micro-surgical techniques.

Details of 45 of the cases are published in this paper, data on the remaining patient being published separately as this 23 year old patient had an accidental bilateral isthmic resection during a hernia repair in childhood. The mean age at sterilisation was 28 years, 80% of patients being 30 years or less at the time of operation. Thirteen of the 45 women were 30 or under at sterilisation and none had more than two children. In 75% of cases the indications were social or economic and in 25% medical or obstetric. Twenty two patients (49%) had puerperal sterilisation, usually at the time of caesarean section.

The mean age at first request for reversal was 33 years, that is five years after sterilisation. The commonest reason for requesting reversal was re-marriage after divorce (25 cases, 55%).

Eighteen patients were unsuitable for reversal because of irreversibility of original operation (15 cases), uterine lesions making pregnancy potentially dangerous (2 cases) and age and genetic defect (1 case).

In the discussion the authors emphasise the association between regrets and age at sterilisation * and advise particular care when sterilisation is requested by a woman 30 years or under who has two children or less. They also concur with Winston (ref. 78) that it is "particularly unwise to sterilise women immediately after pregnancy or if their marriage is in jeopardy" and point out that in a certain number of their series, marital discord and instability at the time of sterilisation made regret almost predictable. **

In France, most women requesting reversal have had "une technique, en général, mutilante", that is to say irreversible (one third of cases in this series) or with little chance of success because resection has been extensive. The authors recommend a technique which destroys less than 1cm of the isthmus, i.e., "mini-Pomeroy" or clip sterilisation, at least in younger women.

* "Plus la femme est jeune, plus elle aura le temps de regretter sa mutilation dans les années de sa vie génitale active qui vont suivre, spécialement à l'occasion de changements affectifs ou socio-économiques."

** "C'est précisément chez ces couples instables qu'il y aura le plus de divorces. Par conséquent la mésentente du couple est une contre-indication à la stérilisation de la femme".

SUMMARY OF LITERATURE REVIEW.

Several significant publications from the literature on female sterilisation have been summarised here in chronological order.

The 1960's.

Reports appearing in the 1960's, for example that of Adams (1964, ref. 2) noted, "the gradual but constant increase in the sterilisation rate and the 'laudable' increase in the proportion of cases labelled 'socio-economic indications'". This he attributes to "a more honest appraisal of the 'true situation' and a reduced tendency to make a 'quasi-medical situation' serve as an indication for sterilisation". During this decade, the women sterilised were generally of high parity and indications were normally obstetric or medical or there were major socio-economic factors. That is to say that acceptable reasons for sterilisation were factors over which the patient has no control and which make future childbearing inadvisable or dangerous.

Tubal ligation seems to have been the favoured method of sterilisation, though salpingectomy or fimbriectomy was done and, when there were important gynaecological symptoms, hysterectomy would be carried out sometimes mainly for its secondary effect on fertility. Sterilisation done as a contraceptive preference of women of low parity was apparently rare.

The timing of operation was often related to other medical or surgical events. In the published studies, sterilisation was usually done concurrently with therapeutic termination or caesarean section or carried out early in the puerperium. Results were often confounded by failure to separate termination/sterilisation or sterilisation done concurrently with caesarean section from interval operations. Though often more convenient for the surgeon and the patient, these are times of exceptional emotional stress or instability.

Many retrospective reports appearing in the 1960's attempted to define profiles of women more likely to regret their sterilisation, but there was no unanimity of approach and standardised comparative data were not often obtained. Barglow & Eisner (1966, ref. 9) comment on the "marked disagreement among various authors about the statistical incidence of poor emotional outcome of tubal ligation". They attribute this to different evaluation techniques and various time intervals following surgery, different criteria of 'good' and 'bad' outcome and the fact that the characteristics of the patients sampled differed widely between studies. The authors aimed, "to isolate the tubal ligation variable, and to make observations of a relatively homogeneous sample, which we hope can serve as a standard control group for further studies.....".

In assessing outcome and regret, investigators often interviewed large numbers of patients at varying intervals after/

after operation. Postal questionnaire surveys were also used. Barglow & Eisner (1966, ref. 9) used both and Barnes & Zuspan (1958, ref.10)reported the results of individual interviews by a social worker in the patient's home.

Many identified patients were lost to follow-up in some studies; Lu & Chun (1967, ref. 42) had 34% response and Black & Sclare (1968, ref.12) interviewed 168 patients (35%) from 480 identified. The group of patients lost to follow-up may contain a higher proportion of dissatisfied women who may be less likely to agree to co-operate. On the other hand, women of high parity who see sterilisation as a solution to their socio-economic problems are less likely to complain.

These factors should be remembered when considering the percentages of women expressing regret or dissatisfaction. However, relative satisfaction does not mean that there are no undesirable sequelae, such as menstrual disturbances. As Barnes & Zuspan (1958, ref. 10)pointed out, "consideration only of the failure rate ignores the fate of 'successful cases'....". "It is well for the obstetrician-gynaecologist to recognise the impact on the total emotional life of his patient and her family of the operation he performs".

The 1970's.

In the 1970's, laparoscopic methods of sterilisation had become established making possible minimal operating times and earlier discharge from hospital. Steptoe (1970, ref. 68), in this country, published an early follow-up report of 278 women sterilised by laparoscopic diathermy. Thompson & Wheelless (1971, ref. 71), in Baltimore, demonstrated that the technique was applicable to outpatients and reported the prospective series of 300 patients as well as a retrospective group of 366. A few years later, occlusive devices were being commonly used for tubal sterilisation.

During the decade, there was a growing awareness of possible side-effects of oral contraceptives, especially in women over 35 years. Criteria of acceptance for operation by gynaecologists were becoming more liberal and sterilisation was increasingly done as the contraceptive choice of younger women of low parity.

Several authors published retrospective studies on the emotional reaction to sterilisation and on psychological and psychiatric aspects (Sim et al, 1973, ref. 63 ; Ansari & Francis, 1976, ref. 6 ; Kopit & Barnes, 1976, ref. 39).

Prospective studies involving post-operative follow-up at scheduled intervals were done by Campanella & Wolff (1975, ref. 13)/

(1975, ref.13) and also by Smith (1979, ref. 65) in Dundee. Using the General Health Questionnaire, Smith also screened patients for psychiatric morbidity, identifying "psychiatric cases" at the time of referral. In India, Khorana & Vyas (1975, ref.38) described a prospective study by structured interviews and questionnaires, of 500 women and their husbands.

Several authors studied the timing of sterilisation, its effect on outcome and its relationship to satisfaction with the operation. Emens & Olive (1978, ref.25) concluded that "the greater the interval from any obstetric event, the better the results of sterilisation". Mowat (1974, ref. 45) in Glasgow, wrote on "delayed postpartum sterilisation" and studied the number of patients who subsequently reconsidered their original request for sterilisation in this "cooling off period". From Singapore, Cheng (1979, ref. 18) studied sterilisation in relation to induced abortion and reported on 406 women who "volunteered to be allocated randomly to either a concurrent induced abortion/sterilisation group or a group which was sterilised six weeks after abortion". From the responses of the interval group, it was estimated that 2-10% of women sterilised at the time of therapeutic abortion would have changed their minds. This was "set against the 4% of women who became pregnant again before being sterilised".

Much interest and controversy arose over possible gynaecological sequelae of sterilisation. Muldoon (1972, ref. 46) followed/

followed up 374 patients for 10 years after sterilisation and found that 43% had required subsequent gynaecological surgery. He advocated selective hysterectomy sterilisation in highly parous patients and in those who had previous menstrual disorders.

Neil et al (1975, ref. 47) investigating menstruation after sterilisation, studied a laparoscopic diathermy group, a tubal ligation group and a control group whose husbands had undergone vasectomy. The combined sterilised group reported excessive menstrual loss and menstrual pain much more frequently than did the control ($p < 0.001$). The laparoscopic group was worse than the laparotomy group as regards menstrual loss and pain. Laparoscopy and laparotomy sterilisation were also compared by Chamberlain & Foulkes (1976, ref. 16), who pointed out that heavier periods after sterilisation may be related to withdrawal of oral contraception rather than sterilisation itself.

Towards the end of the decade, potentially reversible methods of tubal occlusion, using metal clips or "silastic" rubber bands were being increasingly employed. Lieberman et al (1978, ref. 41) were able to report data from four United Kingdom hospitals on 504 sterilised women in a study of menstrual patterns using a spring loaded clip. The authors concluded that sterilisation alone, using the spring clip method, is not associated with menstrual changes in the year following operation.

Menstrual disturbances following tubal occlusion had been attributed to disruption of the utero-ovarian blood supply, especially/

especially by extensive cauterisation at laparoscopy. Edgerton (1978, ref.22) compared 517 women sterilised by a technique causing marked tissue destruction with 495 patients sterilised with minimal tissue damage. There was no statistically significant difference between groups for incidence of abnormal uterine bleeding, pelvic pain or dysmenorrhoea. This led the author to conclude that, "it is questionable that the disruption of the blood supply was responsible for the subsequent abnormal uterine bleeding or dysmenorrhoea".

Unlike the work of Neil and his colleagues, the studies of Lieberman et al and Edgerton did not have control groups of non-sterilised women. A different approach is provided by the report of Poma (1980, ref. 54) who compared "hospitalisation experience" of 514 sterilised women over seven years with that of non-sterilised patients matched for age and parity. Comparison of hospital records showed that, when admissions for delivery were discounted, there was a 2:10 fold preponderance of readmission among sterilised women" depending on age group. Also, 22 (4.3%) of the sterilised women were readmitted because of "menstrual irregularities" compared with only two (0.4%) of controls.

With the dramatic increase in the numbers of sterilisations performed, the question of sterilisation failure and tubal pregnancy assumed clinical significance. The clinical presentation and diagnostic difficulties were discussed by Chakravarti & Shardlow (1975, ref. 15). Hughes (1980, ref. 36) pointed/

pointed out that "patients who had been sterilised by laparoscopic tubal cautery were more likely to have ruptured ectopic pregnancy with acute blood loss and shock than those who had open tubal ligation, which was associated with a more chronic form of this condition".

From a review of 10,174 sterilisations and a study of 51 pregnancies due to failure, Cheng et al (1977, ref. 17) noted that most failures occurred three to six months after sterilisation and "only two occurred later than 24 months after the procedure". The authors stressed the importance of quoting cumulative failure rates calculated by life table procedures, in order to achieve a worthwhile comparison of published failure rates.

Microsurgical techniques for reversing tubal sterilisation were reported on and Winston (1977, ref. 78) reviewed 103 women requesting sterilisation reversal. Henrion et al (1979, ref. 34) in France, observed that "requests for re-permiabilisation surgery, previously rare, are becoming more common". From the study of 36 patients requesting sterilisation reversal, Thomson & Templeton (1978, ref. 72) emphasise that the psychological consequences of sterilisation are still poorly understood and that a small minority of patients, "not only bitterly regretted their decision, but also had serious problems adjusting to being sterilised". Dubuisson et al (1980, ref. 21) concurred with Winston that it is "particularly unwise to sterilise women immediately after/

after pregnancy or if their marriage is in jeopardy" and point out that in a certain number of their series, marital discord and instability at the time of sterilisation made regret almost predictable.

PLAN FOR THE STUDY.

After reviewing the literature on female sterilisation, my interest, which had developed slowly from a number of small events in the course of daily contact with patients, led to the stage of deciding on a design for the study.

The realisation that an important change was occurring in attitudes and in contraceptive practice had been brought home to me by the rapid increase in demands from women patients for the secure family limitation afforded by surgical sterilisation. The obstetric work-load of the practice had always been heavy due to the preponderance of young married couples in the practice population (Fig. A2). Perhaps due to the expansion of employment opportunities for married women and the consequent raising of life-styles in the town, more women seemed to be seeking increased freedom from childbearing and childrearing. This, combined with a disenchantment with standard contraceptive methods, seemed to be causing in the practice the sort of increase in female sterilisation that had been reported in the literature.

Sim et al (1973, ref. 63) had reported that laparoscopic sterilisation was "the commonest gynaecological operation (apart from abortion) performed in Birmingham". Wolff & Pegden (ref. 80) in 1972, found 11% of couples "definitely sterile" due to surgery or injury compared with 2% five years previously. Teper (1977, ref. 69) had estimated that the ultimate levels of sterilisation in a cohort of Aberdeen couples followed up from 1971 would reach 46% for females and 8% for males.

I had observed in the practice (page 25) a number of cases where the psycho-social outcome of sterilisation was unsatisfactory. In addition, I had the clinical impression that sterilised women complained more frequently of menstrual problems. Both of these subjects had been discussed in the literature by psychiatrists and obstetricians, but with the exception of one small series of 61 sterilised women (Curtis, 1979, ref. 19), I could find no literature from general practice.

In addition to the interest aroused by this change affecting my practice, I was aware of deficiencies in my knowledge and the need to develop new skills of counselling appropriate to the changing circumstances. Barglow & Eisner (1966, ref. 9), from their impressive study of tubal ligation in Switzerland, list the "conventional conditions" or rules, for acceptance of patients for sterilisation:-

- (1) A patient should be at least 30 years old with at least three living children including the infant just delivered.
- (2) A patient should be psychologically "normal" and have the full consent of her husband to undergo the operation.

Patients not conforming to these "conditions" were referred for psychiatric screening before being listed for operation.

During the 1960's, in Sweden (Ekblad, 1961, ref. 24) and in the U.S.A., hospital "sterilisation committees" seemed to be quite common. These groups had the power to sanction or refuse sterilisation.

Solid rules, more appropriate to the "disease model" often followed in the management of pregnancy and abortion, have given way to guidelines and a more functional approach. With the dramatic increase in sterilisation for non-medical indications, (Adams, 1964, ref. 2), it is now recognised as arbitrary to limit operation to those who meet pre-set criteria of age and parity. The woman requesting sterilisation is usually not ill and is exercising a personal choice of contraception. A patient is often pressing and the doctor reluctant. Social factors are important statistically, but the life pattern of the patient is of greater consequence in the individual case.

Several authors (Nichols, 1973, ref. 49; Sim et al, 1973, ref. 63) list personality and psychiatric contra-indications. Baudry et al (1971, ref. 11) detail their interview technique for the "assessment of patients seeking tubal sterilisation on psycho-social grounds". In-depth psychiatric or personality assessment before sterilisation is no guarantee of eventual satisfaction and is probably impossible logistically. However, it would certainly seem that "there is no evidence that psychiatrists, social workers or others need to be routinely involved", (Smith, 1979, ref. 65).

A good doctor/patient relationship is probably a cardinal factor for good outcome and psychological response. In this respect the general practitioner is often well placed to provide suitable counselling as he usually knows a good deal about the individual/

the individual, the marriage and the family. The responsibility on him is correspondingly great and the acceptance of a counselling role implies a willingness to spend time trying to assess the couple's motivation in requesting sterilisation for the wife, to analyse the role they think their sterilisation will play in their lives and to help avoid precipitate decisions.

With these various questions in mind, the study was planned to take the following form:--

Part I.

INTRODUCTION.

An introduction to the practice and the practice population to conclude with a statement of aims. This to be followed by a review of the literature leading to a plan or design for the study.

Part II.

THE PRACTICE STUDIES.

Research projects within the practice aimed at identifying cases, enumerating and classifying the operations done and studying the indications. Patients to be interviewed to assess outcome with a view to improving future management and counselling of patients requesting sterilisation.

The practice studies to take the form:-

- (a) Preliminary record search (Chapter 3).
- (b) Random sample of married women in the practice (Chapter 4).
- (c) Follow-up of 375 sterilised women (Chapter 5).
- (d) Comparison with matches (Chapter 6).
- (e) How patients felt about their sterilisation (Chapter 7).

Part III.

CONCLUSIONS AND GUIDELINES FOR COUNSELLING.

To be discussed under the headings:-

- (a) Review of Methods.
- (b) Commentary on several aspects of sterilisation.
- (c) Guidelines and Sterilisation counselling.
- (d) Clinical Conclusions.
- (e) Personal Conclusions.

CHAPTER 3.

THE PRELIMINARY RECORDS SEARCH.

The records search was carried out to estimate the number of women in the practice who had undergone elective sterilisation and thus to gauge the extent of the subject to be studied.

METHOD.

The practice records have been deliberately prepared for teaching and research over a number of years. Specially prepared A4 folders are used for the medical records, which are backed up with morbidity registers. During the change-over from the old EC5/6 record system (using 4½" x 7½" envelope), particular care was taken to range in chronological order all notes and letters dating from previous practices and to marry these with data arising from contacts with this present practice. These general practice notes provide a comprehensive record of contacts between patients and health services, both in the community and in hospital.

Operation notes and consultant's letters are routinely filed in the patient's medical record and they provided firm data on operations done during the time patients were with this practice. In many cases a copy of the referral letter was also available, so that the doctor's indications for operation at the time of referral were established and could be compared with those/

those given retrospectively by the patient at interview. Information on operations done before the patient joined my group practice was less uniform. In a few cases no old records of any kind were ever received for patients joining the practice. The patients who had been operated on in the puerperium were less well documented than those who had interval operations and thus had discharge letters from a gynaecology unit. It may be that obstetric units are more busy or that discharge slips from these units tend to be flimsier and less likely to be recognised and filed by practice staff. Formal typed summaries of obstetric cases were less frequently found in patient records.

The search was carried out by me between October and December 1976. It was decided to look at the records of patients in the 20/50 year age range as being likely to contain almost all women who had sterilisation operations. The records of female patients with dates of birth 1926/1955 inclusive were extracted alphabetically in batches, surveyed and then replaced after marking to indicate that the notes had been searched. From October 1976 onward, careful note was kept of all female patients in the age group who left or joined the practice. All incoming records were searched for reference to gynaecological operations. A final survey was done on Sunday, 12th December 1976, when the Health Centre was closed, having previously arranged that all records held by the doctors or the secretary would be returned to the files. All records not marked as previously searched were removed and examined on this day.

RESULTS.

From a practice population of 9,624 patients, the case notes of 2,123 women in the age range 21/50 years were studied. Record of elective sterilisation was found in 272 patients (12.8%) and nine patients were on the waiting list for sterilisation. Remedial operations resulting in sterility (hysterectomy and oophorectomy/salpingectomy) had been done in 46 patients (2.2%).

Patients who had had elective sterilisation were classified only as such, but may also have had other procedures at the same or different times. Patients who had not been sterilised and had more than one gynaecological procedure were classified according to the clinically most significant condition.

In the whole group of women surveyed, 655 patients (30.8%) had records of gynaecological surgery having been done. The results of the search are detailed in Table No. B1.

DISCUSSION.

Two main sources of error were anticipated in this method of estimating the number of women in the practice who had undergone elective sterilisation. Firstly, not all operations done would be recorded in the notes, so the method could not identify all cases however carefully it was carried out.

Secondly,/

Secondly, medical records in the practice files do not represent a completely accurate list of patients at risk to the practice at any one time. Records are held for patients who have left the practice and may not have re-registered with another N.H.S. doctor and thus have their notes recalled. In the same way, new patients may have registered and be receiving treatment and yet the records of their previous illnesses may not be received for some months. In practice these two tendencies probably balance out and have little influence on the results as the group practice total list has been stable for some years.

These discrepancies were expected to result in an underestimate of the number of cases in the practice, but the magnitude of this underestimate is uncertain. By records survey, the minimum prevalence of sterilisation among all adult women in the practice was estimated at 12.8%. The records search was valuable, however, in estimating the extent of the problem to be studied and as a base line for the process of case identification.

It should be made clear that for the record search the denominator is all adult women in the practice. None of the sterilised women discovered by the search was single and the random sample described in the next chapter was therefore drawn from married women. The denominator for the random sample is married women and for the record search is adult women, married and single.

TABLE NO. B1.CORRECTED FIGURES FROM SEARCH OF RECORDS DONE 12th Dec., 1976.

Practice population - 9,624.

Age group studied - Female patients with dates of birth 1926-1955
inclusive.

	<u>No. of Patients</u>	<u>% of Group</u>
Total in Group.	2,123	100%
<hr/>		
Elective Sterilisation	272	12.8%
Waiting List for Sterilisation	9	0.4%
Operation arranged patient changed mind	14	0.7%
Changed decision to Vasectomy	3	0.1%
Intrauterine contraceptive device (ever-use)	82	3.9%
Infertility Investigations	46	2.1%
Hysterectomy	41	1.9%
D & C and Cautery ++	33	1.6%
D & C alone ++	46	2.2%
Cautery alone	48	2.3%
Oophorectomy/salpingectomy	5	0.2%
Diagnostic laparoscopy	8	0.4%
Repair operation	7	0.3%
Other minor procedures *	24	1.1%
Not yet classifiable - incomplete information	17	0.8%
	<hr/> 655 <hr/>	<hr/> 30.8% <hr/>

++ Elective only, not terminations or spontaneous abortions.

* "Other" includes for example Bartholin abscess, myomectomy, ovarian cystectomy, cone biopsy etc.

Of all the women in the group ("in childbearing years"):-

(1) Over 30% have had some gynaecological procedure.

(2) Over 12% have been sterilised surgically.

CHAPTER 4.

THE RANDOM SAMPLE OF MARRIED WOMEN IN
THE PRACTICE.

This study was undertaken in the summer of 1977
in order to:-

- (1) Provide a more accurate estimate of the prevalence of female sterilisation in the practice population.
- (2) To determine rates for some of the variables to be examined in the main study.

METHOD.

The sample of female patients, with dates of birth 1926/55 inclusive, was taken from the practice age/sex register. Patients in each five year age stratum were numbered and a 1:10 sample was drawn using a table of random numbers. There is no known case in the practice of a single woman being sterilised and single women were excluded. "Married", is taken to include divorced, separated and widowed.

When patients were being numbered in the age/sex register, no information was available on current marital status. Similarly, it was not known how many patients might still be on the register when they had in fact left the practice. After a chosen patient was identified in the age/sex register, her medical record card was withdrawn to check and tag. If the patient was known by the doctor or staff to be definitely single, or to have left/

left the practice, she was replaced in the group by the next patient in the register. For example, if number 56 was drawn and found to be single, she was replaced in the group by number 57. Questionnaires returned by single women were rejected, as were questionnaires returned by the G.P.O. as undeliverable. These patients were replaced in the way described above. The current Voter's Roll was checked against their last known address before any patient was replaced as having left the district.

The 216 patients thus identified were sent a two page questionnaire. Patients who did not reply received a follow-up letter with duplicate questionnaire.

One hundred and seventy-seven husbands of the women responding were patients of the practice and their records were examined to give some estimate of the prevalence of male sterilisation.

RESPONSE.

From the 216 patients sent questionnaires, replies were obtained in the first instance from 187 (86.6%). The 29 patients who did not reply were sent a follow-up letter with duplicate questionnaire and this was returned by 19 patients (65.5% of those followed-up). Efforts were made to contact the remaining patients by visiting and a few more forms were completed in this way. Of the 216 women contacted, 210 responded, four declined/

declined to participate and two could not be contacted even by visiting. One of these two patients who could not be contacted returned a completed questionnaire some considerable time after the results had been analysed. She was therefore regarded as a non-responder. The over-all response rate is thus 97.2%. A study of the practice records of the non-responders showed one of the six to have been sterilised (16.7%) which is consistent with the percentage of those responding (18.6%).

COMPOSITION OF THE SAMPLE.

The composition of the sample is detailed in Table No. C1.

RESULTS.

PREVALENCE OF STERILISATION.

Of the 210 women responding, 39 (18.6%) had undergone tubal ligation or diathermy. The percentage sterilised in each age group is given in Table No. C2. Note that the age groups having the highest percentage of sterilised women are over represented in the practice population vis-a-vis of that of Glenrothes town (see and compare Table No. A1 with Table No. C2).

The sample reflects the age distribution of the population of married women from which it was drawn and as each member of the relevant population had an equal and independent chance/

chance of selection, it is possible to calculate limits within which the population parameters are likely to lie. In this way, the 95% confidence limits for the percentage of married women who have had elective sterilisation are 13.3% - 23.8%.

Though the main purpose was to review female sterilisation, an attempt was made to estimate the relative importance of vasectomy in the practice population. Of the sample of 210 women, 177 had husbands registered with the practice and the records of these men were reviewed. Seven of the 177 men (4.0%) were recorded as having vasectomy and one had a history of severe orchitis, but there is no indication whether or not this affected subsequent fertility. There was no case of both husband and wife having a sterilisation operation.

Two women in the group had hysterectomy for medical rather than contraceptive reasons and four women who had infertility investigations had remained childless.

SOCIAL CLASS.

The assessment of social class was based on husband's occupation or own occupation if separated, divorced or widowed. The professional and managerial groups (I & II) represent together 18% of the population, clerical and skilled artisans (III) 48% and semi-skilled and unskilled (IV & V) 34%. The distribution of social class by age is given in Table No. C3.

ORIGIN OF PATIENTS (Born in Fife or not).

Being a new town with ample new housing and developing industry, Glenrothes tends to attract large numbers of people from outwith the old county boundaries. In case the incoming population should differ significantly in characteristics or attitudes, the question was asked, "Were you born in Fife? If not, in which town were you born?". Of the total of 210 women, 80 (30.1%) were born in Fife (Table C4).

MARITAL STATUS.

Patients were asked their present marital status and whether or not they had married more than once. Single women had been excluded when the sample was drawn. In the whole sample, 195 women (93%) were presently married and of these 189 women (96.9% of those married) were in their first marriage. The proportion in this age group of widows and divorced and separated women in this practice is therefore small (Table C5).

LIVE BIRTHS.

For the whole sample of 210 women, the mean number of live births is 2.28 : nineteen women were childless and none had more than five live births. The distribution of live births within the sample is given in Table C6.

AGE AT DELIVERY OF FIRST SURVIVING CHILD.

The group is tabulated according to age at delivery of first child surviving to the time of the survey and the results are given in Table C7. The mean age at delivery for the whole sample is 23.2 years.

INDICATIONS OF PSYCHIATRIC ILLNESS.

Different indices of psychiatric illness were sought, viz.,

- (1) History of taking psychotropic drugs,
- (2) History of overdose or attempted suicide, and
- (3) History of consulting a psychiatrist.

Psychotropic Drugs - The question was asked, "Have you ever had tablets from any doctor for a nervous condition?". This was presumed to indicate the numbers of women who had ever been sufficiently disturbed to have required prescription of psychotropic drugs. No attempt was made to determine when the drugs were taken or for how long. In the whole sample of 210 women, 109 (51.9%) had taken psychotropic drugs. The proportion ranged from 45% in younger women to 64% in the older. The complete figures are given in Table C8.

OVERDOSE OR ATTEMPTED SUICIDE.

Nine of the 210 patients answered "Yes" to this question giving a rate for the whole sample of 4.3%. The full distribution is given in Table C9.

CONSULTATION WITH A PSYCHIATRIST.

The question asked was, "Have you ever consulted a specialist (psychiatrist) for a nervous condition?". It might be expected that all patients answering 'Yes' to the question on attempted suicide might also affirm having "seen a psychiatrist". This was not the case. The records of patients answering 'Yes' to attempted suicide and 'No' to consulting psychiatrists were surveyed. When the attempt was recent, a discharge letter from the medical ward was generally found. A psychiatric opinion was not invariably sought, thus tending to confirm the validity of the patients' answers.

Fifteen patients answered affirmatively, giving the rate for the whole sample of 7.1%. A full distribution is given in Table No. C10.

RELIGIOUS BELIEF OR CONVICTION.

The question, "Do you have religious belief or conviction?" was judged more relevant than asking religious denomination. One might expect Roman Catholic patients to show different attitudes to sterilisation, termination of pregnancy and contraception than women in other religious groups. While this is almost certainly the case to some extent, the author's experience in the practice in prescribing oral contraceptives, suggests that this influence may be relatively small. Had the question been phrased with reference to religious denomination, a greater/

greater error may have arisen as patients may have felt obliged to declare some "family" affiliation, while they themselves had no observance. In the whole sample, 134 women claimed religious belief or conviction, a rate of 63.8%. Table No. C11 gives detailed figures and demonstrates a clear relationship between age and religious belief. In the youngest age group, 50% had religious belief or conviction compared to 84% in the oldest age group.

FURTHER EDUCATION.

It was hoped that the answers to this question and to the question on smoking habits might provide some indication of intelligence and personality. The question was asked, "At what age did you leave full-time education (school or college)?" Patients who remained at school or college after the age of 15 years were counted as having had further education. In the whole sample of 210 women, 53 (25.2%) had followed further education at least for a time. A full distribution is given in Table No. C12.

CIGARETTE SMOKING.

The distribution of cigarette smokers by age groups is given in Table No. C13. For the whole sample, 92 women (43.8%) were cigarette smokers.

INFERTILITY INVESTIGATIONS.

Patients were asked whether or not they had ever had infertility investigations and the results are detailed in Table No. C14. Of/

Of the 210 patients in the sample, eleven (5.2%) had a history of infertility investigations. One of the eleven patients who had been investigated had been sterilised after bearing children. Of the ten other women, six were parous and four were childless, though one had conceived and miscarried.

PHLEBITIS OR THROMBOSIS.

Patients were asked whether or not they had ever had phlebitis or thrombosis. Thirteen patients (6.2%) answered affirmatively. No patient had a history of cardiac or cerebral thrombosis or any complication (e.g., pulmonary embolism) of leg vein thrombosis. The distribution is detailed in Table C15.

EVER-USE OF CONTRACEPTIVES.

A list of contraceptive methods was included in the questionnaire and patients asked to underline each that they had used at any time. As expected, there was considerable variation between the age groups and two responding patients in the oldest group did not answer the question. The frequency distributions are given in Table C16. Of the 208 patients, twelve (5.8%) had never used contraceptives. An oral contraceptive had been taken by 144 patients (69.2%) and the ever-use of oral contraception varied from 22% in the oldest group to 100% in the youngest. The condom had been used by 111 (53.4%) while an occlusive cap had been used by only 23 patients (11.1%) and an interuterine device by 14 patients (6.7%).

MENSTRUAL, SEXUAL AND FAMILY PROBLEMS*

Patients were asked the general question whether they were having problems with their monthly periods, in their sex life, or in their family life. Three women were post-menopausal, giving a base number for menstrual problems of 207 rather than 210. The numbers answering 'Yes' in each category were:-

	<u>Base Number</u>	<u>Number answering 'Yes'</u>
Menstrual problems	207	58 (28.0%)
Sexual problems	210	33 (15.7%)
Family problems	210	54 (25.7%)

The prevalence of menstrual, sexual and family problems in the various age groups is given in Tables C17, C18 and C19 respectively. There was little difference in the prevalence of menstrual disturbances between the age groups but there are noticeable differences between the age groups in the percentage of women with sexual problems and this is shown diagrammatically in Fig. C1 (after Table No. C18). The distribution for family problems is illustrated in Fig. C2 (after Table No. C19).

* These questions are discussed more fully in Chapter 7 under, "Patients and Method" and also under "Changes after Sterilisation - The Patient's View".

AGE AT OPERATION.

The range of ages at operation for the 39 sterilised patients ranged from 22/44 years. The mean age at operation was 32.3 years (standard deviation 5.9).

INDICATIONS FOR STERILISATION.

An estimate of the relative importance of medical and social indications for sterilisation was obtained from the sample. The principal indication for operation in the 39 sterilised women was:-

Medical	3 (7.7%)
Psychiatric	2 (5.1%)
Obstetric	8 (20.5%)
Social, including 'own wish'	26 (66.7%)

In 15 (38.5%) of patients, difficulty with current contraception was given as a subsidiary indication.

INDICATIVE DIFFERENCES BETWEEN STERILISED WOMEN
AND OTHERS.

LIVE BIRTHS.

Of the 210 women in the whole sample, 191 had borne at least one child. One hundred and fifty nine women had two or more live births. For the 39 patients voluntarily sterile, the mean number of live births is 2.85 compared with a mean of 2.15 for the rest of the sample. This difference is statistically significant ($p < 0.01$). The distribution of live births for the voluntarily sterile and others is given in Table C20.

HISTORY OF THERAPEUTIC ABORTION.

When the sterilised and 'others' are compared for history of therapeutic abortion, the difference between groups is highly significant ($p < 0.001$). See Table C21. However, all ten sterilised women had a therapeutic abortion at the time of sterilisation and five of the ten had more than one termination. Of the other 29 sterilised women, none had a history of therapeutic abortion at any time. None of the women in the 'other' group had more than one termination. The difference is due to this sub-group of the sterilised women.

MENSTRUAL PROBLEMS.*

The general question was asked, "Do you have problems with your monthly periods?". Three women were post-menopausal; of the remainder, 58 (28.0%) had menstrual problems. There was little difference in the prevalence of menstrual disturbance between age groups.

The 39 sterilised women and 168 'others' are compared for menstrual problems in Table No. C22. The difference is statistically significant ($X^2 = 5.2, p < 0.05$).

Of the 168 women in the non-sterilised group, 51 (30.4%) were currently taking an oral contraceptive and 117 were not. The pill-takers showed seven (13.7%) with menstrual problems compared with 34 (29.1%) of non-takers and the difference is significant at the 5% level.

SEXUAL PROBLEMS. *

Sexual problems were reported by 33 women (15.7%) in the whole group of 210 patients. The sterilised women were found on the average to be more likely to have sexual problems; eleven of the 39 sterilised answering 'yes' compared with 22 of the 171 'others'. The difference is statistically significant ($X^2 = 4.5, p < 0.05$). The comparison between voluntarily sterile women and 'others' is detailed in Table No. C23.

* Discussed more fully in Chapters 6 and 7.

FAMILY PROBLEMS. *

In the whole group of 210 women, 54 (25.7%) were experiencing problems in their family life. In the sterilised group, 14 (35.9%) of the 39 women had family problems compared with 40 (23.4%) of the 171 'others'. The difference is not significant at the 5% level.

OTHER CHARACTERISTICS OF THE SAMPLE.

The sterilised and 'others' were compared for social class, religious belief or conviction, secondary education after 15 years, cigarette smoking, history of psychotropic drug taking and of attempted suicide, history of infertility investigations and history of phlebitis or thrombosis. In no case was this difference statistically significant at the 5% level. This comparison did, however, indicate trends which could be clearly demonstrated between the larger numbers of sterilised patients and matches compared in the main study. The detailed comparison of these other characteristics is given in Table No. C24.

* Discussed more fully in Chapters 6 and 7.

DISCUSSION.

For the purpose of sampling, the practice age/sex register was used to define the size and the age distribution of the population to be surveyed. Fraser (1978, ref. 28) has raised doubts about the reliability and validity of age/sex registers as the true population denominators in general practice. As he points out, "The practice list is not an accurate population denominator for several reasons but principally because of 'list inflation', that is where the general practitioner holds medical records for patients who are no longer under his care". The reverse situation, where a practice is at risk for patients who do not register till they become ill, was noted by Morrell (1970, ref. 44).

In this present study there are two factors which increase the reliability of the age/sex register as a true population denominator of my practice. Firstly, it has been prepared directly from the medical records held in the practice and those records are on the whole more correct for patients' names and addresses than the Family Practitioner Committee files (Farmer et al, 1974, ref. 27). The second factor is that the practice has been of stable size for some years and "This latent element of potential patients should roughly balance the inflation due to those who have left the area and not yet registered with a new doctor", (RCGP/OPCS/DHSS 1974, ref. 59).

In retrospect, the random sample proved useful in two ways. Firstly, it yielded an estimate of the prevalence of female sterilisation of 18.6% and indicated some questions to be pursued in the study of identified cases. Secondly, the process of sampling also established contact with many patients seen infrequently if at all and showed, for example, the greater prevalence of menstrual and sexual problems than I was aware of either from consultations or from the practice disease index.

Striking differences in the prevalence of sexual problems between the age groups is illustrated in Table No. C18. While young women seem to consult fairly commonly because of sexual difficulties, older women, in my experience, rarely complain directly of sexual problems. The high prevalence of sexual problems demonstrated in menopausal and pre-menopausal women is apparently not directly reflected in an increased consultation rate. Patients were asked directly about sexual problems in the course of later interviews of sterilised patients and matches. Many of the women seemed to welcome the occasion to discuss difficulties in their sex lives and it seems likely that a substantial number of consultations ostensibly for vaginal discharge or minor menstrual disturbances, represent unexpressed, and often by the doctor unrecognised, sexual anxieties.

Reasons were not sought in this study for the increased prevalence of menstrual problems in the sterilised group. Figures for the non-sterilised group demonstrated again the/

the protective effect of oral contraceptives against menstrual disorders. It may be, as suggested by Chamberlain & Foulkes (1976, ref.16) that the withdrawal of cyclic hormones after sterilisation may be more important than the operation itself in influencing menstruation. One would also expect, in some patients, that the operation would focus attention on uterine function, at least for a time.

An increasing acceptance by couples of sterilisation operations has been noted by several authors in this country. In 1973, Ann Cartwright (1976, ref.14) in a sample of 1,457 mothers in England and Wales, found that 4% had undergone sterilisation operations and predicted a rise to 11%, together with a decrease in the use of the Pill and an increasing popularity for the coil. In "Families Five Years On", Woolf and Pegden (1976, ref.80), studying the fecundity of couples in 1972, found 11% 'definitely sterile' due to surgery or injury, compared with 2% five years previously. In 1975, Whitley (1977, ref.75) from the perspective of his Edinburgh practice, reported 133 sterilised women out of 814 between the ages of 17 and 42 years, a prevalence of 16.3%. An estimate of the ultimate levels of sterilisation in a population is given by Teper (1977, ref.69) in Aberdeen. A cohort of Aberdeen couples has been followed-up since 1971 and it is estimated that the ultimate levels of sterilisation will reach 46% for females and 8% for males.

It is clear that, in this practice, elective female sterilisation is by far the most important factor permanently affecting the fertility of couples. Male sterilisation is found to a significant but lesser degree. Operations not primarily contraceptive but resulting in sterility, are of little importance (there were none in the male group) and the prevalence of primary female sterility is probably low. In terms of sterile couples, at least 21.9% were known to have chosen surgical contraception.

Multiparity is a generally accepted indication for sterilisation and in this study, as expected, the sterilised women have on average more live births than others; but they do not have excessively large families. None of the sterilised women had more than five children.

From larger surveys, it is said that the prevalence of sterilisation is inversely related to the wife's education, (Phillips, 1971, ref. 53). Woolf and Pegden (1976, ref. 80) found female sterilisation commoner in the lower socio-economic groups. Excluding hysterectomies, 7% of women with husbands in non-skilled manual occupations had been sterilised, compared with 2% of women with husbands in managerial occupations. Though no statistically significant differences emerge from this study, the findings are consistent with those in the larger surveys. It seems probable that girls who leave school at 15 years to start work will be more likely to marry younger and to be/

be in the lower socio-economic group. They may start and complete their family earlier and be less inclined to continue oral contraception or barrier methods to a more distant menopause.

An incidental, and to me surprising finding of the survey was that 43.8% of the women in the sample were cigarette smokers. The clear association between smoking and lung cancer has been common knowledge for over a decade and expensive and imaginative health education programmes have been undertaken. Despite all this, it is disappointing to realise that nearly half of the adult women in my practice continue to smoke and that the younger women, at whom much of this propaganda is aimed, seem no more enlightened than their elders. As regards contraceptive practice, it is noteworthy that all the women in the youngest age group of the sample had taken or were taking an oral contraceptive. It is also noteworthy that 6.2% of the sample, equivalent to 130 women in the whole practice, had a history of phlebitis or thrombosis which would prevent them starting or continuing an oral contraceptive. No patient, however, had a history of cardiac or cerebral thrombosis nor any complication (e.g., pulmonary embolism) of leg vein thrombosis.

Though no statistically significant difference in history of psychotropic drug taking was demonstrated between the groups, the figures for this and for a history of suicidal attempt/

attempt seemed to justify further study. General practice, with its long time-span and frequent contacts, may be a more appropriate environment than out-patient clinics in which to study these problems. Psycho-social morbidity and menstrual and sexual problems, before and after operation, are considered in Chapters 7 and 8.

TABLE NO. C1.

COMPOSITION OF SAMPLE.

Year of Birth & Group Mid-age	Number in Complete Group	Number responding	Reason for Non-Response	
			Replied Refusing	No Reply
1926-30 (49yrs)	25	25	0	0
1931-35 (44yrs)	29	28	1*	0
1936-40 (39yrs)	43	41	2	0
1941-45 (34yrs)	40	40	0	0
1946-50 (29yrs)	43	40	1	2
1951-55 (24yrs)	36	36	0	0
	216	210	4	2

RESPONSE RATE 97.2%

- * This patient is known from records to have been sterilised. Study of the medical records of the other 5 patients showed no reference to sterilisation operation. Thus 1 in 6 of non-responders is known to be sterilised (16.7%) which is consistent with percentage in those responding (18.6%).

The sample was taken from the practice age/sex register. Patients in each age stratum were numbered and a 1 in 10 sample was drawn using a table of random numbers. Single women were excluded.

TABLE NO. C2

Prevalence of Elective Female Sterilisation in Random Sample of Practice Population Surveyed in 1977.

Year of Birth & Group Mid-age	Number in Sample	Number Sterilised	% Sterilised
1926-30 (49yrs)	25	4	16.0
1931-35 (44yrs)	28	4	14.3
1936-40 (39yrs)	41	10	24.4
1941-45 (34yrs)	40	9	22.5
1946-50 (29yrs)	40	8	20.0
1951-55 (24yrs)	36	4	11.1
	210	39	18.6

RESPONSE RATE 97.2%

Prevalence elective sterilisation in whole sample 18.6%
(standard error \pm 2.7)

95% Confidence Limits for percentage in whole practice
population 13.3% - 23.8%.

TABLE NO. C3

SOCIAL CLASS

Random Sample of Practice Population Surveyed in 1977.

Year of Birth & Group Mid-age	Number in Sample	<u>SOCIAL CLASS</u>		
		I & II	III	IV & V
1926-30 (49yrs)	25	4 (16%)	12 (48%)	9 (36%)
1931-35 (44yrs)	28	8 (29%)	9 (32%)	11 (39%)
1936-40 (39yrs)	41	10 (24%)	17 (41%)	14 (34%)
1941-45 (34yrs)	40	5 (12.5%)	24 (60%)	11 (27.5%)
1946-50 (29yrs)	40	5 (12.5%)	22 (55%)	13 (32.5%)
1951-55 (24yrs)	36	6 (17%)	16 (44%)	14 (39%)
	210	38 (18%)	100 (48%)	72 (34%)

RESPONSE RATE 97.2%

Assessment of social class was based on husband's occupation or own occupation if separated, divorced or widowed.

Key:- I & II - Professional and Managerial.
 III - Clerical and skilled artisan.
 IV & V - Semi-skilled and unskilled.

TABLE NO. C4

ORIGIN OF PATIENTS (Born in Fife or not).

Random Sample of Practice Population Surveyed in 1977.

Year of Birth & Group Mid-age	Number in Sample	Number Born in Fife
1926-30 (49yrs)	25	7 (28%)
1931-35 (44yrs)	28	9 (32%)
1936-40 (39yrs)	41	15 (37%)
1941-45 (34yrs)	40	20 (50%)
1946-50 (29yrs)	40	12 (30%)
1951-55 (24yrs)	36	17 (47%)
	210	80 (38.1%)

RESPONSE RATE 97.2%

1. Rate for whole sample is 38.1% (standard error \pm 3.35)
2. Question asked was, "Were you born in Fife? If not, in which town were you born?".

TABLE NO. C5

MARITAL STATUS

Random Sample of Practice Population Surveyed in 1977.

Year of Birth & Group Mid-age	Number in Sample	Now Married		Divorced or Separated	Widow
		First Marriage	Second or Subsequent		
1926-30 (49yrs)	25	22	2	0	1
1931-35 (44yrs)	28	24	0	3	1
1936-40 (39yrs)	41	36	1	4	0
1941-45 (34yrs)	40	33	3	4	0
1946-50 (29yrs)	40	38	0	2	0
1951-55 (24yrs)	36	36	0	0	0
	210	189	6	13	2

RESPONSE RATE 97.2%

1. Single women were excluded from the sample.
2. For whole group:-

Married	-	195 (93%)
Divorced or separated	-	13 (6%)
Widowed	-	2 (1%)
		<u>210 (100%)</u>
3. Patients were asked both their present marital status and whether or not they had married more than once.
4. None of the women in the divorced or widowed categories had been married more than once.

TABLE NO. C6

LIVE BIRTHS.

Random Sample of Practice Population surveyed in 1977.

Year of Birth & Group Mid-age	Number in Sample	Number of Live Births						Mean
		0	1	2	3	4	5	
1926-30 (49yrs)	25	1	2	9	8	1	4	2.72
1931-35 (44yrs)	28	0	6	8	5	6	3	2.71
1936-40 (39yrs)	41	3	2	19	10	4	3	2.46
1941-45 (34yrs)	40	1	5	14	13	5	2	2.55
1946-50 (29yrs)	40	6	7	14	10	2	1	1.95
1951-55 (24yrs)	36	8	8	15	5	0	0	1.47
	210	19	30	79	51	18	13	2.28

RESPONSE RATE 97.2%

1. For the whole sample:-

Mean = 2.28 (standard error \pm 0.087)

Standard deviation = 1.26.

TABLE NO. C7

AGE AT DELIVERY OF FIRST SURVIVING CHILD.

Random Sample of Practice Population Surveyed in 1977.

Age Range in Years	Numbers of Women
17-19	38 (19.9%)
20-22	65 (34.0%)
23-25	37 (19.4%)
26-28	27 (14.1%)
29-31	15 (7.9%)
32-34	6 (3.1%)
35-37	1 (0.5%)
38-40	2 (1.1%)
	<u>191 (100%)</u>

1. Mean for whole sample is 23.2 years (standard error \pm 0.32).
2. Of the 210 women in the sample, 19 were childless, leaving analysis to be done on 191.

TABLE NO. C8

PSYCHOTROPIC DRUGS

Patients with History of taking Psychotropic Drugs in Random Sample of Practice Population.

Year of Birth & Group Mid-age	Number in Sample	History Psychotropic Drugs
1926-30 (49yrs)	25	16 (64.0%)
1931-35 (44yrs)	28	13 (46.4%)
1936-40 (39yrs)	41	24 (58.5%)
1941-45 (34yrs)	40	23 (57.5%)
1946-50 (29yrs)	40	18 (45.0%)
1951-55 (24yrs)	36	15 (46.6%)
	210	109 (51.9%)

RESPONSE RATE 97.2%

1. Rate for whole sample is 51.9% (standard error \pm 3.45).
2. Question asked was "Have you ever had tablets from any doctor for a nervous condition?".

TABLE NO. C9

PATIENTS WHO HAVE TAKEN AN OVERDOSE OR ATTEMPTED SUICIDE.

Random Sample of Practice Population Surveyed in 1977.

Year of Birth & Group Mid-age	Number in Sample	Numbers with History of Overdose or Suicide Attempt
1926-30 (49yrs)	25	2 (8%)
1931-35 (44yrs)	28	1 (4%)
1936-40 (39yrs)	41	2 (5%)
1941-45 (34yrs)	40	3 (8%)
1946-50 (29yrs)	40	0
1951-55 (24yrs)	36	1 (3%)
	210	9 (4.3%)

RESPONSE RATE 97.2%

1. Rate for whole sample is 4.3% (standard error \pm 1.4)
2. The question wasked was, "Have you ever taken an overdose or attempted suicide?".
3. A question was also asked regarding psychiatric in-patient admission, but numbers were too small to justify tabulation.

TABLE NO. C10

PATIENTS WHO HAVE CONSULTED A PSYCHIATRIST.

Random Sample of Practice Population Surveyed in 1977.

Year of Birth & Group Mid-age	Number in Sample	Numbers with History of Consulting a Psychiatrist.
1926-30 (49yrs)	25	2 (8%)
1931-35 (44yrs)	28	2 (7%)
1936-40 (39yrs)	41	5 (12%)
1941-45 (34yrs)	40	0
1946-50 (29yrs)	40	4 (10%)
1951-55 (24yrs)	36	2 (6%)
	210	15 (7.1%)

RESPONSE RATE 97.2%

1. Rate for whole sample is 7.1% (standard error ± 1.8)
2. Question asked was, "Have you ever consulted a specialist (psychiatrist) for a nervous condition?". It might be expected that all patients answering 'yes' to the question on attempted suicide might also affirm having "seen" a psychiatrist. This was not the case. The records of patients answering 'yes' to attempted suicide and "no" to consulting psychiatrist were surveyed. When the attempt was recent, a discharge letter from the Medical Ward was generally found. A psychiatric opinion was not invariably sought, thus tending to confirm the validity of patients' answers.

TABLE NO. C11

RELIGIOUS BELIEF OR CONVICTION.

Random Sample of Practice Population Surveyed in 1977.

Year of Birth & Group Mid-age	Number in Sample	Number Replying 'Yes'
1926-30 (49yrs)	25	21 (84%)
1931-35 (44yrs)	28	20 (71%)
1936-40 (39yrs)	41	27 (66%)
1941-45 (34yrs)	40	25 (63%)
1946-50 (29yrs)	40	23 (58%)
1951-55 (24yrs)	36	18 (50%)
	210	134 (63.8%)

RESPONSE RATE 97.2%

1. Rate for whole sample is 63.8% (standard error \pm 3.32)
2. Question was, "Do you have religious belief or conviction?".

TABLE NO. C12

FURTHER EDUCATION.

Random Sample of Practice Population Surveyed in 1977.

Year of Birth & Group Mid-age	Number in Sample	Number with Full Time Education beyond age 15.
1926-30 (49yrs)	25	5 (20%)
1931-35 (44yrs)	28	9 (32%)
1936-40 (39yrs)	41	11 (27%)
1941-45 (34yrs)	40	4 (10%)
1946-50 (29yrs)	40	10 (25%)
1951-55 (24yrs)	36	14 (39%)
	210	53 (25.2%)

RESPONSE RATE 97.2%

1. Rate for whole sample is 25.2% (standard error \pm 3.0).
2. Question asked was "At what age did you leave full time education (school or college)?".

TABLE NO. C13

CIGARETTE SMOKING

Random Sample of Practice Population Surveyed in 1977.

Year of Birth & Group Mid-age	Number in Group	Number who smoke Cigarettes
1926-30 (49yrs)	25	14 (56%)
1931-35 (44yrs)	28	11 (39%)
1936-40 (39yrs)	41	12 (29%)
1941-45 (34yrs)	40	18 (45%)
1946-50 (29yrs)	40	22 (55%)
1951-55 (24yrs)	36	15 (42%)
	210	92 (43.8%)

RESPONSE RATE 97.2%

1. Rate for whole sample is 43.8% (standard error \pm 3.4)
2. Question asked was "How many cigarettes do you smoke per day?".

TABLE NO. C14

INFERTILITY INVESTIGATIONS.

Patients with History of Infertility Investigations in Random Sample of Practice Population Surveyed in 1977.

Year of Birth & Group Mid-age	Number in Sample	Number with History of Infertility Investigations.
1926-30 (49yrs)	25	2 (8%)
1931-35 (44yrs)	28	3 (11%)
1936-40 (39yrs)	41	1 (2%)
1941-45 (34yrs)	40	1 (2%)
1946-50 (29yrs)	40	4 (10%)
1951-55 (24yrs)	36	0
	210	11 (5.2%)

RESPONSE RATE 97.2%

1. Rate for whole sample is 5.2% (standard error ± 1.54)
2. One of the 11 patients with a history of infertility investigations had been sterilised after bearing children (i.e., 1 in 39 sterilised women in the whole sample).
3. Of the 10 women in the "other" group, 6 were parous and 4 were childless, though one had conceived and miscarried.

TABLE NO. C15

PHLEBITIS OR THROMBOSIS.

Patients with History of Phlebitis or Leg Vein Thrombosis in
Random Sample of Practice Population Surveyed in 1977.

Year of Birth & Group Mid-age	Number in Sample	Number with History of Phlebitis .
1926-30 (49yrs)	25	1 (4%)
1931-35 (44yrs)	28	5 (18%)
1936-40 (39yrs)	41	2 (5%)
1941-45 (34yrs)	40	3 (8%)
1946-50 (29yrs)	40	1 (3%)
1951-55 (24yrs)	36	1 (3%)
	210	13 (6.2%)

RESPONSE RATE 97.2%

1. Rate for the whole sample is 6.2% (standard error ± 1.66)
2. No patient had history of cardiac or cerebral thrombosis nor of any complication (e.g., pulmonary embolism) of leg vein thrombosis.

TABLE NO. C16
EVER - USE OF CONTRACEPTIVES BY AGE GROUP.

Year of Birth & Group Mid-age	Number in Sample	NUMBER WHO HAVE EVER USED:									
		NONE	PILL	I.U.C.D.	CAP	CONDOM	SPERMI-CIDES ALONE	C.I.	SAFE PERIOD	OTHER	
1926-30 (49yrs)	23*	3 (13%)	5 (22%)	0	2 (9%)	2 (9%)	3 (13%)	8 (35%)	2 (9%)	1 (4%)	
1931-35 (44yrs)	28	3 (11%)	12 (43%)	0	5 (18%)	17 (61%)	2 (7%)	7 (25%)	4 (14%)	3 (11%)	
1936-40 (39yrs)	41	2 (5%)	26 (63%)	4 (10%)	7 (17%)	26 (63%)	2 (5%)	12 (29%)	4 (10%)	5 (12%)	
1941-45 (34yrs)	40	2 (5%)	30 (75%)	4 (10%)	3 (8%)	24 (60%)	2 (5%)	6 (15%)	2 (5%)	5 (13%)	
1946-50 (29yrs)	40	2 (5%)	35 (88%)	0	2 (5%)	20 (50%)	2 (5%)	3 (8%)	0	1 (3%)	
1951-55 (24yrs)	36	0	36 (100%)	6 (17%)	4 (11%)	22 (61%)	2 (6%)	9 (25%)	1 (3%)	4 (11%)	
	208	12 (5.8%)	144 (69.2%)	14 (6.7%)	23 (11.1%)	111 (53.4%)	13 (6.3%)	45 (21.6%)	13 (6.3%)	19 (9.1%)	

Response Rate 96.3%

* Two responding patients did not answer this question.

TABLE NO. C17

PATIENTS WITH MENSTRUAL PROBLEMS.

Year of Birth & Group Mid-age	Number in Group	Number with Problems
1926-30 (49yrs)	22	7 (32%)
1931-35 (44yrs)	28	7 (25%)
1936-40 (39yrs)	41	12 (29%)
1941-45 (34yrs)	40	10 (25%)
1946-50 (29yrs)	40	12 (30%)
1951-55 (24yrs)	36	10 (28%)
	<u>207</u>	<u>58 (28.0%)</u>

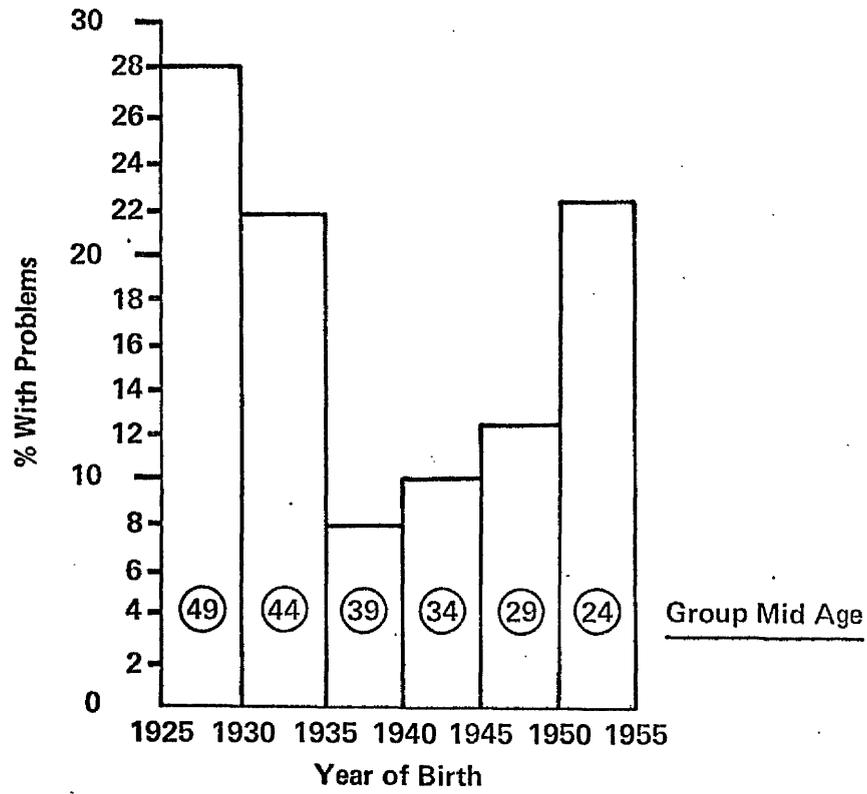
TABLE NO. C18

PATIENTS WITH SEXUAL PROBLEMS.

Year of Birth & Group Mid-age	Number in Group	Number with Problems
1926-30 (49yrs)	25	7 (28%)
1931-35 (44yrs)	28	6 (21%)
1936-40 (39yrs)	41	3 (7%)
1941-45 (34yrs)	40	4 (10%)
1946-50 (29yrs)	40	5 (13%)
1951-55 (24yrs)	36	8 (22%)
	<u>210</u>	<u>33 (15.7%)</u>

FIG. C1.

PERCENTAGE OF WHOLE SAMPLE WITH SEXUAL PROBLEMS



Menopausal

Pre-menopausal

Middle Marriage

Young Marriage

TABLE NO. C19

PATIENTS WITH FAMILY PROBLEMS.

Year of Birth & Group Mid-age	Number in Group	Number with Problems
1926-30 (49yrs)	25	11 (44%)
1931-35 (44yrs)	28	4 (14%)
1936-40 (39yrs)	41	9 (22%)
1941-45 (34yrs)	40	10 (25%)
1946-50 (29yrs)	40	9 (23%)
1951-55 (24yrs)	36	11 (31%)
	210	54 (25.7%)

FIG. C2.

PERCENTAGE OF WHOLE SAMPLE WITH FAMILY PROBLEMS

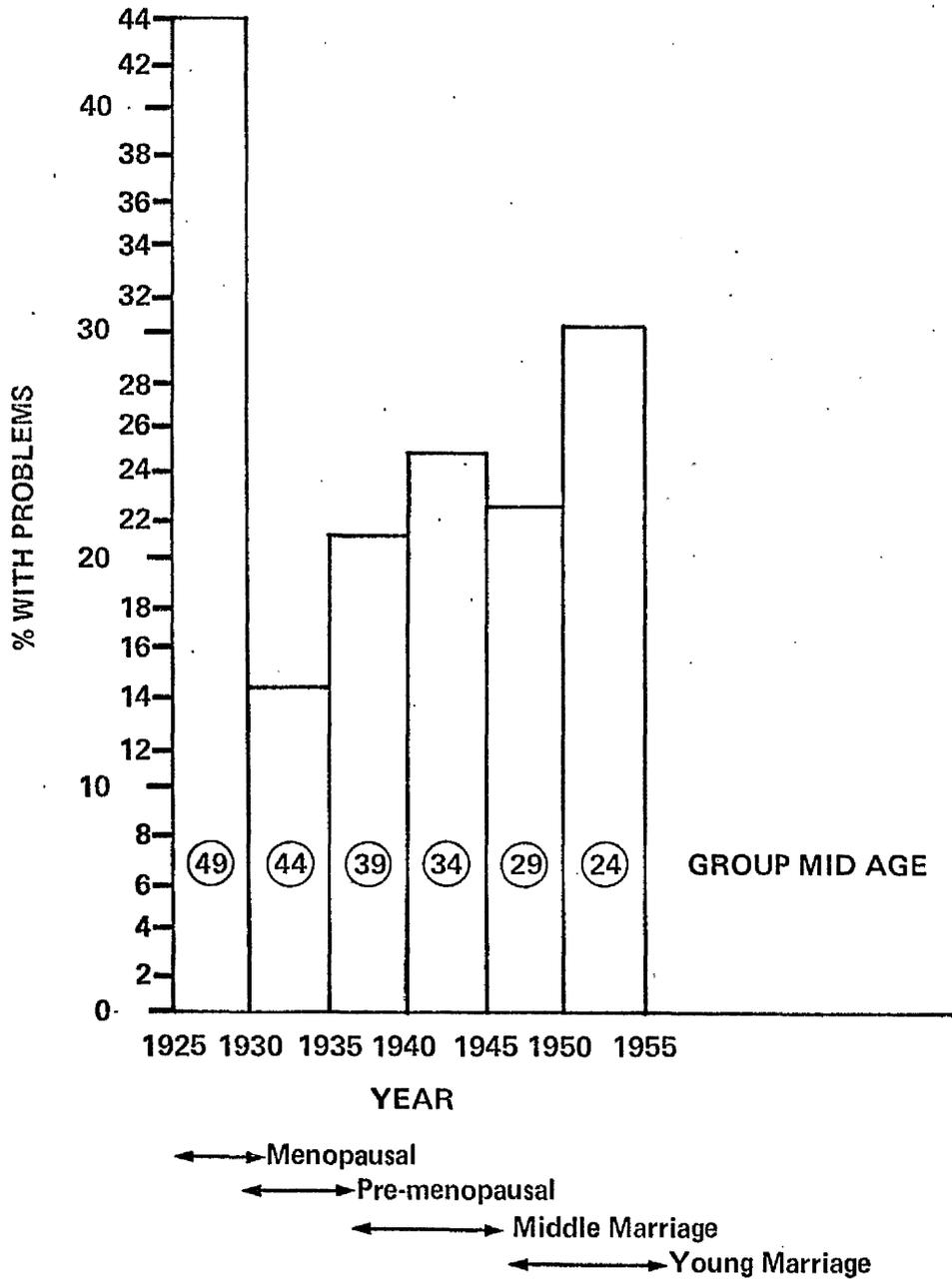


TABLE NO. C20

LIVE BIRTHS -

Comparison between Voluntarily Sterile & Others in Random Sample of Practice Population Surveyed in 1977.

	Number in Group	Number of Live Births						Mean	Standard error
		0	1	2	3	4	5		
Voluntarily Sterile	39	0	1	16	14	4	4	2.85	0.162
Others	171	19	29	63	37	14	9	2.15	0.097
	210	19	30	79	51	18	13		

The difference between groups is statistically significant $P < 0.001$

TABLE NO. C21.

THERAPEUTIC ABORTION -In Random Sample of Practice Population Surveyed in 1977.

	Number in Group	Past History Therapeutic Abortion
Termination Sterilisation	10	10
Other Sterilisation	29	0
'Others'	171	8 (4.7%)
	110	18 (8.6%)

TABLE NO. C22

MENSTRUAL PROBLEMS.

Comparison between Voluntarily Sterile Women & 'Others' in
Random Sample of Practice Population Surveyed in 1977.

	Number in Group	Number with Problems
Voluntarily Sterile	39	17 (43.6%)
'Others'	168	41 (24.4%)
	207	58 (28.07%)

TABLE NO. C23

SEXUAL PROBLEMS.

Comparison between Voluntarily Sterile Women & 'Others' in
Random Sample of Practice Population Surveyed in 1977.

	Number in Group	Number with Problems
Voluntarily Sterile	39	11 (28.2%)
'Others'	171	22 (12.9%)
	210	33 (15.7%)

TABLE NO. C24

SOME OTHER CHARACTERISTICS OF THE SAMPLE.

	Numbers with Characteristic		
	Whole Sample (n=210)	Sterilised Group (n=39)	Other Group (n=171)
<u>Husband's Occupation</u>			
Professional & Managerial	38 (18%)	3 (7.7%)	35 (20.5%)
Clerical & skilled artisan	100 (48%)	21 (53.8%)	79 (46.2%)
Semi-skilled & unskilled	72 (34%)	15 (38.5%)	57 (33.3%)
Religious belief or conviction	134 (63.8%)	23 (59.0%)	111 (64.9%)
Secondary education after 15 years	53 (25.2%)	7 (17.9%)	46 (26.9%)
Cigarette smoking	92 (43.8%)	21 (53.8%)	71 (41.5%)
History Psychotropic Drug taking	109 (51.9%)	25 (64.1%)	84 (49.1%)
History attempted Suicide	9 (4.3%)	3 (7.7%)	6 (3.5%)
History Infertility Investigations	11 (5.2%)	1 (2.6%)	10 (5.8%)
History Phlebitis or Thrombosis	13 (6.2%)	3 (7.7%)	10 (5.8%)

CHAPTER 5.

FOLLOW-UP OF 375 STERILISED WOMEN.

The aim of this chapter is to examine the group of 375 identified sterilised women from the demographic viewpoint of a general practice rather than a series of clinic cases.

METHOD.

The work had begun in October 1976 with a personal survey of all the case notes (2,123) held in the practice for females born 1926/55 inclusive. This has been described fully in chapter 4. From October 1976, all referrals for sterilisation were noted and the records of new patients joining the practice during the study were searched. Not all patients had reference in their records to sterilisation and further unsuspected cases were found in the course of questionnaire sampling of the population to estimate prevalence of sterilisation and in seeking matches. Recruiting of new patients ended on 31st March 1978, having extended over 18 months.

In this way 421 possible cases were identified and sent a two page questionnaire. Those not responding within one month were sent a follow-up letter and questionnaire. The responding patients were invited to come for interview and this was conducted in each case by the author using a standard pro-forma. The results of interview are discussed in chapter 7.

THE POSTAL QUESTIONNAIRE.

An example of the postal questionnaire is given in the appendix/

the appendix together with samples of the standard letters used. The two page questionnaire (yellow and white sheet) was posted with a covering letter (white) and a stamped addressed envelope for return.

The yellow page contained questions on social background and obstetric and contraceptive history. It asked when the patient had come to Glenrothes, her marital status, and also about her husband's and her own employment. She was asked whether she had been born in Fife, which doctor she normally consulted, whether she had religious belief or conviction, when she had left school and how many cigarettes per day she smoked. Further questions covered the outcome of her pregnancies and contraception ever-use.

The second page (white) first asked for details of past medical history of phlebitis or thrombosis and of any indicators of psychiatric disturbance. Gynaecological history was covered by questions on specific operations and a general question, "Have you ever had any other gynaecological operation?". This question had also been used in the random sample and was used in the search for matches. It served to identify unsuspected cases, that is patients who had been sterilised but whose written records contained no note of the operation.

After the completed questionnaire was received, the blue sheet was attached to the front of the questionnaire and a green sheet (to be used at the time of interview) was fixed to the end.

The blue front cover summarised various important dates/

dates, for example the date the patient joined the practice list, date of referral for operation, date of operation and date of interview. Details of the operation, the hospital where it was performed and the name of the surgeon where known were also recorded. The indications for operation were noted on this sheet using a combination of information from the case notes and also details from the patient at interview.

The green interview sheet covered specific standard questions and gave space to record the patient's comments and any other facts arising from the interview. The standard questions included the patient's reasons for wanting the sterilisation operation, who had suggested the operation to her and two questions intended to give an indication of the husband's attitude. Questions were then asked on menstruation, sex life and family life. These were aimed to determine whether the patient had problems in these areas before her operation and whether, since the operation, the patient had noted any change. Lastly, the patient was questioned on her feelings about the operation, whether she regretted it and if she could have the choice to make again, would she agree to have the operation.

RESULTS.

RESPONSE RATE.

Of the 421 potential respondents written to, 25 had left the district and nine had changed their minds after referral for operation, leaving 387 possible cases; of these, ten did not respond and two replied declining to co-operate. Completed questionnaires were received from 375 sterilised patients (96.9% response). See Table No. D1.

OPERATION DATES AND DEFINITIONS.

The distribution of operation dates for the 375 study patients is shown in Fig. D1. "Puerperal" refers to sterilisation done within one month of delivery of a child and "termination" to sterilisation done at the same time as therapeutic abortion. "Interval" refers to elective operations unrelated to recent childbirth or therapeutic abortion. Relatively few operations were done before the introduction of the Abortion Act (1967). The very dramatic and continuing rise in interval operations after 1970 is a most striking feature. Termination sterilisations have fallen off steadily from the peak in 1972 and this diminution is mirrored by a dramatic rise in interval sterilisation.

TYPE OF OPERATION.

In only two cases sterilisation was by hysterectomy. Tubal occlusion was done at open operation in 128 (34.1%) cases and by laparoscopy in 245 (65.3%) cases.

SURGEONS.

Of the operations done, 271 (72.3%) were performed at the local general hospital and one surgeon performed or supervised 202 (53.9%) of the series of 375.

PRINCIPAL INDICATION FOR OPERATION.

Where possible the principal indications for operation were determined both from the study of the medical records and from the answers of the patient at interview. The distribution is given in Table No. D2.

Cases where a major physical condition could have made pregnancy hazardous, ("medical") or where there was clear evidence of psychiatric illness, ("psychiatric"), were uncommon. Obstetric indications were important in just over 20% of cases, but by far the largest group were those, ("social"), who simply wished to have sterilisation as a permanent method of family limitation. Column 2, ("contraceptive problems"), shows the percentage of each group who had medical problems with contraception before operation. This did not include patients who had been worried about the effects of the "pill" or felt that they had been on an oral contraceptive long enough. It was restricted to cases where there appeared to be a clear physical relationship, for example prolonged amenorrhoea or migraine due to oral contraceptive, or menorrhagia from an interuterine device.

AGE AT OPERATION.

The distribution for age at time of operation is given in Table No. D3. The mean age at operation for the whole series is 33.6 years and the range is from 20-48 years.

SOCIAL CLASS.

The social class distribution, determined by husband's occupation, was:- professional and managerial 58 (15.4%), clerical and skilled artisan 175 (46.7%) and semi-skilled and unskilled 142 (37.9%).

REPRODUCTIVE PROFILE OF THE STERILISED WOMEN.TIMING OF OPERATIONS.

Several parameters were examined in relation to the timing of the sterilisation operations. The ages of the sterilised women at marriage, at delivery of the first surviving child, at delivery of the last surviving child, and the time of sterilisation operation were tabulated and arithmetic means calculated. In this way a "reproductive profile" was constructed for the "interval", "termination" and "puerperal" groups.

- *INTERVAL - refers to elective operations unrelated to recent child-birth or therapeutic abortion.
- **TERMINATION - refers to sterilisation done at the same time as therapeutic abortion.
- ***PUERPERAL - refers to sterilisation done within one month of delivery of a child.

A pictorial representation of the results is given in Fig. D2.

It will be seen that in all three groups patients had married, on average, in their twentieth year. Patients in the interval group, on average, had their first child 1.9 years later at 22.5 years and only 4.4 years elapsed before they had their last child at 27.4 years. A further 6.5 years elapsed before interval sterilisation was performed at 33.9 years.

Patients who came eventually to termination/sterilisation had their first child a little earlier, at 22.0 years, that is 1.2 years after marriage on average. The last child was delivered 6.5 years later when they were 28.5 years old. On average, a further 6.5 years had elapsed before their final (unwanted) pregnancy was terminated and combined with a sterilisation operation.

The patients who had their sterilisation operation in the puerperium showed a different pattern. They showed the longest average interval (2.3 years) between marriage and birth of the first surviving child at 24.4 years. They had the longest interval (7.6 years) between first and last surviving child and had their last child, and their sterilisation, in their thirties at 30.7 years.

The average interval between first and last surviving child was thus 4.9 years for the interval group, 6.5 years for the termination group and 7.6 years for the puerperal group.

A fuller tabulation of this data is given in Tables D4, D5 and D6.

MEAN NUMBER OF PREGNANCIES AND LIVE BIRTHS.

The mean number of pregnancies and live births for the interval, termination and puerperal groups and for the whole group of sterilised women is given in Tables D7 and D8. For the whole group of 375 women, the mean number of pregnancies per individual was 3.5 (sd 1.5) and the mean number of live births was 3.0 (sd 1.2).

FAILURE RATE.

There were two instances of failed sterilisation:-

Case 1 - A woman of 35 who had been sterilised in June 1974 by laparoscopic diathermy. She had had a tendency to hypertension during her two pregnancies and had been taking an oral contraceptive. Because of a rising blood pressure and her age, sterilisation had been recommended. She called me nearly two years after her sterilisation, complaining of malaise and some lower abdominal pains. At this stage she was not ill and her symptoms were not disabling. Ectopic pregnancy was considered very unlikely in view of her tubal diathermy two years earlier. However, I called to see her a few hours later and found the clinical picture dramatically changed and the patient showing signs of intra-peritoneal bleeding.

Emergency laparotomy showed the abdominal cavity to be full of liquid and clotted blood. After removal of this, it was/

was found that she had ruptured an isthmic pregnancy on the right side. The Fallopian tube had ruptured close to the site of her previous laparoscopic sterilisation producing a vertical tear which separated the tube from the uterus. Emergency hysterectomy was carried out and the patient's recovery was uneventful.

Case 2 - A 37 year old woman had been treated for over 18 months for a hysterical anxiety state with panic attacks. Among her many irrational fears was the worry that she might be pregnant after hearing of an ectopic pregnancy in a relative who had undergone the sterilisation operation. My patient had had a laparoscopic diathermy sterilisation done in July 1977. At that time she was 35 years of age and had stopped her oral contraceptive prior to an operation for varicose veins. Feeling her general health much improved when not taking the "pill", she was reluctant to restart and requested sterilisation.

The patient reported her period a few days late and I felt inclined to attribute this to the effects of her anxiety state. Her amenorrhoea persisted and I ordered a pregnancy test which proved positive. Examination supported a diagnosis of early pregnancy. Suction evacuation was done and histology showed that she had had a missed abortion. At her original sterilisation the tubes were not divided and presumably the tube recanalised during the prolonged healing process. She was offered repeat sterilisation but, understandably, she declined this.

Such cases must be relatively rare in the experience of the average general practitioner. These two cases do, however, serve as a reminder that prior sterilisation operation is no guarantee of the absence of a pregnancy. A history of sterilisation must not be allowed to slow or distort the doctor's normal clinical reflexes.

One further case is worthy of comment. It concerns a young woman who was not realised to be in very early pregnancy when her sterilisation operation was done. She required a termination procedure two months after her sterilisation.

TABLE NO. D1

RESPONSE PATTERN TO QUESTIONNAIRE.

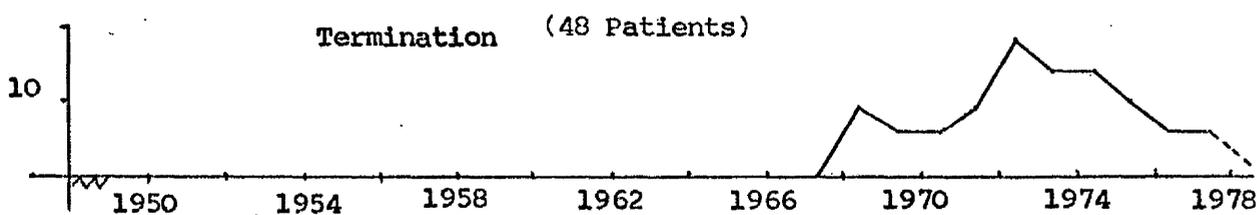
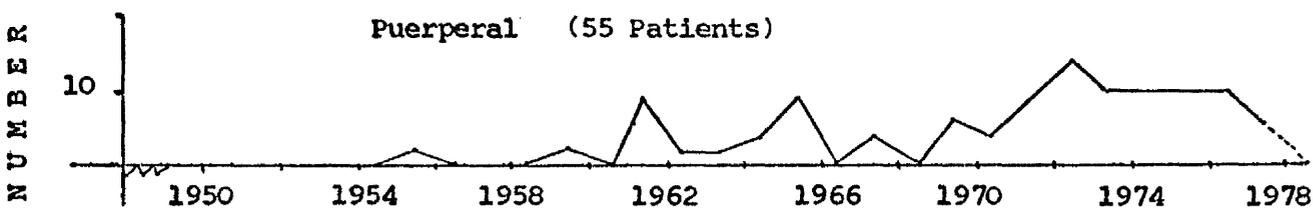
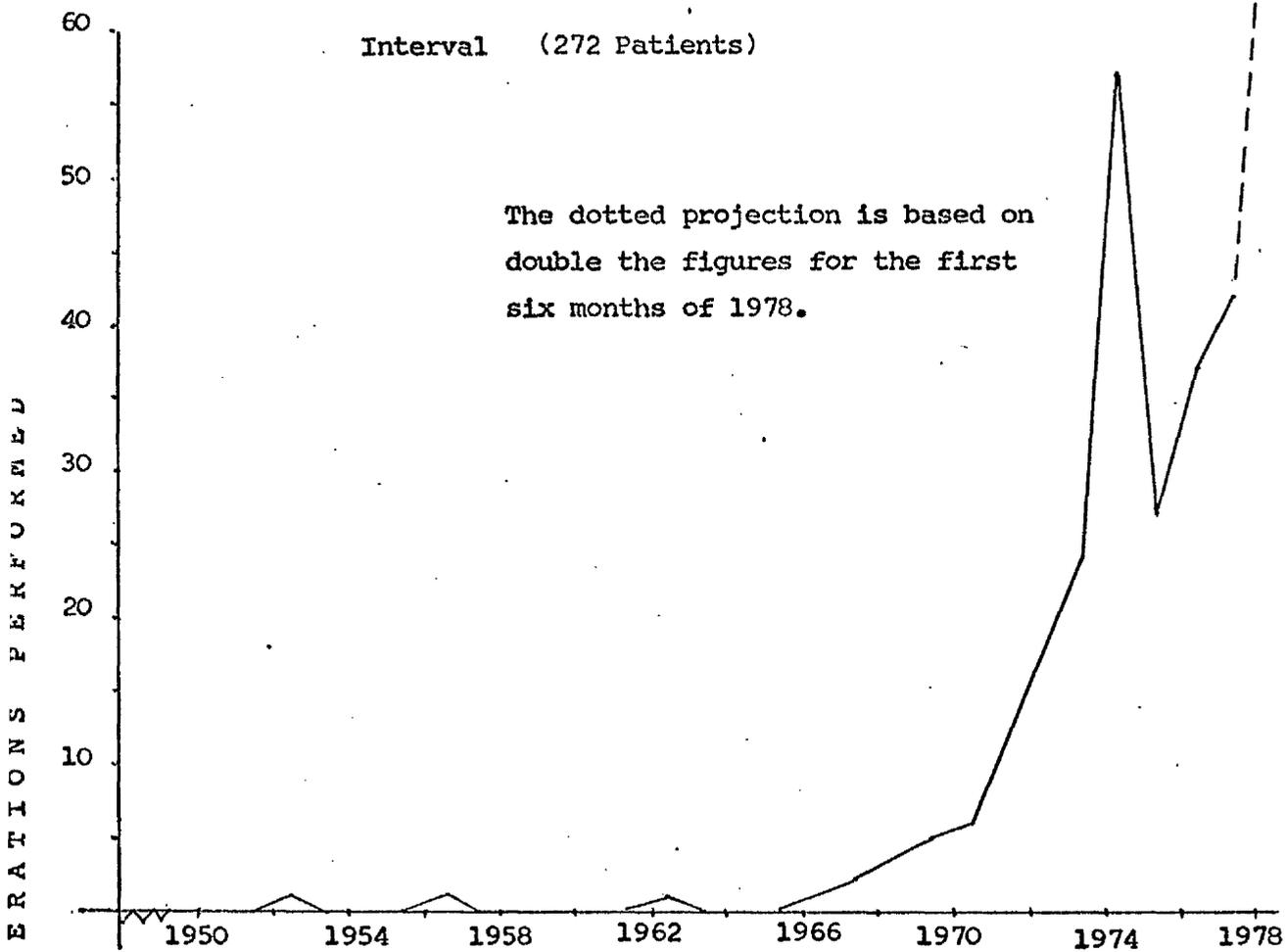
Responded to Questionnaire	375
Non-responders	10
Replied declining to co-operate	2
possible cases	<u>387</u>
Changed mind after referral	9
Records held for patients no longer in district	25
	<u>421</u>
Response rate from possible cases	96.9%

Fig. D1.

DISTRIBUTION OF OPERATION DATES OF STUDY POPULATION

197

(375 PATIENTS).



Year of Operation

TABLE NO. D2

INDICATIONS FOR OPERATION.

	Number of Patients	Number of these with Contraceptive Problems
Medical	22 (5.8%)	8 (36.4%)
Psychiatric	21 (5.6%)	11 (52.4%)
Obstetric	79 (21.1%)	25 (31.6%)
Social	253 (67.5%)	95 (37.5%)
	<u>375 (100%)</u>	<u>139 (37.1%)</u>

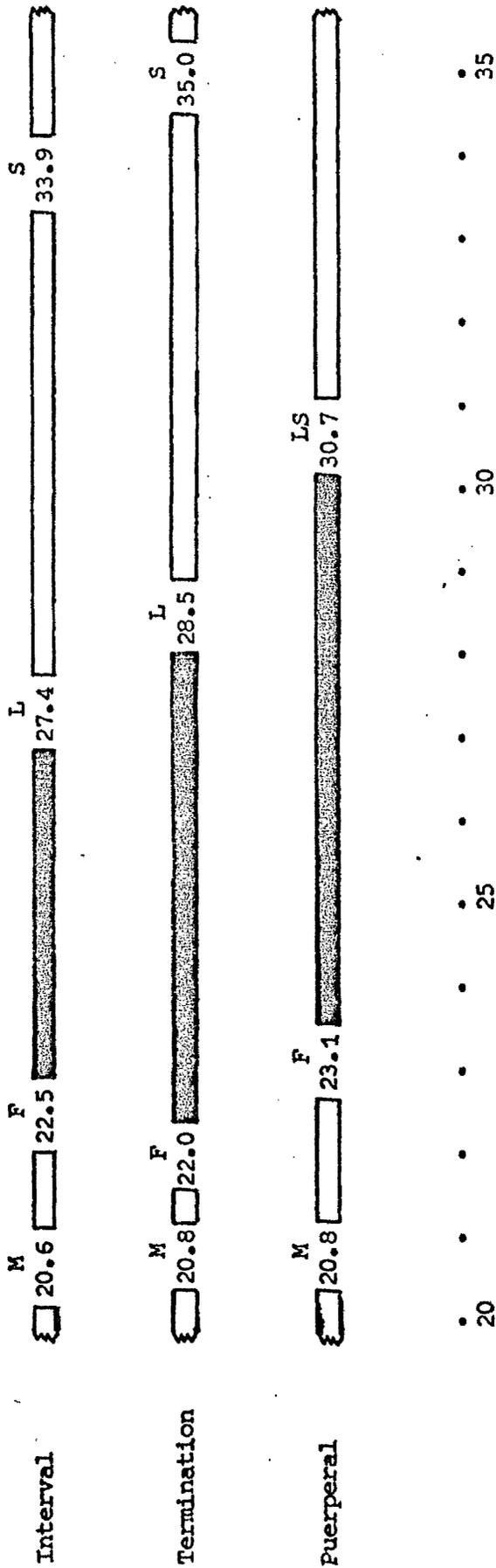
TABLE NO. D3

AGE AT OPERATION.

<u>Age in Years</u>	<u>No. of Patients</u>
Up to 25	29 (7.7%)
26 - 30	90 (24.0%)
31 - 35	101 (26.9%)
36 - 40	110 (29.4%)
41 & over	45 (12.0%)
	<u>375 (100%)</u>

Range 20 to 48 years. Mean 33.6 years (sd 5.6)

Fig. D2.



M, F, L and S represent the mean age at marriage, first and last surviving child and sterilisation operation, respectively.

The shaded band represents the reproductive range and LS the interval between last surviving child and operation.

TABLE NO. D4.

AGE AT FIRST MARRIAGE.

Age in Years	Interval	Termination	Puerperal	Total
Under 18	20 (7.8%)	4 (9.1%)	5 (10.0%)	29 (8.3%)
18 - 20	123 (47.9%)	20 (45.5%)	22 (44.0%)	165 (47.0%)
21 - 23	79 (30.7%)	15 (34.1%)	15 (30.0%)	109 (31.0%)
24 - 26	29 (11.3%)	2 (4.5%)	5 (10.0%)	36 (10.3%)
Over 26	6 (2.3%)	3 (6.8%)	3 (6.0%)	12 (3.4%)
	257 (100%)	44 (100%)	50 (100%)	351*(100%)

* Not all patients answered this question.

Mean for whole group - 20.6

Standard deviation - 2.6

TABLE NO. D5.

AGE AT DELIVERY OF FIRST SURVIVING CHILD.

Age in Years	Interval	Termination	Puerperal	Total
Under 20	37 (13.6%)	9 (18.7%)	10 (18.2%)	56 (15.0%)
20 - 22	116 (42.8%)	20 (41.7%)	19 (34.6%)	155 (41.4%)
23 - 25	72 (26.6%)	12 (25.0%)	12 (21.8%)	96 (25.7%)
26 - 28	30 (11.1%)	3 (6.3%)	8 (14.5%)	41 (11.0%)
Over 28	16 (5.9%)	4 (8.3%)	6 (10.9%)	26 (6.9%)
	271* (100%)	48 (100%)	55 (100%)	374 (100%)

* One woman had no child of her own.

Mean for whole group - 22.5

Standard deviation - 3.3

TABLE NO. D6.

AGE AT DELIVERY OF LAST SURVIVING CHILD.

Age in Years	Interval	Termination	Puerperal	Total
Under 20	3 (1.1%)	0	0	3 (0.8%)
20 - 22	23 (8.5%)	4 (8.3%)	3 (5.5%)	30 (8.0%)
23 - 25	72 (26.6%)	12 (25.0%)	8 (14.5%)	92 (24.6%)
26 - 28	83 (30.6%)	13 (27.1%)	11 (20.0%)	107 (28.6%)
Over 28	90 (33.2%)	19 (39.6%)	33 (60.0%)	142 (38.0%)
	<u>271*(100%)</u>	<u>48 (100%)</u>	<u>55 (100%)</u>	<u>374 (100%)</u>

* One woman had no child of her own.

Mean for whole group - 28.0

Standard deviation - 4.7

TABLE NO. D7

MEAN NUMBER OF PREGNANCIES.

Group	Number	Mean	sd
Interval	272	3.2	1.4
Termination	48	4.7	1.3
Puerperal	55	4.0	1.7
Total	375	3.5	1.5

Differences: Interval & termination $p < 0.001$

Interval & puerperal $p < 0.01$

Termination & puerperal $p < 0.05$

TABLE NO. D8

MEAN NUMBER OF LIVE BIRTHS.

Group	Number	Mean	sd
Interval	272	2.8	1.1
Termination	48	3.4	1.2
Puerperal	55	3.6	1.6
Total	375	3.0	1.2

Differences: Interval & termination $p < 0.001$

Interval & puerperal $p < 0.001$

Termination & puerperal - not significant.

CHAPTER 6.

COMPARISON WITH MATCHES.

The aim of this chapter is to compare the sterilised patients with other married women of the same age who had joined the practice at approximately the same time. Randomly determined matches were obtained from the age/sex register and 347 match pairs were studied.

The latter factor, time of joining the practice, was included in an effort to allow for major fluctuations in social class and geographic origin of patients, which occur in rapidly growing practices in New Town developments. Matching for time of joining the practice would also, by limiting the analysis to contacts with one group of doctors only, simplify any future investigation of morbidity patterns without sacrificing valid randomisation.

It was hoped also to match for parity as this factor seemed likely to be relevant, especially when considering contraception, abortion, gynaecological illness and menstrual problems. A short pilot exercise showed matching for parity to be impracticable. This was due partly to the fact that the age/sex register did not record parity and most case records did not contain reliable information on parity, except when a recent Maternity Services Record was included in the notes. Problems were also posed by the relatively small population of women available in the practice/

practice to serve as matches, given the large number of sterilised patients, viz., 375, which represented nearly one fifth of all the adult women in the practice.

Some statistical evidence is presented later in this chapter (under "Present Menstrual Problems") to support the view that the difference in menstrual problems in cases and matches is not explained by differences in parity.

METHOD OF CHOOSING MATCHES.

A ledger-type age/sex register is kept in the practice, with patients born in the same year being netered in order of joining the practice. Matches were chosen as the nearest non-sterilised patient to the entry for the index case, that is the nearest in time of joining the practice list. Single women were excluded. The cases were thus matched for age and for time of joining the practice.

Each of the matches chosen in this way was sent the same questionnaire that had been used for the sterilised patients. The two-page questionnaire (yellow and white sheet) was posted with a covering letter and a stamped addressed envelope for return. Those women who had not replied within one month were sent a follow-up letter and questionnaire. Matches were not interviewed as observer time was limited by practice commitments, although significant information was validated from a study of the medical records.

The questionnaire has already been described fully in Chapter 5. The yellow page comprised questions on social background and contraceptive and obstetric history. The white page covered general medical history and sought indicators of a history of psychiatric disturbance. Questions were asked about gynaecological operations and matches were also asked whether they had problems with menstruation or in their sex life or family life.

RESULTS.

RESPONSE.

Matches were chosen for the 375 sterilised patients who had replied by returning a questionnaire. Of the 375 matches approached, 347 responded giving a response rate of 92.5 per cent. The comparison is based on the 347 match pairs.

The significance of the results was tested by McNemar's test for paired alternatives, by a chi-square test, or using the standard test for the difference between two means, as appropriate.

SOCIAL CLASS.

There was no significant difference in social class distribution between the sterilised patients and their matches. Comparative distributions are given in Table No. E1.

AGE AT MARRIAGE AND AGE AT DELIVERY OF FIRST SURVIVING CHILD.

The mean age at first marriage for the sterilised group is 20.6 years and for the matches 21.4 years ($p < 0.01$). Full comparative distributions are given in Table No. E2.

The mean age at delivery of first surviving child for the sterilised group is 22.6 years and for the matches 23.4 years ($p < 0.01$). Full comparative distributions are given in Table No. E3.

PARITY.

The mean number of pregnancies for the sterilised group was 3.5 (sd 1.5) and for the matches 2.6 (sd 1.8). Comparative distributions are given in Table No. E4.

The mean number of live births for the sterilised group was 3.0 (sd 1.2) and for the matches 2.2 (sd 1.3). Comparative distributions are given in Table No. E5.

PRESENT MENSTRUAL PROBLEMS.

Sterilised patients and matches were asked if they were having problems with their menstrual periods. Of the 347 sterilised women, two had had hysterectomy sterilisation, six had hysterectomy after sterilisation and 11 were post-menopausal thus leaving 328 for analysis. Similarly, excluding 10 matches who had had hysterectomy and one who was post-menopausal, the replies of 336 matches were available for analysis.

In the group of sterilised women, 147 (44.8%) were currently experiencing menstrual problems compared with 63 (18.8%) of the matches. This difference is highly significant statistically ($\chi^2 = 50.95$: $p < 0.001$).

Accurate data on parity for the non-sterilised women available for matching was often not present in the case notes. Because of this and the relatively small practice population, it had proved/

proved impracticable to match for parity as well as for age. In order to assess the effect of parity, the comparison was made of the rates for menstrual problems in sterilised women and matches stratified by number of births (Table No. E6).

While there is no apparent variation in rates with parity in either sterilised patients or matches, rates were recalculated standardising for parity. The difference between the standardised overall rates for sterilised (42.8%) and for matches (19.7%) remains highly significant ($\chi^2 = 47.28$: $p < 0.001$). The effect of parity is not significant ($\chi^2 = 5.27$: $p < 0.5$).

When the results are re-analysed omitting oral contraceptive users from the matches group, the differences remain highly significant and the rates are not dependent on parity.

When the calculations are repeated using rates by number of pregnancies rather than births, the differences are again highly significant. Indirectly standardised rates for menstrual problems for sterilised women are 43.9% and for matches 20.0% with $\chi^2 = 49.85$: $p < 0.001$. While there is evidence of increasing menstrual problems with increasing number of pregnancies in the "Totals" column, this is really due to the fact that the women with a large number of pregnancies contain a larger proportion of sterilised women than the matches, who tend to have had fewer pregnancies. (Table No. E7).

The differences are again highly significant when oral contraceptive users are omitted. The high rate for menstrual problems does not depend on the number of pregnancies. The data on which these calculations are based are detailed in Tables Nos. E8 & E9.

Women on oral contraceptives are known, on average, to have more regular periods with a reduced flow and less dysmenorrhoea. Among the 336 matches analysed, 74 (22.0%) were currently taking oral contraceptive and the association between oral contraception and menstrual problems in matches is illustrated in Table No. E10. Some women are no doubt influenced to choose oral contraception partly to alleviate menstrual problems.

As the sterilised women no longer require oral contraceptive to prevent pregnancy, a comparison was made between menstrual problems in the sterilised patients and the matches not taking oral contraceptive (Table No. E11). When the results are re-analysed omitting oral contraceptive users from the matches group, the differences remain statistically highly significant after standardising for both births (Table No. E8) and pregnancies (Table No. E9).

In order to confirm the apparent findings of the approach detailed above, an analysis was done of the results obtained in those pairs (patient and match) who were by chance of the same parity to see whether a high rate of menstrual problems was still found in the sterilised patients.

After excluding 30 pairs of the same parity because either the sterilised or match was post-menopausal or had had a hysterectomy, 84 pairs were left out of 347 where the number of births is identical for both the sterilised women and matches. The difference remains significant at the five per cent level. Similarly, the difference remains statistically significant comparing pairs with the same number of pregnancies. The data and calculations are detailed in Tables Nos. E12 & E13.

SEXUAL PROBLEMS.

The sterilised patients also showed a higher prevalence of sexual problems than the matches, 23.9% and 9.6% respectively. The comparison for sexual problems is given in Table No. E14.

HISTORY OF THERAPEUTIC ABORTION.

Sixty (17.3%) of the sterilised and 12 (3.5%) of the matches give a history of therapeutic abortion. Forty-four of those 60 sterilised women had their sterilisation at the same time as a termination of pregnancy. Several of the sterilised women, but none of the matches, had had more than one therapeutic abortion.

PAST HISTORY OF GYNAECOLOGICAL ILLNESS.

Some indication of gynaecological illness in the two groups is given by the number who have had elective D&C and/or cauterly/

cautery (Table No. E15). It is interesting that the women eventually sterilised have virtually the same incidence of infertility investigations as the matches.

PSYCHO-SOCIAL FACTORS.

The reasons why women choose sterilisation rather than continuing conventional methods of contraception are not known, but this comparison shows some psycho-social variables which are associated with female sterilisation.

From Table No. E16, the sterilised are seen to be more likely to have taken psychotropic drugs and to have a higher rate for attempted suicide. Religious belief was much less common among the sterilised patients who were also less likely to have continued secondary education after 15 years of age.

In Tables Nos. E17, E17a & E17b, the history of taking psychotropic drugs, of having consulted a psychiatrist and of having taken an overdose or having attempted suicide is displayed in more detail. The sterilised patients are grouped according to the timing of their operations and the groups compared with their matches.

Thirty-seven (10.7%) of the sterilised women had a history of psychiatric disturbance severe enough to warrant consultation/

consultation with a psychiatrist. Of these, 17 (45.9%) had been admitted to a psychiatric ward. Seventeen (4.9%) of the sterilised patients and 16 (4.6%) of the matches had a history of in-patient treatment.

For each variable and in each group, more of the sterilised than the matches have a history of psychiatric disturbance. The differences are more marked in each case for the termination group, i.e., the women who were sterilised at the time of therapeutic abortion. A history of overdose or attempted suicide is found in eight (18.2%) patients in the termination group and one patient (2.3%) of the matches. The rate is over twice as high for cases than for matches in the puerperal and interval groups i.e., when sterilisation was done after delivery of a baby or as an elective procedure unconnected with a pregnancy.

The distribution of patients professing religious belief or conviction is given in Table No. E18. The sterilised are grouped according to the timing of their operations and the groups compared with their matches. Similarly, the distribution of patients who had continued secondary education beyond the age of 15 years is given in Table No. E19.

There is no significant difference in the numbers of cigarette smokers between the sterilised group and the matches. It is remarkable that, at a time of intense anti-smoking propaganda, nearly half of both groups continue to smoke cigarettes regularly.

CONTRACEPTIVE EVER-USE.

The ever-use of contraceptives by the sterilised women and the matches is detailed in Table No. E20. It will be seen that more sterilised patients have used oral contraception and more of the matches the male condom. It would seem possible that, among the sterilised patients, the woman may have been more often responsible for contraception than was the case among the matches.

REMARRIAGE AND DIVORCE.

In the sterilised group, 33 (9.5%) had married more than once, compared with 16 (4.61%) of the matches ($p < 0.05$). Eleven (11.3%) of the termination and puerperal group were divorced or separated compared with four (4.1%) of their matches. Comparative distributions are given in Tables Nos. E21 and E22.

TABLE NO. E1.

COMPARISON WITH MATCHES - SOCIAL CLASS.

Husband's Occupation	Sterilised	Matches
I & II Professional & Managerial	54 (15.6%)	63 (18.1%)
III Clerical & Skilled Artisan	163 (46.9%)	155 (44.7%)
IV & V Semi-skilled & Unskilled	130 (37.5%)	129 (37.2%)
	<u>347 (100%)</u>	<u>347 (100%)</u>

TABLE NO. E2.

COMPARISON WITH MATCHES - AGE AT FIRST MARRIAGE.

Age in Years	Sterilised	Matches
--------------	------------	---------

Under 18	27 (8.3%)	18 (5.2%)
18 - 20	153 (46.9%)	133 (38.8%)
21 - 23	100 (30.7%)	122 (35.6%)
24 - 26	35 (10.7%)	51 (14.9%)
Over 26	11 (3.4%)	19 (5.5%)
	<u>326 (100%)</u>	<u>343 (100%)</u>

Mean	20.6	21.4
------	------	------

s.d.	2.5	3.2
------	-----	-----

NOTE - Not all patients answered the question.

TABLE NO. E3.

COMPARISON WITH MATCHES - AGE AT DELIVERY OF FIRST
SURVIVING CHILD.

Age in Years	Sterilised	Matches
Under 20	52 (15.0%)	39 (12.3%)
20 - 22	140 (40.5%)	112 (35.5%)
23 - 25	90 (26.0%)	85 (26.9%)
26 - 28	41 (11.9%)	47 (14.9%)
Over 28	23 (6.6%)	33 (10.4%)
	<u>346 (100%)</u>	<u>316 * (100%)</u>
Mean	22.6	23.4
s.d.	3.4	4.0

- * One of the sterilised women and 31 of the matches were childless.

TABLE NO. E4.

COMPARISON WITH MATCHES - NUMBER OF PREGNANCIES.

Number of Pregnancies	Sterilised	Matches
0	1 (0.3%)	28 (8.1%)
1	9 (2.6%)	46 (13.3%)
2	82 (23.6%)	107 (30.8%)
3	111 (32.0%)	91 (26.2%)
4	68 (19.6%)	40 (11.5%)
5	42 (12.1%)	22 (6.3%)
More than 5	34 (9.8%)	13 (3.8%)
	347 (100%)	347 (100%)
Mean	3.5	2.6
s.d.	1.5	1.8

TABLE NO. E5.

COMPARISON WITH MATCHES - NUMBER OF LIVE BIRTHS.

Number of Live Births	Sterilised	Matches
0	1 (0.3%)	31 (8.9%)
1	12 (3.5%)	51 (14.7%)
2	125 (36.0%)	141 (40.6%)
3	117 (33.7%)	80 (23.1%)
4	58 (16.7%)	28 (8.1%)
5	24 (6.9%)	9 (2.6%)
More than 5	10 (2.9%)	7 (2.0%)
	<u>347 (100%)</u>	<u>347 (100%)</u>
Mean	3.0	2.2
s.d.	1.2	1.3

TABLE NO. E6.

CURRENT MENSTRUAL PROBLEMS IN WHOLE POPULATION OF STERILISED
PATIENTS AND MATCHES / NUMBER OF BIRTHS. **

No. of Births	Sterilised		Matches		Total	
	No. of Patients	No. with menstrual Problems	No. of Patients	No. with Menstrual Problems	No. of Patients	No. with Menstrual Problems
0	1	1 (100%)	30	6 (20.0%)	31	7 (22.6%)
1	12	6 (50.0%)	49	7 (14.3%)	61	13 (21.3%)
2	117	57 (48.7%)	135	25 (18.5%)	252	82 (32.5%)
3	105	43 (40.9%)	77	13 (16.9%)	182	56 (30.8%)
4	58	25 (43.1%)	30	9 (30.0%)	88	34 (38.6%)
5	27	11 (40.7%)	7	3 (42.9%)	34	14 (41.2%)
6	5	2 (40.0%)	4	0 (-)	9	2 (22.2%)
More than 6.	3	2 (66.6%)	4	0 (-)	7	2 (28.6%)
	328	147 (44.8%)	336	63 (18.8%)	664*	210 (31.6%)

* Excluded from the full group of 694 patients were:-

18 Women who had hysterectomy.

12 Women who were post-menopausal.

30

** Includes stillbirths.

TABLE NO. E7.

CURRENT MENSTRUAL PROBLEMS IN WHOLE POPULATION OF STERILISED
PATIENTS AND MATCHES / NUMBER OF PREGNANCIES.

No. of Preg- nancies	Sterilised		Matches		Total	
	No. of Patients	No. with Menstrual Problems	No. of Patients	No. with Menstrual Problems	No. of Patients	No. with Menstrual Problems
0	1	1 (100%)	28	6 (21.4%)	29	7 (24.1%)
1	8	3 (37.5%)	45	4 (8.8%)	53	7 (13.2%)
2	80	36 (45.0%)	103	22 (21.3%)	183	58 (31.7%)
3	108	50 (46.3%)	90	15 (16.6%)	198	65 (32.8%)
4	67	26 (38.8%)	38	10 (26.3%)	105	36 (34.3%)
5	38	16 (42.1%)	20	5 (25.0%)	58	21 (36.2%)
6	16	10 (62.5%)	6	1 (16.7%)	22	11 (50.0%)
More than 6.	10	5 (50.0%)	6	0 (-)	16	5 (31.3%)
	328	147 (44.8%)	336	63 (18.8%)	664*	210 (31.6%)

* Excluded from the full group of 694 patients were:-

18 Women who had hysterectomy.

12 Women who were post-menopausal.

—
30
—

TABLE NO. E8.

MATCHES - CURRENT MENSTRUAL PROBLEMS / NUMBER OF BIRTHS**.

No. of Births	Not Taking Oral Contraceptives.		Taking Oral Contraceptives.		Total	
	No. of Patients	No. with Menstrual Problems	No. of Patients	No. with Menstrual Problems	No. of Patients	No. with Menstrual Problems
0	25	6 (24.0%)	5	0 (-)	30	6 (20.0%)
1	39	5 (12.8%)	10	2 (20.0%)	49	7 (14.3%)
2	98	19 (19.4%)	37	6 (16.2%)	135	25 (18.5%)
3	64	12 (18.8%)	13	1 (7.7%)	77	13 (16.9%)
4	24	9 (37.5%)	6	0 (-)	30	9 (30.0%)
5	5	2 (40.0%)	2	1 (50.0%)	7	3 (42.9%)
6	3	0 (-)	1	0 (-)	4	0 (-)
More than 6.	4	0 (-)	0	0 (-)	4	0 (-)
	262	53 (20.2%)	74	10 (13.5%)	336*	63 (18.8%)

* Excluded from the full group of 347 patients were:-

10 Women who had hysterectomy.

1 Woman who was post-menopausal.

11

** Includes stillbirths.

TABLE NO. E9.

MATCHES - CURRENT MENSTRUAL PROBLEMS / NUMBER OF PREGNANCIES.

Not Taking Oral Contraceptives.		Taking Oral Contraceptives.		Total		
No. of Pregnancies	No. of Patients	No. with Menstrual Problems	No. of Patients	No. with Menstrual Problems	No. of Patients	No. with Menstrual Problems
0	23	6 (26.0%)	5	0 (-)	28	6 (21.4%)
1	37	4 (10.8%)	8	0 (-)	45	4 (8.8%)
2	72	17 (23.6%)	31	5 (16.1%)	103	22 (21.3%)
3	71	11 (15.5%)	19	4 (21.1%)	90	15 (16.6%)
4	31	10 (32.2%)	7	0 (-)	38	10 (26.3%)
5	18	4 (22.2%)	2	1 (50.0%)	20	5 (25.0%)
6	5	1 (20.0%)	1	0 (-)	6	1 (16.7%)
More than 6.	5	0 (-)	1	0 (-)	6	0 (-)
	262	53 (20.2%)	74	10 (13.5%)	336*	63 (18.8%)

* Excluded from the full group of 347 patients were:-

10 Women who had hysterectomy.

1 Woman who was post-menopausal.

TABLE NO. E10.

ORAL CONTRACEPTION & MENSTRUAL PROBLEMS IN MATCHES.

	No. of Patients	No. with Menstrual Problems.
Taking oral contraceptive	74	10 (13.5%)
Not taking oral contraceptive	262	53 (20.2%)
Total	336	63 (18.8%)

Difference in percentages - $p < 0.001$.

TABLE NO. E11.

PATIENTS WITH CURRENT MENSTRUAL PROBLEMS.

	No. of Patients	No. with Menstrual Problems.
Matches not taking oral contraceptive.	262 *	53 (20.2%)
Sterilised patients.	328 **	147 (44.8%)

Difference in percentages - $p < 0.001$.

- * Excluded - 10 patients who had hysterectomy.
1 patient who was post-menopausal.
- ** Excluded - 2 patients who had hysterectomy sterilisation.
11 patients who were post-menopausal.
6 patients who had hysterectomy after sterilisation.

TABLE NO. E12.

TO IDENTIFY PAIRS OF SAME PARITY (CRITERION -- BIRTHS).

Number identified	-	84
Less matches on oral contraceptive	-	18
		<u> </u>
TOTAL		<u>66</u>

CURRENT MENSTRUAL PROBLEMS.

Sterilised only	-	24 (n ₁)
Match only	-	7 (n ₂)
Both	-	7
Neither	-	28
		<u> </u>
TOTAL	-	<u>66</u>

Using McNemar's Test for paired alternatives, viz.:-

$$\frac{n_1 - n_2}{\sqrt{n_1 + n_2}} = 2.8737 \quad p < 0.05$$

TABLE NO. E13.

TO IDENTIFY PAIRS OF SAME PARITY (CRITERION - PREGNANCIES).

Number identified	-	59
Less matches on oral contraceptive	-	15
		<u> </u>
TOTAL		44
		<u> </u>

CURRENT MENSTRUAL PROBLEMS.

Sterilised only	-	18 (n ₁)
Match only	-	6 (n ₂)
Both	-	4
Neither	-	16
		<u> </u>
TOTAL		44
		<u> </u>

Using McNemar's Test for paired alternatives, viz.:-

$$\frac{n_1 - n_2}{\sqrt{n_1 + n_2}} = 2.2454 \quad p < 0.05$$

TABLE NO. E14.

PATIENTS WITH CURRENT SEXUAL PROBLEMS.

	<u>Number, with Problems.</u>
Sterilised Patients	82 (23.9%)
Matches	33 (9.6%)

Difference in percentages - $p < 0.001$.

* Four patients did not answer the question.

TABLE NO. E15

GYNAECOLOGICAL HISTORY.

	Sterilised (n=347)	Matches (n=347)
Elective D&C/Cautery.	130 (37.5%)	80 (23.1%)*
D&C after (spontaneous) abortion.	55 (15.9%)	51 (14.7%)
Infertility Investigations.	14 (4.0%)	16 (4.6%)

*** $p < 0.001$

TABLE NO. E16.

PSYCHO-SOCIAL FACTORS.

	Sterilised (n=347)	Matches (n=347)
History of taking psychotropic drugs.	220 (63.4%)	172 (49.6%)*
History of attempted suicide.	32 (9.2%)	12 (3.5%)**
Religious belief or conviction.	178 (51.3%)	234 (67.4%)*
Secondary Education after 15 years.	74 (21.3%)	99 (28.5%)*
Cigarette Smoking.	169 (48.7%)	161 (46.4%)

- $p < 0.05$
- ** $p < 0.01$
- *** $p < 0.001$

TABLE NO. E17.

PATIENTS WITH HISTORY OF TAKING PSYCHOTROPIC DRUGS.

	<u>Sterilised</u> n = 347	<u>Matches</u> n = 347
Interval	** 157 (62.8%)	126 (50.4%)
Termination	* 33 (75.0%)	23 (52.3%)
Puerperal	30 (56.6%)	23 (43.4%)
	*** 220 (63.4%)	172 (49.6%)

TABLE NO. E17a.

PATIENTS WHO HAVE CONSULTED A PSYCHIATRIST.

	<u>Sterilised</u> n = 347	<u>Matches</u> n = 347
Interval (250 pairs)	19 (7.6%)	20 (8.0%)
Termination (44 pairs)	9 (20.5%)	6 (13.6%)
Puerperal (53 pairs)	9 (17.0%)	7 (13.2%)
	37 (10.7%)	33 (9.5%)

TABLE NO. E17b.

PATIENTS WHO HAVE TAKEN AN OVERDOSE OR ATTEMPTED SUICIDE.

	<u>Sterilised</u> n = 347	<u>Matches</u> n = 347
Interval (250 pairs)	17 (6.8%)	8 (3.2%)
Termination (44 pairs)	* 8 (18.2%)	1 (2.3%)
Puerperal (53 pairs)	7 (13.2%)	3 (5.7%)
	** 32 (9.2%)	12 (3.5%)

- * p < 0.05
- ** p < 0.01
- *** p < 0.001

TABLE NO. E18.

COMPARISON WITH MATCHES - RELIGIOUS BELIEF OR CONVICTION.

	Sterilised n = 347	Matches. n = 347
Interval Group (250 Pairs)	130 (52.0%)	169 (67.6%) ***
Termination Group (44 Pairs)	24 (54.5%)	27 (61.4%)
Puerperal Group (53 Pairs)	24 (45.3%)	38 (71.7%) **
	178 (51.3%)	234 (67.4%) ***

** p < 0.01

*** p < 0.001

TABLE NO. E19.

COMPARISON WITH MATCHES - SECONDARY EDUCATION BEYOND
15 YEARS.

	Sterilised n = 347	Matches n = 347
Interval Group (250 Pairs)	55 (22.0%)	68 (27.2%)
Termination Group (44 Pairs)	10 (22.7%)	16 (36.4%)
Puerperal Group (53 Pairs)	9 (17.0%)	15 (28.3%)
	74 (21.3%)	99 (28.5%)*

* $p < 0.05$

TABLE NO. E20.

EVER-USE OF CONTRACEPTIVES.

	Sterilised (n=347)	Matches (n=347)
Oral Contraceptive	277 (79.8%)	203 (58.5%)***
Sheath	185 (53.3%)	229 (66.0%)**
Cap	50 (14.4%)	34 (9.8%)
Coil	35 (10.1%)	28 (8.1%)

*** $p < 0.001$ ** $p < 0.01$

TABLE NO. E21.

COMPARISON WITH MATCHES -- REMARRIAGE & DIVORCE.

	Sterilised	Matches
First Marriage	281 (80.9%)	299 (86.2%)
Second or Subsequent Marriage	33 (9.5%)	16 (4.6%)
Divorced or Separated	29 (8.4%)	23 (6.6%)
Widowed	4 (1.2%)	9 (2.6%)
	347 (100%)	347 (100%)

TABLE NO. E22.

COMPARISON WITH MATCHES - DIVORCE & SEPARATION.

		Number of Patients Divorced or Separated	
		Sterilised	Matches
Interval Group	(n = 250)	18 (7.2%)	19 (7.6%)
Termination Group	(n = 44)	6 (13.6%)	2 (4.6%)
Puerperal Group	(n = 53)	5 (9.4%)	2 (3.8%)
Total	(n = 347)	29 (8.4%)	23 (6.6%)

CHAPTER 7.

HOW PATIENTS FELT ABOUT THEIR STERILISATION.

The aim of this chapter is to make some estimate, from interviews, of how sterilised women feel about the choice they made and in particular to examine the circumstances of those regretting the operation, with a view to improving the future management of patients coming to their general practitioner for advice about sterilisation. The results are examined broadly under the headings:-

- (1) Regrets,
- (2) Changes after sterilisation.

PATIENTS AND METHOD.

The details of the method of case identification and of a follow-up of the 375 patients identified are given in chapters 4 and 6 respectively. The 375 patients who responded to a postal questionnaire were invited to attend for interview. There were no refusals, but seven patients had left the district leaving 368 (98.1%) who were interviewed by me using a standard pro forma.

Patients were asked if they had regrets about their operation and the reasons given for regret were examined. They were also asked about menstruation and sex life after sterilisation, whether they had problems before the operation and whether they thought there had been changes since. Information was sought on changes in regularity of menstruation, pain, amount of bleeding and length of period. Differences in frequency of intercourse and enjoyment or satisfaction were noted, as were any views expressed to the/

the patient by the husband. The question was also put, "Do you think having the operation has made any difference to your family as a whole, i.e., the happiness of your husband and children?".

Respondents were interviewed in my consulting room during normal surgery hours. Care was taken that the atmosphere of the interviews should be relaxed and as near that of an ordinary consultation as possible. In this way it was hoped to encourage patients to speak frankly about their feelings towards their sterilisation and about any regrets they might have.

RESULTS OF INTERVIEWS.OPERATION TO INTERVIEW INTERVAL.

The interval between operation and interview varied from six months to 25 years. Sixty per cent of patients were interviewed less than four years after their operation and 94% less than ten years after operation. A fuller tabulation is given in Table No. F1. The mean operation to interview interval for the whole series was 3.7 years.

AGENCY SUGGESTING.

Patients were asked at interview whether they thought a sterilisation had been their own idea or, if not, who had suggested it to them. Nearly half of the patients (48.4%) said that sterilisation was their own idea and 18.2% that the operation had been suggested by their general practitioner. The full distribution is given in Table No. F2. It may seem surprising that the Family Planning Clinic was mentioned by only 24 patients and that the Health Visitor was not mentioned at all.

HOW PATIENTS FELT ABOUT THEIR STERILISATION - REGRETS.

Patients were asked whether they had felt any regrets in the immediate post-operative period, whether they now felt any regrets and whether they would choose to have the operation again. In this way, four groups of patients can be distinguished from the questions on regret and the distribution is shown in Table No. F3.

Groups I and II, who had no regrets at the time of interview, have been combined to form the non-regretful group. Similarly Groups III and IV had regrets regarding the operation at the time of interview and are combined to form the regretful group. This division is supported by the patient's answers to the definite question whether or not they would choose to have the operation again (see Fig. F1).

The full distribution of patients' answers, from which Figure F1 was prepared, is given in Table No. F4. It will be seen from this table that only one of the patients, who said she had no regrets about her sterilisation, would not choose to have the operation again, but only because she had suffered some very distressing post-operative complications. If they had the choice to make again, 157 patients (53.8%) thought they would say, "Yes" to sterilisation, while a further 132 (45.2%) would say, "definitely yes" to sterilisation in the same circumstances.

Of the 76 patients who expressed regrets about their operation, over half (56.6%) felt that they would, nonetheless, make the same choice again in the same circumstances.

In summary, therefore, 289 patients (78.5%) were fully satisfied with their sterilisation and had no regrets at the time of interview.

The regretful group of 76 patients was compared with the non-regretful on a number of variables in an attempt to determine specific factors related to regret.

AGE AT OPERATION AND PARITY.

A strong association was found between regret and age at operation. Sixty (20.6%) of the group without regrets were under thirty years at the time of operation, compared with 38 (50.0%) of the regretful group (Table No. F5). The difference in percentages is highly significant ($p < 0.001$). For the non-regretful group, the mean number of living children is 2.9 and for the regretful 3.0.

TIMING OF OPERATION.

Though the termination and puerperal groups showed a higher proportion of regretful patients (28%) than the interval group (18%), the difference was not statistically significant. Patients who had termination/sterilisation were asked to distinguish their regret at being sterilised from their feelings about their termination(s).

The full distribution of regrets related to timing of operation is given in Table No. F6, and the definition of the terms used is given on the next page.

REGRETS - OTHER CLINICAL FACTORS.

The regretful and non-regretful patients were compared for several other clinical factors and the results are given in the Table No. F7. It will be seen from this table that the regretful patients were more likely ($p < 0.05$) to have had "clinical", (i.e., non-social) indications for operation and to have had problems with contraception before deciding on sterilisation. It was also less likely ($p < 0.05$) that vasectomy had been considered by the couple. The husbands of the regretful patients were more likely to have objected to the operation or had doubts but this difference did not reach significance at the five per cent level.

REGRETS - SOCIAL FACTORS.

The regretful and non-regretful are compared for social class and further education in Table No. F8. There was no statistically significant difference between the regretful and others for either of these variables.

Definition of terms:-

- (1) Termination sterilisation - When sterilisation was done at the same time as a therapeutic abortion.
- (2) Puerperal sterilisation - When sterilisation was decided on during pregnancy and done not later than one month after delivery.
- (3) Interval sterilisation - When sterilisation was an elective procedure unconnected with a pregnancy.

REGRETS - PERSONALITY INDICATORS.

Several variables, which are taken to be indicators of personality, are examined in Table No. F9. It will be seen that the regretful patients were significantly more likely to have a history of consultation with a psychiatrist and more likely to have a history of overdose or suicidal gesture ($p < 0.05$). No statistically significant difference was demonstrated between groups for cigarette smoking or for religious belief or conviction.

REASONS GIVEN FOR REGRET.

Most women give more than one reason and some give as many as four. The series was divided into two groups, namely:-

(1) Relatively Satisfied (n = 43), i.e., expressed regrets but would have the operation again, and (2) Dissatisfied (n = 33), i.e., regretful and would not have the operation again (see Fig. F1).

The reasons given by the 76 women expressing regret are summarised in Table No. F10. Examples of "severe social problems" referred to in the table are:-

(a) the patient who cared for a 16 year old severely handicapped child, (b) the patient whose last baby was severely epileptic and required constant supervision and (c) the patient whose husband had severe disabling multiple sclerosis. These problems were added to the responsibility of caring for other children.

Sex problems and loss of libido were mentioned by the older women only (range age at operation 32-43 years, age at interview 34-50 years). All but one woman giving "loss of femininity" as a reason were 30 or over at the time of operation (range 30-36 years at operation and age at interview 37-44 years). Guilt was mentioned as a reason for regret only once in each group. Insufficient time to consider the operation was mentioned only once in the relatively satisfied group, twice in the dissatisfied. A feeling that the patient was too young when the operation was performed was quoted once by the relatively satisfied and three times by the dissatisfied.

ILLUSTRATIVE CASES (INTERVAL STERILISATION).

In the following cases sterilisation was an elective procedure unconnected with a pregnancy.

Case No. 86.

This woman married at 17 years, was sterilised at 29 years and was interviewed five years after her operation. She is now separated from her husband because of his homosexual behaviour which she discovered some three years after her sterilisation. Now deeply regretful because she cannot have a child to another man, she has asked for a reversal operation, but this is not feasible.

Case No. 133.

This girl married at 19 years and was sterilised five years later, though her general practitioner and surgeon tried to dissuade her from operation because of her age. Interviewed three years after her operation, she is regretful because she has separated from her husband and would like a child to her new consort.

Case No. 162.

This patient was sterilised in her mid thirties, 15 years after her marriage. She was weepy for some weeks after the operation and now, four years later, feels depressed because she "should really have had more children". She feels that the operation "has changed me completely".

Case No. 202.

Had interval operation at age of 25 years. She is now/

now divorced but means to remarry and wishes to bear a child to her future husband. Some time after the interview she telephoned me enquiring about reversal operation, saying that she felt "twenty-five is too young for sterilisation".

Case No. 209.

Had sterilisation operation at 32 years. She feels she has been "changed completely", "psychologically changed". Her bad temper upsets her family and she finds that sex is no longer exciting.

Case No. 212.

This woman was sterilised when she was aged 36 years and of her sterilisation she says she "did it for her husband". She regrets the operation principally because of her marked loss of libido and less sexual pleasure both for herself and her husband.

Case No. 233.

Sterilised when aged 29 years on medical advice as she had three stillbirths and two anencephalics. She has two living children and says that, given the choice, she would not have the operation again.

Case No. 234.

Sterilised at 27 years after having four children. Has never been really reconciled to her operation as she is "just daft on bairns".

All the above patients were "dissatisfied" in that they would not choose to have the operation. The following cases are "relatively satisfied", expressing some regrets but accepting the correctness of their decision to be sterilised.

Case No. 94.

Was sterilised at 32 years. She was seen at Gynaecology Outpatients on a Friday and sterilised on Wednesday of the next week. She felt she had been "too rushed" and that "something had been taken away".

Case No. 115.

Sterilised at 27 years because of medical indications. She had early regrets only and observes of her time in hospital that patients in the same ward were having infertility investigations.

Case No. 246.

"Would not be sorry to have another baby". She was sterilised aged 27 because her last baby had been epileptic and she had difficulty coping with her family.

Case No. 363.

Felt "very broody" for the first year. She had always wanted a girl and could not lift a baby for a year after her operation (aged 28 years). She had thought of adoption, "when my husband was drinking less".

Case No. 376.

Was sterilised seven years ago when she was 35 years. She has many misgivings about her sterilisation but says she would make the same choice again, despite her present depression which she attributes "to her age".

ILLUSTRATIVE CASES (PUERPERAL STERILISATION).

In the following cases sterilisation was decided on during pregnancy and done not later than one month after delivery.

The undernoted are examples of "dissatisfied" patients.

Case No. 158.

Sterilised when 34 years old. She is still upset when she sees a baby and regrets her sterilisation despite easing of money and marital problems.

Case No. 227.

This patient was sterilised at 29 years. Her baby died shortly after the sterilisation.

Case No. 382.

Sterilised after delivery at 30 years. She had strong pressure from a cardiologist to agree to sterilisation. She cried all day after the operation and was "eaten up with jealousy because of my sister's pregnancy".

Case No. 418.

Married at 21 years and sterilised for social reasons
at/

at 28 years. Her husband was very ill at the time and there was little intercourse but no contraception. She was widowed and has married again five years after her operation. She feels that her regret is simply because of the second marriage.

ILLUSTRATIVE CASES (TERMINATION STERILISATION).

In the following cases, sterilisation was done at the same time as a therapeutic abortion.

The undernoted are examples of "dissatisfied" patients.

Case No. 93.

This girl was married by the time she was 20 and had her sterilisation at 31 years. She was interviewed six years after the operation. She felt regrets about her termination, but strongly regrets the sterilisation also. She felt that there was insufficient time for consideration and her husband felt both the termination and sterilisation were, "wrong". She felt she had, "no chance to come to terms" and that her "womanhood had been interfered with". She feels that she was "pressurised" by her doctors. There is also one adopted child in the family.

Case No. 171.

Married at 19 years and had her termination/sterilisation at 27 years. Her husband wanted no more children but she would have liked a girl. She now feels that she was too young to be sterilised and that it was wrong to do the two operations at the same time.

Case No. 184.

Termination/sterilisation at 36 years. She had a handicapped child who is now 16 years old. Her husband did not wish more children and the "pill" made her sick.

Case No. 323.

Married at 19 and sterilised four years later when she was only 23. The family had very poor housing and the husband also supported his first child. Vasectomy was considered by the couple. At first the sterilisation helped their financial problems but now, one year later, she is regretful and would have liked a girl.

CHANGES AFTER STERILISATION - THE PATIENT'S VIEW.

At interview patients were asked about menstruation, sex life and family life after sterilisation. The main trends in the group were:- a worsening in menstruation for 154 (42.2%) and improvement in sex life for 133 (36.2%) and family life for 137 (37.2%). The full distributions are given in Table No. F11.

Menstrual problems before sterilisation were reported at interview by 101 of 368 patients (27.4%), sex problems by 94 patients (25.5%) and family problems by 96 patients (26.1%).

These questions are now considered separately and in greater detail.

MENSTRUATION AFTER STERILISATION.

Nearly 45% of patients noticed no change in menstruation after their sterilisation. Forty-two per cent felt that menstruation was worse and only 13% noticed an improvement. The views of the regretful and non-regretful are compared in Table No. F12. There was no statistically significant difference between the two distributions.

A number of follow-up studies report increased menstrual disturbance following sterilisation (Whitehouse (1969) ref. 73: Williams et al (1951) ref. 77: Powell (1962) ref. 56: Adams (1964) Ref. 2: Neil et al (1975) ref. 47). Lu & Chun (ref. 42), postulated that disturbed menstruation was the result of interruption of the terminal branch of the uterine artery/

artery to the ovary. Neil et al (ref. 47) found a greater frequency of problems in patients sterilised by laparoscopic diathermy. They suggest that this may be due to the increased tissue destruction and disruption of the blood supply involved in this method of sterilisation.

The answers of those patients sterilised at laparoscopy are compared in Table No. F13 with the answers of patients who had open operation. In this present series, no significant difference was found between the two distributions.

Chamberlain & Foulkes (ref. 16) found that patients who had been taking oral contraception had heavier and longer menses after the operation than did those who had used no contraception. A comparison from this present study is given in Table No. F14. Forty-nine point one per cent of those taking oral contraception immediately before their sterilisation reported worse menstruation after, compared with 36.8% of women not on oral contraception before the operation. However, this difference does not reach statistical significance at the 5% level.

SEX LIFE AFTER STERILISATION.

Nearly half of the patients (49.7%) noticed no change in sex life after sterilisation, though just over one quarter (25.5%) of all patients reported problems in their sex life before operation. After operation, 36.2% of patients found their sex life better and 14.1% worse./

14.1% worse. Most patients who reported their sex life better spoke of "less fear", or said that they were less tense or anxious at intercourse. The following are typical of the patients who had experienced an improvement:-

Case No. 54.

This woman had married at age 18 and had three children. Before her sterilisation she had been much troubled by dyspareunia. She now felt "a difference" and said that she had "not the same fear". Her sex life was better and she had no dyspareunia.

Case No. 73.

Was married at age 21 and had two children (twins). Her sterilisation had been requested because of socio-economic pressures. Before the operation she had been frigid "because of fear". Her husband had had doubts about the operation and was willing to have a vasectomy but could not afford private fees. Since the operation she has noticed her sex life "very much better".

Case No. 404.

Has two children and had social indications for sterilisation. There was also a history of developing phlebitis while taking an oral contraceptive. Before operation she was "very nervous about pregnancy". Her very tense behaviour had "upset the family" but now "even my personality has changed". She felt much more relaxed and reported that since her operation her sex life had been much better.

Illustrations of regretful patients who found their sex life worse after sterilisation are given in chapter 8, page .

The views of the regretful and non-regretful patients of change in sex life are compared in Table No. F15. A statistically significant difference is demonstrated ($p < 0.01$).

FAMILY LIFE AFTER STERILISATION.

Only 5.4% of women felt that their family life was worse after sterilisation, compared with 37.2% who felt that it was better. Fifty-seven point four per cent of patients noticed no change in family life after the operation. Family problems before sterilisation were reported by 26.1% of the patients.

Case No. 23.

Married at 19 years and had three children. She now had more peace of mind and "can plan further ahead". She and her husband were "definitely happier" and one reason for sterilisation was to be sure that she could continue "the swing shift" (evening work in an electronics factory).

Case No. 66.

Married at 17 years and had two children. She was very upset by the second birth which was, however, not a complicated delivery. She had been depressed after this confinement and had "a terrible fear I might fall again". Her family life was now better because she was sure she would have no more children. She thought she had much more patience now, accepted her second child better and was looking forward to see her growing up.

Case No. 76.

Married at age 19 and had five children, the last when she was 33 years. Sterilised at age 36, she now felt "less anxious" and thought there was now "less worry for my husband, financially".

Case No. 93.

Had three children of her own and one adopted child. A further pregnancy had ended in therapeutic termination and sterilisation. Before her sterilisation the family had experienced financial problems and constant worry about an unexpected pregnancy. While she still felt upset and regretful about her termination, she felt that the sterilisation had been beneficial in her family life because they could now avoid the financial stress and the limiting of her family had helped the education of her existing children.

Case No. 187.

Married at 19 years and sterilised by the age of 31 years. She had three children and the indications for operation were non-clinical. She had felt "too old to take the pill" and worried a great deal about an unexpected pregnancy. Since the operation her family life was more relaxed. She felt "a great weight off my mind not worrying about a pregnancy". If she had become pregnant again, she would have asked for an abortion.

Case No. 237.

This woman had her last pregnancy terminated by vacuum aspiration/sterilisation at the age of 37. At the time she had four young children and also looked after her sister's disabled child. She subsequently divorced her husband who had died the year before the interview. She felt that her family life was much better after the operation because she was able to get out to work. Even before her divorce her husband did not support her financially.

Case No. 277.

This woman had an interval sterilisation at 34 years and/

and had only one child. She was a full-time school teacher. The operation had made a difference to her family life as she now was "more even tempered" and had "no worry about pill side-effects".

Case No. 367.

Married at 22 years with only one child. Had an interval sterilisation aged 30. Her husband was attending a training college which she felt would have been impossible without her sterilisation. Both she and her husband felt less anxious and happier.

The views of the regretful and non-regretful patients of change in family life are compared in Table No. F16. A statistically significant difference is demonstrated ($p < 0.001$).

TABLE NO. F1

INTERVAL BETWEEN OPERATION & INTERVIEW.

6 months to 3 yrs.	221	(60.1%)
4 to 6 years	95	(25.8%)
7 to 9 years	30	(8.1%)
10 years & over	22	(6.0%)
<hr/>		
	<u>368</u>	<u>100%</u>

TABLE NO. F2

AGENCY SUGGESTING STERILISATION.

Patient Herself	178 (48.4%)
G.P.	67 (18.2%)
Obstetrician	43 (11.7%)
Other Specialist	34 (9.2%)
Family Planning Clinic	24 (6.5%)
Other *	22 (6.0%)
	<hr/>
	368 (100%)
	<hr/>

- * This group comprised:- husband - 11 patients,
a friend - 4, neighbour - 3, mother - 2,
sister - 1, don't know - 1.

TABLE NO. F3

REGRETS AFTER STERILISATION.

<u>Group</u>		
I	No regrets	253 (68.7%)
II	Transient Post-op. regrets	39 (10.6%)
III	Late regrets only	51 (13.9%)
IV	Persistently regretful since operation	25 (6.8%)
<hr/>		
	Total	<u>368 (100%)</u>

Figure Fl.

DEFINITION OF GROUPS.

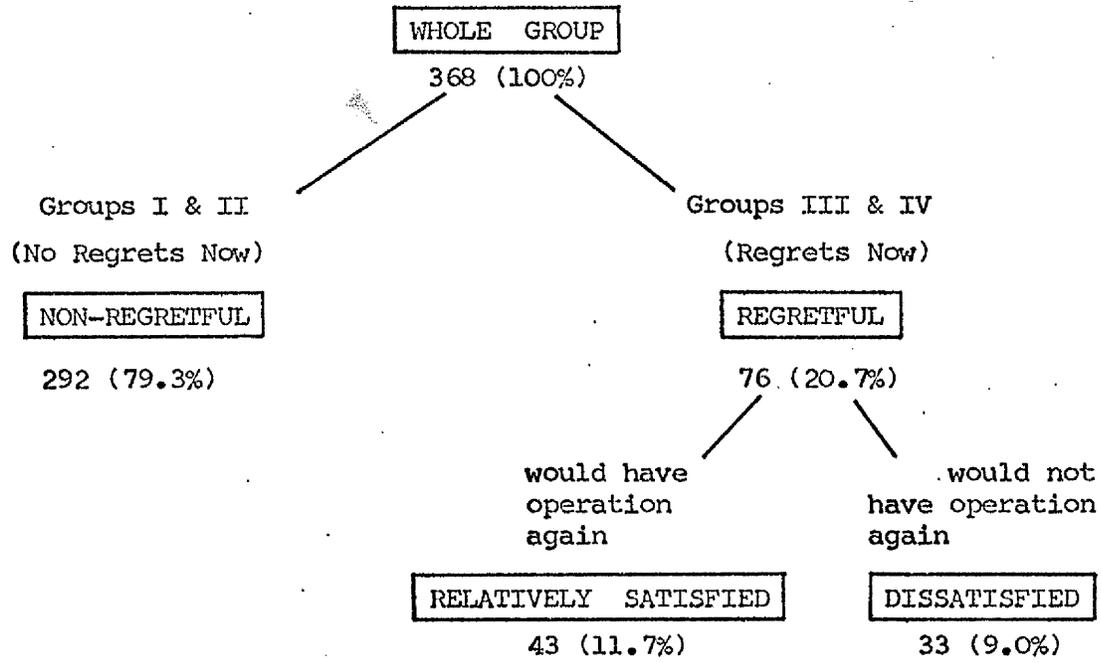


TABLE NO. F4

WHETHER PATIENTS WOULD CHOOSE TO HAVE THE OPERATION
AGAIN (IN THE SAME CIRCUMSTANCES).

	Non-Regretful	Regretful	
Definite 'NO'	0	11 (14.5%)	} Dissatisfied
No	1 *	19 (25.0%)	
Undecided	2	3 (3.9%)	
Yes	157 (53.8%)	37 (48.7%)	} Satisfied
Definite 'YES'	132 (45.2%)	6 (7.9%)	
	292 (100%)	76 (100%)	

* This patient had very distressing post-operative complications.

TABLE NO. F5

REGRETS - AGE AT OPERATION.

	Number in Group	Number under 30 yrs at Operation.
Non-Regretful	292	60 (20.6%)
Regretful	76	38 (50.0%)
	368	98 (26.6%)

Difference in percentages $p < 0.001$.

TABLE NO. F6

REGRETS - TIMING OF OPERATION.

	Interval	Termination	Puerperal
Non-Regretful	219 (82.0%)	34 (72.3%)	39 (72.2%)
Regretful	48 (18.0%)	13 (27.7%)	15 (27.8%)
	267 (100%)	47 (100%)	54 (100%)

TABLE NO. F7

REGRETS - OTHER CLINICAL FACTORS.

	<u>NUMBERS WITH CHARACTERISTIC</u>	
	Non-Regretful (n = 292)	Regretful (n = 76)
"Clinical" (ie Non-Social) Indication for Operation.	86 (29.5%)	33 (43.4%) *
Vasectomy considered by couple.	124 (42.5%)	22 (28.9%) *
Husband objected to Operation or had doubts.	26 (8.9%)	10 (13.2%)
Problems with Contraception before deciding on Sterilisation	103 (35.3%)	39 (51.3%) *

* $p < 0.05$

TABLE NO. F8

REGRETS - SOCIAL FACTORS.

		<u>NUMBERS WITH CHARACTERISTIC</u>	
		Non-Regretful (n = 292)	Regretful (n = 76)
<u>Social Class</u>	Professional & Managerial.	41 (14.0%)	16 (21.1%)
	Clerical & Skilled		
	Artisan.	136 (46.6%)	34 (44.7%)
	Semi-skilled & Unskilled.	115 (39.4%)	26 (34.2%)
Further Education beyond age of 15 years.		63 (21.6%)	13 (17.1%)

TABLE NO. F9

REGRETS - PERSONALITY INDICATORS.

	<u>NUMBERS WITH CHARACTERISTIC</u>	
	Non-regretful (n = 292)	Regretful (n = 76)
Cigarette Smoking	138 (47.3%)	45 (59.2%)
Religious Belief or Conviction	151 (51.7%)	35 (46.1%)
History of Consultation with Psychiatrist	23 (7.9%)	15 (19.7%) *
History of Overdose or Suicidal Gesture	20 (6.8%)	14 (18.4%) *

* $p < 0.05$

TABLE NO. F10

REASONS GIVEN FOR REGRET.

	Relatively	Dissatisfied
	Satisfied	
	<u>Numbers of Women giving Reasons</u>	
	n = 43	n = 33
Advised Sterilisation for 'clinical' reasons (Did not choose operation).	14 (32.5%)	6 (18.2%)
Advised Sterilisation for severe Social Problems (Did not choose op.)	2 (4.6%)	5 (15.2%)
Wanted another Child (same consort)	12 (27.9%)	9 (27.2%)
Met another man and wished his child	3 (6.9%)	7 (21.2%)
Strong Maternal feelings, jealous of Pregnancy in others.	12 (27.9%)	7 (21.2%)
Sex Problems/Loss Libido	1 (2.3%)	3 (9.1%)
Felt Loss of Femininity	2 (4.6%)	8 (24.2%)*
Marital Problems	3 (6.9%)	3 (9.1%)
Miscellaneous	6 (13.9%)	7 (21.2%)

* Difference in percentages significant $p < 0.05$

TABLE NO. F11

MENSTRUATION, SEX-LIFE & FAMILY LIFE AFTER STERILISATION -
 PATIENT'S VIEW OF CHANGE.

	Menstruation	Sex Life	Family Life
Worse	154 (42.2%)	52 (14.1%)	20 (5.4%)
No Change	164 (44.9%)	183 (49.7%)	211 (57.4%)
Better	47 (12.9%)	133 (36.2%)	137 (37.2%)
	365* (100%)	368 (100%)	368 (100%)

- * Two patients had hysterectomy sterilisation and one did not answer this question.

TABLE NO. F12

REGRETS - PATIENT'S VIEW OF CHANGE IN MENSTRUATION.

	Not Regretful	Regretful
Worse	118 (40.8%)	36 (47.4%)
No Change	134 (46.4%)	30 (39.5%)
Better	37 (12.8%)	10 (13.1%)
	<u>289 (100%)</u>	<u>76 (100%)</u>

TABLE NO. F13

LAPAROSCOPY - MENSTRUATION AFTER STERILISATION.

	Laparoscopy	Open Operation
Worse	104 (43.3%)	50 (40.0%)
No Change	101 (42.1%)	63 (50.4%)
Better	35 (14.6%)	12 (9.6%)
	240 (100%)	125 (100%)

TABLE NO. F14

ORAL CONTRACEPTION - MENSTRUATION AFTER STERILISATION.

	Not on O.C. before Sterilisation	On O.C. to time of Sterilisation
Worse	75 (36.8%)	79 (49.1%)
No Change	99 (48.5%)	65 (40.4%)
Better	30 (14.7%)	17 (10.5%)
	204 (100%)	161 (100%)

TABLE NO. F15

REGRETS - PATIENT'S VIEW OF CHANGE IN SEX LIFE.

	Not Regretful	Regretful
Worse	32 (10.9%)	20 (26.3%)
No Change	150 (51.4%)	33 (43.4%)
Better	110 (37.7%)	23 (30.3%)
	<u>292 (100%)</u>	<u>76 (100%)</u>

($\chi^2 = 11.747$ d.f. 2 $p < 0.01$)

TABLE NO. F16

REGRETS - PATIENT'S VIEW OF CHANGE IN FAMILY LIFE.

	Not Regretful	Regretful
Worse	7 (2.4%)	13 (17.1%)
No Change	173 (59.2%)	38 (50.0%)
Better	112 (38.4%)	25 (32.9%)
	<u>292 (100%)</u>	<u>76 (100%)</u>

($\chi^2 = 25.386$ d.f. 2 $p < 0.001$)

CHAPTER 8.

C O N C L U S I O N S .REVIEW OF METHODS.PROBLEMS OF TIME.

The study has been retrospective and largely, though not entirely, descriptive. To the constraints of retrospective research have been added the problems of available time, familiar to all clinicians undertaking research, but perhaps particularly acute for the lone observer subject to the heavy commitment of full-time general practice.

I had originally estimated that I might find about 60 sterilised women in the practice. This guess, based on "experience", was quickly shown to be wildly inaccurate by the record search which discovered 272 cases. Further enquiry revealed 375 sterilised women and finding this number completely upset earlier logistic predictions.

An additional unrecognised factor influencing the study was the rapid increase in the incidence of new cases which co-incided with the start of the main study in 1976/77 (see Fig. D1). At this stage the first priority was to deal with this unforeseen load of extra cases. In order to complete the study within a reasonable time, plans to interview matches as well as cases had to be abandoned.

THE QUESTIONNAIRE.

These problems of time and the unexpectedly large number of cases discovered made it clear, early in the investigation, that validation of the questionnaire would be impracticable. A particular difficulty was to find adequate extra consulting time for interviews during normal opening hours of the Health Centre. Limited validation was possible by comparing patients' answers, for example on indications for operation, with referral letters and by a general review of case notes after the interview. Replies from the sterilised group and the matches were also generally consistent with those obtained earlier from the random sample.

A gratifying aspect of the questionnaire survey was the high response rate, achieved with the minimum of follow-up of non-responders. The consistent quality and completeness of returned questionnaires was much better than expected, particularly from the lower socio-economic groups. A possible explanation for this is the familiarity gained by most women with the rather complex and searching application forms now used by many local firms when recruiting labour.

A RETROSPECTIVE OBSERVATIONAL STUDY.

An important factor in observational studies is the selection of subjects for study and the accuracy of the sampling frame. Errors due to poor response rate are probably minimal in this present study. The sampling frame in general practice is the list of registered patients, supported by the age/sex register. Like all lists, these are to some extent inaccurate and out of date.

I have already raised, in a discussion of the random sample (page 154), the question of the reliability and validity of age/sex registers as true population denominators in general practice. There are two factors supporting the accuracy of the age/sex register in this present study. Firstly, it has been prepared directly from the medical records held in the practice and those records are on the whole more correct for patients' names and addresses than the Family Practitioner Committee files (Farmer et al, 1974, ref.27). The second factor is that the practice has been of stable size for some years and "This latent element of potential patients should roughly balance the inflation due to those who have left the area and not yet registered with a new doctor", (RCGP et al, 1974, ref. 59).

Many of the limitations of this study are also those of retrospective research. Much of the data was relatively easily obtained, was voluminous and covered, in a few cases, /

cases, up to twenty years of patient experience of sterilisation. On the other hand, the investigation was of the history of sterilisation in the practice and depended partly on past records of variable completeness and accuracy and partly on patients' fallible memory and personal biases. The material proved more than adequate in quantity but on the other hand often lacked detail, though the data obtained appeared to be reasonably consistent and reliable.

THE CHOICE OF MATCHES.

The aim of the match comparison was to compare the histories of cases with the histories of some controls. In theory, the control subjects should be like those under observation in every aspect except that they had not undergone sterilisation. In fact, it was possible to pair each sterilised woman with a non-sterilised woman of the same age who had joined the practice at a similar time, thus deliberately equalising these factors in both groups.

It was thought that the important variables to be elicited would be age, length of time with the practice and parity. Age was easily determined from the age/sex register and length of time registered with the practice from the front of the case record. Parity could be determined from the records in only a minority of cases, usually when recent general practitioner maternity record or obstetric discharge slip was contained within the notes.

Considerable practical difficulty was experienced in matching for the first two factors while maintaining strict randomisation. At this stage it was judged impracticable to match for parity. The effect of this variable on the results is discussed on page 211.

In fact, the index and match groups showed several statistically significant differences in marital and gynaecological histories and in psycho-social profiles. The interpretation of the data and any inferences must therefore be made cautiously. Various factors are shown to be associated with female sterilisation but the evaluation of these associations can only be conjectural.

It would seem in some cases, however, that there is sufficient evidence from the match comparisons (e.g., menstrual and sexual problems) to justify prospective investigation.

COMMENTARY.

Large scale programmes of voluntary sterilisation as a means of population control were instituted in Japan and Puerto Rico in the nineteen forties (Dourlen-Rollier, 1977, ref.20). Governments in countries with high birth rates frequently offer social advantages to those who have undergone sterilisation. In Seoul, South Korea, family heads who have had vasectomy are given priority in the allocation of municipal housing. The population council in Pakistan introduced a scheme for an endowment assurance worth 10,000 rupees, which is issued when either spouse is sterilised.

During the last decade not only has female sterilisation become widely acceptable in this country, but the social class and parity distribution has altered markedly. Writing in 1968 in Aberdeen, Thompson & Baird (ref.70), followed up 186 women, mostly sterilised after childbirth or termination, in 134 (72.0%) of whom "debility and multiparity" was an indication for operation. They found sterilisation "seldom necessary in upper social-class couples", but in the lower social classes, "it has been freely used and is widely accepted". In this series, where interval operations are much more important, few women had more than four children and there was no significant difference in social class between cases and their matches.

INDICATIONS - CONTRACEPTIVE PROBLEMS.

In this series, the indications for operation were multiple, but I have attempted to divide them into broad groups and to highlight the importance of a history of contraceptive problems. Numerically, clinical indications are relatively less important. (Page 198, Table No. D2).

The present high rate of sterilisations, both female and male, may be partly a reflection of the nature of current contraceptives and their acceptability. Mechanical methods may disturb otherwise good marital relations. Anxieties about side-effects of oral contraceptives are widespread and there is evidence suggesting "that the long-term use of oral contraception, at least in parous women over 30 years requesting sterilization, is associated with a small but significant reduction in sexual responses" (Leeton et al, 1978, ref.40). A woman is also likely to have different needs for contraception at different times in her life depending on the permanence of sexual relationships, a wish to have children and perhaps the demands of a career.

A special circumstance in which sterilisation is often an ideal solution is the couple in their late forties with a grown-up family. Menstruation may be erratic as the menopause approaches; the security of oral contraception has been renounced because of age related risks. Recurring fears of unwanted/

unwanted pregnancy may greatly stress the marriage and sterilisation might provide a happy answer.

In this present study (page 198, Table No. D2), 37.1% of the sterilised women had medical problems with contraception. If patients having difficulty with mechanical methods or worried about the "pill" were to be included, this percentage would be considerably higher. Indeed, patients choosing sterilisation as surgical contraception may be an "atypical example of a very much larger number of people who may not want to have more children, but are anxious and uncertain, and do not know what to do", (Pond, 1971, ref. 55). Would sterilisation have been requested if current contraceptive practice were better?

In addition, the present study shows a difference ($p < 0.01$) in ever-use of contraceptives between the sterilised women and matches (page 236, Table No. E20.) The sterilised patients also appear to marry and have their first child earlier than the control group ($p < 0.01$) and by their late twenties their family is complete (page 218/9, Tables Nos. E2 & E3).

The comparison of contraceptive ever-use suggest that they, rather than their husbands, have more often been responsible for the couple's family planning and the difficulties they experience may be a strong incentive to seek operation. It is likewise possible that the sterilised women have/

have been less able to discuss contraception freely with their husbands and less able to find a mutually satisfactory solution.

PSYCHIATRIC ASPECTS OF STERILISATION.

The sterilised women in this series have been shown to be more likely than their matches to have taken psychotropic drugs and to have a higher rate for attempted suicide (page 233, Table No. E17b. The differences are most marked for the termination group - eight (18.2%) of patients with a history of suicide attempt and one patient (2.3%) of their matches - but for both the interval and puerperal group the rate is over twice as high for cases as for matches.

Thus, these indicators of psychiatric disturbance were more often found in the sterilised patients than in women of the same age registered with the same practice. However, the main indication for sterilisation was psychiatric in only 5.6% of cases. Detailed investigations of doctor/patient contacts for psychiatric, gynaecological and general complaints are being pursued at present. Morbidity patterns before and after operation are under study as are comparisons between sterilised patients and their matches.

Black & Sclare (1968, ref. 12), found that 22% of the 168 patients studied had, "definite evidence of psychiatric disorder before being sterilised". This they define as "emotional disturbances which necessitated attendance upon the family doctor or psychiatrist". Psychiatric indication for sterilisation was found by them in only two patients (1.2%) in the follow-up sample.

Another retrospective study, that of Sim et al (1973, ref. 63), reported similar findings. "Out of 35 patients (23%) with a previous history of psychiatric illness, ten (6.6%) had had in-patient treatment". In this present study, 10.7% of the sterilised women had a history of psychiatric disturbance severe enough to warrant consultation with a psychiatrist. Of these, 17 sterilised patients (45.9%) had been admitted to a psychiatric ward. Thus 17 (4.9%) of the sterilised patients and 16 (4.6%) of matches have a history of in-patient treatment.

Whereas Black & Sclare had found that patients with antecedent psychiatric disorder had less benefit from sterilisation, Sim and his colleagues found that, "such a history did not affect the result of the sterilisation".

In summary, Black & Sclare conclude that, "Sterilisation can be expected to improve socio-economic functioning but has little influence on any basic psychiatric problems". In this present study patients reported a marked improvement in sex life and family life after operation.

The papers of Black & Sclare and of Sim and his colleagues both reported retrospective studies and neither had controls. They can thus assess psychiatric disturbance only in terms of history of psychotropic medication, contact with specialist services, or evidence from the patient of drug overdose or other incident indicative of psychiatric illness.

Smith (1979, ref. 65) has used the General Health Questionnaire to assess "hidden psychiatric morbidity" and identified 25% of her sample as "psychiatric cases" at the time of referral. No control group was used for her sample, but "this degree of psychiatric disturbance is greater than that found in the general population using the same screening method" (Goldberg et al, 1976, ref.32). From her follow-up of these patients, Smith showed that this rate of disturbance was less by one year after operation.

LIFE EVENTS.

In this present study, religious belief was much less common among the sterilised patients (234 Table No. E18), who were also less likely to have continued secondary education after fifteen years of age. It may also be that the sterilised women are more vulnerable to contraceptive difficulties or to an unplanned pregnancy and less inhibited, or sustained by religious belief.

The present study also shows that 33 (9.5%) of the sterilised women had married more than once, compared with 15 (4.6%) of the matches ($p < 0.05$). Eleven (11.3%) of the termination/puerperal group were divorced or separated compared with four (4.1%) of their matches. Of the 76 sterilised patients who had regrets, ten (13.2%) said that they had met another man and wanted his child; six (7.9%) had regrets because of marital problems.

The sterilised patients have thus been shown to be more vulnerable to psychiatric disturbance and to have less stable marital histories. These two characteristics may not be unrelated. Psychiatric disturbances may become more important with the increase in sterilisation operations in younger women of low parity and could possibly lead to a public health problem.

EMOTIONAL AND PERSONALITY FACTORS.

The reasons why women opt for sterilisation as their contraceptive choice are not known, but personality factors are important and as yet have been little studied. As Black & Sclare (1968, ref. 12) have emphasised, "A patient's final decision to surrender her reproductive potential involves complex and ambiguous emotions".

The attitudes of society have changed regarding family size, childbirth and a woman's career aspirations. No doubt economic and political pressures and improved contraceptive technology have been important motive forces. The one or two child family has become the norm, but most women still greatly value their capacity to bear children. Conscious acceptance of sterilisation - a permanent procedure - cannot be achieved without emotional repercussions. Even within a good marriage, sterilisation must entail some degree of psychological and emotional reaction. Elective sterilisation, because it implies the conscious acquiescence in loss of maternal function by surgery in a patient who is not ill, must involve some degree of psychological impairment or mutilation.

From my interviews with 368 patients at various times after their sterilisation, I now realise that many of these women have experienced feelings of uneasiness similar to that felt by older women when their children leave home. Indeed some 10.6%, whom I have classified under "transient post-operative regrets (Table No. F3) suffered fairly severe symptoms, sufficient to make them/

them regret their recent sterilisation. Many had been tearful and distraught in the post-operative period, though all were non-regretful at the time of interview. It would seem clinically important to recognise this phenomenon so that nursing and medical staff can offer appropriate support.

Barglow (1964, ref. 8) found "persistence of conscious pregnancy fantasies or symptoms and signs" in 80% "months and years" after postpartum sterilisation of 190 women patients. These women were "relatively young" and "free of major systemic illness and manifest psychopathology". Palmer & Czernichow (1975, ref. 52) comment* that, "Even in the well informed woman, to whom the operation has been explained in detail, there can still persist all the unconscious fantasies equating sterilisation with castration, and a certain guilt associated with the idea of sexuality freed from fecundity".

Happily these conflicts appear usually to be rapidly resolved. Soutoul & Duchateau (1976, ref.66) comment,** "The well balanced woman is going to overcome these inward conflicts" - (dissociating fertility and sexuality, procreation and pleasure), - "that is the so called mourning stage - and restructure from within. The neurotic will 'manufacture' psychological and somatic symptoms at various levels and will worsen the difficulties of the couple".

* "Mais, même chez une femme bien informée, et a qui l'intervention a été expliquée en details, peuvent subsister tous les phantasmes inconscients assimilant stérilisation et castration, et une certaine culpabilité associée a l'idée de la sexualité libérée de la fécondité."

These processes of "working through" have been related to "mourning and depression following object loss and to phantom limb following amputation" (Barglow, 1964, ref. 8).

Despite this emotional reaction, 92% of the patients interviewed by Barglow said that they would choose sterilisation if faced with the same decision again. These figures are in keeping with my own where 90.2% of patients would choose to have the operation again in the same circumstances (Table No. F4). The majority of these patients (72.0%) had elective interval sterilisation unrelated in time to recent parturition or therapeutic abortion.

The following quotations illustrate the feelings of loss expressed by some women at interview:-

Case No. 93 - "Something has been taken away".

Case No. 162 - "The operation has changed me completely".

Case No. 263 - This patient had no regrets at the time of interview but said she had been upset at the time because "the possibility had been taken away, though we want no more children".

Case No. 375 - After the operation, "that was me finished and passed away".

Case No. 420 - "I felt that much less of a woman".

** "La femme équilibrée va dépasser ces conflits internes (c'est la phase dite de deuil) et se restructurer de l'intérieur. La nevrosée va - fabriquer des symptômes - somatiser a des niveaux divers et majorer les difficultés du couple".

SEX LIFE AND STERILISATION.

In this series, nearly half of the patients noticed no change in sex life after sterilisation though over one quarter (25.5%) of all patients reported problems in their sex life before operation. Of the 185 women who noticed a change, the majority (71.9%) found their sex life improved, whereas 28.1% found it worse (Table No. F15). The regretful patients fared worse than the others; 26.3% noticed a worsening in their sex life compared with 10.9% of the non-regretful, (Table No. F15). Nonetheless, even among the regretful, more patients (30.3%) found their sex life better than worse (26.3%).

When present sexual problems are considered (Table No. E14), 23.9% of the sterilised reported current problems despite the general tendency for improved sex life after operation. Among the matches only 9.6% reported problems ($p < 0.001$).

Smith (1979, ref. 65) in Dundee, reports broadly similar answers to questions on change in sexual satisfaction after sterilisation. In her series there was no substantial difference in the answers obtained at two months and at one year after sterilisation. The results from Smith's study are tabulated on the next page alongside those from the present study.

Smith's Survey (n = 163)		Present Study (n = 368)	
Sexual Satisfaction - 1 yr post-operative		Sex Life - Patients View of Change.	
WORSE	8%		14.1%
NO CHANGE	58%		49.7%
BETTER	34%		36.2%

While many patients experience an increase in libido and in sexual satisfaction after operation, important adverse effects are suffered by some women.

Black & Sclare (1968, ref.12), from their psychiatric follow-up of sterilised patients, found that "The improvement in psycho-sexual adjustment, however, was comparatively slight". They concluded that fear of conception was not a major factor in explaining poor sexual adjustment. Whitehouse (1969, ref. 73) comments that in a significant minority, "Sub-conscious realisation of their loss of reproductive function may lead to sexual frigidity in some women, whilst others may seem less sexually attractive to their husbands". This concept of "Gout du risque" is raised by several authors (Soutoul & Duchateau, 1976, ref. 66; Palmer & Czernichow, 1975, ref. 52).

The following quotations illustrate the reactions expressed by some women at interview:-

Case No. 20 had a "less warm relationship" with her husband and because of this she felt "an old woman over night".

Case No. 209 said that she felt "changed completely". She added, "I am psychologically changed. My bad temper upsets the family and sex is no longer exciting".

Case No. 212 - This patient felt much less libido and had less sexual pleasure. She said that her husband felt, "It is not the same".

Case No. 36 - "I feel less of a woman". "I have lost something important".

Case No. 141 - This patient felt, "Not a woman". She was against vasectomy.

REGRET AFTER STERILISATION.

The prevalence of regret after sterilisation has been quoted by Schwyhart & Kutner (1973, ref. 50) as ranging from one to 18%. Recent British studies quote 3.3% "dissatisfied" (Sim et al, 1973, ref. 63), 4.9% regrets (Whitelaw, 1979, ref. 74), 6.6% "definitely dissatisfied" (Curtis, 1979, ref. 19). This present study reveals 33 dissatisfied women (9.0%) who would not have the operation again. It seems to me possible that women may be more frank in expressing their regrets to their own general practitioner than to a consultant, who may have/

have performed the operation. The prevalence of regret may now be higher than the three to four per cent suggested in earlier British reports (Thompson & Baird, 1968, ref. 70, Black & Sclare, 1968, ref. 12) which studied women of higher parity who often had obstetric indications for operation.

Most authors are agreed * that sterilisation should not be advocated for younger patients, especially if they are of low parity. This present study shows a striking association between regret and age at operation ($p < 0.001$). Fifty per cent of patients who expressed regrets at interview were under thirty years of age (Table No. F5, p.264) at the time of operation. In contrast, only 20% of those without regrets were under thirty years when they were sterilised.

While not all women expressing strong dissatisfaction would request reversal, it seems not unlikely that many of them would. Reversal operations are not without risk and the need for effective pre-operative counselling and for continued prospective assessment of regret is undiminished. From his/

*
 Adams, (1964, ref. 2).
 Norris, (1964, ref. 51).
 Black & Sclare, (1968, ref. 12).
 Sim et al, (1973, ref. 63).
 Campanella & Wolff, (1975, ref. 13).
 Winston, (1977, ref. 78).
 Thomson & Templeton (1978, ref. 72).
 Dubuisson et al (1980, ref. 21).

his study of 103 women who asked for reversal of sterilisation, Winston (1977, ref. 78) concludes, "It therefore seems unwise to sterilise women under thirty, particularly immediately after pregnancy or if their marriage is in jeopardy".

Whitelaw (1979, ref. 74), from a study of 485 sterilisations, advises caution, "When a young woman requests sterilisation" and admits, "The possibility of such a contingency (divorce and remarriage) is difficult to assess and is an outcome which may come as a surprise not only to the surgeon but to the couple concerned". From this present study and on-going experience with my own patients, I endorse these conclusions.

Baird (ref. 7) in 1965, pointed to the "striking" increase in the birth rate since 1958, which he attributed to "A much higher marriage rate, especially in the younger age groups, and a slight increase in the average family size". Young marriage is still the norm and it is increasingly common in my practice for young women in their early twenties with one or two children to request sterilisation. These requests are frequently made at a time of stress or uncertainty, often due to problems in managing their young children, to financial worries or to sexual tensions within their marriage. Rather than face their emotional problems, some of these women seek sterilisation; a long-term solution to a short-term situation. They often seem to look on surgery as a sort of cure by magic.

MENSTRUATION & STERILISATION.

It is not easy to obtain direct data on menstrual dysfunction. There is no way of directly measuring menstrual pain. Timing can be assessed from menstrual calendars and some indication of the amount of bleeding may be had from questions on the number of pads or tampons used, the frequency of changing on the "heavy" days and the presence of clots or "flooding". Attempts to measure blood loss more accurately (Kasonde & Bonar, 1976, ref.37.) emphasise the unreliability of reports of menorrhagia.

The effect of contraception is also difficult to assess. Women who have used oral contraceptives may dislike their "normal" periods when these return after sterilisation. If a control group is studied, the type of contraception used may modify the natural pattern of menstrual bleeding. If oral contraception users are excluded from the control group, as in this present study, the beneficial effect of the oral hormones on bleeding and pain is lost. The diminished control group thus shows a higher rate of menstrual disorder.

Many authors* have reported an increase in menstrual disturbances after sterilisation. Lu & Chun (1967, ref. 42) postulated that this was the result of interruption of the terminal/

* Black & Sclare (1968, ref.12). Lu & Chun (1967, ref.42).
 Neill, J.G., (1969, ref. 48). Muldoon, (1972, ref. 46).
 Whitehouse, (1969, ref. 73). Adams (1964) ref. 2)
 Chamberlain & Foulkes, (1976, ref.16).

terminal branch of the uterine artery to the ovary, resulting in cystic degeneration and consequent disturbance in ovarian function. It may possibly be that the prostaglandin equilibrium of the uterus is also disturbed by this alteration in blood supply to the utero-ovarian axis. Neil et al (1975, ref. 47), in a controlled study, presented some evidence that the frequency of post-operative menstrual problems varies with the procedure:- 39% with diathermy and laparoscopy and 22% with tubal ligation ($p < 0.001$). This difference they attribute to increased tissue destruction and disruption of blood supply in the laparoscopy group.

In addition to the effects of interrupted blood supply and hormone withdrawal, it seems probable that psychological factors also play a part. These psychological factors may possibly alter the hormonal control of the menstrual cycle via the higher centres, thus affecting thresholds for complaints.

In this present study, 44.8% of all the sterilised patients reported menstrual problems, compared with 18.8% of all matches. Because of the effect of oral contraceptives, a comparison was made between those matches not using oral contraception and the corresponding sterilised patients. Of the sterilised, 44.8% complained of menstrual problems compared with 20.2% of matches not using oral contraception.

The reported changes in menstruation after sterilisation are dealt with in Chapter 7 (Tables Nos. F11, F12, F13 and F14). Patients on oral contraceptive before operation fared worse than those not on the "pill"; and the laparoscopy group had more problems than the group having open operation. A greater proportion of the regretful patients reported worse menstruation than the group without regrets. In none of these comparisons was the difference statistically significant.

Menstrual problems before sterilisation were reported at interview by 27.4% of women. In the whole group of sterilised patients, nearly 45% noticed no change in menstruation after their operation. Forty-two per cent felt that menstruation was worse and only 13% noticed an improvement. These results should be viewed in light of the suggestion that the sterilised women appear to be more "gynaecologically vulnerable" before operation.

Whatever is the extent and the mechanism of this change, a cardinal factor is what the patient believes about uterine function rather than what the scientific facts may be. The work of the general practitioner, as doctor of first contact, and more important as doctor of continuing care, is quickly affected by any substantial change in the prevalence of menstrual disorders. Increased complaints of irregular periods, menorrhagia and dysmenorrhoea may exert medico-economic effects.

Proposals for a Prospective Investigation.

The intention to provide a retrospective descriptive survey appears to have been reasonably fulfilled. The further aim, to explore clinical impressions about menstrual problems in sterilised women, has been only partly achieved. In the circumstances under which the work was done and given the problems of time already detailed, the approach to the investigation could be only superficial. Nothing has been or could have been proved. Nonetheless, the differences demonstrated between cases and controls are very large. It seems unlikely that they could be fully accounted for by differences in parity between the groups, errors in the choice of matches or subjective biases.

In my opinion, based on reading and the work I have done, the association between tubal occlusion and increased menstrual problems is real and the question is of major clinical importance. None of the published papers I have read answers the questions posed or adequately covers all aspects of the problem.

From my reading of the literature and from tackling practical problems encountered in my own research, the main defects in previous work appear to be:-

- (1) Lack of uniformity in reporting findings, making valid comparison virtually impossible.
- (2) Terms are rarely defined and normal standards are not specified. "Dysfunctional uterine bleeding", "significant abnormal bleeding", "heavier more frequent periods" and even "menorrhagia" or "metrorrhagia" do not appear to have commonly accepted interpretations. My own term, "menstrual problems", I consider/

I consider to be too generalised and unsatisfactory. At least, however, it seems to have a clear meaning to my patients and to be clearly understood by them. Workable and generally acceptable definitions of these terms are required.

Attempts to be more scientific have sometimes been counter-productive. While appreciating the thoroughness of the work of Chamberlain & Foulkes (1976, ref.16), I question the accuracy of the very detailed descriptions of their menstrual periods from 1971 to 1973 given retrospectively by women in 1975. In my experience, only a small minority of women, when asked retrospectively, are found to have kept detailed contemporaneous notes of their menstruation.

Equally unconvincing clinically are the measurements of blood loss before and after sterilisation by Kasonde & Bonnar (1976, ref. 37). Their study aims to measure "total menstrual blood loss" and presumes that all menstrual blood passed was recovered in tampons and towels. It seems to me likely that significant further unmeasured blood loss will normally occur at micturition. "Total menstrual blood loss" is not in any case a clinical criterion and may not be relevant to the clinical problems of initiating treatment and assessing progress.

- (3) The percentage follow-up is often much too small and the length of follow-up much too short, especially when assessing long-term effects. One questionnaire or one interview is inadequate to assess/

to assess long-term complications, especially minor gynaecological morbidity which does not justify referral for operation. General practitioner researchers giving continuous comprehensive care and keeping good records should be well placed to answer this criticism.

- (4) Very varied operative techniques are often grouped together and were formerly combined with other procedures, e.g., caesarean section and therapeutic abortion.
- (5) To date series have seldom been controlled. The controlled investigation which impressed me most as being a worthwhile approach was that of Neil et al (1975, ref. 47). Unfortunately the numbers are rather small for definitive conclusions.

The problems of finding suitable controls appear to be very difficult. Even if controls can be found, matching for age, parity and previous gynaecological and perhaps psychiatric morbidity, the two groups remain very different, not least in attitudes. The control woman is not operated on and does not become pregnant because she or her husband is practising some other form of contraception or because her husband has had a vasectomy.

If sterilised women are used as their own controls, the bias of time is introduced. This is particularly important as post-sterilisation women are often in an age group subject to pre-menopausal changes in menstrual patterns.

In my opinion, a prospective study is required to answer some of these criticisms. This could profitably combine the experience of continuing care in general practice with the expertise of gynaecological specialists and perhaps follow the lines of the R.C.G.P. Oral Contraceptive Study (1974, ref. 58).

GUIDELINES AND STERILISATION COUNSELLING.

Before the passing of the Abortion Act in 1967, sterilisation operations were relatively rarely done in this country and were usually for medical, obstetric or eugenic indications. At about the same time, in the USA, the American College of Obstetricians and Gynecologists, "abandoned its age-parity formula for elective sterilisation and also recommended dissolution of hospital sterilisation committees" (Shepard, 1974, ref. 62). Since 1967, very many more operations have been done, usually for purely contraceptive purposes in healthy women who simply prefer this means of family limitation.

I have already drawn attention, in the "plan of the study" (page 130) to several papers listing personality and psychiatric contra-indications and to the interview technique detailed by Baudry et al (1971, ref. 11). It was clear, from the interviews, that very few of my patients had enjoyed in-depth psychiatric or personality assessment; surprisingly few had sought advice from Family Planning Clinics or social agencies (Table F2, page 260). My impression, from interviews and from the counselling I have done, is that formal interview by consultants is usually unnecessary and an uneconomic use of special skills. Smith (1979, ref. 65), from her prospective psychiatric study of Dundee women, concludes "there is no evidence that psychiatrists, social workers or others need to be routinely involved".

Probably more helpful than one long session, when decision is difficult, is the possibility to have more than one short appointments with a well known counsellor, informally, and in a familiar environment. These conditions general practice is well suited to provide.

Most authors are agreed that adverse emotional sequelae may be minimised if sterilisation is avoided in younger women. However, it has been pointed out that with the increasing demand for sterilisation for younger women, "has come a greater criticism by our patients of the conservative views of their doctors" (Emens, 1980, ref. 26). Emens also advises that it is unwise to refuse sterilisations simply on account of age as "the under-privileged grand multipara of tomorrow is the young woman of to-day who already has two or three children".

Campanella & Wolff, (1975, ref. 13), in their retrospective study of emotional reactions, found more complaints of deterioration in general health and sexual relationships in younger than older women. For some young women, with strong career motivation, a life which does not include the care of more young children may be a wise and stable choice which the doctor should accept. For the majority, the doctor's role is to help the patient find time to weigh alternatives.

Most authors also caution against sterilisation when the marriage is not stable. My impression is that, in most people, /

people, the pattern of reaction to emotional stress varies little throughout adult life. The motivation for a sterilisation request may be based on irrational factors and may be an effort by the patient to solve a psycho-sexual problem. The situation leading to the request for operation may eventually cause the breakdown of the marriage, which may be blamed by the patient on the sterilisation itself.

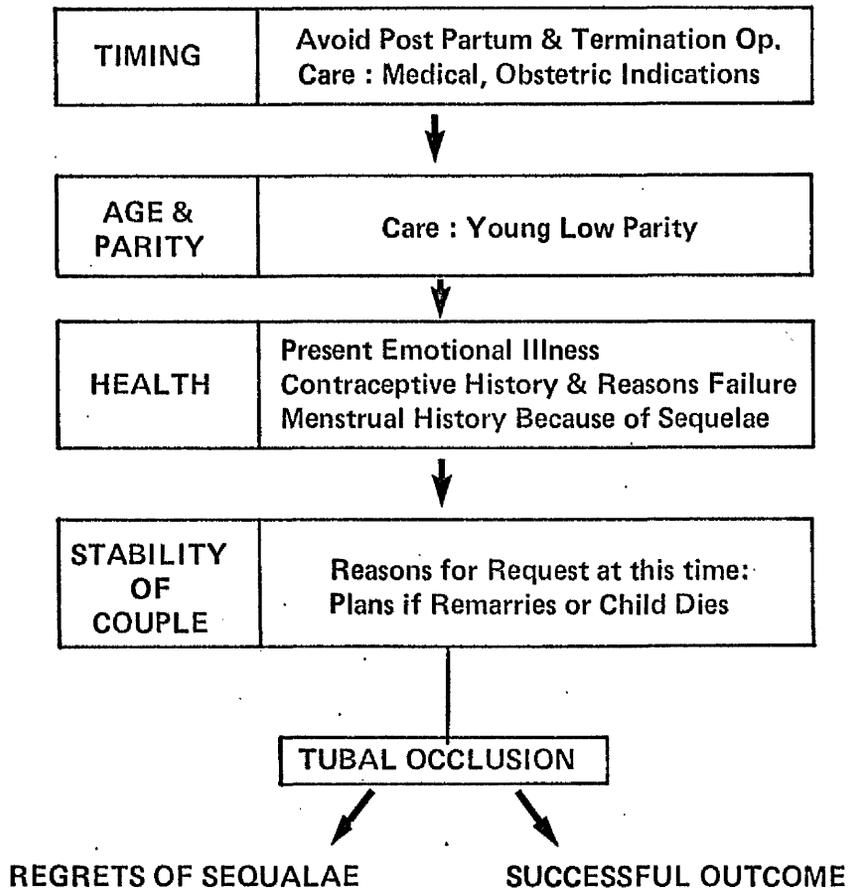
With regard to past history of psychiatric illness, Sim and his colleagues (1973, ref. 63) conclude that, apart from post-abortive depression, "psychiatric considerations need not be entertained". Unstable personalities are not helped by operation, but there is a good case for avoiding the stress of further pregnancies and for preventing further children being born to disturbed families.

The continuing relationship of a general practitioner with his patient, through varied illnesses and situations of stress, highlights for him the problems arising in the minority of patients who regret their sterilisation. From my own experience, I am convinced that it is worthwhile to look carefully at why elective sterilisation is requested at a particular time. This is especially so when the woman is in her twenties and of low parity. Patients who vehemently and perhaps impulsively demand sterilisation, may bitterly regret their decision and join the group of unhappy and unstable women who just as vehemently wish reversal a few years later.

The counselling procedure which I have followed is illustrated graphically in Fig. G1. The younger the woman, whatever her parity, the greater is the need for unhurried counselling.

Where possible I prefer to see the couple together and also separately, alone. This is especially so when the question of vasectomy is raised by the wife and there appears to be some reluctance or disagreement on the husband's part over its advisability. In a good marriage, the decision to seek sterilisation and the choice of partner to have the operation is often resolved before consultation. The best chance of a happy outcome exists when the patient has made her own decision after discussion, unhurried, and on the basis of family size alone.

Figure G1.

A SCHEME FOR ASSESSMENTCONTRA FACTORS

1. Irrational elements in reasons for sterilisation
2. Frigidity or impotence. Unrealistic expectations of OP.
3. Poor judgement and impulsiveness*
4. Previous refusal to face consequences of decisions or acts*

* Hospital or Clinic less likely to know this

CLINICAL CONCLUSIONS.

The aim of this work has been to present a descriptive survey of female sterilisation as seen in one general medical practice. This has been done by enumerating and classifying the operations done, reviewing the indications and assessing outcome by interviewing patients. It has also been possible to explore the clinical impression that sterilised women complain more frequently of gynaecological symptoms (in particular, menstrual problems) than do women who have not been sterilised.

The studies done in the practice were:-

Record Search.

The preliminary search, of the records of 2,123 women both married and single, identified 272 patients (12.8%) noted to have had elective sterilisation and nine patients who were on the waiting list for operation. No single women were found among the sterilised women identified.

Random Sample.

A one in ten random sample of married women was drawn from the practice age/sex register to provide a more accurate estimate of the prevalence of female sterilisation and to determine rates for some of the variables to be examined in the main study. Two hundred and ten women (97.2%) responded to the postal questionnaire. The prevalence of elective female sterilisation in the sample of married women was found to be 18.6% and at least 21.9% of couples were known to have chosen surgical/

surgical contraception. When the sterilised women were compared with the "others", they were found, on average, to have slightly larger families and to be more likely to complain of menstrual and sexual problems. The principal indication for operation was "own wish" in 26 patients (66.7%) and 15 (38.5%) gave difficulty with contraception as a subsidiary indication.

Follow-up of 375 sterilised women.

In chapter 5, a group of 375 identified sterilised women are examined from the demographic viewpoint of a general practice population. Two hundred and fifty-three patients (67.5%) had no medical or obstetric reason for operation, choosing sterilisation simply for convenient and permanent contraception. The distribution of operation dates is illustrated in Fig. D1 and it is noted that relatively few operations were done before the Abortion Act (1967). Fifty-five sterilisation operations had been done in puerperium and 48 at the time of therapeutic abortion, leaving 272 interval operations unrelated to recent childbirth or termination of pregnancy. These three groups are contrasted and "reproductive profiles" are compared.

Comparison with Matches.

A comparison of 347 sterilised patients with randomly determined matches is detailed in chapter 6. The sterilised women appear to marry (mean 20.6 years) and have their first child (22.6 years) earlier than their matches (21.4 years and 23.4 years respectively) and to be more often responsible for the couple's family planning./

family planning. In the sterilised group, 33 (9.5%) had married more than once, compared with 16 (4.61%) of the matches ($p = 0.05$). Eleven (11.3%) of the termination and puerperal group were divorced or separated compared with four (4.1%) of their matches. They were more likely to have taken psychotropic drugs and to have attempted suicide and less likely to have religious belief or to have attended secondary education. The prevalence of menstrual problems was significantly higher in the sterilised after operation (44.8%) than in matches (18.8%) as was the prevalence of sexual problems (23.9% and 9.6% respectively).

Interviews.

The outcome of sterilisation is examined in chapter 7 and is discussed broadly under the headings:-

- (1) Regrets.
- (2) Changes after Sterilisation.

Three hundred and sixty-eight of the sterilised women were interviewed to assess how they felt about the choice they had made and in particular to examine the circumstances of those regretting the operation, with a view to improving the future management of patients coming for advice about sterilisation.

Two hundred and ninety-two (79.3%) were pleased with the operation and 76 (20.7%) expressed regrets, though more than half of these (56.6%) said they would have the operation again in the same circumstances. Sixty (20.6%) of the group without regrets were under thirty years at the time of operation compared/

compared with 38 (50.0%) of the regretful group ($p = 0.001$). The regretful women were also more likely to have "clinical" indications for operation, to have major contraceptive problems before operation, to have a history of attempted suicide and less likely to have discussed vasectomy. The main changes reported after sterilisation were a worsening in menstruation for 154 (42.2%) and improvement in sex life for 133 (36.2%) and family life for 137 (37.2%).

PERSONAL CONCLUSIONS.

I have already commented on some of the difficulties encountered in the research and on problems of time. This is not to deny that the work has proved personally rewarding.

Firstly, the research has provided me with new knowledge. The clinical impressions described on page 25 have been consolidated by some direct measurement. Conjecture can be supported by data on sterilised patients in my own practice. Some of this data has been used in advising practice patients on contraception and sterilisation.

New knowledge is not the same as understanding but I have learned also from the contacts with patients which arose directly from the research. Many patients were seen for interview or were contacted for information missing from case records. A few were seen specially while trying to achieve a satisfactory response rate. The attitudes of these patients and the reasons for non-response were enlightening. Professional contact with well patients, who were not seeking advice but were responding to my request for help, can only have matured the doctor/patient relationship. The willing response and co-operation of almost all patients approached, often at considerable inconvenience to themselves, was most gratifying.

New skills were also required for the research. A more disciplined approach to reading and storing of information proved/

proved necessary, together with a renewed grappling with the principles of medical statistics, neglected since student days. The excellent advice is often given, and ignored that investigators should consult with a medical statistician early in the design stage of their investigation. I must agree with the editorial comment in the British Medical Journal (1977, ref.) that, "though this advice is unexceptional it may not be so practical as it seems, for statisticians, and especially medical statisticians, are often not to be found outside the larger centres with the time, special experience and interest to devote to clinical investigations". This is a minor example of the sense of intellectual and geographic isolation which can be felt by a general practitioner researcher. Unfortunately, research in general practice is still a minority interest and the environment of service general practice is less conducive than that of a University Department to the discussion of day-to-day problems in clinical research.

Doctors tend to think in terms of patients and statisticians in terms of numbers. Communication is hindered by gaps in knowledge of research methods and basic statistical theory. These gaps can now be filled by post-graduate seminars tailored to the requirements of general practitioner researchers. I have personally found such meetings both interesting and valuable.

The main benefits which I have gained from carrying out this investigation include the change in personal attitudes to reading journals, /

journals, to making and recording more exact observations, a renewed interest in daily consultations and a stimulus to teaching.

This work has proved for me an intellectual voyage of discovery, about sterilisation, my patients and my daily work and has brought some awareness of the nature of interface between scientific observation and clinical judgement.

LIST OF REFERENCES.

1. Adair, F. & Brown, I. (1939). Puerperal Sterilization. American Journal of Obstetrics and Gynecology, 37, 472-476.
2. Adams, T.W. (1964). Female Sterilization. American Journal of Obstetrics and Gynecology, 89, 395-401.
3. Alderman, B. (1972). Gynaecological Illness after Sterilization. British Medical Journal, I, 504.
4. Alderman, B. (1975). Menstrual Loss after Tubal Ligation. The Lancet, Nov., 1039-1040.
5. Alderman, B. (1977). Women who regret Sterilisation. British Medical Journal, II, 766.
6. Ansari, J.M.A. & Francis, H.H. (1976). A Study of 49 Sterilized Females. Acta Psychiatrica Scandinavica, 54, 315-322.
7. Baird, D. (1965). A Fifth Freedom? British Medical Journal, 2, 1141-1148.
8. Barglow, P. (1964). Pseudocyesis and Psychiatric Sequelae of Sterilization. Archives of General Psychiatry, 11, 571-580.

9. Barglow, P. & Eisner, M. (1966). An Evaluation of Tubal Ligation in Switzerland. American Journal Obstetrics and Gynecology, 95, 1083-1094.
10. Barnes, A.C. & Zuspan, F.P. (1958). Patient Reaction to Puerperal Surgical Sterilization. American Journal of Obstetrics and Gynecology, 75, 65-71.
11. Baudry, F., Herzig, N. & Wiener, A. (1971). Assessment of Patients Seeking Tubal Sterilization on Psychosocial Grounds. Obstetrics and Gynaecology, 38, 411-415.
12. Black, W.P. & Sclare, A.B. (1968). Sterilization by Tubal Ligation - A Follow-up Study. Journal Obstetrics and Gynaecology British Commonwealth, 75, 219-224.
13. Campanella, R. & Wolff, J.R. (1975). Emotional Reaction to Sterilization. American Journal of Obstetrics and Gynecology, 45, No. 3, 331-334.
14. Cartwright, A. (1976). How Many Children? Routledge & Kegan Paul, page 55.
15. Chakravarti, S. & Shardlow, J. (1975). Tubal Pregnancy after Sterilization. British Journal of Obstetrics and Gynaecology, 82, 58-60.

16. Chamberlain, G. & Foulkes, J. (1976). Long Term Effects of Laparoscopic Sterilization on Menstruation. Southern Medical Journal, 69, No.11, 1474-1475.
17. Cheng, M.C.E. et al (1977). Sterilization Failures in Singapore: An Examination of Ligation Techniques and Failure Rates. Studies in Family Planning, 8, 109-114.
18. Cheng, M.C.E. et al (1979). Safety of Postabortion Sterilisation compared with Interval Sterilisation. The Lancet, Sept., 682-685.
19. Curtis, D.M. (1979). The Sequelae of Female Sterilization in one General Practice. Journal of the Royal College of General Practitioners, 29, 366-369.
20. Dourlen-Rollier, A.M. (1977). An International Overview of Sterilization. American Journal Reproductive Medicine, 18, 281-284.
21. Dubuisson, J.B., Barbot, J. & Henrion, R. (1980). A Propos de 46 Demandes de Désterilisation Tubaire. Contraception-Fertilité - Sexualité, 8, No.9, 681-685.
22. Edgerton, W.D. (1978). Late Complications of Laparoscopic Sterilization, II. The Journal of Reproductive Medicine, 21, 1, 41-44.

23. 'Editorial' (1977). Statistical Errors. British Medical Journal, I, 66.
24. Ekblad, M. (1961). The Prognosis after Sterilization on Social-psychiatric Grounds. Acta Psychiatrica Scandinavica, Suppl. 161.
25. Emens, J.M. & Olive, J.E. (1978). Timing of Female Sterilisation. British Medical Journal, II, 1126.
26. Emens, J.M. (1980). Female Sterilization. The Practitioner, 224, 1177-1183.
27. Farmer, R.D.T., et al (1974). British Journal of Preventive and Social Medicine, 28, 49-53.
28. Fraser, R.C. (1978). The Reliability and Validity of the Age-sex Register as a Population Denominator in General Practice. Journal of the Royal College of General Practitioners, 28, 283-286.
29. Glenrothes Development Corporation (1977). Statistical Survey, page 2.
30. Goldberg, D.P., et al (1970). A Standardized Psychiatric Interview suitable for use in Community Surveys. British Journal of Preventive and Social Medicine, 24, 18-23.

31. Goldberg, D.P. (1972). The Detection of Psychiatric Illness by Questionnaire. London: Oxford University Press.
Institute of Psychiatry. Maudsley Monographs No. 21.
32. Goldberg, D., Kay, C. & Thompson, L. (1976). Psychiatric Morbidity in General Practice and the Community.
Psychological Medicine, 6, 565-569.
33. Hallberg, L. & Nilsson, L. (1964). Determination of Menstrual Blood Loss. Scandinavian Journal of Clinical and Laboratory Investigation, 16, 244-248.
34. Henrion, R., et al (1979). Tubal Repermeabilisation.
Nouvelle Presse Médicale, 8, 13, 1091-1094.
35. Hughes, G.J. (1977). Sterilisation Failure. British Medical Journal, 2 1337-1339.
36. Hughes, G.J. (1980). Ectopic Pregnancy after Sterilization.
The Medical Journal of Australia, 1, 275.
37. Kasonde, J.M. & Bonnar, J. (1976). Effect of Sterilization on Menstrual Blood Loss. British Journal of Obstetrics and Gynaecology, 83, 572-575.
38. Khorana, A.B. & Vyas, A.A. (1975). Psychological Complications in Women Undergoing Voluntary Sterilization by Salpingectomy. British Journal of Psychiatry, 127, 67-70.

39. Kopit, S. & Barnes, A.B. (1976). Patients Response to Tubal Division. Journal of the American Medical Association, 236, 24, 2761-2763.
40. Leeton, J., McMaster, R. & Worsley, A. (1978). The Effects on Sexual Response and Mood after Sterilization of Women taking long-term Oral Contraception: Results of a Double-blind cross-over Study. Australian and New Zealand Journal of Obstetrics and Gynaecology, 18, 194-197.
41. Lieberman, B.A., et al (1978). Menstrual Patterns after Laparoscopic Sterilization using a Spring-loaded Clip. British Journal of Obstetrics and Gynaecology, 85, 376-380.
42. Lu, T. & Chun, D. (1967). A Long term Follow-up Study of 1,055 Cases of Postpartum Tubal Ligation. Journal of Obstetrics & Gynaecology British Commonwealth, 74, 875-880.
43. Milt, B. (1928). Ztschr. Ges. Neur. U. Psychiat., 112, 639.
(Not consulted by Author).
44. Morrell, D.C., Gage, H.G. & Robinson, N.A. (1970). Patterns of Demand in General Practice. Journal of The Royal College of General Practitioners, 19, 331-342.
45. Mowat, J. (1974). Delayed Postpartum Sterilization. British Medical Journal, 2, 306-308.

46. Muldoon, M.J. (1972). Gynaecological Illness after Sterilization. British Medical Journal, 1, 84-85.
47. Neil, J.R., et al (1975). Late Complications of Sterilisation by Laparoscopy and Tubal Ligation. The Lancet, II, 699-700.
48. Neill, J.G. (1969). A Follow-up Study of One Hundred Cases of Sterilization by Tubal Ligation. Ulster Medical Journal, 38, 119-122.
49. Nichols, C.R. (1973). Some Psychologic Aspects of Operations Leading to Infertility. Southern Medical Journal, 66, 4, 439-441.
50. Niswender, G.D., Akbar, A.M., & Nett, T.M. (1976). The role of blood flow in regulating ovarian function. The endocrine function of the human ovary. Proceedings of the Serono Symposium, Vol. 7: Academic Press, London. Page 71-79.
51. Norris, A.S. (1964). An Examination of the Effects of Tubal Ligation: Their Implications for Prediction. American Journal of Obstetrics and Gynecology, 90, 431-436.
52. Palmer, R. & Czernichow, Y. (1975). Conséquences Psychosexuelles de la Stérilisation. Le Concours Médical, 97, 27-29.

53. Phillips, N. (1971). The Prevalence of Surgical Sterilization in a Suburban Population. Demography, 8, 2, 261-270.
54. Poma, P.A. (1980). Report of a paper presented at the 65th Clinical Congress of the American College of Surgeons on an Evaluation of long term Morbidity associated with Tubal Sterilization. Hospital Practice, May, 153/157/160.
55. Pond, D.A. (1971). Psychological Aspects of Sterilization. Nursing Times, Nov. 18, 1435-1437.
56. Powell, J.R. (1962). Cesarean Section Sterilization - Hysterectomy or Tubal Ligation? Obstetrics and Gynecology, 19, 387-396.
57. Radwanska, E., Berger, G.S. & Hammond, J. (1979). Luteal Deficiency among Women with normal Menstrual Cycles, requesting reversal of Tubal Sterilization. Obstetrics and Gynecology, 54, 189-192.
58. Royal College of General Practitioners (1974). Oral Contraceptives and Health. Pitman Medical.
59. Royal College of General Practitioners, Office of Population Censuses and Surveys & Department of Health and Social Security (1974). Morbidity Statistics From General Practice. Second National Study 1970-71. London: H.M.S.O.

60. Schwyhart, W.R. & Kutner, S.J. (1973). A Reanalysis of Female Reactions to Contraceptive Sterilization. The Journal of Nervous and Mental Disease, 156, 5, 354-370.
61. Scott, J.S. (1972). Gynaecological Illness after Sterilization. British Medical Journal I, 504.
62. Shepard, M.K. (1974). Female Contraceptive Sterilization. Obstetrical and Gynecological Survey, Vol. 29, No. 11. Baltimore: Williams & Wilkins, page 740.
63. Sim, M., Emens, J.M. & Jordan, J.A. (1973). Psychiatric Aspects of Sterilization. British Medical Journal, 3, 220-222.
64. Skajaa, K. (1932). Acta Obst. et Gynec. Scandinav., 12, 114.
65. Smith, A.H.W. (1979). Psychiatric Aspects of Sterilization: A Prospective Study. British Journal of Psychiatry, 135, 304-309.
66. Soutoul, J.H. & Duchateau, G. (1976). Etude des Répercussions Psycho-somatiques et conditions d'indication de la Ligature-résection Tubaire. Gynécologie, 27, 4, 369.
67. Steptoe, P.C. (1967). Laparoscopy in Gynaecology. Baltimore: Williams & Wilkins.

68. Steptoe, P.C. (1970). Recent Advances in Surgical Methods of Control of Fertility and Infertility. British Medical Bulletin, 26, 1, 60-64.
69. Teper, S. (1977). Sterilisation: The Aberdeen Experience, and some Broader Implications. Journal of Medical Ethics, 4, 18-24.
70. Thompson, B. & Baird, D. (1968). Follow-up of 186 Sterilised Women. The Lancet, I, 1023-1027.
71. Thompson, B. & Wheelless, C. (1971). Outpatient Sterilization by Laparoscopy A Report of 666 Patients. Obstetrics and Gynecology, 38, 912-915.
72. Thomson, P. & Templeton, A. (1978). Characteristics of Patients Requesting Reversal of Sterilization. British Journal of Obstetrics and Gynaecology, 85, 3, 161-164.
73. Whitehouse, D.B. (1969). Tubal Ligation. A Follow-up Study. Advances in Fertility Control, 4, 22-26.
74. Whitelaw, R.G. (1979). 10-Year Survey of 485 Sterilizations. British Medical Journal, 1, 32-33.
75. Whitley, M.W. (1977). Survey of Contraception in a City Group Practice. Health Bulletin - H.M.S.O., Edinburgh, 35, 3, 129-130.

76. Wig, N.N., et al (1977). A Prospective Study of Psychiatric and Menstrual Disturbances Following Tubal Ligation. Indian Journal of Medical Research, 66, 4, 581-590.
77. Williams, E.L., Jones, H.E. & Merrill, R.E. (1951). The Subsequent Course of Patients Sterilized by Tubal Ligation. American Journal of Obstetrics and Gynecology, 61, 423-426.
78. Winston, R.M.L. (1977). Why 103 Women asked for Reversal of Sterilisation. British Medical Journal, 2, 305-307.
79. Wood, C. (1979). Current Status of Sterilization. Australian Family Physician, 8, 5, 486-490.
80. Woolf, M. & Pegden, S. (1976). Families Five Years On. Office of Population Censuses and Surveys, 110-112.