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A.M. MPITI
I. KALULE-SABITI

The Proximate Determinants of Fertility in Lesotho

INTERNATIONAL STATISTICAL INSTITUTE
Permanent Office. Director: E. Lunenberg

Mailing Address:
428 Prinses Beatrixlaan, PO Box 950
2270 AZ Voorburg
Netherlands

WORLD FERTILITY SURVEY
Project Director: Halvor Gille

The World Fertility Survey is an international research programme whose purpose is to assess the current state of human fertility throughout the world. This is being done principally through promoting and supporting nationally representative, internationally comparable, and scientifically designed and conducted sample surveys of fertility behaviour in as many countries as possible.
The WFS is being undertaken, with the collaboration of the United Nations, by the International Statistical Institute in cooperation with the International Union for the Scientific Study of Population. Financial support is provided principally by the United Nations Fund for Population Activities and the United States Agency for International Development.
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A.M. MPITI
Bureau of Statistics
Maseru, Lesotho

I. KALULE-SABITI
WFS Consultant

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Preface

One of the major objectives of the World Fertility Survey programme is to assist the participating countries in reaching a better understanding of their levels of fertility. To this end a number of countries included as part of their fertility questionnaires a module designed to gather information on the proximate determinants of fertility. This module, called Factors Other Than Contraception Affecting Fertility (FOTCAF), asked questions pertaining to the onset, patterns and termination of childbearing, elucidating such matters as menarche, menopause, breastfeeding, abstinence and sterility.

In order to promote the analyses of these data and to provide specialized training in the relevant techniques, it was decided to organize a workshop on the proximate determinants of fertility. This workshop was held at the London headquarters of the WFS between March and June 1982 with the participation of researchers from six of the countries that had used the FOTCAF module: Ghana, Haiti, Lesotho, the Philippines, Syria and Tunisia. Working in close collaboration with WFS staff and consultants, the participants analysed the data from their respective national fertility surveys after receiving formal training in the relevant demographic and data processing techniques.

The present document reports on the findings from the analysis of the Lesotho Fertility Survey 1977.

Shea Oscar Rutstein, as the co-ordinator of the workshop, Benoît Ferry and Hilary Page, as consultants, and Andrew Westlake, as the data processing co-ordinator, assumed major responsibilities in the successful completion of the work. Many other staff members also made significant contributions, in particular Ishmael Kalule-Sabiti who is co-author of the report with A. M. Mpiti.

HALVOR GILLE
Project Director

1 Introduction

1.1 THE LESOTHO FERTILITY SURVEY

Under the auspices of the World Fertility Survey (WFS) Programme, the Government of Lesotho conducted a fertility study whose main fieldwork activities took place between April and December 1977.

Fieldwork for the Lesotho Fertility Survey (LFS) was done mainly in two phases with a time lapse of about two and a half months between the phases. During the first phase a household schedule was administered. The household schedule recorded usual members of a household and non-members who had spent the previous night with the household, for all households in the sample. It also obtained information on relationships among all household members and estimated the number of eligible women per household for the individual interviews of the second phase. An eligible woman was one who slept in the interviewed household the previous night, was ever married and aged from 15 to under 50 years.

For all recorded individuals, questions on sex, age and whether they had spent the previous night in the household were asked. For those aged eight years and over questions on school attendance and the highest standard of education attained were asked. The marital status of individuals aged 15 upwards was ascertained, and a question on the survival of the first spouse was asked of those married more than once. For the same age group, questions on survival of parents and whether the individual was the eldest living son/daughter of his/her father/mother were also asked. The schedule also obtained details of the number of live births and some particulars of the most recent live births for all women aged 15 years and over in the household.

Another section of the schedule required sex, age at death and date of death for members of the household who had died in the last 24 months before the date of the interview.

During the second phase, an individual questionnaire was administered to all eligible women in a subsample of households selected from the sample of the household survey. The individual questionnaire incorporated both the WFS Core Questionnaire and the module on Factors Other Than Contraception Affecting Fertility (FOTCAF). It had the following sections:

Section 1 Information on the respondent's background.
Section 2 Maternity history details of all live births and outcomes of all pregnancies (of seven or more months) of the respondent.
Section 3 Marriage history of the respondent.
Section 4 Contraceptive knowledge and use.
Section 5 Breastfeeding practices, fertility regulation and temporary absences of husbands.
Section 6 Respondent's work history.
Section 7 Information on the background of the current (or last) husband of the respondent.

A short version of the household schedule was also administered during the second phase as a means of verifying the presence of eligible respondents in the selected households.

A post-enumeration individual questionnaire, consisting of selected sections of the individual questionnaire, was also administered to a subsample of about a thousand women in order to assess the reliability of the results obtained during the second phase of the LFS.

While the First Country Report of the LFS (Central Bureau of Statistics 1981) is a very general analysis and presentation of the results of the two phases, the present analysis will be a comprehensive study of the intermediate fertility variables and an evaluation of the contribution of each to the fertility levels and patterns in Lesotho. It will therefore focus almost exclusively on the results of the second phase of the LFS.

1.2 INTERMEDIATE FERTILITY VARIABLES

The fact that socio-economic, cultural and environmental situations affect the number of children that an average women will have throughout her reproductive period has been known to students of population for some time now. The relationships, however, of these situations to fertility in general have not been clearly understood since they sometimes lead to contradicting conclusions. For example, increase in educational levels for some populations has been associated with an increase in the level of fertility and yet a generally accepted conclusion is that education has an inverse relationship with fertility.

An explanation of this apparent contradiction was offered by Davis and Blake in the 1950s when they pointed out that cultural and socio-economic settings affect fertility indirectly through 'intermediate fertility variables' which are themselves directly related to fertility. For example, if rises in educational standards result in delayed entry into sexual unions (often approximated by age at first marriage in most societies) then the childbearing period for an average woman is shortened and she will thus produce fewer children if all other variables remain unchanged. Thus, education affects age at first marriage which has a direct bearing on the reproductive period.

Since the effects of a social or economic change on one or more intermediate fertility variables may be different for different groups and not necessarily in the same direction, there is the possibility that socio-economic change may not result in a change in fertility or a change in the expected direction. Thus, while education may raise age at first marriage, it may also reduce the intensity and duration of breastfeeding and thus result in shortened birth intervals, which are associated with high fertility.

Thus, a study of intermediate fertility variables is likely to provide a better insight into fertility changes and give a better explanation of the observed fertility and more reliable predictions of future trends.

1.3 A GENERAL NOTE ON METHODS OF ANALYSIS AND PRESENTATION OF RESULTS

Almost all of the intermediate fertility variables that will be investigated here are duration variables. They were measured in terms of the time elapsed before the particular event occurred. For example, age at entry into sexual union is recorded as the time elapsed between the date of birth of an individual woman and the date of the first marriage; duration of breastfeeding is the time between the date of birth of the breastfed child and the date on which the child was weaned. However, for some individuals the time elapsed to the day of the interview may not have been sufficient for the event to have occurred. In these cases the information on duration has been censored by the interview. For censored information, classic life-table methods and use of current status data are found to be the most suitable analytic methods and will thus be employed for duration analysis.

Some intermediate fertility variables which are very crucial (for this kind of analysis) are sometimes not very easy or convenient to measure and conclusions must be made using proxy variables. For example, the onset of ovulatory cycles will be approximated by the age at menarche, duration of post-partum non-susceptible period by duration of post-partum amenorrhoea, and the end of ovulatory cycles by menopause.

For the presentation of results and comparisons among subgroups, rather than show or comment on the whole of the distributions, use will be made of quantiles (Tx). Tx will generally be the time elapsed before the event occurs to x per cent of the population. As a measure of central tendency the trimean, which is defined as $(T25+2T50+T75)/4$, will be used. In cases where the computation of the trimean is not possible or the result is not unique because of the nature of the data used, other summary measures will be adopted and explanations for their derivation given in the relevant sections or the appendices.

Description of patterns of family formation will be done in three stages of patterns: *starting patterns, birth spacing patterns* and *stopping patterns*. For example, two of the variables that will be investigated for the starting patterns are age at first marriage and the average age at which the women bear their first child. For birth spacing patterns variables include mean length of live-birth intervals, post-partum non-susceptible period and contraceptive usage, and for stopping patterns the mean age at final birth. Where the nature of the data permits, analysis will be done at the national level and for the subgroups by age, by residence and by educational level. Major residential subgroupings will be those classifying the population into *Urban* and *Rural* and into the four regions of *Lowlands*, *Foothills*, *Orange River Valley* and *Mountains*. Educational subgroups will be made up of those with no formal education combined with those of lower primary in a *0–4 years* group, higher primary in a *5–6 years* group, and those who have completed primary and higher education in a *7+ years* group.

One major limitation on the analysis – especially for the starting patterns – is due to the fact that detailed information in the LFS individual questionnaire was obtained only for ever-married women. In some cases it has been possible to make the necessary adjustments while in others it was impossible to do so without unwarranted assumptions.

2 Starting Patterns of Family Formation

2.1 INTRODUCTION

For the discussion of the starting patterns of family formation the variables that will be dealt with are age at first birth for those who do bear children, age at menarche, age at first marriage (union) and the interval from first union to first birth.

As mentioned earlier, the fact that detailed information in the individual questionnaire was collected only for the ever-married women will certainly introduce biases into some of the results, as late starters are clearly under-represented. For some variables it has been possible to attempt adjustment by combining the detailed information for the ever-married women obtained from the individual questionnaire with the age structure of never-married women obtained from the shortened version of the household questionnaire. For the analysis of age at first marriage, for instance, this clearly provides quite a good adjustment. For age at first birth, however, the adjustment is less satisfactory. It would be quite appropriate if no women had children before marriage, which is not the case in the Lesotho. Also, the adjustment has only been made at the national level (because of time constraints) and thus it is not possible to investigate differentials for most of the subgroups in these two variables.

For other variables (such as age at menarche and interval between marriage and first birth) there is no way to make an adjustment. The results are presented in the unadjusted form for the ever-married women, with discussions of any probable bias for each variable as it is presented.

2.2 AGE AT FIRST LIVE BIRTH

The average age at which women bear their first child in Lesotho is revealed to be about 21 years (table 1 and figure 1), which is slightly above the averages for Ghana (20) and Kenya (19). By the age of 17 years, only about 10 per cent of women have had their first live birth and still only about a quarter have done so by the time they are 19 years old. It is not until about the age of 30 years that the 90 per cent mark is reached. The distributions show an almost constant pattern of age at first live birth for all the five-year cohorts although there are some variations in the ages at which the 90 per cent quantile is reached. The ages at which the older women reached the 90 per cent quantile are relatively higher, which may be due to misreporting (a tendency perhaps to omit some final birth).

Since the ages of the never-married women who have borne children are not included in the numerator of the percentile, even though their numbers were used in the denominator, the results are upwardly biased. The figure of 21 years, therefore, if everything else holds, could be regarded as the upper limit of the age at which an average Lesotho woman will bear her first child. (This bias is only important for the younger women.)

Table 1 Age at first live birth, by current age[a]

Current age	Quantiles T10	T25	T50	T75	T90	Averages (trimean)	N
15–19	17.4	18.5	–	–	–	–	1196
20–24	17.2	18.8	20.6	23.4	–	20.9	912
25–29	17.2	18.8	21.0	23.4	–	21.1	737
30–34	16.9	18.5	20.4	22.9	29.3	20.6	554
35–39	17.5	19.0	20.9	23.0	28.2	21.1	488
40–44	17.0	19.1	21.4	24.6	33.3	21.6	505
45–49	16.7	18.7	20.9	23.9	31.5	21.1	305
15–49	17.2	18.8	20.8	23.6	29.7	21.0	4697

[a]Estimates were derived from life-table analysis of data collected for ever-married women combined with the age structure of never-married women. They assume that no never-married woman has already borne a child.

2.3 THE PROXIMATE DETERMINANTS OF AGE AT FIRST BIRTH

Age at menarche

One of the necessary conditions for conception to take place is that the woman must have already started ovulating. Since it is difficult for a woman to know if her body has started to ovulate, except by the use of very complicated clinical tests, the occurrence can be approximated by menarche (the onset of menstrual periods). Menstruation, being a very noticeable process, lends itself as a useful survey tool for the estimation of the start of ovulation even though sometimes it precedes ovulation by several months.

According to the results of the LFS, 10 per cent of the ever-married women interviewed started having menstrual periods by the age of 13 years. By slightly after their fourteenth birthday 25 per cent had begun and by the age of 15 years, almost 50 per cent of the women had experienced menstruation. By the age of 17, more than 90 per cent of the women had started menstruating (table 2 and figure 2). The distributions of the onset of menstruation for cohorts of women give an impression that the younger cohorts experienced the onset at earlier ages, ie the age at menarche has been declining in recent years. This decline may be due entirely to the exclusion

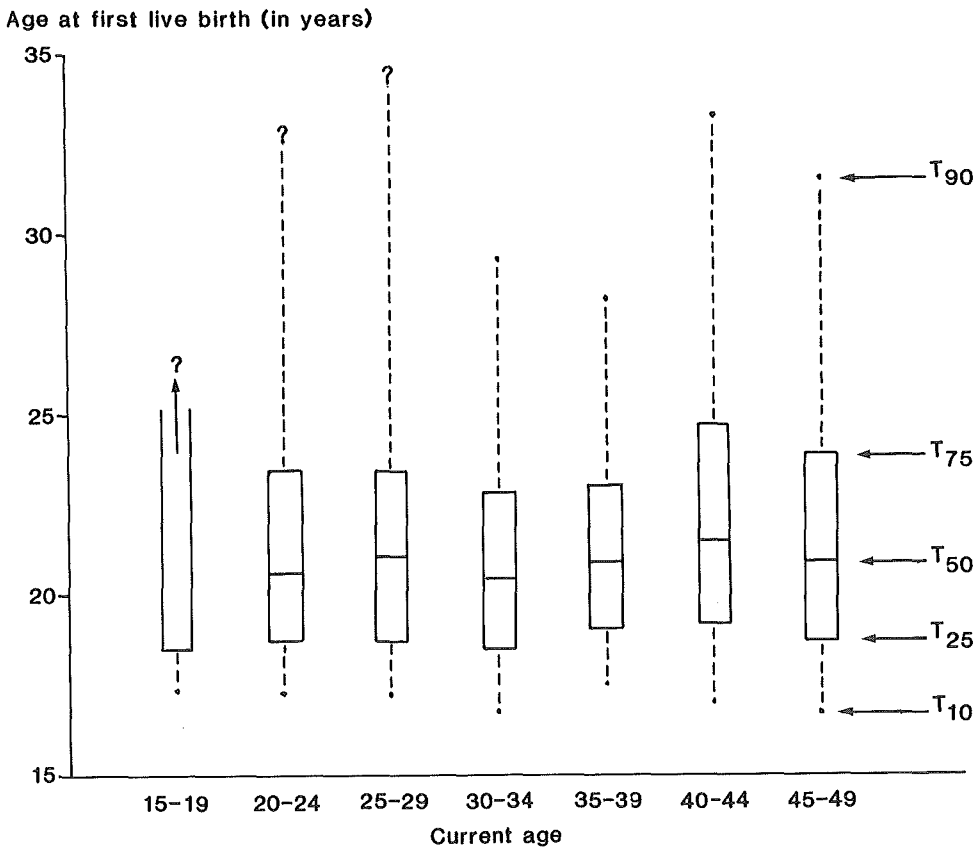

Figure 1 Age at first live birth, by current age (all women)

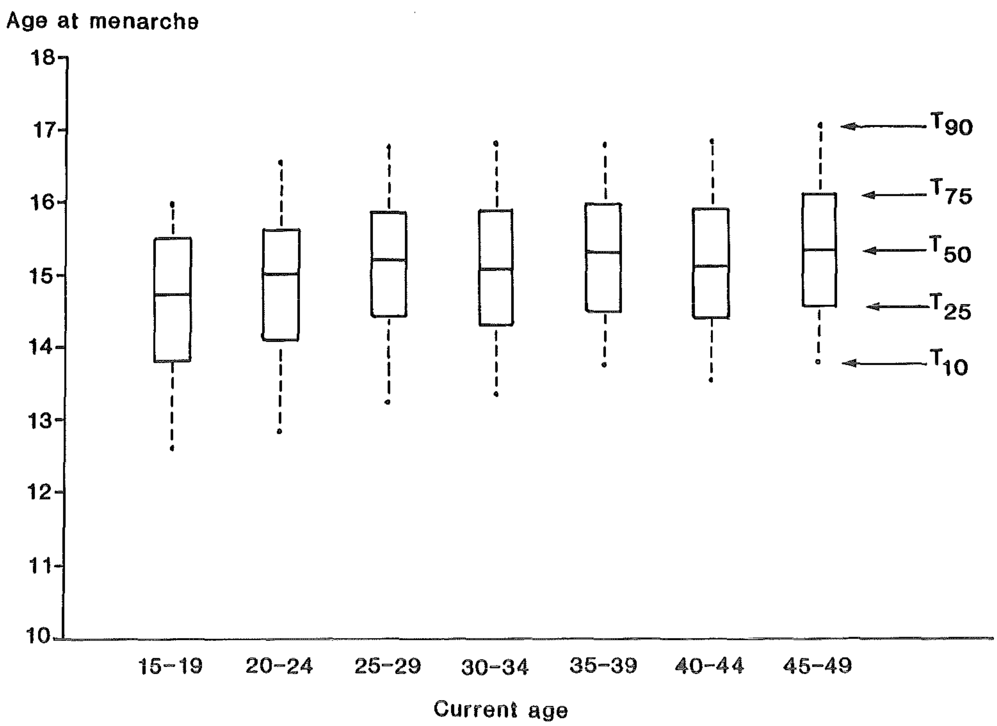

Figure 2 Age at menarche, by current age (ever-married women only)

of the never-married category of women, since marriage in Lesotho, as in many other places, is most likely to take place after the onset of menstruation. For the younger age groups, those who are married may be those who have reached their menarche relatively early.

The median ages at menarche for the educational, regional and urban/rural subgroups, like that of the country as a whole, are almost exactly 15 years with surprisingly small dispersions (only about one and a half years between T25 and T75). That the dispersions are so

Table 2 Age at menarche, by current age[a]

Current age	Quantiles T10	T25	T50	T75	T90	Averages (trimean)	N
15–19	12.7	13.8	14.7	15.5	16.0	14.7	375
20–24	12.9	14.2	15.0	15.7	16.6	15.0	759
25–29	13.3	14.4	15.2	15.9	16.8	15.2	681
30–34	13.4	14.3	15.1	15.9	16.8	15.1	526
35–39	13.8	14.5	15.3	16.0	16.8	15.3	471
40–44	13.6	14.4	15.2	15.9	16.8	15.2	498
45–49	13.8	14.6	15.4	16.1	17.1	15.4	293
15–49	13.2	14.3	15.1	15.8	16.7	15.1	3603

[a]Estimates derived from life-table analysis for the data for ever-married women only.

Table 3 Age at first marriage, by current age[a]

Current age	Quantiles T10	T25	T50	T75	T90	Averages (trimean)	N
15–19	16.0	17.2	18.7	–	–	–	1196
20–24	15.5	17.0	18.7	20.7	–	18.8	912
25–29	15.3	17.0	18.9	20.9	24.5	18.9	737
30–34	15.4	16.9	18.5	20.6	25.1	18.6	554
35–39	15.6	17.2	18.8	20.9	24.8	18.9	488
40–44	15.0	16.7	18.7	21.0	25.3	18.8	506
45–49	15.0	16.7	18.3	20.0	22.7	18.5	305
15–49	15.5	17.0	18.7	20.8	24.6	18.8	4698

[a]Estimates were derived from life-table analysis of data collected for ever-married women combined with the age structure of never-married women.

small is suspect. The respondents may have reported ages that are usually associated with the reaching of (social) puberty rather than the date on which the individuals actually first experienced menstruation.

Age at first marriage

After ovulation has begun, for childbearing to occur, the woman must engage in sexual relations. Having a sexual partner is approximated by marriage in most societies as it is within marriage that most sexual intercourse occurs. Age at first marriage (marriage is taken in its broad sense which embraces all forms of cohabitation) may therefore be taken as indicating the exposure to sexual intercourse.

From table 3 and figure 3, the average age at which women marry is just under 19 years. Midway between ages 15 and 16 years, 10 per cent have already married, but the 90 per cent mark is not reached until midway between 24 and 25 years. Except for the last 10 per cent of the oldest cohort of women, the distributions show a remarkable consistency and give the impression that the age at first marriage has remained constant even in the recent past.

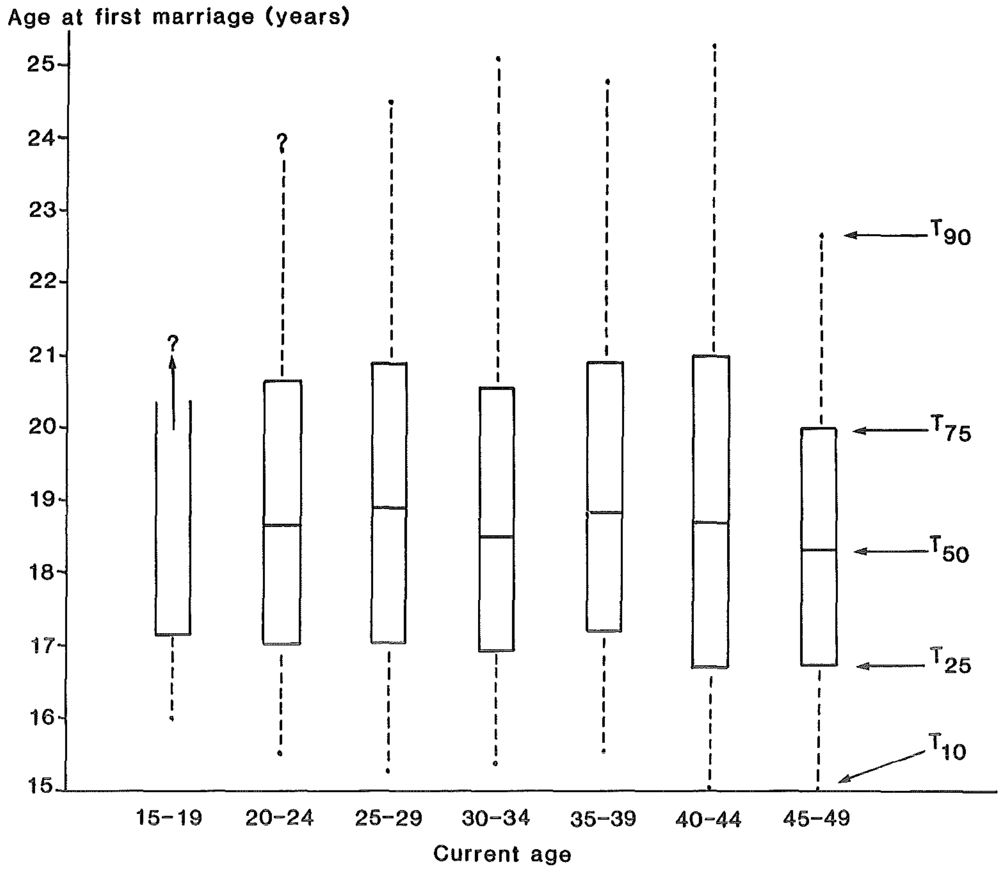

Figure 3 Age at first marriage, by current age (all women)

Thus, from the averages, a Lesotho woman will bear her first child 2.2 years after she marries for the first time. This seems rather a long period when one considers that no substantial contraception is practised to delay the first birth and also that well over 10 per cent of conceptions that lead to the first live birth may have taken place before the first marriage.

According to table 4, which shows the apparent relationship between date of first marriage and date of first live birth, about 6 per cent of women who had at least one birth had their first live birth before their marriage. It should be noted here, however, that a large proportion of these apparent pre-marital conceptions may be due to the imputation of dates of first marriage and those of the first live births. The imputation became necessary because a substantial number of women gave only the year or an age, and not the month, for their dates of birth, their marriages or the births of their children.

Although there was no direct questioning on contraceptive usage in order to delay the first birth, a very rough indication of such use may be contraceptive usage among ever-married women who have had no children even though this may be a special group of women. Women with no children will obviously include a disproportionately high proportion of contraceptors. Even so, only just over 4 per cent of ever-married women who have borne no child were found to have ever used any contraceptive method, with only just over 1 per cent ever having used an 'efficient' method. The proportion who use contraception after marriage but before their first birth must be much lower than this in the population as a whole. Use of contraception to extend the interval between marriage and first birth is clearly limited to a very small subgroup of women in Lesotho.

Primary sterility

Since most women marry and almost no control to prevent a first birth is practised, childlessness or the failure to conceive among married women may be taken as an indicator of primary sterility or very marked subfecundity. About 13 per cent of the ever-married women aged 15–49 years reported themselves as having had no live birth (table 5). This is reduced to about 5 per cent for those who had been married for at least five years. The percentages that experienced no pregnancy were respectively about 8 and 3 for all ever-married women and women married for five years or more. Primary sterility is, therefore, not very widespread. The data for subgroups is presented in table 6.

2.4 INTERVAL BETWEEN FIRST MARRIAGE AND FIRST BIRTH

Table 7 presents data on interval length between first marriage and first birth. Figure 4 gives the demographic presentation of the data. The average interval from first marriage to first birth is about 21 months. Ten per cent of the ever-married women have had their first birth by just after 7 months of marriage, 25 per cent by just after 10 months and 50 per cent by 18.7 months of marriage. By 5.4 years (64.5 months) 90 per cent of the ever-married women have had their first birth. In other words only 10 per cent have not had their first child after 5.4 years of first marriage.

Data for subgroups are presented in table 8 and in figure 5. Lowlands, 7+ years of education and urban categories experience the shortest intervals between first marriage and first birth. The categories are, however, highly overlapping in that most educated women reside in urban areas which are located mainly in the lowlands region.

It appears from the table that rural women with no or very little education residing in the mountains and Orange River Valley took longer to bear their first child than those with seven or more years of education, urban and residing in lowlands and foothills regions. It was only after 19, 22, 22 and 19 months of first marriage that 50 per cent of ever-married women in the categories rural, no or little education (0–4 years), mountains and Orange Valley River respectively had their first child.

The very short interval between first marriage and first birth (2.9 months) among 10 per cent of the ever-married

Table 4 Relationship between date of first marriage and date of first live birth: ever-married women

	No live births	First live birth			Total
		Before marriage	Within 9 months	After 9 or more months	
Married< 9 months					
Number	135	6	3	0	144
Row percentage	93.8	4.2	2.1	0.0	100.0
Column percentage	29.0	3.4	1.0	0.0	4.0
Married> 9 months					
Number	330	168	288	2673	3459
Row percentage	9.5	4.9	8.3	77.3	100.0
Column percentage	71.0	96.6	99.0	100.0	96.0
All					
Number	465	174	291	2673	3603
Row percentage	12.9	4.8	8.1	74.2	100.0
Column percentage	100.0	100.0	100.0	100.0	100.0

Table 5 Percentage never having had a live birth and percentage never having had a pregnancy, by current age

Current age	All ever-married women			Women married five years or more		
	No live birth	No pregnancy	N	No live birth	No pregnancy	N
15–19	55.2	37.6	375	0.0	0.0	11
20–24	18.3	10.0	759	6.0	2.3	299
25–29	5.9	2.9	681	4.6	2.8	610
30–34	3.4	2.3	526	3.8	2.3	511
35–39	4.5	3.8	471	3.9	3.2	466
40–44	5.6	4.2	498	5.7	4.2	496
45–49	4.1	3.9	293	4.1	3.8	292
15–49	12.9	8.3	3603	4.5	3.1	2685

Table 6 Percentage never having had a live birth and percentage never having had a pregnancy, by subgroups

Subgroup	All ever-married women			Women married five years or more		
	No live birth	No pregnancy	N	No live birth	No pregnancy	N
Regions						
Lowlands	12.5	7.8	1483	3.9	2.7	1118
Foothills	13.7	9.2	826	4.5	3.4	621
ORV[a]	12.0	8.9	460	5.3	3.4	358
Mountains	11.7	7.9	617	4.9	3.3	490
Education						
0–4 years	10.1	6.8	1172	5.6	3.9	970
5–6 years	12.8	8.0	1536	3.9	2.6	1193
7+ years	17.7	11.4	895	4.0	2.5	521
Type of area						
Urban	14.3	8.8	273	6.0	5.0	199
Rural	12.8	8.2	3316	4.4	2.9	2476
Total Lesotho	12.9	8.3	3603	4.5	3.1	2685[b]

[a]Orange River Valley.
[b]Subgroup numbers (N) do not always add up to the overall total because of the exclusion of 'not stated' categories.

Table 7 First marriage to first birth interval (in months), by current age[a]

Current age	Quantiles					Trimean	N
	T10	T25	T50	T75	T90		
15–19	9.0	11.0	20.0	30.0	41.2	20.3	375
20–24	6.9	10.4	18.5	32.6	55.9	20.0	759
25–29	7.8	10.1	18.5	33.6	62.9	20.2	681
30–34	4.0	9.9	16.0	32.0	58.2	18.5	526
35–39	7.8	10.4	17.4	33.1	62.9	19.6	471
40–44	7.1	11.1	21.0	45.1	89.3	24.6	498
45–49	6.1	10.8	19.1	46.9	114.0	24.0	293
15–49	7.1	10.4	18.7	35.0	64.5	20.7	3603

[a]Estimates derived from life-table analysis of the data for all ever-married women. Here the series of quantiles Tx represent the number of months elapsed since marriage by which x per cent of women had borne their first child.

urban women may be due, perhaps, to more frequent cohabitation before formal marriage in urban cities.

2.5 CONCLUSIONS

Average age at menarche for Basotho women is, and apparently has been in the recent past, around 15 years and there seems to be no difference among and between subgroups by region, educational level and urban/rural classification. On the average, women first marry when they are 19 years old and bear their first child 18 to 24 months later; this despite the fact that pre-marital childbearing exists and there is hardly any contraceptive use to delay the first live birth.

First marriage to first live-birth interval length is very much shorter for the women of highest educational standard (16.7 months) than for those of lowest educational standard (24.1 months), shorter for women who reside in urban places (17.9 months) than for women in

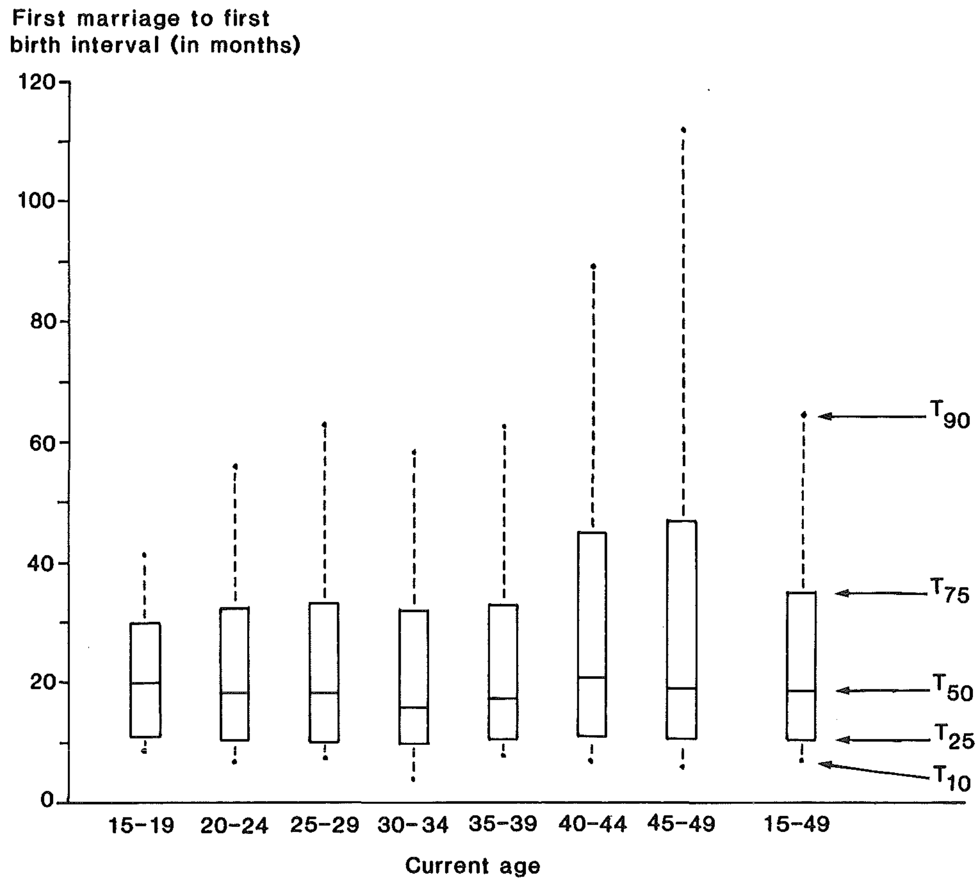

Figure 4 First marriage to first birth interval (in months), by current age

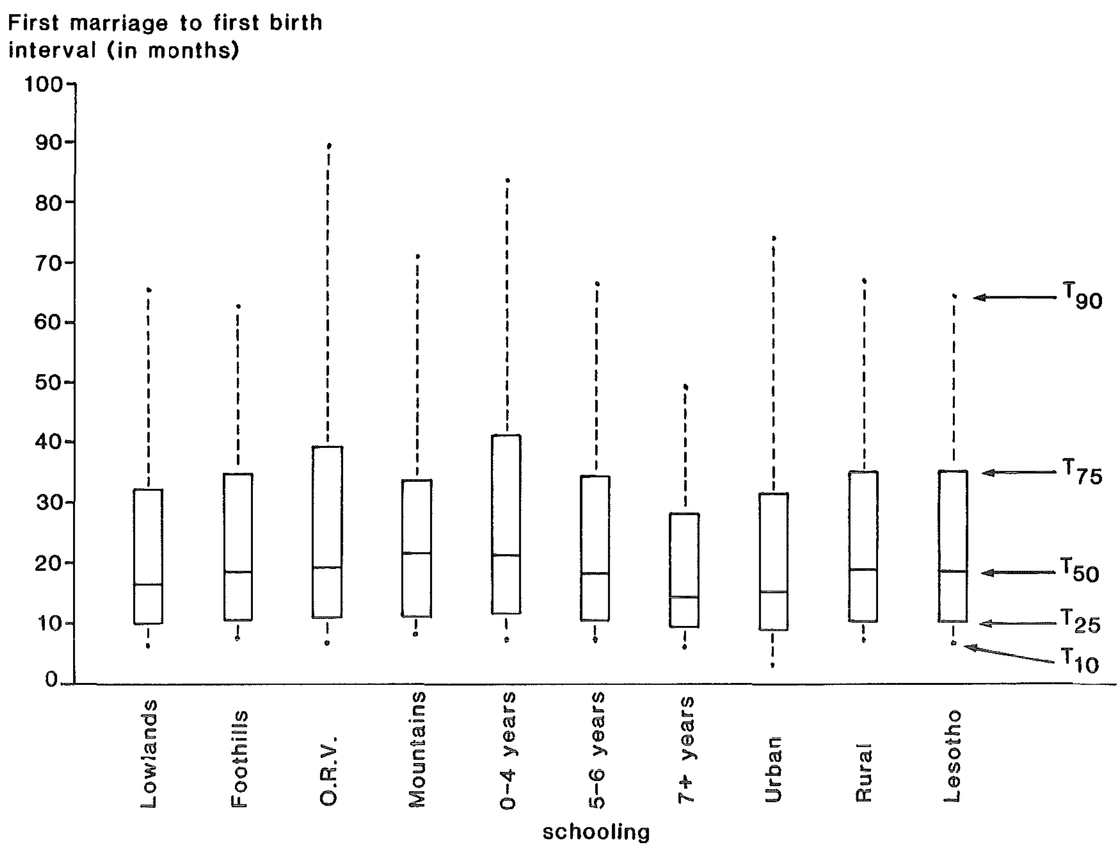

Figure 5 First marriage to first birth interval (in months), by subgroups

Table 8 First marriage to first birth interval (in months), by subgroups

Subgroup	Quantiles					Trimean	N
	T10	T25	T50	T75	T90		
Regions							
Lowlands	6.4	10.0	16.8	32.6	65.4	19.1	1483
Foothills	7.6	10.4	18.8	35.0	62.9	20.8	826
ORV[a]	6.8	11.1	19.4	39.7	89.8	22.4	460
Mountains	8.1	11.1	21.8	33.8	71.0	23.4	617
Education							
0–4 years	7.2	11.7	21.6	41.5	83.8	24.1	1172
5–6 years	7.6	10.4	18.5	34.7	66.4	20.1	1536
7+ years	6.2	9.5	14.4	28.5	49.3	16.7	895
Type of area							
Urban	2.9	9.1	15.4	31.8	74.1	17.9	273
Rural	7.4	10.5	18.9	35.3	68.1	20.9	3316
Total							
Lesotho	7.1	10.4	18.7	35.6	64.5	20.7	3603[b]

[a]Orange River Valley.
[b]Subgroup numbers (N) do not always add up to this overall total because of the exclusion of 'not stated' categories.

rural areas (20.9 months), and longer for the mountain women (23.4 months) than for the women in the lowlands (19.1 months). Some of the observed differentials, however, may be due to the interaction between the background variables used for the subgrouping. For instance, highly educated women are most likely to reside in urban centres while the urban centres themselves are located almost exclusively in the lowland zone.

There seems to be no desire to delay the first baby; this is supported by the apparent prevalence of pre-marital conception coupled with the fact that no substantial contraception is practised before the first live birth. Thus, the delay to reach universality in the bearing of the first child, as evidenced by the fact that even after five years of marriage more than 10 per cent of the ever-married women have not yet borne their first child, may be interpreted as being due to sterility or subfecundity, relatively intense spontaneous abortion or the frequent and often prolonged absences of husbands even this early after marriage. The differences observed among the subgroups may however throw some light on the relative importance of some of the factors that might account for the elongation of the interval.

A look at the absence of pregnancy or live birth among all ever-married women and women married for at least five years, shows the incidence of pregnancies or live births to be not always higher for the subgroups that have shorter intervals from first marriage to first birth (lowlands, 7+ years of education, and urban categories; see tables 6 and 8). In fact, in no subgrouping is the evidence of pregnancy or live birth highest for the subgroup that has the shortest interval length. Thus, low incidence of pregnancy or live births (ie sterility or subfecundity) is not the cause of observed lengthened intervals from first marriage to first birth.

On the other hand, highly educated women are more likely to marry equally educated men who usually participate less in the migratory labour to the neighbouring Republic of South Africa, which usually accounts for the frequent and often prolonged absences of husbands (able-bodied adult males) from the country. The highly educated men are more likely to be in professional, managerial and administrative positions which are mostly located in the urban centres in Lesotho. The lowlands, in addition to containing the urban centres, have the largest share of arable land and the modern sector of the economy, and the sustained presence of men may be most prevalent in the lowlands. In this manner, the prolonged and frequent absences of males from the country may be affecting the length of the interval between first marriage and first birth.

In addition, the presence of health and medical facilities in the urban centres and hence in the lowlands, and the facts that the highly educated women are more likely to be able to afford and use these facilities and that hygienic standards are better for them, may greatly reduce the likelihood of spontaneous abortion among them.

3 Birth Spacing Patterns of Family Formation

3.1 INTRODUCTION

Biologically a woman is capable of conceiving only after ovulation has begun and before menopause, which is the time when ovulation stops. The length of the period in between these two events is on average about 30–35 years. Thus, the number of children that a woman will have within this period depends, among other things, on the length of the interval between successive births.

There is clearly a minimum beyond which the interval between any two live births cannot be shortened. For example, no interval will, on average, be shorter than nine months as this is the usual gestation period for a conception that leads to a live birth. A few months post-partum are added by the fact that the woman will not be in a susceptible state and not every sexual relation will lead to a conception even when a woman is susceptible. On the other hand, a birth interval can be lengthened considerably by varying some of its components which are possible to influence.

For the purpose of this analysis, the interval between two successive births will be broken into three components and the proximate determinants of each examined where possible. The post-partum non-susceptible period, which is a period post-partum during which the woman is biologically incapable of conceiving (she is not ovulating), will form the first component while the fixed nine-month period of gestation before a live birth will constitute the third. This leaves a residual period during which the woman is exposed to the risk of conception (the exposure interval) and includes any time lost due to pregnancies that terminate in non-live births.

An apparently better way of arriving at estimates of the length of the pure exposure interval would be to look at intervals between successive pregnancies and not just between live births, as the latter has to include the unknown element of the period of time lost due to pregnancies that do not end in a live birth. Although information was collected on pregnancy histories, the main reason for not attempting this method is because some pregnancies – especially of short duration and ending in non-live births – are often seriously under-reported.

The analysis will be restricted to birth intervals that started a few years before the survey even though data were collected for all birth intervals of the women interviewed. The reason for this restriction is because detailed questioning on the proximate determinants of the intervals was done only for, at most, the ultimate and penultimate births.

3.2 BIRTH INTERVALS

Table 9 and figure 6 give a summary of the estimated live-birth interval lengths (in months) for live-birth intervals which started within the six years before the date of interview. The table also gives the percentages of birth intervals that were closed within the six years. An interval is closed if a live birth that started it is followed by another live birth before the date of interview. To be noted here is the fact that the analysis is for birth intervals and not for the women who had these births.

From this table it appears that it is not until the twentieth month that 10 per cent of the live births are followed by another and almost three years (35.7 months) elapse before 50 per cent of the live-birth intervals are closed. The 90 per cent quantile is not reached within six years except for the cohort of women who were aged 20–24 at the time of the survey. Also,

Table 9 Live-birth interval length (in months), by current age of mother; all intervals started in the six years preceding the survey[a]

Current age of mother	Quantiles					Trimean	% of intervals closed within six years	N
	T10	T25	T50	T75	T90			
15–19	22.8	29.4	36.3	46.0	–	37.0	81.2	192
20–24	19.5	26.4	32.4	43.7	62.8	33.7	91.9	974
25–29	19.4	25.5	34.2	44.2	–	34.5	89.7	1165
30–34	19.7	26.6	34.0	46.6	–	35.3	89.6	815
35–39	20.4	27.2	36.5	52.0	–	38.1	85.0	564
40–44	23.3	31.9	45.0	–	–	–	68.8	405
45–49	22.6	41.9	–	–	–	–	37.6	115
15–49	20.0	26.8	35.7	49.7	–	37.0	84.9	4230

[a]Estimates derived from life-table analysis of data for all ever-married women.

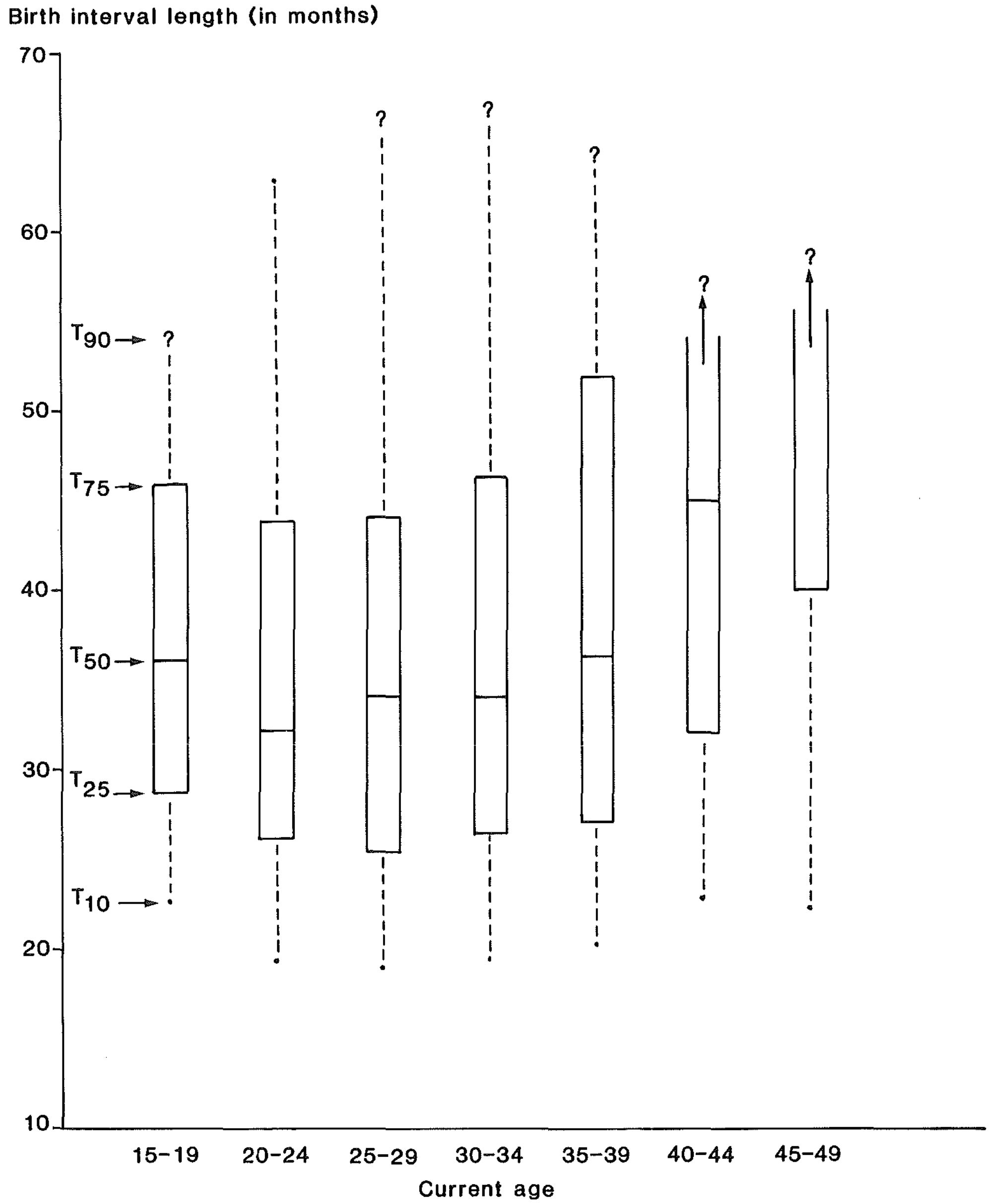

Figure 6 Live-birth interval length, by current age of mother; all intervals started in the six years preceding the survey

except for the cohort of women aged 15–19 years, the percentage of intervals closed within six years decreased with age (from about 92 per cent for the 20–24 years age group to just under 38 per cent for the women aged 45–49 years). That the percentage of closed live-birth intervals is considerably less for the age group 15–19 years than for the older age group of 20–24 years, at all points where comparison is possible, may be due to the fact that births in the past six years must have occurred at very young ages for some of these women and they were thus subjected to adolescent sterility or could be selective for low socio-economic status and long breast-feeding.

With the exception of the youngest age group, the duration at which a given quantile is reached is longer for older age groups, signifying that it takes longer for older women than for the younger. This is, of course, reasonable as older women should consist largely of women of higher parities who may be considering stopping family formation and may experience low sexual relations. Also, there is a likelihood that older women breastfeed longer and thus have their post-partum non-susceptible period much extended.

Table 10 gives a summary of the live-birth interval lengths for the subgroups. At the regional level, the women from the mountain zone exhibit the shortest live-birth interval length. Even the durations at which quantiles are reached are earlier for the mountain zone with the exception of the 75 per cent quantile, which is reached slightly earlier for the foothill zone. The Orange River Valley, while showing a pattern close to that of the mountain zone, is consistently higher than the mountain zone, except that the percentage of live-birth intervals closed in six years is slightly greater.

By educational subgroups, the average length of a live-birth interval is longer (slightly over 38 months as measured by the trimean) for the least educated group of women while it is about equal, at 36 months, for the

Table 10 Live-birth interval length (in months), by subgroups

Subgroup	Quantiles				Trimean	% of intervals closed within six years	N
	T10	T25	T50	T75			
Regions							
Lowlands	20.6	27.1	36.2	51.7	37.8	83.4	1708
Foothills	20.8	27.4	35.9	47.4	36.7	84.7	976
ORV[a]	20.5	27.0	35.9	51.5	37.6	86.6	543
Mountains	18.5	26.1	34.3	48.0	35.7	86.0	764
Education							
0–4 years	19.9	26.6	37.0	53.1	38.4	83.4	1310
5–6 years	20.0	27.0	35.3	47.3	36.2	85.3	1874
7+ years	19.9	26.4	35.0	49.0	36.4	86.8	1046
Type of area							
Rural	20.0	26.8	35.6	49.4	36.9	85.3	3930
Urban	18.4	25.4	36.5	58.3	39.2	80.0	284
Total Lesotho	20.0	26.8	35.7	49.7	37.0	84.9	4230[b]

[a]Orange River Valley.
[b]Subgroup numbers (N) do not always add up to this overall total because of the exclusion of 'not stated' categories.

intermediate and the highly educated groups. The proportion of live-birth intervals closed within the six years is highest for the highly educated subgroup and lowest for the least educated group. With regard to the urban/rural subgrouping, the urban group emerges with a longer average interval and a smaller proportion of closed intervals than the rural group; this despite the fact that the 10 and 25 per cent quantiles are reached one and a half months earlier. However, chance fluctuations may be playing an important role in influencing the results, especially for the urban data which are based on quite small numbers.

Controlling for age among the subgroups, a summary of median lengths (T50s) of birth intervals for subgroups is given in table 11. Considering the two youngest age groups, 15–24 and 25–34 years, among the regions the mountains have the shortest medians; for education it is the most highly educated, and for type of area of residence it is the urban dwellers who have the shortest median intervals.

Table 11 Median live-birth interval length (in months) for the various subgroups, by current age of mother

Subgroup	Current age of mother				N
	15–24	25–34	35–49	15–49	
Regions					
Lowlands	35.1	34.2	43.4	36.2	1708
Foothills	32.2	35.3	40.0	35.9	976
ORV[a]	32.5	35.2	40.9	35.9	543
Mountains	30.4	32.1	43.5	34.3	764
Education					
0–4 years	34.9	34.0	43.8	37.0	1310
5–6 years	32.9	34.4	40.5	35.3	1874
7+ years	30.4	33.8	43.1	35.0	1046
Type of area					
Rural	32.8	34.2	42.0	35.6	3930
Urban	31.2	33.1	55.7	36.5	284
Total Lesotho	32.7	34.1	42.3	35.7	4230[b]

[a]Orange River Valley.
[b]Subgroup numbers (N) do not always add up to this overall total because of the exclusion of 'not stated' categories.

3.3 THE POST-PARTUM NON-SUSCEPTIBLE PERIOD AND ITS DETERMINANTS

Post-partum variables and measurement of their duration

The post-partum non-susceptible period is, in most cases, approximated by the period of post-partum amenorrhoea. Its duration is usually associated with the prevalence and the intensity of breastfeeding. It is shortest (around one and a half months) where breastfeeding is hardly practised and longest (upwards of 18 months) where breastfeeding is common and is the sole form of feeding for a long time.

In most societies sexual intercourse is not resumed immediately after the occurrence of a birth, and there is usually a period of abstinence. Where the duration of abstinence is longer than the duration of amenorrhoea, it clearly adds to the length of a birth interval and thus affects fertility, whereas it has no effect if it is shorter. The months added by the practice of post-partum abstinence after the end of amenorrhoea clearly should not be regarded as part of the non-susceptible period as the woman is then susceptible; however, for the convenience of the present analysis amenorrhoea and abstinence will be treated in exactly the same way, since both are the result of the birth and they have overlapping periods. For this analysis there will even be use of an overall post-partum non-susceptible/non-exposed period (nsp/nep) which is defined for each birth as whichever is

Table 12 Mean duration of post-partum amenorrhoea (in months) following live births in the last four years, by current age of mother

Current age of mother	Quantiles					Average duration		Prevalence/ incidence estimate of mean duration	N
	T10	T25	T50	T75	T90	Trimean	Mean		
A All live births									
15–24	0.7	3.3	6.8	11.5	13.7	7.1	9.0	9.3	239
25–34	*	3.4	9.3	14.9	19.4	9.2	10.7	10.3	286
35–49	1.8	4.0	10.0	14.1	23.5	9.5	13.2	12.1	157
15–49	0.4	3.4	8.6	13.4	20.7	8.5	10.8	10.2	681
B Children still surviving at time of survey									
15–24	0.8	3.6	7.1	12.0	13.7	7.5	10.2	**	
25–34	*	4.0	10.2	16.2	19.6	10.2	11.5	**	
35–49	1.8	5.0	11.2	14.0	22.8	10.4	13.9	**	
15–49	0.5	3.8	9.5	13.9	21.3	9.2	11.3	**	

*See text.
**No estimate because the assumption of a constant stream of births is violated.

longer – the period of post-partum abstinence or the duration of post-partum amenorrhoea.

Detailed questions regarding the post-partum variables which we could analyse using life-table methods were asked only for the currently open pregnancy interval and the last closed pregnancy interval (pregnant women are classified as currently in a closed interval). Because of the biases that are inherent in the results for intervals obtained this way, use of life-table methods becomes difficult to justify. Current status data can, however, be derived for all births and the use of current status data makes the computation of mean durations and quantiles possible if the proportion in the state (Pd) is regarded as corresponding to the survival function (lx) of a life table. Alternatively, the mean duration can be estimated by using the relationship between the prevalence, the incidence and the average duration of a condition.[1] This is a well known relationship in epidemiology and it has the following equation:

mean duration = prevalence/incidence

Post-partum amenorrhoea

Table 12 gives the 10, 25, 50, and 90 percentiles, the trimean, the mean duration $\bar{X}$ (estimated by the use of proportions P(d) as life-table function lx) and the mean duration $\bar{X}$ (estimated by the prevalence/incidence method), of the post-partum amenorrhoea period for the broad age groups of 15–24 years, 25–34 years and 35–49 years. The use of broader age groups than before becomes necessary at this stage as monthly occurrences of births to sample women are small and the proportions of women in a state by month would thus be subject to pronounced reversals. This would especially be so when the subgroups are considered.

The average duration of post-partum amenorrhoea in Lesotho lies somewhere in the middle of the extremes that are found in other populations; it is from 9 to just under 11 months for all births and somewhat longer when only births where the children survived to the survey are considered. The duration clearly increases with increasing age of women, and this is the expected direction as the older women are likely to subscribe more to institutions that uphold breastfeeding and hence put their children on the breast for longer periods.

According to table 12, 10 per cent of women had begun to menstruate within two weeks of a birth. Indeed, values of T10 could not be estimated at all for women aged 25–34 because fewer than 90 per cent reported themselves amenorrhoeaic in the months following a live birth. It thus seems that some women confused post-partum blood loss with actual menstruation. This will not affect the quantiles from T25 onward, but may have resulted in a very slight underestimate of the current status and prevalence/incidence means.

For the subgroups, we have presented only the estimates of the mean obtained from the prevalence/incidence ratio because of the small sample sizes. To be noted here is the fact that this method tends to overestimate the mean duration for the youngest women and tends to underestimate the mean duration for the oldest women (see table 12). As table 13 shows, the increase of the duration of post-partum amenorrhoea with increasing age is still evident with the exception of the Orange River Valley, where the mean duration for the 15–24 years age group is somewhat longer than that of the older age group of 25–34 years, and in the urban subgroup where the duration is shorter for the 35–49

[1]The prevalence/incidence mean will be used frequently in our analysis, and is obtained from the relation $\bar{X} = P/I_n$ where P is the number of women in the original state (in this case, the number in post-partum amenorrhoea) and I_n is the average number of births each month over the last n months. Values of P/I_{12} and P/I_{24} were very similar in most calculations, the greatest differences occurring in the 15–24 age group. This mean is simple to estimate, but assumes a constant stream of births in the recent past. It will be used in the subgroup calculations where numbers are too small to allow calculation of a useful current status mean.

Table 13 Mean duration[a] of post-partum amenorrhoea (in months) for the various subgroups, by current age of mother (all live births)

Subgroup	Current age of mother			
	15–24	25–34	35–49	15–49
Regions				
Lowlands	8.4	10.4	11.1	9.8
Foothills	9.2	10.8	13.2	10.8
ORV[b]	10.9	9.2	11.3	10.2
Mountains	7.1	10.0	12.5	9.3
Education				
0–4 years	9.4	11.1	12.9	11.0
5–6 years	9.5	10.2	11.9	10.3
7+ years	8.9	9.7	11.0	9.5
Type of area				
Rural	9.3	10.3	12.3	10.3
Urban	8.4	10.1	8.9	9.6
Total Lesotho	9.2	10.3	12.3	10.1

[a]Estimated by the use of prevalence/incidence ratio method because of the small number sizes of some subgroups.
[b]Orange River Valley.

years age group than for the age group 25–34 years. Here, small numbers may be influencing the results; the urban subgroup is very small, and among the regions the Orange River Valley also has very few individuals in it. The mean duration of post-partum amenorrhoea is shortest (9.3 months) and longest (10.8 months) for the mountains and the foothills regions respectively; shortest for the highly educated (9.5 months) and longest (11.0 months) for the lowest educational subgroup and longer for the rural than for the urban subgroup.

Breastfeeding

Since post-partum amenorrhoea depends heavily on breastfeeding practices, we have also expanded the information on breastfeeding. The results are given in two stages: what could be regarded as 'partial breastfeeding' implies that a child is fed both on breast-milk and supplementary food, and 'full breastfeeding' implies that breastfeeding is the sole form of feeding the child. The idea here, of course, is for the partial breastfeeding to give an indication of a much more reduced intensity of breastfeeding. However, the exact meaning of the data available is not entirely clear because of the way the questions were asked and the various possible interpretations of the questions the respondents could have made. For example, the only question for the separation of the two categories is:

'How many months old was the child when you began giving him/her any other food along with breastfeeding?'

Some children may have been given 'other foods' on only a very few occasions for various reasons, and it is not clear whether they would then have to fall into the partially breastfed category. Also, there may be some period added to the duration of breastfeeding which should properly be excluded or tabulated separately for a meaningful interpretation of the results. We refer here to the period when the child is already too old to survive on the mother's milk alone but does receive a suckle because it has not yet been officially weaned. Whether respondents included or excluded this period depends on how they interpreted the central question that was asked:

'After ______ months had you completely stopped breastfeeding your child even once a day?'

Tables 14 and 15 present the usual quantiles and the mean durations of breastfeeding and full breastfeeding for the three broad age groups.The average duration of breastfeeding is between 19 and 21 months while that of full breastfeeding is only about 3 months with the durations somewhat longer for the breastfeeding of the child who survived to the time of the survey. There seems to be no clear relationship between the duration of breastfeeding and the age of the women except that the

Table 14 Duration of breastfeeding (in months) following live births in the last four years, by current age of mother

Current age of mother	Quantiles					Average duration		Prevalence/ incidence estimate of mean duration
	T10	T25	T50	T75	T90	Trimean	Mean	
A All live births								
15–24	5.8	15.2	20.6	26.1	28.5	20.6	19.9	19.5
25–34	6.5	13.5	21.3	23.8	30.5	20.0	19.6	18.8
35–49	4.6	12.2	23.8	26.8	35.3	21.6	21.1	20.4
15–49	5.5	13.6	21.2	26.4	32.3	20.6	20.2	19.1
B Children still surviving at time of survey								
15–24	12.9	16.1	21.3	26.6	28.8	21.3	22.0	*
25–34	12.9	14.5	21.7	27.0	31.0	21.2	21.8	*
35–49	4.8	15.2	24.3	27.0	35.5	22.7	23.1	*
15–49	12.4	15.6	22.1	26.9	32.6	21.7	22.3	*

*No estimate because the assumption of a constant stream of births is violated.

Table 15 Duration of full breastfeeding (in months) following live births in the last four years, by current age of mother

Current age of mother	Quantiles					Average duration		Prevalence/ incidence estimate of mean duration
	T10	T25	T50	T75	T90	Trimean	Mean	
A All live births								
15–24	0.3	1.1	3.2	5.3	7.2	3.2	3.4	3.4
25–34	0.4	1.3	2.6	4.6	6.3	2.8	3.0	2.5
35–49	0.3	1.5	3.3	5.3	9.1	3.4	3.8	3.2
15–49	0.3	1.2	2.9	5.1	6.7	3.0	3.3	2.9
B Children still surviving at time of survey								
15–24	0.5	1.6	3.3	5.5	7.2	3.4	3.6	*
25–34	0.6	1.5	2.8	4.7	6.4	3.0	3.2	*
35–49	0.5	1.6	3.4	5.4	9.1	3.5	3.8	*
15–49	0.6	1.6	3.1	5.2	6.8	3.2	3.5	*

*No estimate because the assumption of a constant stream of births is violated.

oldest age group exhibits higher means in all the cases. Also, there seems to be no strong association between duration of breastfeeding, whether partial or full, and the duration of post-partum amenorrhoea. The absence of any clear relationship with these other variables may, however, be due to the impreciseness of and the various interpretations that could be made in the questions on breastfeeding.

For the subgroups (tables 16 and 17) there does not appear to be much difference in the durations of breastfeeding among the regions; the difference between the highest and the lowest value being about half a month.

Table 16 Mean duration[a] of breastfeeding (in months) for the various subgroups, by current age of mother (all live births)

Subgroup	Current age of mother			
	15–24	25–34	35–49	15–49
Regions				
Lowlands	18.6	19.6	20.6	19.5
Foothills	20.2	18.3	20.3	19.4
ORV[b]	20.3	17.5	18.8	18.9
Mountains	18.4	19.0	22.5	19.4
Education				
0–4 years	20.0	19.2	22.2	20.2
5–6 years	20.2	19.0	20.0	19.6
7+ years	18.4	18.6	18.5	18.5
Type of area				
Rural	19.5	19.2	20.9	19.6
Urban	20.0	15.3	16.7	17.4
Total Lesotho	19.5	18.8	20.4	19.1

[a]Estimated by the use of prevalence/incidence ratio method because of the small number sizes of some subgroups.
[b]Orange River Valley.

Table 17 Mean duration[a] of full breastfeeding (in months) for the various subgroups, by current age of mother (all live births)

Subgroup	Current age of mother			
	15–24	25–34	35–49	15–49
Regions				
Lowlands	3.2	1.7	3.1	2.5
Foothills	2.6	2.2	2.6	2.4
ORV[b]	3.7	3.9	2.5	3.6
Mountains	2.4	2.9	4.0	2.9
Education				
0–4 years	2.9	3.1	3.7	3.2
5–6 years	3.6	2.4	2.4	2.8
7+ years	3.8	1.9	4.0	3.1
Type of area				
Rural	3.4	2.5	3.1	3.0
Urban	3.7	1.6	4.4	3.0

[a]Estimated by the use of prevalence/incidence ratio method because of the small number sizes of some subgroups.
[b]Orange River Valley.

Again, there appears to be no association between the durations of both forms of breastfeeding and the duration of post-partum amenorrhoea at the regional level. With regard to the subgroups by educational standard, the least educated have the longest mean duration of breastfeeding while the most highly educated have the shortest. Similarly for the rural/urban grouping, the rural subgroup exhibits a slightly longer duration of breastfeeding. These relationships fail to hold even for these subgroups when full breastfeeding is considered. The only generalization about the results is that the oldest age group of women, which exhibits highest mean durations of breastfeeding, in most cases also has the longest durations of post-partum amenorrhoea.

Table 18 Duration of post-partum abstinence (in months) following live births in the last four years, by current age of mother

Current age of mother	Quantiles					Average duration		Prevalence/ incidence estimate of mean duration
	T10	T25	T50	T75	T90	Trimean	Mean	
A All live births								
15–24	5.1	11.0	15.9	24.8	26.2	16.9	16.8	16.1
25–34	4.1	8.3	12.9	22.3	28.8	14.1	15.2	13.7
35–49	2.9	6.5	10.6	25.3	32.0	13.3	16.9	14.1
15–49	3.9	8.5	14.3	24.4	26.8	15.4	16.3	14.4
B Children still surviving at time of survey								
15–24	7.3	11.6	20.0	25.0	26.3	19.2	17.4	*
25–34	4.5	9.0	14.3	22.8	30.3	15.1	16.6	*
35–49	3.3	6.3	11.0	25.4	33.1	13.4	18.1	*
15–49	4.7	10.0	19.5	24.7	27.0	18.4	17.6	*

*No estimate because the assumption of a constant stream of births is violated.

Post-partum abstinence

According to table 18, post-partum abstinence lasts for 14 to just under 17 months for all live births and slightly longer, from 17 to 18 months, when only births where the children survived are included. Up to about four months post-partum, 90 per cent of the mothers still abstain and it is not until the lapse of about 27 months that only 10 per cent of the mothers still remain in the abstaining stage. There is also apparently an earlier return to sexual relations among older women.

Even for the subgroups (table 19) the decline of abstinence with increasing age still persists. Duration of abstinence is higher in the mountains and the Orange River Valley regions (respectively 15.9 and 15.4 months) and shorter in the lowlands and the foothills regions (respectively 14.3 and 13.2 months). Among educational subgroups, the most highly educated exhibit the shortest period of post-partum abstinence while the urban mean duration of abstinence is shorter than that of the rural subgroup.

From the range of the duration of post-partum abstinence it is possible that abstinence is a major determinant of fertility in Lesotho. That younger women abstain more than the older women, at the national level and for the different subgroups, is definitely contrary to the usual expectation. Abstinence is associated with social institutions that should have a stronger hold on older generations than on younger ones. An explanation of this in Lesotho, however, may lie in the frequent and often prolonged absences of males for employment in the neighbouring Republic of South Africa. Almost all of the males who leave Lesotho for work are employed in the labour-intensive mining industry of the Republic of South Africa. As this is an occupation that needs more muscle than anything else, it is the young male adults – husbands of young women – who are likely to be involved in greater proportions. This is reflected in the low sex ratios in the distributions of the *de facto* population enumerated by the survey and the census, according to age (Central Bureau of Statistics 1981, table 3.2, p. 39). Because of these absences, the young women might in fact be abstaining for longer periods than their older counterparts do.

Table 19 Mean duration[a] of post-partum abstinence (in months) for the various subgroups, by current age of mother (all live births)

Subgroup	Current age of mother			
	15–24	25–34	35–49	15–49
Regions				
Lowlands	15.0	13.4	15.2	14.3
Foothills	15.2	11.9	12.6	13.2
ORV[b]	17.4	13.9	14.4	15.4
Mountains	15.3	16.3	16.0	15.9
Education				
0–4 years	15.2	14.9	14.2	14.8
5–6 years	17.1	13.7	15.4	15.3
7+ years	15.7	12.3	12.5	14.1
Type of area				
Rural	16.2	13.7	14.9	14.9
Urban	15.3	13.7	8.9	13.4
Total Lesotho	16.1	13.7	14.1	14.4

[a]Estimated by the use of prevalence/incidence ratio method because of the small number sizes of some subgroups.
[b]Orange River Valley.

The combined impact of post-partum amenorrhoea and abstinence

The non-susceptible period was found on average to be from 9 to 11 months (see table 12). The combined non-susceptible/non-exposed period falls in the range of 16–18 months (table 20). Thus, abstinence adds about seven months to the birth interval. Although there was a clear increase in the duration of post-partum amenor-

Table 20 Combined effect of post-partum amenorrhoea and abstinence duration, ie combined non-susceptible/non-exposed period (in months), following live births in the last four years, by current age of mother

Current age of mother	Quantiles[a]					Average duration		Prevalence/ incidence estimate of mean duration
	T10	T25	T50	T75	T90	Trimean	Mean	
A All live births								
15–24	6.1	11.4	19.0	24.8	26.4	18.6	17.5	16.9
25–34	4.4	9.5	18.7	22.6	28.8	17.4	16.6	15.6
35–49	5.4	10.0	15.9	26.0	32.8	17.0	20.0	18.1
15–49	5.2	10.1	19.2	24.7	26.9	18.3	17.7	16.3
B Children still surviving at time of survey								
15–24	7.8	11.9	20.0	25.0	26.6	19.2	18.8	*
25–34	4.9	10.8	19.4	23.5	30.3	18.3	18.1	*
35–49	5.5	10.6	24.2	26.0	33.1	21.2	21.4	*
15–49	8.5	11.6	20.2	24.9	31.5	19.2	19.2	*

[a]Tx indicates the estimated duration by which x per cent of the women had resumed both menstruation and sexual relations (therefore become exposed) after the births in question, based on current status data.
*No estimate because the assumption of a constant stream of births is violated.

rhoea with increasing age, the relationship here is not brought out well because of the irregularities that were seen in the duration of post-partum abstinence. Again, the average duration is somewhat longer in the case of mothers whose children survived to the time of the survey. Only about 10 per cent of mothers have become exposed to the risk of conceiving another child even after the lapse of five months and it is not until about the nineteenth month that 50 per cent of the mothers are exposed.

The mountains and the Orange River Valley show longer durations of the non-exposed periods than the lowlands and the foothills regions (table 21). The most highly educated show a shorter duration of about 16 months while the other two education subgroups show equal durations at about 17 months. The largest difference, close to two months, is seen between the mean durations of the rural and the urban subgroups with the urban showing a shorter mean, brought about by the very short duration of older urban women.

Table 21 Mean duration[a] of the combined non-susceptible/non-exposed period (in months) for the various subgroups, by current age of mother (all live births)

Subgroup	Current age of mother			
	15–24	25–34	35–49	15–49
Regions				
Lowlands	16.4	15.4	18.1	16.3
Foothills	16.6	14.3	17.6	15.9
ORV[b]	17.7	15.8	18.1	17.0
Mountains	15.8	17.3	19.5	17.1
Education				
0–4 years	16.0	16.9	18.4	17.0
5–6 years	18.4	15.2	18.8	17.1
7+ years	16.2	14.9	17.5	15.9
Type of area				
Rural	17.1	15.7	18.8	16.8
Urban	16.3	15.3	12.2	15.1
Total Lesotho	16.9	15.6	18.1	16.3

[a]Estimated by the use of prevalence/incidence ratio method because of the small number sizes of some subgroups.
[b]Orange River Valley.

3.4 THE EXPOSURE INTERVAL AND ITS DETERMINANTS

Estimation of the exposure interval

The duration of exposure within the interval between successive live births is hard to estimate because there were no direct questions asked in the questionnaire. Thus, an idea of the magnitude of the length is arrived at by considering the residual that is left unexplained by other estimates. It should be noted here that the inclusion of open intervals in the computation of birth interval length overstates the interval, because it includes an unknown number of intervals that will never close, while consideration of only closed intervals, within the short period of six years, over-represents short intervals and hence results in a downward bias. This problem did not arise in the analysis of post-partum variables because even for the intervals that will never close the women cannot remain indefinitely in the post-partum state.

Estimation of the exposure interval is done in two ways. In the first instance it is estimated by the prevalence/incidence ratio method already used for the post-partum variables. The mean is estimated as:

$$\bar{X} = P/I$$

where P is the number of women currently in exposed status (ie not amenorrhoeic, pregnant, menopausal or sterilized) and I is estimated from the monthly average number of births, assuming a constant stream of births in the recent past.

If there has been a constant stream of births, it might be reasonable to assume that the number of mothers becoming exposed again by reaching the end of post-partum amenorrhoea and abstinence is roughly constant. In this case the number of births per month can be assumed to approximate I. P is estimated as the number of women who have had at least one child and excludes those who will never close their current birth interval. P is likely to provide an overestimate, bearing in mind that the proportion reporting themselves as pregnant is usually too low, especially for the first few months of pregnancy, and that the indicators available from which we estimate the numbers who will never bear another child often lead to an underestimate of the number of intervals that will never be closed.

The second method estimates the exposure interval as a residual after subtracting from the last closed birth interval the duration of non-susceptibility to conception, and the nine-month period of live-birth gestation. As mentioned earlier, this method is likely to underestimate the exposure interval.

We might expect that estimates based on the P/I ratio would exceed those based on the last closed birth interval, for two reasons: the likely overestimate of P owing to difficulty in estimating the number of intervals that will be closed; and the bias towards short intervals amongst those which have been closed. The results from both methods are presented in table 22; they suggest that the P/I method indeed gives overestimates of the exposure interval, the difference being more marked among the older women. Obviously, the figure for the 35–49 age group is a bad estimate owing to the fact that only a small proportion of older women gave any indication that they were unlikely to have another live birth at some time.

Information on the proximate determinants of exposure interval

Information on the proximate determinants of the exposure interval is rather scanty in Lesotho. Computation of fecundability, which is usually estimated as the ratio of the proportion of conceptions that took place during the first three months after first marriage to the proportion of the rest of the conceptions which led to first live births, is hard to justify because of the imputation of dates mentioned earlier. Also, there is no information on coital frequency which is one of the determinants of fecundability.

Table 22 Estimated duration of recent intervals of exposure (in months), by current age of women

Current age	All recent birth intervals (including current open intervals except those known to be likely to remain unclosed)[a]	Last closed birth interval per woman[b]
15–24	8.4	8.2
25–34	14.8	9.1
35–49	30.5	10.6
15–49	15.1	9.2

[a]Prevalence/incidence ratio, P/I, with P estimated as the number of women currently married reported as currently neither pregnant nor in post-partum amenorrhoea or abstinence, and not reported as menopausal or having other fecundity impairments, sterilized or terminally abstaining.
[b](Closed birth interval) – (9) – (retrospectively reported duration for whichever was longer, post-partum amenorrhoea or post-partum abstinence).

Table 23 Average duration (in months) of temporary absences in the last closed and open intervals after resumption of sexual relations and menstruation, by current age of women

Current age	Last closed interval		Open interval	
	$\bar{X}$ (months)	No of cases	$\bar{X}$ (months)	No of cases
15–24	1.9	443	4.2	269
25–34	1.8	1077	5.3	483
35–49	1.4	1144	5.7	687
15–49	1.6	2664	5.3	1439

$\bar{X}$ is the average duration in months of temporary absences

Lengthy periods of separation of husband and wife can have a significant impact on the exposure interval. However, these separations may overlap with periods of pregnancy or those of the post-partum states. Although some information about the absences of husbands was obtained, the problem of separating the periods of overlap makes it impossible to interpret the findings in a meaningful way. Rough estimates of the durations of temporary absences, in the last closed birth interval and the current open interval after resumption of sexual relations and menstruation by age of women are presented in table 23. These periods are seen as about one and a half months for the closed interval and five months for the open interval on average.

Contraceptive usage has already been mentioned as being very low in Lesotho. Only about 3 per cent of apparently fecund women reported having used contraceptive methods in the last closed and current open birth interval.

Time lost through foetal wastage is also impossible to estimate as no information exists.

3.5 CONCLUSIONS

Birth spacing patterns have been analysed in detail in this section. The data indicate that live-birth intervals are long in Lesotho with an average duration of about 37 months (ie three years). This duration varies across subgroups. Urban, 0–4 years education, lowlands and Orange River Valley categories have their intervals above the national average, 39.2, 38.4, 37.8 and 37.6 months respectively. Of all the factors affecting the birth interval length in Lesotho, breastfeeding and post-partum abstinence seem to be the most important. Women breastfeed, on average, for about 20 months with the mountains, 0–4 years of education, rural and lowlands subgroups having their average breastfeeding periods above the national average – 22.5, 22.2, 20.9 and 20.6 months respectively. Urban women and those with seven or more years of education experience the shortest periods of 16.7 and 18.5 months respectively. The above observed long breastfeeding durations are, however, associated with relatively short post-partum amenorrhoea of about 10.1 months. This also varies across subgroups, and is longest for women with 0–4 years of education and shortest for mountain women with 11.0 months and 9.3 months respectively. All other subgroups have their amenorrhoea between these two extremes.

Post-partum abstinence is widely observed among Lesotho women. It lasts, on average, for 14 to just over 16 months for all births and between 17 and 18 months when only surviving births are considered. Thus abstinence exceeds amenorrhoea and it decreases with age. The combined duration of post-partum amenorrhoea and post-partum abstinence ranges from 16 to 18 months. It is longest among women of the Orange River Valley and mountain regions; among women with little or no education and those with 5–6 years of education as well as among rural residents. Women residing in the lowlands region, educated and urban residents experienced the shortest duration. The figures for temporary separation of spouses can only be considered rough estimates. The period tends to overlap with the period of pregnancy and post-partum status, making it difficult to interpret the results usefully. Open interval figures are high (5.0 months) compared to those of the closed interval (1.5 months).

4 Stopping Patterns of Family Formation

4.1 INTRODUCTION

In this section, we shall estimate the age at last or final birth, examining the major proximate determinants such as age at which women cease to be fecund; age at menopause and secondary sterility; sterilization; definitive widowhood, divorce or separation; terminal abstinence within marriage and the prevalence of contraception and abortion.

Women may cease to be fecund as a result of either sterilization or natural causes, ie through the definitive cessation of ovulation, which in WFS data can be approximated by menopause or secondary sterility. Fecund women may stop having sexual relations either because of termination of marriage as a result of definitive widowhood, divorce or separation, not followed by remarriage or reconciliation, or through complete cessation of sexual relations ('terminal' abstinence) although still in union. The practices of contraception and abortion also have the effect of preventing any more births.

The analysis of the stopping pattern is restricted largely to older women aged over 45 whose reproductive lives are almost completed. Because of changes over time, the conditions affecting starting patterns of family formation 30–40 years ago might be quite different from those affecting stopping patterns. Such conditions might also be quite different from those likely to be experienced by the younger women, who are unlikely to replicate the stopping patterns of their predecessors. Unfortunately, however, the analysis of stopping patterns of younger cohorts is impossible since apart from a handful of women who may have been sterilized, one cannot be certain that they will never have another child. The restriction of the analysis to older women aged 45–49 has yet another constraint. Although most of the women in the 45–49 years cohort will have become infecund and therefore unable to produce more children, a few, especially the younger members of the cohort, will have another child before reaching the age of 50. Since their reproductive period is not yet completed, it is difficult to make a very exact statement of their eventual stopping patterns. For analytical purposes, therefore, the only proximate determinant marking the end of a woman's childbearing period of which one can be certain is sterilization (and widowhood in some cases). However, less than 1 per cent of the respondents in the LFS reported themselves to have been sterilized and only 7 per cent had been widowed, divorced or separated. The impact of sterilization on stopping patterns of family formation is thus negligible. Moreover, the impact of union dissolution, as in other tropical African countries, is surrounded by uncertainty and speculation since being a widow or a divorcee does not necessarily prevent a woman from engaging in sexual relations with other men and so prevent the risk of childbearing. In such circumstances, to take the effect of definitive widowhood, divorce or separation on stopping patterns may be inappropriate and is entirely dependent on the fecundity status of the woman (ie whether she is too old or in a post-menopausal state). For the other variables such as terminal abstinence and menopause, we have to rely on the woman's perceptions that she has reached the end of her reproductive career – for example that she will never again have sexual relations or that she is post-menopausal. There are also indirect indicators that suggest that she has reached the end point. For example a woman aged 45 who has been a widow for 12 years is unlikely to remarry in her few remaining potentially fecund years, and a woman who has not menstruated for two or three years (although not pregnant or breastfeeding) has probably reached her menopause. In both cases it is assumed that a woman's circumstances will not change subsequently. Moreover, we should note at this point that some stopping variables, such as menopause, are usually considered not to be events but transitional periods. In the case of menopause, menstruation becomes increasingly irregular and infrequent until it finally ceases completely. Furthermore, coital frequency for some women may decline slowly and irregularly until it reaches zero. This problem also occurs in some of the starting variables (eg entry into regular sexual relations) and for some of the spacing variables (eg gradual weaning). It is, however, more common in the stopping variables, and it is even exaggerated by the degree of uncertainty introduced when even the oldest women for whom we have information have not quite completed their potential childbearing period.

Finally, it should be emphasized that no attempt is made in this exercise to evaluate the variables that are speculative in nature, such as stated intention to have no more children. Rather, the focus is on the best estimates we can make, given the data available on age at final birth, of indicators of ceasing to be fecund, and on age at ceasing to have sexual intercourse.

4.2 AGE AT FINAL LIVE BIRTH

The age at the most recent birth was recorded for all ever-married women in the survey. As most of the women aged 45 and over are approaching the end of their reproductive lives, their most recent recorded birth will in fact be their final birth for most of them with very few going on to have another child. Among the oldest women, aged 49, this minority is so small as to be negligible and we can therefore assume that their frequency distribution by age at the most recent birth corresponds to their frequency distribution by age at

Table 24 Recorded percentage distribution by age at most recent birth and estimated percentage distribution by age at final birth, for women currently aged 45–49

Age at the birth	Most recent birth (recorded)	Final birth (estimated)
10–14	1.3	1.3
15–19	5.0	4.8
20–24	10.9	10.4
25–29	11.7	11.3
30–34	10.5	10.2
35–39	22.5	21.5
40–44	30.4	29.1
45–49	7.5	12.5
Mean age	34.9	36.0
N	293	

final birth. We can then use this distribution to adjust the distribution by age of the next youngest cohort, in order to allow for the small proportion of this cohort who will go on to have another child. Each successively younger cohort in the age group 45–49 can be adjusted on the basis of the reported or adjusted data for the older cohorts with more complete information (see appendix tables A1 and A2). The results are summarized in table 24. The mean age at final birth is estimated to be 36 years, well below the averages of about 40 recorded in Ghana and Kenya.

The proportions with a final birth at a young age are high. For instance, 17 per cent reported a final birth before age 25 and 28 per cent before age 30. By contrast, in Kenya about 4 and 8 per cent had a final birth before ages 25 and 30 respectively. In this section we try to discover the reasons for the early cessation of childbearing in Lesotho.

4.3 THE PROXIMATE DETERMINANTS OF AGE AT FINAL BIRTH

Age at ceasing to be fecund

Several questions were asked covering each woman's current fecundity status. These included her own perception of whether she and her husband would be able physically to have a child in the future if they wanted one and her own judgement or whether she was menopausal. Questions were also included to ascertain whether she or her husband had been sterilized. The exact questions asked in the relevant parts of the LFS are given in figure 7.

The data presented in table 25 on menopause and general fecundity status can only be interpreted with great uncertainty for several reasons: women, especially those in the peri-menopausal period, require knowledge of a large number of biological characteristics in addition to menstruation, many of which are not readily apparent and can be revealed only through detailed laboratory tests, to be able to give detailed and accurate information on fecundity status. In the circumstance, it is doubtful whether respondents in the LFS were in a position to give information concerning their fecundity status with certainty. The absence of any respondents expressing doubt to the fecundity status question is not convincing and can only be regarded as an indication of over-optimism. The situation is even more aggravated when those women are asked to make predictions about their fecundity status on the basis of the incomplete knowledge of the present as implied in question 562. As long as they are still menstruating, women may have a tendency to perceive or report themselves as fecund even though their chances of conception and successful gestation may be nil or at least very low in the final years before menopause. Similarly, they may perceive or report themselves as infecund when they start experiencing irregularity in their menstrual cycles even though there is a small chance that they may be fecund.

The proportion of ever-married women reporting themselves fecund declines gradually with increasing age (table 25). While about 98 per cent of young women in the age group 15–19 years stated they were fecund and about 2.0 per cent, having not had their first live birth, pessimistically reported themselves infecund (not menopausal), three-quarters of the older women aged 40 and a third of those aged 48 claimed still to be fecund, a reflection of over-optimism among the older women.

Failure to have a live birth in five years of continuous exposure is highly suggestive of infecundity (or at least marked subfecundity). Table 26 presents the proportions of women who have not had a live birth in the last five years among non-contracepting women who have been continuously married for this period. The proportions are much higher than those reporting themselves as infecund (see column 4, table 25).

Reported percentages with a characteristic suggesting the end of a woman's fecund period

In this subsection we combine the various indicators that a woman may have reached the end of her fecund life. The indicators used are: self-reported infecundity, menses stopped more than six months ago, menopause, sterilization, no birth in five years of exposure, the total being any one of these characteristics. It is assumed that a woman with any one of these characteristics is probably infecund, and since acquisition of each of these characteristics is essentially non-reversible we can use the proportions with the characteristics to make a rough estimate of the mean age at becoming infecund[2] using the usual current status procedures.

The estimated mean ages[3] at acquiring each of the

[2]This can only be rough, not only because of problems of data quality but because, even with perfect reporting, one does not know the age at which a currently menopausal woman or a couple with no birth in five years of exposure did (or will actually) become infecund.

[3]The mean age x at acquiring the characteristic was estimated from the current status data (ie the proportion who have not yet acquired a given characteristic, tabulated by age) using the formula:

$$X = \alpha + \frac{\left(\sum_{x=\alpha}^{\beta} n \cdot {}_nL_x\right)}{1 - l_s} + l_\beta \cdot e^0_\beta$$

where α and β represent the lower and upper ages at which the characteristic can be acquired, l_s is the proportion who have not acquired it by age β and ${}_nL_x$ is estimated as the observed proportion without the characteristic between ages x and (x + n). This is a general expression used in estimating singulate mean age at marriage.

COL. 1		COL. 2	COL. 3
		EVER HEARD OF	EVER USED
0 FEMALE STERILI-ZATION	415. Some women have an operation in order not to have any more children. Have you ever heard of this method? CIRCLE RESPONSE IN COL. 2 IF YES — IF NO, SKIP TO NEXT UNCIRCLED METHOD 416. INTERVIEWER: SEE 216 CURRENTLY PREGNANT 1 (SKIP TO NEXT UNCIRCLED METHOD) — NOT CURRENTLY PREGNANT 2 417. Have you ever had such an operation? YES 1 — NO 2 (SKIP TO NEXT UNCIRCLED METHOD) 418. Was the purpose of that operation to prevent you having any (more) children? YES 1 — NO 2 (SKIP TO NEXT UNCIRCLED METHOD)	YES 1 NO 2	
0 MALE STERILI-ZATION	419. Some men have an operation in order not to have any more children. Have you ever heard of this method? CIRCLE RESPONSE IN COLUMN 2 IF YES — IF NO, GO TO NEXT UNCIRCLED METHOD 420. INTERVIEWER: SEE 301, 310 CURRENTLY MARRIED 1 — SEPARATED, WIDOWED, OR DIVORCED 2 (SKIP TO NEXT UNCIRCLED METHOD) 421. Has your husband had such an operation? YES 1 (GO TO 422) — NO 2 (GO TO 422)	YES 1 NO 2	
	422. Have you ever heard of any other methods which men use to avoid pregnancy? YES 1 — NO 2 (SKIP TO 423) What methods have you heard of? (LIST EACH METHOD BELOW)		

Figure 7 Part of Lesotho Fertility Survey questionnaire

HUSBAND OR WIFE STERILIZED [1] (SKIP TO 574)   CURRENTLY PREGNANT [2] (SKIP TO 565)   ALL OTHERS [3]

(SEE 301, 310)

CURRENLY MARRIED [1]   SEPARATED, WIDOWED, OR DIVORCED [2] (SKIP TO 574)

562. As far as you know, is it physically possible for you and your husband to have a child, supposing you wanted one?

YES [1] (SKIP TO 564)   NO [2]

563. Do you think you are in the menopause?

YES [1]   NO [2]

(ALL SKIP TO 574)

564. INTERVIEWER: CIRCLE APPROPRIATE BOX (SEE 501, 504)

NO LIVE BIRTH [1] (SKIP TO 567)   ONE OR MORE LIVE BIRTH [2] (SKIP TO 569)

565. Do you want to have another child sometime, in addition to the one you are expecting?

YES [1]   NO [2] (SKIP TO 572)   UNDECIDED [3] (SKIP TO 572)

566. How many more children do you want to have, after the one you are expecting?

__________ (NUMBER)

(SKIP TO 572)

567 Do you want to have any children?

YES [1]   NO [2] (SKIP TO 572)   UNDECIDED [3] (SKIP TO 572)

568. Would you prefer your next child to be a boy or a girl?

BOY [1]   GIRL [2]   EITHER [3]

OTHER ANSWER (SPECIFY): __________

(SKIP TO 574)

Table 25 Percentage distribution of all ever-married women according to self-reported fecundity status, by current age

Current age	Fecund	Uncertain	Infecund (not menopausal)	Infecund (menopausal)	Sterilized	Total	Total no of women
15–19	98.4	0.0	1.6	0.0	0.0	100.0	364
20–24	97.4	0.0	2.6	0.0	0.0	100.0	729
25–29	94.1	0.0	5.7	0.0	0.2	100.0	613
30–34	90.7	0.0	7.8	0.2	1.3	100.0	451
35–39	81.6	0.0	14.6	1.5	2.2	100.0	403
40	74.7	0.0	20.9	2.2	2.2	100.0	91
41	67.3	0.0	28.8	1.9	1.9	100.0	52
42	69.0	0.0	25.4	4.2	1.4	100.0	71
43	60.7	0.0	21.3	16.4	1.6	100.0	61
44	54.0	0.0	40.7	5.3	0.0	100.0	113
45	53.5	0.0	39.5	4.7	2.3	100.0	43
46	43.2	0.0	37.8	16.2	2.7	100.0	37
47	31.4	0.0	41.2	25.5	2.0	100.0	51
48	33.3	0.0	40.0	24.4	2.2	100.0	45
49	26.9	0.0	30.8	38.5	3.8	100.0	26
15–49	86.0	0.0	10.9	2.3	0.8	100.0	3150

Source: Based on table 9.20, p. 185, of Lesotho Fertility Survey, First Country Report (Central Bureau of Statistics 1981)

Table 26 Percentage of non-contracepting women who have not had a live birth in the last five years despite having been married throughout the period

Current age	Percentage with no live birth in the five years[a]	N
15–19	0.0	8
20–24	4.5	201
25–29	9.1	353
30–34	21.7	295
35–39	33.8	247
40–44	41.6	204
45–49	54.1	74
15–49	22.4	1382

[a]Restricted to non-users of contraception who have been married throughout the five-year period.

characteristics are presented in tables 27 and 28. To make the calculations easier, it was assumed that l_β and the proportion without the characteristic in question, reach zero at age 50 for infecundity and for 'any one or more of the characteristics', and at age 55 for menopausal and 'no birth in the last five years of exposure'. We have set β at 50 for sterilization on the grounds that women beyond age 50 are most probably already infecund. The mean age at reaching menopause was estimated at 49.5 years, which corresponds to the estimates for Kenya (49.2 years) and Ghana (49.1 years). The mean age at becoming infecund (non-menopausal) was estimated at 43.5 years, six years lower than the mean age at becoming menopausal and a whole 7.5 years higher than the mean age at last birth estimated for the oldest women in the age group 45–49 years. The estimated mean age at sterilization should not be given too much weight because of the small sample size involved.

Nevertheless, despite all the problems of misstatement of ages and over-optimistic reporting of indicators of stopping patterns, the estimates of mean ages at acquiring the above characteristics seem plausible. Tables 27 and 28 suggest that on average women in Lesotho acquire a stopping characteristic at around age 41.

Age at terminating sexual relations

The impact of age at which women cease to be in marital union can be measured from LFS data either by using ages at last termination of union as reported by women who are no longer married, or the proportions by age who are widowed, divorced or separated. In either case, in order to facilitate calculations, we must assume that women aged over 45 are unlikely to remarry. If, however, they did remarry, it will have very minimal impact on fertility since they will probably be infecund by then. We can also assume that women who have been divorced or widowed for more than a certain number of years and have not remarried are unlikely ever to remarry.

The estimated average number of years lived without being widowed, divorced or separated is about 47.2 (tables 29 and 30) ranging between 46.5 and 47.9 for the subgroups urban and foothills respectively. The proportion still widowed, divorced or separated at the time of the survey was about 7 per cent and this varied between 0.4, 16.3 and 18.6 per cent in age groups 20–24, 40–44 and 45–49 respectively. These figures are suggestive of the low rates of remarriage among the widowed, divorced or separated women in Lesotho. The overall impact of marital dissolution expressed as the average percentage of reproductive life (taken as 15–50 years) lost to this factor is $(50-47.2)/(50-15)=8.0$ per cent,

Table 27 Reported percentages with a characteristic suggesting that their fecund period is over (all ever-married women)

Current age	Self-reported infecundity (non-menopausal)	Menopausal	Sterilized	No birth in the last five years[a]	Any one or more of the characteristics
15–19	1.4	0.0	0.0	0.0	1.3
20–24	2.8	0.0	0.0	4.5	4.1
25–29	5.9	0.0	0.2	9.1	10.1
30–34	8.5	0.2	1.3	21.7	20.0
35–39	17.4	2.8	2.2	33.8	27.5
40–44	37.0	8.1	7.1	41.6	46.8
45–49	62.1	26.1	13.0	64.1	67.8
Estimated mean age at acquiring the characteristic	43.5[b]	49.5[c]	49.6[d]	41.5[c]	41.2[b]
Observed or assumed % ever acquiring the characteristic	100.0	100.0	0.8	100.0	100.0

[a]Restricted to non-users of contraception who have been married throughout the five-year period.
[b]Assuming that no one acquires the characteristic after age 50.
[c]Assuming that no one acquires the characteristic after age 55.
[d]Average years lived without acquiring the characteristic, assuming that no one acquires the characteristic beyond age 50.

Table 28 Estimated age at acquiring a characteristic suggesting that the fecund period is over, by subgroups (all ever-married women)

Characteristic	Region of residence				Education			Type of area of residence	
	Lowlands	Foothills	ORV[a]	Mountains	0–4 years	5–6 years	7+ years	Rural	Urban
Menopause[c]	49.6	49.4	50.2	50.3	49.6	50.0	49.5	49.7	50.2
Self-reported infecundity (non-menopausal)[b]	42.5	44.1	43.4	45.2	43.9	43.1	43.0	43.5	44.0
No birth in the last five years[c]	41.1	42.8	42.1	43.0	42.4	42.7	40.2	42.3	39.7
Any one or more of the characteristics[b]	38.0	39.6	39.3	40.5	39.3	39.0	38.6	39.1	38.0

[a]Orange River Valley.
[b]Assuming that no one acquires the characteristic after age 50.
[c]Assuming that no one acquires the characteristic after age 55, and assuming that those who acquire it after age 50 do so at age 52.5 (menopause) or at age 51 (no birth in the last five years).

indicating that marriage dissolution has a relatively small impact on stopping patterns of fertility.

Risk reduction through contraception and abortion as proximate determinants of the stopping pattern

Information on induced abortion is not available from the LFS. There is also no evidence that abortion is widespread among Lesotho women although it is possible that a minority of women with secondary or higher education living in large urban centres may practice abortion for spacing purposes. We cannot, therefore, determine whether this factor is operating in the stopping patterns of family formation. Similarly, we have no means of determining whether contraception is being used in effect to stop family formation with the data available. The proportions using both types of methods of contraception are very low (table 31). In the older age groups, particularly, there is no indication that they are using it to keep down fertility at the later ages.

Table 29 Percentages reporting themselves widowed, divorced or separated and mean years spent without acquiring the characteristic (all ever-married women)

Current age	Percentage reporting themselves widowed/ divorced/separated	N (Total N=3603)
15–19	0.0	375
20–24	0.4	759
25–29	3.2	681
30–34	8.6	526
35–39	11.9	471
40–44	16.3	498
45–49	18.6	293
Mean years spent without acquiring the characteristic	47.2[a]	

[a]Assuming that no one acquires the characteristic beyond age 50.

4.4 CONCLUSIONS

The most striking outcome of this analysis is that Lesotho women stop childbearing very early, at an average age of 36 years, long before the natural processes of ageing oblige them to. This is one of the lowest ages at stopping family formation in sub-Saharan African countries for which WFS data are available. This early age at last live birth cannot be explained by high levels of contraceptive use or sterilization. Moreover, the estimated age at reaching menopause is about 49 years while that of marital dissolution is as high as 47 years. These are therefore not strong determinants of stopping family formation.

Analyses of spacing patterns have shown that post-

Table 31 Reported percentages of women using contraception other than sterilization or terminal abstinence

Current age	Inefficient methods	Efficient[a] methods	N
15–19	1.6	0.3	367
20–24	2.1	1.1	722
25–29	4.6	2.8	614
30–34	4.7	2.7	449
35–39	3.8	4.8	390
40–44	3.9	1.3	383
45–49	0.0	0.0	200
15–49	3.8	2.9	3125

[a]Efficient methods of contraception include: Pill, IUD, Female Scientific methods, Condom, Injection.

partum abstinence is widely observed and that abstinence adds, on average, several months of protection from the risk of contraception over and above the protection afforded by post-partum amenorrhoea. Moreover, absences of husbands were much longer than in other sub-Saharan African WFS surveys. In a predominantly subsistence society like Lesotho, ownership of land is an important economic consideration. However, with all the good arable land largely confined to the lowlands region, the limitation of this resource coupled with unemployment and inadequate wage earnings have had the effect of drawing young adult males from the country to the neighbouring Republic of South Africa.

These observations suggest several explanations for the relatively low mean age at the last live birth:

1 A certain proportion of husbands working in the Republic of South Africa do not return to their wives, although such desertions are not reported as marital

Table 30 Proportion not currently widowed, divorced or separated and mean years spent without acquiring the characteristic, by subgroups (all ever-married women)

Subgroups	Current age							Mean years spent without acquiring the characteristic[a]	N
	15–19	20–24	25–29	30–34	35–39	40–44	45–49		
Regions									
Lowlands	1.000	0.993	0.961	0.910	0.886	0.855	0.832	47.2	1374
Foothills	1.000	1.000	0.980	0.959	0.897	0.907	0.840	47.9	784
ORV[b]	1.000	1.000	0.943	0.889	0.914	0.788	0.786	46.6	420
Mountains	1.000	0.992	0.975	0.920	0.913	0.795	0.813	47.0	571
Education									
0–4 years	1.000	1.000	0.970	0.900	0.904	0.846	0.802	47.1	914
5–6 years	1.000	0.997	0.959	0.934	0.909	0.818	0.842	47.3	1434
7+ years	1.000	0.993	0.978	0.892	0.849	0.892	0.794	47.0	848
Type of area									
Rural	1.000	0.997	0.974	0.919	0.902	0.838	0.819	47.2	3093
Urban	1.000	0.982	0.898	0.850	0.806	0.905	0.857	46.5	247

[a]Assuming that no one acquires the characteristic beyond age 50.
[b]Orange River Valley.

dissolutions since there may have been no quarrel, certainly no divorce, and the wife does not know if her husband is dead. Such separations could affect even the youngest women as the men go away to work when they are in their twenties.

2 It is possible that terminal abstinence is voluntarily practised (we could class the young women in the previous paragraph as involuntary abstainers) by some women when they reach their thirties. While information on terminal abstinence was not collected, we know that post-partum abstinence was long enough to have an effect on spacing pattern, and other studies (eg Caldwell and Caldwell 1977) have shown a link between long post-partum abstinence and terminal abstinence. In contrast, Kenya and Ghana had low levels of both post-partum and terminal abstinence.

5 The Fertility Reducing Impact of the Intermediate Fertility Variables

5.1 INTRODUCTION

The roles played by the proximate determinants of fertility at each stage in a woman's reproductive life have been analysed in the preceding sections in sufficient detail. The importance of each analysis cannot be overemphasized. Many governments today incorporate fertility reduction oriented population policies in their development plans as a basis for setting a time target for attaining their desired fertility reduction. A prerequisite for setting such goals for fertility reduction is an understanding of the intermediate fertility variables and their disaggregated role in quantitative terms. This understanding can then be used to translate the implications of the fertility targets into social policy and programmes. This section of the report attempts to quantify the effects of the intermediate fertility variables on the overall level of Lesotho fertility and measure differentials among selected subgroups, using Bongaarts' model (1978).

Bongaarts demonstrated that differences in fertility between populations are mainly a function of four intermediate fertility variables: the proportion married among the population, contraceptive use and effectiveness, the prevalence of induced abortion, and the duration of post-partum infecundity (influenced by breastfeeding). In the model, the assumption is made that in the absence of lactation and contraception there is an average birth interval of about 20 months, of which about seven months represent the time of exposure to conception (ie the menstruating interval); the potential fertility of populations would thus vary within a narrow range of 13.5–17.5 births per woman, with an average of 15.3.

5.2 THE MODEL AND ITS ESTIMATION

Bongaarts' original model specifies the relation between the intermediate fertility variables and the fertility rates as follows:

$$TFR = TF \times C_m \times C_i \times C_c \times C_a \quad (1)$$

where TFR is the total observed fertility; C_m is the index of marriage; C_i is the index of post-partum infecundity due to amenorrhoea and post-partum abstinence; C_c is the index of contraception; and C_a is the index of induced abortion. TF is the total potential fertility ('total fecundity'), or the level of total fertility if all women were continuously married between ages 15 and 50, did not breastfeed, use contraception or have induced abortions. This level, in other words, represents the hypothetical fertility level that would exist in the absence of any reduction by the four determinants.

The extended version of the original model breaks down the intermediate fertility variables as follows:

$$TFR = TF \times (C_{em} \times C_{diss}) \times (C_{ppam} \times C_{ppab}) \times (C_{st} \times C_{tab} \times C_{om}) \times C_a \quad (2)$$

The index of marriage, C_m, is split into components C_{em} and C_{diss} measuring the proportionate reduction in fertility due to delayed initial entry into union and marital dissolution respectively (ie $C_m = C_{em} \times C_{diss}$). The index of post-partum infecundity, C_i, decomposes into two components: C_{ppam} and C_{ppab}, measuring the proportionate reduction in fertility due to post-partum amenorrhoea and post-partum abstinence beyond amenorrhoea respectively (ie $C_i = C_{ppam} \times C_{ppab}$). Because of the very small number of contraceptors in Lesotho and lack of data on terminal abstinence it was unjustifiable to decompose the index of contraception in order to determine the separate suppressing effects of sterilization, terminal abstinence in union and other contraceptive methods on fertility. The model estimates were based on the observed TFR and total marital fertility rate (TMFR) calculated for the period 0–4 years before the date of the interview.

Table 32 presents the inputs and values for each of the parameters in equations (1) and (2) of the Bongaarts' model for the whole of Lesotho and selected subgroups. These parameters were obtained from the equations below:

$$C_m = TFR/TMFR \quad (3)$$

$$C_i = 20/(18.5 + i) \quad (4)$$

$$C_c = 1 - 1.08\ (u \times e) \quad (5)$$

where i is the combined mean duration of post-partum amenorrhoea and post-partum abstinence (ie nsp/nep) which was estimated for all births using the prevalence/incidence (P/I_{24}) ratio; 20 is a birth interval without lactation or post-partum abstinence and is made up of an average gestation and exposure period of 18.5 months and post-partum amenorrhoea of 1.5 months; 1.08 is the correction factor for primary sterility; e measures the use effectiveness of contraception and u is the prevalence of contraceptive use (including male methods – sterilization) among married women of reproductive ages 15–49. The proportions using each method of contraception were calculated for the age groups 15–24, 25–34 and 35–49. Using Bongaarts' (1985) estimated values of average use effectiveness of each method (pill (0.90), IUD (0.95), condom (0.80), sterilization (1.00) and other methods especially traditional methods (0.60)) the overall effectiveness, 'e', multiplied by use, 'u', for each age group was estimated. The calculated values of u and e of the three broad age groups 15–24, 25–34 and 35–49 were standardized on uniform age structure by taking weighted averages of three broad age groups:

$$\frac{i\,(15\text{–}24) \times 1 + i\,(25\text{–}34) \times 1 + i\,(35\text{–}49) \times 1.5}{3.5} \quad (6)$$

Table 32 Estimates of indices of intermediate fertility variables using Bongaarts' model (for Lesotho and selected subgroups)

	TFR	TM_{em}	TM	TNM	TF_{ppam}	Implied TF	C_m	C_{em}	C_{diss}	C_i	C_{ppam}	C_{ppab}	C_c	C_a
Total Lesotho	5.79	7.24	7.51	7.83	11.19	13.75	0.77	0.80	0.96	0.58	0.70	0.82	0.96	1.00
Regions of residence														
Lowlands	5.46	7.28	7.43	8.04	13.18	14.11	0.73	0.75	0.97	0.58	0.61	0.94	0.93	1.00
Foothills	6.03	7.26	7.43	7.75	11.40	13.37	0.81	0.83	0.97	0.58	0.68	0.85	0.96	1.00
ORV[a]	6.07	7.40	7.64	7.84	11.20	13.99	0.79	0.82	0.96	0.56	0.70	0.81	0.98	1.00
Mountains	6.05	7.29	7.45	7.70	10.69	13.75	0.81	0.83	0.97	0.56	0.72	0.78	0.97	1.00
Education														
0–4 years	5.89	7.27	7.32	7.67	11.30	13.70	0.80	0.81	0.99	0.56	0.68	0.83	0.96	1.00
5–6 years	6.05	7.29	7.49	7.86	11.39	14.04	0.81	0.83	0.98	0.56	0.69	0.81	0.95	1.00
7+ years	5.32	7.19	7.71	8.29	11.51	14.30	0.69	0.74	0.93	0.58	0.72	0.81	0.93	1.00
Type of area of residence														
Rural	5.85	7.35	7.51	7.85	11.38	13.77	0.78	0.80	0.98	0.57	0.69	0.82	0.96	1.00
Urban	4.58	6.42	7.51	8.04	11.32	13.41	0.61	0.71	0.86	0.60	0.71	0.84	0.93	1.00

[a]Orange River Valley.

The indices of contraception, C_c, were then calculated using equation (5). Induced abortion has been assumed to be absent because of lack of data. Hence the index C_a has been set to 1.

In the extended model, the effects of post-partum infecundability were derived from the equations:

$$C_{ppam} = 20/(18.5+i) \quad (7)$$

and

$$C_{ppab} = (18.5+i)/(18.5+i+j) \quad (8)$$

where i is the mean duration of post-partum amenorrhoea, and j is the mean additional number of months of abstinence.

The steps followed in deriving the effects of late entry into union or marital dissolution are described elsewhere[4].

5.3 RESULTS

The results are summarized in tables 32 and 33. Overall, indices C_m, C_c and C_i are equal to 0.77, 0.96 and 0.58 respectively. These can be interpreted to mean that total fertility is 77 per cent of total marital fertility as a result of non-marriage; total marital fertility is 96 per cent of total natural marital fertility as a result of contraception; while total natural marital fertility is only 58 per cent of total fecundity as a result of post-partum non-susceptibility (in this case lactational amenorrhoea and post-partum abstinence extending beyond the period at which the menses returned).

When the influence of all four proximate determinants are present, as in the real world, fertility will be observed at a level of total fertility (TFR). When the effect of delayed initial entry into union (C_{em}) is removed, ie all women enter marriage at age 15, fertility will rise to a level of total marital fertility (TM_{em}); and when the reducing effect of marital dissolution (C_{diss}) is removed, ie all marriages are stable, fertility will rise to a level of total marital fertility (TM). Eliminating then the effect of contraception, fertility will rise further to a level of total natural marital fertility (TNM). Removing the reduction effect of post-partum amenorrhoea (C_{ppam}), fertility will rise to a level of total potential fertility (total fecundity, TF_{ppam}) and finally, removing the reducing effect of post-partum abstinence (C_{ppab}) beyond post-partum amenorrhoea, fertility reaches the maximum level of implied total potential fertility (or total fecundity, TF). Thus, the implied total fecundity rate of 13.75 means that, on average, Basotho women who remain continuously married from age 15 to age 50 and who do not breastfeed, use contraception or resort to induced abortion, have the potential to give birth to a mean of 13.75 children.

Table 33 presents indices converted into the number of births averted due to non-marriage (delayed marriage plus marital dissolution), contraception, and the combined effect of post-partum amenorrhoea and post-partum abstinence. The figures are presented graphically in figure 8. It is evident from both the table and the figure that the combined effect of post-partum amenorrhoea and post-partum abstinence is the most important factor in affecting the level of fertility in Lesotho, averting on average between five and six births of potential fertility. Post-partum amenorrhoea alone averts, on average, three to five births with little variation between subgroups. Its greatest impact on fertility is found among lowlands women where it averts five births (accounting for 37 per cent reduction in potential fertility) and lowest among the educated women and those residing in the mountains region (where it accounts for 22 per cent reduction in potential fertility). The contribution of additional post-partum abstinence beyond amenorrhoea is very apparent in the table. On average, one to three births are averted by additional abstinence. It

[4]Many of the techniques applied in this report are discussed fully in Ferry and Page (1984).

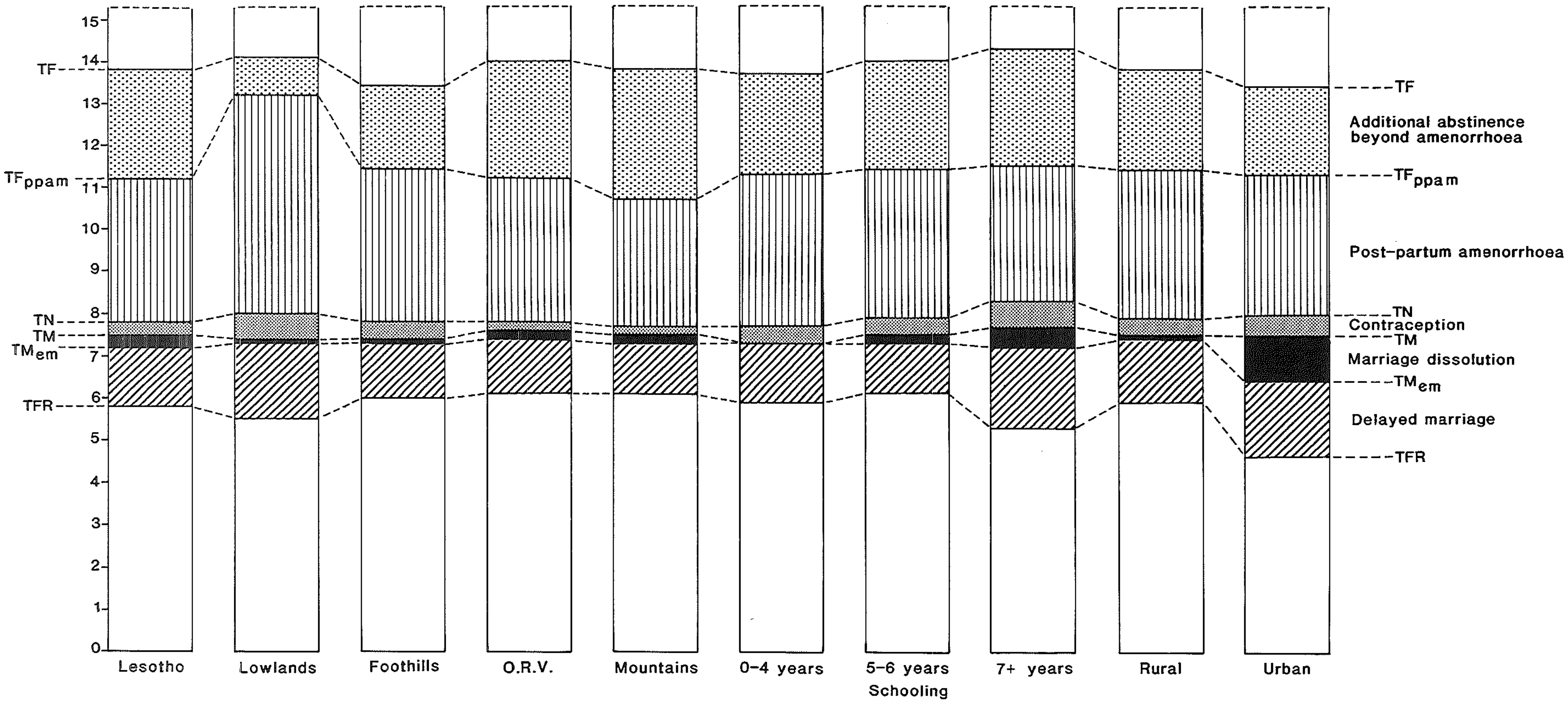

Figure 8 Relationships between the fertility reduction by intermediate variables and variable measures of fertility

Table 33 Number of births averted as a result of non-marriage (delayed marriage + marital dissolution), contraceptive use, post-partum amenorrhoea and additional abstinence

Fertility indicator	Number of births averted by	Total	Regions of residence				Education			Type of area	
			Lowlands	Foothills	ORV[a]	Mountains	0–4 years	5–6 years	7+ years	Rural	Urban
TFR		5.8	5.5	6.0	6.1	6.1	5.9	6.1	5.3	5.9	4.6
	Delayed marriage	1.4	1.8	1.3	1.3	1.2	1.4	1.2	1.9	1.5	1.8
TMem		7.2	7.3	7.3	7.4	7.3	7.3	7.3	7.2	7.4	6.4
	Marital dissolution	0.3	0.1	0.1	0.2	0.2	0.0	0.2	0.5	0.1	1.1
TM		7.5	7.4	7.4	7.6	7.5	7.3	7.5	7.7	7.5	7.5
	Contraceptive use	0.3	0.6	0.4	0.2	0.2	0.4	0.4	0.6	0.4	0.5
TNM		7.8	8.0	7.8	7.8	7.7	7.7	7.9	8.3	7.9	8.0
	Pp amenorrhoea	3.4	5.2	3.6	3.4	3.0	3.6	3.5	3.2	3.5	3.3
TF_{ppam}		11.2	13.2	11.4	11.2	10.7	11.3	11.4	11.5	11.4	11.3
	Additional abstinence	2.6	0.9	2.0	2.8	3.1	2.4	2.6	2.8	2.4	2.1
TF		13.8	14.1	13.4	14.0	13.8	13.7	14.0	14.3	13.8	13.4
Per cent of potential fertility due to											
Observed fertility		42	39	45	44	44	43	44	37	43	34
Delayed marriage		10	13	10	9	9	10	9	13	11	13
Marital dissolution		2	1	1	1	1	0	1	3	1	7
Contraceptive use		2	4	3	1	1	3	3	4	3	4
Pp amenorrhoea		25	37	27	24	22	26	25	22	25	25
Additional abstinence		19	6	15	20	22	18	19	20	17	16
Total		100	100	100	100	100	100	100	100	100	100

[a]Orange River Valley.

has lowest impact in the lowlands where it averts only one birth (accounting for 6 per cent reduction of potential fertility). Non-marriage averts one to three births, being more important among women with seven or more years of schooling, urban residents and those residing in the lowlands region. Of the components of non-marriage, delayed marriage is the most important factor in restraining fertility, averting, on average, one to two births (ie a 9–13 per cent reduction in potential fertility). Its greatest impact is in the lowlands, and among urban and the most educated women, averting about two births (accounting for 13 per cent reduction in potential fertility). Marital dissolution averts less than a child except among urban women where it averts one child (accounting for 7 per cent reduction in potential fertility). Contraception has little impact on fertility, accounting in total for only 2 per cent reduction of potential fertility with little variation across subgroups (varying between 2 and 4 per cent). Comparable analyses on FOTCAF data from Kenya, Ghana and the Philippines show that modernization, in the form of education and urbanization, affects the intermediate fertility variables by reducing lactation and increasing contraception; the same cannot be said about Lesotho despite lower observed total fertility among educated women and those residing in the lowlands region and urban centres. The best educated and urban women are protected from childbearing by post-partum amenorrhoea and abstinence for as long as lesser educated and rural women. Noticeable differentials appear only in the effect of marriage patterns, with the former groups averting more births through delayed marriage and marital dissolutions.

6 Conclusions and Implications

We have seen that the combined post-partum amenorrhoea and abstinence is the major single factor in restraining fertility in Lesotho. The additional impact of abstinence beyond amenorrhoea is of paramount significance in this respect. We have also seen that the regular and often lengthy absences from the country at any one time of young adult males for labour in the Republic of South Africa contributes towards the maintenance of periods of abstinence and the lengthening of inter-pregnancy intervals. If a major change in socio-economic and political conditions in Lesotho were followed by a substantial drop in the labour migration, there might very well be an increase in fertility if the possible weakening of practices of abstinence were not accompanied by greater use of contraception. However, the substantive point to emerge from this analysis is that while in some other countries such as Kenya, Ghana and the Philippines, modernization (as measured by education and urbanization) is having a significant impact on the intermediate fertility variables by reducing lactation and increasing contraception, the same is not yet true for Lesotho.

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Appendix Tables

Table A1 Percentage reported ages at last birth, by current age

Current age	N	Percentage reported ages at last birth														
		12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
45	72	0.0	1.4	0.0	1.4	0.0	0.0	2.8	0.0	1.4	1.4	2.8	0.0	1.4	5.6	1.4
		(0.0)[a]	(1.3)	(0.0)	(1.3)	(0.0)	(0.0)	(2.6)	(0.0)	(1.3)	(0.3)	(2.6)	(0.0)	(1.3)	(5.2)	(1.3)
46	46	0.0	0.0	0.0	0.0	2.2	2.2	2.2	0.0	6.5	2.2	2.2	4.3	0.0	4.3	0.0
		(0.0)	(0.0)	(0.0)	(0.0)	(2.1)	(2.1)	(2.1)	(0.0)	(6.1)	(2.1)	(2.1)	(4.0)	(0.0)	(4.0)	(0.0)
47	68	0.0	0.0	1.5	0.0	1.5	0.0	1.5	1.5	2.9	7.4	1.5	0.0	4.4	1.5	1.5
		(0.0)	(0.0)	(1.4)	(0.0)	(1.4)	(0.0)	(1.4)	(1.4)	(2.8)	(7.1)	(1.4)	(0.0)	(4.2)	(1.4)	(1.4)
48	61	0.0	0.0	0.0	0.0	0.0	0.0	1.6	3.3	0.0	0.0	4.9	1.6	1.6	1.6	3.3
		(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(1.6)	(3.2)	(0.0)	(0.0)	(4.8)	(1.6)	(1.6)	(1.6)	(3.2)
49	46	2.2	0.0	2.2	0.0	2.2	0.0	2.2	2.2	0.0	0.0	0.0	2.2	6.5	2.2	0.0
		(2.2)	(0.0)	(2.2)	(0.0)	(2.2)	(0.0)	(2.2)	(2.2)	(0.0)	(0.0)	(0.0)	(2.2)	(6.4)	(2.2)	(0.0)
45–49	293	0.3	0.3	0.7	0.3	1.0	0.3	2.0	1.4	2.0	2.4	2.4	1.4	2.7	3.1	1.4
		(0.3)	(0.3)	(0.7)	(0.3)	(1.0)	(0.3)	(1.9)	(1.3)	(1.9)	(2.3)	(2.3)	(1.3)	(2.6)	(3.0)	(1.3)

Current age	N	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
45	72	1.4	1.4	0.0	5.6	0.0	2.8	1.4	5.6	0.0	11.1	5.6	1.4	6.9	9.7	5.6
		(1.3)	(1.3)	(0.0)	(5.2)	(0.0)	(2.6)	(1.3)	(5.2)	(0.0)	(10.4)	(5.2)	(1.3)	(6.4)	(9.1)	(5.2)
46	46	2.2	2.2	0.0	0.0	2.2	2.2	0.0	0.0	6.5	4.3	6.5	4.3	4.3	8.7	4.3
		(2.1)	(2.1)	(0.0)	(0.0)	(2.1)	(2.1)	(0.0)	(0.0)	(6.1)	(4.0)	(6.1)	(4.0)	(4.0)	(8.1)	(4.0)
47	68	5.9	5.9	1.5	0.0	0.0	1.5	1.5	0.0	2.9	4.4	2.9	4.4	1.5	5.9	5.9
		(5.7)	(5.7)	(1.4)	(0.0)	(0.0)	(1.4)	(1.4)	(0.0)	(2.8)	(4.2)	(2.8)	(4.2)	(1.4)	(5.7)	(5.7)
48	61	4.9	3.3	1.6	4.9	0.0	1.6	4.9	0.0	6.6	6.6	1.6	6.6	3.3	4.9	11.5
		(4.8)	(3.2)	(1.6)	(4.8)	(0.0)	(1.6)	(4.8)	(0.0)	(6.5)	(6.5)	(1.6)	(6.5)	(3.2)	(4.8)	(11.4)
49	46	2.2	2.2	0.0	0.0	4.3	0.0	2.2	13.0	2.2	2.2	8.7	4.3	4.3	8.7	6.5
		(2.2)	(2.2)	(0.0)	(0.0)	(4.2)	(0.0)	(2.2)	(12.7)	(2.2)	(2.2)	(8.5)	(4.2)	(4.2)	(8.5)	(6.9)
45–49	293	3.4	3.1	0.7	2.7	1.0	1.7	2.0	3.4	3.4	6.1	4.8	4.1	4.1	7.5	6.8
		(3.3)	(3.0)	(0.6)	(2.3)	(1.0)	(1.5)	(2.0)	(3.3)	(3.3)	(5.9)	(4.6)	(3.9)	(3.9)	(7.2)	(6.5)

Current age	N	42	43	44	45	46	47	48	49	Check[c]
45	72	5.6	4.2	5.6	1.4	–[b]	–	–	–	Σ=100.4%
		(5.2)	(5.2)	(3.9)	(5.2)	(1.3)	(2.7)	(2.2)	(2.2)	
46	46	8.7	2.2	6.5	8.7	–	–	–	–	Σ= 99.9%
		(8.1)	(2.0)	(6.1)	(8.1)	(1.1)	(2.7)	(2.2)	(2.2)	
47	68	7.4	10.3	4.4	5.9	–	2.9	–	–	Σ=100.3%
		(7.1)	(9.9)	(4.2)	(5.2)	(1.6)	(2.7)	(2.2)	(2.2)	
48	61	3.3	4.9	6.6	0.0	1.6	1.6	1.6	–	Σ= 99.9%
		(3.2)	(4.8)	(6.5)	(0.0)	(1.6)	(1.6)	(1.6)	(2.2)	
49	46	4.3	2.2	2.2	0.0	2.2	4.3	2.2	–	Σ=100.1%
		(4.2)	(2.2)	(2.2)	(0.0)	(2.2)	(4.2)	(2.2)	(2.2)	
45–49	293	5.8	5.5	4.8	4.1	1.0	1.7	–	–	Σ= 99.8%
		(5.5)	(5.3)	(4.6)	(3.9)	(1.5)	(2.7)	(2.2)	(2.2)	

[a]Percentages given in the second rows (in parentheses) are adjusted percentages.
[b]Dash means no experience yet.
[c]Column check on the adjustment calculation. Percentages for a given cohort should sum up to 100 per cent.

Table A2 Age at last birth, women currently aged 45–49: recorded percentage distribution by age at most recent birth and estimated percentage distribution by age at last birth

Age(x)	Recorded percentage with most recent birth at age x	Estimated percentage with last (=final) birth at age x (adjusted)	Age(x)	Recorded percentage with most recent birth at age x	Estimated percentage with last (=final) birth at age x (adjusted)
12	0.3	0.3	31	1.0	1.0
13	0.3	0.3	32	1.7	1.6
14	0.7	0.7	33	2.0	2.0
15	0.3	0.3	34	3.4	3.3
16	1.0	1.0	35	3.4	3.3
17	0.3	0.3	36	6.1	5.8
18	2.0	1.9	37	4.8	5.8
19	1.4	1.3	38	4.1	3.9
20	2.0	1.9	39	4.1	3.9
21	2.4	2.3	40	7.5	7.2
22	2.4	2.3	41	6.8	6.5
23	1.4	1.3	42	5.8	5.5
24	2.7	2.6	43	5.5	5.2
25	3.1	3.0	44	4.8	4.6
26	1.4	1.3	45	4.1	3.9
27	3.4	3.3	46	1.0	1.5
28	3.1	3.0	47	1.7	2.7
29	0.7	0.7	48	0.7	2.2
30	2.4	2.3	49	2.2	2.2

Table A3 Proportion still fecund and mean age at self-reported infecundity (non-menopausal) for all ever-married women and for selected subgroups

Subgroups	Current age							Mean years[a]	N
	15–19	20–24	25–29	30–34	35–39	40–44	45–49		
Regions									
Lowlands	0.986	0.968	0.927	0.879	0.843	0.600	0.321	42.5	1073
Foothills	1.000	0.987	0.963	0.920	0.845	0.756	0.357	44.1	640
ORV[b]	0.976	0.990	0.924	0.926	0.840	0.560	0.467	43.4	344
Mountains	1.000	0.947	0.944	0.977	0.868	0.742	0.567	45.2	476
Education									
0–4 years	0.990	0.982	0.933	0.936	0.852	0.643	0.452	43.9	819
5–6 years	0.980	0.959	0.944	0.919	0.830	0.685	0.304	43.1	1161
7+ years	0.992	0.781	0.946	0.881	0.881	0.617	0.500	43.0	731
Type of area									
Rural	0.985	0.972	0.938	0.916	0.844	0.651	0.392	43.5	2505
Urban	1.000	0.980	0.979	0.903	0.905	0.677	0.357	44.0	194

[a]Assuming that all have acquired the characteristic by age 50.
[b]Orange River Valley.

Table A4 Proportion not yet menopausal and mean age at becoming menopausal for all ever-married women and for selected subgroups

Subgroups	Current age							Mean years[a]	N
	15–19	20–24	25–29	30–34	35–39	40–44	45–49		
Regions									
Lowlands	1.000	1.000	1.000	0.989	0.982	0.934	0.780	49.6	1255
Foothills	1.000	1.000	1.000	1.000	0.990	0.965	0.714	49.4	712
ORV[b]	1.000	1.000	1.000	1.000	0.990	0.965	0.714	50.2	712
Mountains	1.000	1.000	1.000	1.000	1.000	0.940	0.839	50.3	396
Education									
0–4 years	1.000	1.000	1.000	1.000	0.978	0.923	0.791	49.6	952
5–6 years	1.000	1.000	1.000	0.996	0.989	0.976	0.976	50.0	1325
7+ years	1.000	1.000	1.000	0.990	0.985	0.951	0.750	49.5	795
Type of area									
Rural	1.000	1.000	1.000	0.995	0.986	0.946	0.783	49.7	2843
Urban	1.000	1.000	1.000	1.000	1.000	0.935	0.857	50.2	217

[a]Assuming that all have acquired the characteristic by age 55 and assuming that those who acquire it after age 50 do so on average at age 52.5.

$X = \alpha + \sum_{X=\alpha}^{\beta} N \cdot nLx + l_{52.5} x\, e_{52.5}$ where $X = 15, \beta = 49$

[b]Orange River Valley.

Table A5 Proportion with a birth in the last five years (married throughout the five years) and mean age at last (final) birth for all ever-married women and for selected subgroups

Subgroups	Current age							Mean years[a]	N
	15–19	20–24	25–29	30–34	35–39	40–44	45–49		
Regions									
Lowlands	1.000	0.943	0.897	0.757	0.700	0.529	0.308	41.9	405
Foothills	1.000	0.957	0.910	0.782	0.667	0.660	0.450	42.8	264
ORV[b]	1.000	0.968	0.896	0.892	0.800	0.542	0.250	42.1	152
Mountains	1.000	0.951	0.955	0.762	0.595	0.684	0.500	43.0	212
Education									
0–4 years	1.000	0.971	0.921	0.807	0.659	0.590	0.405	42.4	365
5–6 years	1.000	0.947	0.909	0.768	0.709	0.600	0.462	42.7	501
7+ years	1.000	0.947	0.898	0.786	0.714	0.586	0.091	40.2	207
Type of area									
Rural	1.000	0.952	0.917	0.788	0.683	0.599	0.391	42.3	1002
Urban	1.000	1.000	0.815	0.667	0.667	0.529	0.200	39.7	64

[a]Assuming that all have acquired the characteristic by age 55 and assuming that those who acquire it after age 50 do so on average at age 51.
[b]Orange River Valley.

Table A6 Proportion not having the combined effects of stopping attributes, and mean age at acquiring the characteristics for all ever-married women and selected subgroups

Subgroups	Current age							Mean years[a]	N
	15–19	20–24	25–29	30–34	35–39	40–44	45–49		
Regions									
Lowlands	0.968	0.951	0.870	0.707	0.643	0.368	0.093	38.0	1289
Foothills	1.000	0.974	0.904	0.768	0.612	0.506	0.161	39.6	732
ORV[b]	0.976	0.969	0.861	0.852	0.686	0.340	0.167	39.3	403
Mountains	1.000	0.930	0.908	0.807	0.600	0.548	0.300	40.5	531
Education									
0–4 years	0.990	0.970	0.882	0.786	0.616	0.424	0.188	39.3	986
5–6 years	0.980	0.942	0.885	0.756	0.639	0.445	0.147	39.0	1355
7+ years	0.992	0.966	0.892	0.740	0.671	0.387	0.080	38.6	810
Type of area									
Rural	0.985	0.955	0.887	0.764	0.638	0.430	0.163	39.1	2913
Urban	1.000	0.980	0.875	0.688	0.609	0.375	0.067	38.0	225

[a]Assuming that all have acquired the characteristic by age 50.
[b]Orange River Valley.