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Evaluation of the Lesotho Fertility Survey 1977

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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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Preface

One of the major objectives of the World Fertility Survey programme is to assist the participating countries in obtaining high quality data through national fertility surveys. The high standards set by the WFS are expected to yield better quality data than typically obtained in the past, but this expectation in no way obviates the need for a detailed assessment of the quality of the data. It is recognized that such an evaluation will not only alert the analysts by identifying defects, if any, in the data, but also throw light on the shortcomings of the WFS approach, which can be taken into account in the design of future fertility surveys.

It is in this context that, as part of its analysis policy, the WFS is conducting a systematic programme for a scientific assessment of the quality of the data from each survey. A series of data evaluation workshops is being organized at the WFS London headquarters with the dual objective of expediting this part of the work and of providing training in techniques of analysis to researchers from the participating countries. Working in close collaboration with WFS staff and consultants, participants from four or five countries evaluate the data from their respective surveys after receiving formal training in the relevant demographic and data processing techniques.

The fourth such workshop, involving research on four countries – Lesotho, Syria, Trinidad and Tobago and Turkey – was held between October and December in 1981. The present document reports on the results of the evaluation of the data of the Lesotho Fertility Survey of 1977 and was prepared by K. Balasubramanian, at that time on the WFS staff, who participated on behalf of Lesotho, in collaboration with Ian Timæus. Ibrahim Ali, Desmond Hunte and Sunday Üner, the other participants, contributed to the present evaluation through their ideas and discussions.

Dr Shea Oscar Rutstein, as the co-ordinator of the workshop, assumed a major responsibility in the successful completion of the work, while many other staff members also made significant contributions to it. Andrew Westlake and Maryse Hodgson provided much valuable assistance.

HALVOR GILLE
Project Director

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The authors would like to thank the Bureau of Statistics in Maseru for providing them with otherwise unavailable tables from the 1976 census. Shea Rutstein produced most of the tabulations and was a source of valuable advice throughout the work. The first draft of this report was read by Allan Hill and Colin Newell at the Centre for Population Studies and by John Cleland and Shea Rutstein of the WFS Central Staff. It has benefited greatly from their comments.

1 Introduction

The Lesotho Fertility Survey (LFS) was conducted by the Bureau of Statistics of the Government of Lesotho as part of the World Fertility Survey programme undertaken by the International Statistical Institute. The survey had the following main objectives: to collect demographic data that would provide the Lesotho Family Planning Association and the Ministry of Health with background information needed for planning their services; to update and increase knowledge of levels and patterns of fertility in the country; and to measure the influence of such factors as male labour migration, contraception, breast-feeding and post-partum sexual abstinence on fertility levels in the population. In addition the methodological procedures developed in the course of the LFS were expected to serve as a model for future demographic research undertaken by the Government of Lesotho.

Fieldwork for the LFS was carried out between April and December 1977 and the First Country Report containing substantive results of the survey was published by the Bureau of Statistics in 1981. The findings presented in this report were based on simple and straightforward analysis of contingency tables. For the most part it took the data at face value without evaluation of their quality. As such evaluation would be a lengthy process, it was decided that a detailed assessment of the quality of the LFS data should be undertaken separately after the publication of the First Country Report.

In this report an attempt is made to clarify the nature and extent of reporting errors in the LFS data. Such a study is important because experience of other retrospective surveys in developing countries has shown that the information collected may be subject to major reporting errors that bias demographic estimates. Such errors include the misreporting of age and the omission or misdating of vital events.

This chapter contains a brief account of the characteristics of Lesotho's population and of the 1977 Fertility Survey. It is followed by a short discussion of the various types of error often present in demographic survey data. Chapter 2 is concerned with coverage errors and non-response in the survey. A detailed assessment of the information collected upon age, nuptiality, fertility and mortality is presented in chapters 3–6. Chapter 7 brings together the findings and conclusions and presents an overview of the quality of the LFS.

1.1 COUNTRY BACKGROUND

The Kingdom of Lesotho is an independent country in southern Africa. It has the unusual distinction of being completely surrounded by another country, the Republic of South Africa. Lesotho lies between the southern latitudes 28° and 31° and eastern longitudes 27° and 30°. It covers an area of 30 355 km^2, and is one of the few countries in the world with all its land situated more than 1 500 m above sea level. Because of its altitude and because it lies outside the tropics, the country is free of the tropical diseases prevalent elsewhere in Africa. On the basis of geographical and ecological characteristics, Lesotho can be divided into four regions, namely the Lowlands, the Foothills, the Orange River Valley and the Mountains.

Lesotho has been declared by the United Nations to be one of the least developed countries. It has a *per capita* gross domestic product of US$250 (1978–9 estimate). Agriculture employs about four-fifths of the resident labour force and accounts for about a half of the gross domestic product. The economic structure of the country is characterized by the fact that a sizeable proportion of the male labour force is employed in South Africa. Such employment is usually of a temporary and migratory nature. According to the 1976 census, about 35 per cent of Lesotho's male labour force (those aged between 15 and 64 years) were employed outside Lesotho and only 17 per cent were in paid employment in the country. This pattern of migratory work, although essential for the economy, has grave consequences for family life (Murray 1981) as well as political implications for the country as a whole.

According to the 1976 census, the population of Lesotho was about 1.2 million and growing at around 2.2 per cent per annum. Apart from a few hundred Europeans and Asians, the population is entirely of African origin. Followers of major Christian denominations – Roman Catholic, Lesotho Evangelical Church and Anglican – together constitute about four-fifths of the population. The rest of the population consists of adherents to other sects or religions and includes a small Muslim community located mainly in the north of the country.

The level of fertility in Lesotho is high but moderate by African standards; the crude birth rate has been estimated to be around 40 per 1000 population and the crude death rate to be around 18 per 1000 population. The expectation of life at birth is estimated to be nearly 50 years. About 40 per cent of the population is under 15 years of age and 4 per cent older than 65.

Lesotho is noted for having the most literate population in southern Africa. According to the 1976 census, 63 per cent of the *de jure* male population aged ten years and over have had some schooling. The corresponding figure for the female population is even higher, 84 per cent. The level of urbanization is very low: only 10 per cent of the population live in officially designated urban areas.

1.2 CHARACTERISTICS OF THE LFS

Fieldwork for the LFS was carried out in three separate phases. Phase 1 consisted of a large-scale household survey

conducted by male enumerators. Phase 2, about three months later, was a smaller scale but more detailed survey of ever-married women aged 15–49 and was conducted by female interviewers. Phase 3 involved re-interviewing a subsample of women in order to examine response reliability. In this report we are not concerned with the data obtained in phase 3 of the survey which is to be reported on as part of the response errors project initiated by O'Muircheartaigh and Marckwardt (1981).

The household schedule used in phase 1 of the survey obtained information on household members on both a *de jure* and *de facto* basis. Data on numbers of children ever born and surviving, and particulars of the most recent birth, were obtained from all women of 15 or more years of age irrespective of their marital status. In addition, data were collected on the survivorship of the parents of all respondents aged 15 or more, on the survivorship of the first spouse of everyone married more than once and on deaths of members of the household occurring in the two years preceding the date of survey. The sample design for the household survey was based on the complete enumeration of 100 of the 1066 enumeration areas selected with probability proportional to size. Of the total of 19 162 household units identified in selected enumeration areas, 865 were found to be vacant or unoccupied. The deletion of these from the sample left an effective sample size of 18 297 households.

A short version of the household schedule was also administered during phase 2 as a means of identifying eligible respondents in the selected households. A self-weighting subsample of 5548 households that had been successfully enumerated in phase 1 was drawn for the phase 2 household screening. All eligible women contacted in these households were interviewed in the individual survey. This resulted in a sample of 3603 women. The individual questionnaire was based on the WFS core questionnaire but adapted to suit the local culture and conditions. The questionnaire included the WFS modules on factors other than contraception affecting fertility and some additional questions on sources and availability of contraception. It had the following seven sections:

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

Detailed descriptions of the contents of both household and individual questionnaires are contained in the First Country Report. This report concerns itself with both the data obtained in sections 1, 2 and 3 of the individual questionnaire administered in phase 2 and the data obtained in the household survey.

1.3 TYPES OF ERROR[1]

As noted previously, data collected from retrospective fertility surveys may be affected by various types of error which may bias demographic measures. These errors arise from various sources including faults in the design of the questionnaire, lack of knowledge among the respondents, misinterpretation of the questionnaire, memory lapse and poor interaction between respondent and interviewer. For the present analysis we focus on the following three types of errors: misreporting of age of the respondent, omission of vital events and displacement of dates of vital events.

Misreporting of age of respondents

Respondents may misreport their ages as a result of preferences for ages ending in certain terminal digits at the expense of others. For example, in both the Nepal and Dominican Republic fertility surveys, respondents showed preferences for ages divisible by five and two (Goldman, Coale and Weinstein 1979; Guzmán 1980). More significantly, errors in reporting current age may also arise from the tendency of respondents to declare themselves younger or older than their true ages (ie age transference). In Latin America, Mortara (1964) has shown that women tend to report themselves younger than their true ages. In other societies, older people have a tendency to exaggerate their ages. These errors may produce distorted estimates of the demographic parameters. For example, if age misreporting is selective of women with certain characteristics (eg high parity women, married women, etc) it can produce significant distortions in the fertility estimates (see, for example, Guzmán 1980).

Omission of vital events

A common error in the surveys is failure to report births, infant deaths and first marriages. Frequently, older women omit births and infant deaths which occurred in the more remote past because of memory lapse or of misinterpretation of the questionnaire. Since omission errors are generally more prevalent in the remote past they may produce a false impression of levels and trends in fertility, mortality and nuptiality. For example, omissions of first marriages would result in the recording of a later union as the first union and thereby produce an upward bias in the estimated age at first marriage.

Displacement of vital events

A third major error observed in fertility surveys arises from misplacement of the time of occurrence of past vital events (Brass 1978 and 1981, Potter 1977). Potter (1977) has shown that in maternity histories, displacement of births

[1] This section is reproduced from Balkaran (1982).

in the remote past may result in a concentration of births in periods closer to the survey date and thereby create an artificial impression of a rise in fertility and of a subsequent decline. Analyses of fertility data from a number of WFS surveys have shown evidence of displacement of dates of births towards the survey date, mostly among the oldest cohorts (Chidambaram, Cleland, Goldman and Rutstein 1980). The trend and age patterns of infant mortality and nuptiality can also be distorted by event displacement.

These three major response errors are inter-related and the effects of one type may be indistinguishable from those of another. Errors of omission and event displacement may distort the estimates in a similar manner, eg omission of early births and displacement of dates of early births towards the survey date may each create a false impression of a rise in fertility in the past. In addition, respondents who exhibit one type of reporting error may be more likely to exhibit other types of errors (see, for example, Goldman *et al* 1979 for results of the Nepal Fertility Survey). In the following chapters, errors of omission and displacement will be assessed within the following demographic subjects: nuptiality, fertility and mortality.

2 Non-Coverage and Non-Response

In any survey, enumeration of the selected sample is unlikely to be complete. It usually proves impossible to locate or contact some households or individuals and others who are contacted may refuse to participate in the survey. The extent of these problems is known to be affected greatly by the quality of the fieldwork procedures and interviewers used in the survey. In particular, interviewers may avoid contacting a proportion of those who might have participated willingly in the survey in order to reduce their workload. Moreover, when characteristics of the respondents that are identified during fieldwork are used to determine their eligibility for further questioning, this may result in misclassification of some respondents in such a way that they are excluded wrongly from the sample upon which more detailed information is being collected.

Another problem is that respondents who do participate in a survey may not supply complete information. Some of them will be unable or unwilling to answer certain questions. Again the extent to which this occurs will depend in part upon the skill, persistence and tact of the interviewers.

If non-respondents are similar in their characteristics to those who supply information, the only major effect of non-response will be to increase the sampling errors of the estimates. Although the characteristics of those who have not answered the questions can only be indirectly estimated, there is good reason to believe that this will seldom be so. Rather, non-response tends to be concentrated among subgroups of the population and thus to a greater or lesser degree it will bias the estimates obtained from any survey.

In this chapter the extent of non-response in the two phases of the LFS is documented and an attempt is made to gauge its effect.

2.1 THE HOUSEHOLD SURVEY (PHASE 1)

In the household survey 18 297 occupied household units were identified in the selected enumeration areas. Only 53 of these were not enumerated successfully. Thus the response rate in this phase of the survey was very high with 99.7 per cent of households being covered.

With the apparent exceptions of the questions on fertility and mortality, which are discussed in detail in other chapters, response rates were also very high for the individual questions. Of the 84 843 individuals in the *de jure* population, sex is known for all but 0.01 per cent, an age was supplied for all but 2.35 per cent and marital status is known for all but 0.10 per cent of those aged 15 or more.

2.2 THE HOUSEHOLD SCREENING AND INDIVIDUAL SURVEY (PHASE 2)

In the second phase of the survey coverage errors and non-response represent a more serious problem. The subsample of 5548 households selected for screening in phase 2 was expected to yield a sample of about 5000 women eligible for interview in the individual survey. In fact only 3603 women were successfully interviewed. The final sample size was therefore only 72 per cent of what had been hoped for. The following discussion attempts to explain why this was so.

The first reason is that an unexpectedly high proportion of the dwellings included in the screening could not be located, were found to be unoccupied or could not be enumerated. In all 11.9 per cent of household units fell into these groups; most notably 8.8 per cent of dwellings were found to be vacant. In part this might reflect the mobility of Lesotho's population. However, this seems unlikely to be the whole explanation. In the household survey only 4.6 per cent of all household units were found to be unoccupied. While this proportion could well be an underestimate, it is far lower than that found in phase 2. Moreover the latter sample included only households enumerated successfully in the household survey a few months earlier. This suggests that interviewers were not sufficiently assiduous in their efforts to contact respondents and that on occasions they may have deliberately avoided enumerating some households.

The second reason for the shortfall in the individual survey sample is that an unexpectedly low number of eligible women were enumerated in those households contacted in phase 2. On the basis of the 1966 census results it had been anticipated that on average about 90 eligible women would be contacted per 100 households. In fact only 3684 eligible women were identified in the 4887 households finally enumerated in phase 2, an average of 75 per 100 households. The household survey also suggests that the estimate of the number of eligible women per household obtained from the earlier census was too high. In phase 1 an average of 84 women per 100 households satisfied the criteria of eligibility for the individual survey. Nevertheless this figure remains higher than that obtained in phase 2 of the LFS and the latter therefore needs to be examined further.

To be eligible for inclusion in the individual survey a woman had to have slept in the household the previous night, to be aged between 15 and 49 and to be currently or formerly married. Comparison of the samples of women obtained in phases 1 and 2 in terms of these characteristics can shed light on the nature of any coverage errors in the individual survey. When making such comparisons it should be remembered that results from both surveys are subject to sampling errors and that there is no guarantee of the accuracy of reporting in phase 1.

In the phase 1 household survey the *de facto* female population was almost as large as the *de jure* population. In contrast, in phase 2 the *de facto* female population enumerated during the household screening was only about

92 per cent of the size of the *de jure* population. This is partly because a relatively higher proportion of the *de jure* female population were enumerated as absentees in phase 2. More importantly in phase 2 visitors made up only 2.2 per cent of the *de facto* female population as opposed to 7.0 per cent of it in the phase 1 household survey. Moreover this discrepancy between the results of the two enumerations applies as much or more to the age range eligible for the individual survey as to other age groups. In the phase 1 households survey 7.6 per cent of the *de facto* female population aged 15–49 were visitors, in phase 2 only 2.7 per cent. Furthermore in phase 1 10.0 per cent of the *de jure* female population aged 15–49 were enumerated as absentees and in the phase 2 household screening 12.9 per cent. It is possible that there was an undercount of absentee women in phase 1 but it is highly unlikely that too many visitors were enumerated. While visits to relatives and friends might be avoided in the winter months during which phase 2 of the LFS was conducted, it appears probable that interviewers tended to avoid interviewing visitors to the households included in the sample.

The second criterion of eligibility for the individual survey was the age of the woman. In phase 2 of the LFS only 41.6 per cent of the *de facto* female population were enumerated as aged 15–49 as opposed to 44.0 per cent in phase 1. The quality of the age data will be examined in greater detail in chapter 3. However the distribution by five-year age groups of the female population, shown in table 5, suggests that while the shortfall in phase 2 affects all age groups between 15 and 49, it is particularly large in the 45–49 year old age group.

The third criterion of eligibility was that only ever-married women were interviewed in the individual survey. The proportion of ever-married women in the *de facto* population aged 15–49 is very similar in the two phases of the survey. The figures are broken down by five-year age groups in table 7. They do not suggest that nuptiality was under-reported in phase 2.

The final reason for the shortfall in the size of the individual survey sample is that only 97.8 per cent of the 3684 eligible women identified during the household screening were actually interviewed. Only in six cases was this because the respondent refused to participate in the survey. However, 62 of the women were not at home and were never successfully contacted by an interviewer.

Using the results of the household survey as a yardstick, the relative contributions of the various factors discussed above to the shortfall in the size of the individual survey sample can be assessed. The first problem lies in the design of the survey. The assumption that on average 90 eligible women would be contacted per 100 households, rather than the figure of 84 found during the household survey, accounts for 24 per cent of the shortfall. However, coverage errors are the most important factor. Failure to enumerate households during screening for the individual survey explains 40 per cent of the deficit in the size of the sample. The undercount of visitors in households that were enumerated is responsible for another 15 per cent of the shortfall. Misreporting of age, leading to undercoverage of older women, accounts for a further 15 per cent. Finally failure to interview eligible women identified during screening resulted in the other 6 per cent of the overall deficit in the individual survey sample.

Comparison of the background characteristics of the

Table 1 Per cent distribution of ever-married women aged 15–49 according to background characteristics, by age group in the household (HH) and individual (I) surveys

A Education

Age	No schooling		Lower primary		Upper primary		Secondary +	
	HH	I	HH	I	HH	I	HH	I
15–19	7.4	5.7	40.3	36.7	46.4	51.1	5.9	6.5
20–24	6.0	5.3	36.5	34.7	48.1	49.6	9.3	10.5
25–29	6.1	5.7	40.3	42.7	44.8	45.6	8.8	6.1
30–34	9.7	7.6	42.6	42.2	40.7	44.8	7.0	5.3
35–39	10.4	6.7	46.2	50.5	38.8	37.0	4.7	5.7
40–44	18.8	16.1	49.1	51.6	28.7	30.2	3.4	2.1
45–49	19.4	9.8	52.2	59.6	25.7	29.6	2.6	1.0
15–49	10.4	7.8	43.0	43.9	40.1	42.4	6.5	5.9

B Region

Age	Lowlands		Foothills		Orange R. Valley		Mountains	
	HH	I	HH	I	HH	I	HH	I
15–19	39.2	38.5	25.0	29.1	15.0	13.4	20.8	19.0
20–24	45.0	43.4	21.9	23.8	14.4	14.9	18.8	19.0
25–29	45.7	43.2	21.9	23.7	13.6	13.6	18.8	19.4
30–34	45.3	43.1	21.7	24.4	13.4	12.6	19.5	19.9
35–39	45.3	43.4	24.8	25.8	12.6	12.7	17.3	18.1
40–44	42.0	46.0	22.6	21.9	14.4	13.7	21.0	18.3
45–49	44.8	40.7	21.3	26.8	13.2	14.8	20.7	17.7
15–49	44.2	43.0	22.6	24.6	13.8	13.7	19.4	18.7

women who were interviewed in the individual survey with those of the equivalent group of women enumerated in the household survey can indicate the degree of bias introduced into the individual survey by selectivity in the omission of some of the potential respondents eligible for interview. There are two characteristics of interest for which data are available from the household survey – education and region of residence. The distributions of the two samples by these characteristics are shown in table 1. Sampling errors make it unwise to take much account of moderate discrepancies within individual cells. Nevertheless at least one difference between the educational characteristics of the two samples stands out. In every age group a smaller proportion of the women included in the individual survey report that they have received no formal education. Overall only 7.8 per cent of the individual sample fall into this category as opposed to 10.4 per cent of the equivalent group of women enumerated in the phase 1 household survey. One explanation could be that women exaggerated their level of education in the individual survey. However, the discrepancy between the two phases of the survey is greatest among women aged 45–49. Nearly 20 per cent of the women of these ages in the household survey, but under 10 per cent of those in the individual survey, were reported to have no formal schooling. This age group, we have already suggested, is under-represented relatively severely in the individual survey. It therefore seems likely that the educational distribution of the individual sample is biased and that this is because of coverage rather than reporting errors. That is to say that we believe that those potential respondents omitted from the individual survey for various reasons were disproportionately drawn from the least educated sections of the population. In contrast there is no clear evidence of differential undercoverage by region in the individual survey. There is quite a large difference between the two phases in the regional distribution of the oldest age group. But as the individual survey included only 294 such women this could well result from sampling errors.

Not all the 3603 women eventually interviewed in the individual survey supplied complete information. When vital events such as the birth and marriages of the respondent and the births of her children could not be dated exactly, the dates were imputed during computer edits on the basis of responses to related questions. Table 2 documents the amount of imputation that was needed to complete the marriage and birth histories. Almost all women supplied information on the year of their own birth. However, 28 per cent needed to have the month of their birth imputed. The women were much more aware of the month of birth of their children. Of the total births, numbering 11 316, complete reporting of year and month of birth was achieved for 89 per cent of cases. The level of completeness of date reporting was particularly high for first, last and penultimate births. Nine out of every ten women could supply both a year and a month for the beginning of their first marriage and of their current marriage. This level of completeness of date reporting may be considered high by African standards. However, this does not necessarily guarantee that the data are accurate.

Table 2 Percentage of cases supplying month and year, and year only, for dates of vital events

Vital event	Type of data supplied			Number of cases
	Month and year	Year only	Other[a]	
Respondent's birth	72.2	27.4	0.4	3 603
Beginning of first marriage	88.1	4.6	7.3	3 603
Beginning of current marriage	89.0	4.2	6.8	3 153
Beginning of all marriages	87.8	4.8	7.4	3 712
End of all marriages	81.8	9.5	8.7	559
First birth	91.2	2.4	6.4	3 136
Next to last birth	90.0	3.3	6.7	2 473
Last birth	92.8	2.4	4.8	3 136
All births	88.9	3.6	7.5	11 316

[a]When no calendar information was supplied, dates were imputed using information on the age or number of years ago at which the event occurred.

The age at death of respondents' dead children is one category of demographic events to which values were not imputed if the respondent failed to supply the information. The data are unavailable for 6.2 per cent of all children that had died by the time of the survey. Similarly when women interviewed in the individual survey failed to supply information on their background characteristics these were not imputed to them. The level of response to these questions was very high. The questions on education, literacy, religion, type of place of residence and residence in childhood were all answered by over 99 per cent of the women. One important exception is region of residence. Information on this is not available for women whose usual residence was somewhere other than where they were interviewed. This group comprises 6.0 per cent of the total sample.

3 Age Reporting

This chapter examines the quality of age reporting in the Lesotho Fertility Survey. Both the household and the individual surveys are discussed. Estimates of the age structure of Lesotho's population can be obtained from the household survey conducted in phase 1, which is also an important source of other demographic estimates, in particular of mortality. The usefulness of these will be diminished if age reporting is poor. Because migration abroad is very common but is usually short-term, attention is focused upon the *de jure* population. The individual survey in phase 2 collected detailed information on fertility and many related topics. While it yields age data for only part of the population, evaluation of their quality remains important because biased reporting of age will distort other demographic estimates. As the individual data were collected by interviewing each member of the sample personally, they pertain to the *de facto* population.

3.1 THE HOUSEHOLD SURVEY

Single-year age distributions of male and female household members are shown in figure 1. The data were collected by means of a question on age in completed years. The distributions exhibit the irregular pattern that results from preferences for reporting certain ages when knowledge of exact age in a population is poor. Males and females follow very similar patterns of age heaping. Both sexes tend to report round ages, that is those ending in the digit zero and, to a lesser extent, the digits five and two. This pattern is found in most developing countries. In contrast there is little heaping on ages ending in the digit eight, although it is also a common pattern. This is probably because the survey was held in 1977. There is some heaping on ages ending in the digit seven that suggests a tendency to estimate age from rounded dates of birth and obscures any underlying eight preference. Broadly the degree of age heaping increases with age. In particular it seems more severe above age 30 than at younger ages.

There are a number of major exceptions to the general pattern of digital preference just described. Most notably there is marked heaping on ages 12, 32, 44, 59 and 63 in both the male and female data. This can be attributed to the use of calendars of historical events for the estimation of ages during enumeration. Even when knowledge of exact ages is poor, people often associate their own or their family's birth dates with some specific historical event. In the LFS, interviewers were given intensive training in the use of event calendars for obtaining the most accurate age data possible. While it will have improved the estimation of age, this approach has resulted in heaping on ages calculated from the dates of particularly clearly remembered events. For example, people reported to be 12 years old have their births associated with the general elections for independence in 1965. Similarly the births of those reported to be 32 are associated with the return of the Second World War veterans or the opening of the university college in 1945; the births of those aged 44 are associated with the 'Black Dust storms' and famine of 1933; the births of those aged 59 are associated with the flu epidemic ('Mokkallane') of 1918 and the births of those aged 63 with the beginning of the First World War. Event calendars were also used to

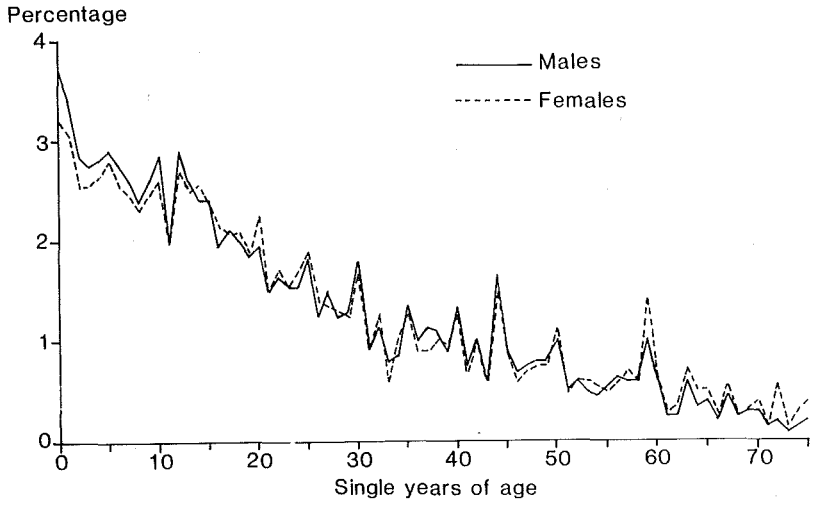

Figure 1 Per cent distribution of the *de jure* male and female population enumerated in the household survey, by single years of age

Table 3 Myers' index of digital preference for the total population by sex (censuses and survey) and for subgroups of the population

A Total population (ages 10–79)

Source of data	*De jure*		*De facto*	
	Male	Female	Male	Female
1966 census	13.4	15.2	13.1	15.0
1976 census	11.4	12.0	12.2	12.0
1977 household survey	12.7	12.7	12.2	12.4

B Subgroups in the 1977 household survey

	De jure		*De facto*	
	Male	Female	Male	Female
Education				
No schooling	17.1	24.1	15.5	23.6
Some schooling	10.1	12.0	8.8	9.9
Region of residence				
Lowlands	9.7	10.7	9.7	10.2
Foothills	15.4	12.7	13.0	11.2
Orange River Valley	15.4	15.2	16.2	15.5
Mountains	17.5	16.4	14.6	16.5

improve estimation of age during the 1966 and 1976 census enumerations. Corresponding patterns of age heaping – applying to different ages of course – can be seen in the data obtained from both censuses.

The degree of digital preference in age reporting can be summarized using Myers' index. Use of the index simplifies comparison of the quality of age data from different sources and among different subgroups of the population. Myers' index is a measure of net digital preference. When several different forms of digital preference are operating at once, as seems to have been happening in the LFS, they will tend to cancel out. Therefore gross digital preference is likely to be underestimated by the index. Values of Myers' index derived from the household survey for the *de jure* and *de facto* populations, together with its values for the 1966 and 1976 census data, are presented in table 3. The index can vary between 0 and 180 and the lower its value the lesser the degree of digital preference. The table reveals that, while there was some improvement in the quality of the age data between the 1966 and 1976 censuses, reporting in the LFS is no better than it was in the recent census. In the 1966 census digital preference was slightly more severe among women than among men. However, in the 1976 census and LFS this differential in the quality of age reporting has disappeared.

Table 3 also contains values of Myers' index for subgroups of the population enumerated in the household survey. As might be expected there are differences in the degree of age heaping between groups with differing levels of education. It is particularly extensive among uneducated women although in this relatively small group this may stem from sampling rather than reporting errors. In contrast knowledge of exact age is more widespread among the educated.[2] Regional differentials in the degree of digital preference as measured by Myers' index are rather small. However the quality of age reporting does seem to be slightly better in the Lowlands and, for women at least, in the Foothills than in the other regions. Much if not all of this regional differential probably stems from differences in the educational structure of the population.

Table 4 gives the per cent distribution and sex ratios in five-year age groups of the *de jure* population enumerated in the household survey. Grouping of the single-year age

[2] It should be noted that educated respondents are on average younger than uneducated ones. This study is not concerned to examine the causal links between age, education and the quality of age reporting.

Table 4 Per cent distribution of the male and female *de jure* population enumerated by the survey and the census, by age

Age	1977 household survey				1976 population census			
	Male	Female	Both sexes	Sex ratio	Male	Female	Both sexes	Sex ratio
0–4	15.4	14.0	14.7	102	14.6	13.7	14.1	99
5–9	13.3	12.6	12.9	97	13.4	12.4	12.8	100
10–14	12.8	12.3	12.5	96	13.2	12.5	12.9	98
15–19	10.3	10.6	10.5	90	10.2	10.7	10.5	88
20–24	8.2	8.7	8.5	87	8.4	8.9	8.6	88
25–29	7.1	7.2	7.1	92	7.1	6.8	6.9	96
30–34	5.5	5.4	5.5	94	5.6	5.5	5.6	95
35–39	5.6	5.0	5.3	103	5.2	4.8	5.0	102
40–44	5.3	5.1	5.2	96	5.3	5.2	5.2	93
45–49	4.0	3.8	3.9	98	4.0	3.8	3.9	99
50–54	3.1	3.3	3.2	84	3.3	3.3	3.3	92
55–59	3.4	3.8	3.6	84	3.5	3.5	3.5	92
60–64	2.2	2.3	2.2	88	2.1	2.5	2.3	78
65–69	1.6	1.9	1.7	77	1.5	1.8	1.7	76
70–74	0.9	1.3	1.1	61	1.0	1.6	1.3	62
75–79	0.8	1.5	1.2	52	0.9	1.6	1.3	53
80 +	0.5	1.2	0.9	40	0.6	1.4	1.0	43
Total	100.0	100.0	100.0	93	100.0	100.0	100.0	93

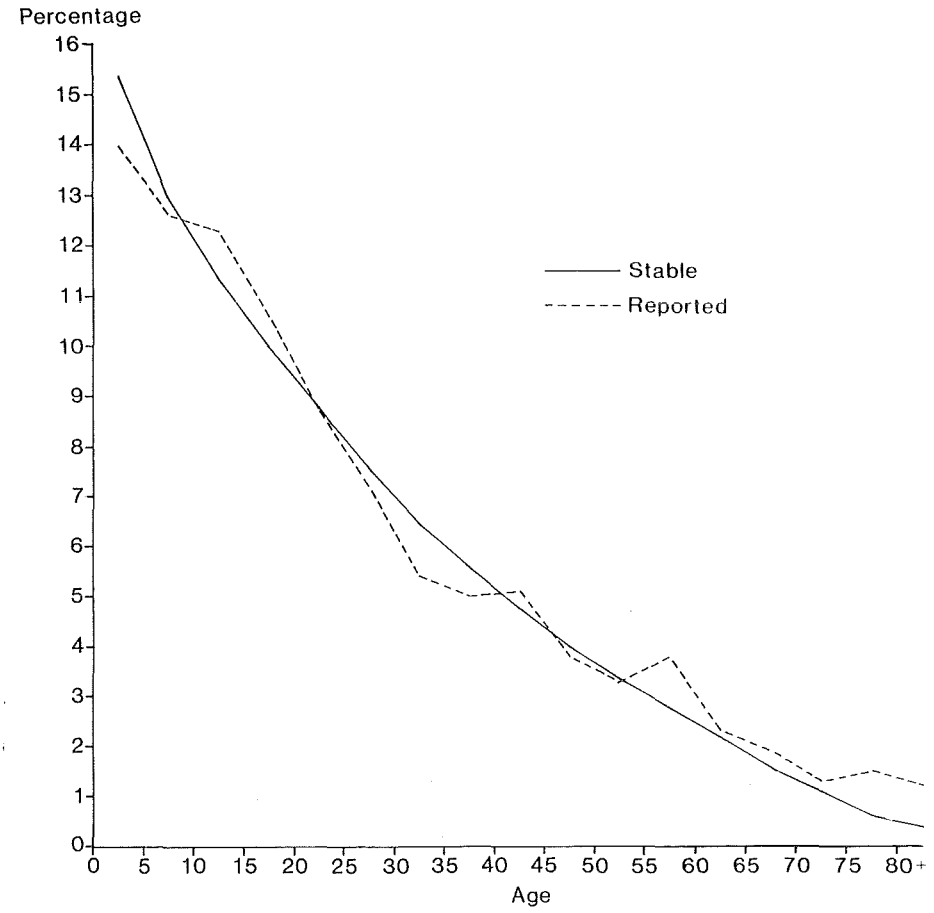

Figure 2 Per cent distribution of the *de jure* female population by five-year age groups as reported (household survey) and as fitted by a stable population (West mortality level 13, r = 0.022; Coale and Demeny 1966)

data into five-year intervals helps to smooth them. However, the very pronounced heaping on ages 44 and 59 observed in the single-year age distribution produces irregularities that persist in the grouped data: the proportions of the population enumerated as aged 40–44 and 55–59 seem rather too high if they are contrasted with the size of neighbouring age groups. The data are compared with the corresponding distribution obtained from the 1976 census. There is a fair degree of consistency between survey and census figures for most of the age groups. Both sources suggest that about 40 per cent of the population are aged under 15 and that 7–8 per cent are aged 60 or more. Both series of sex ratios suggest that there is a deficit of young adult males but that this disappears by the age group 35–39. At older ages the proportion of males in the population declines rapidly. There is probably some permanent emigration. However, restrictions enforced by the Republic of South Africa and the fact that the sex ratio rises at later ages make it unlikely that the deficit of young adult males results from this alone. It therefore seems likely that, even on a *de jure* basis, both the LFS and the 1976 census failed to cover a proportion of the labour migrants who were temporarily out of the country. As male mortality is higher than female mortality it is unlikely that the sex ratio is actually above unity in any adult age group. That this is apparently the situation for the 35–39 year old age group suggests that there are biases in the reporting of age that affect males and females differently. The low sex ratio for the 0–4 age group in the census suggests that there was either some underenumeration of young male children or considerable misstatement of the ages of the young. In contrast the household survey yields a sex ratio of 102 for this age group and one of 107 for infants alone. These ratios seem more plausible.

A clearer idea of the extent of distortions in the reported age distribution can be obtained by comparing it with that of a stable population model.[3] This comparison is made only for females because of the clear evidence of underenumeration of young adult males and is presented in figure 2. While the actual age distribution of Lesotho's female population may differ from that of the model it is likely to do so in a regular way. Generally the distributions agree fairly closely, indicating that the reported data are not greatly biased. However, the model does highlight some implausible features the reported age distribution. The heaping in the 40–44 and 55–59 year old age groups appears clearly. The comparison also suggests that there may have been some underenumeration of young children and exaggeration of the ages of older respondents. These are very common characteristics of developing country data. However the typical pattern of age misstatement often observed in tropical Africa, that is to say

[3] A population's age structure will be approximately the same as some stable population model unless fertility or mortality has fluctuated greatly or declined rapidly or unless migration is of major importance.

Table 5 Per cent distribution of the *de facto* female population in phase 1 and phase 2, by age

Age	Household survey (phase 1)	Household screening (phase 2)
0–9	27.3	28.8
10–14	12.7	12.9
15–19	10.7	10.7
20–24	8.6	7.9
25–29	6.9	6.7
30–34	5.2	4.7
35–39	4.7	4.4
40–44	4.9	4.5
45–49	3.6	2.7
50–54	3.3	4.2
55–59	3.7	3.9
60+	8.4	8.6
Total	100.0	100.0

deficits in the teenage years and surpluses at ages 20–34 (United Nations 1967), is totally absent. Instead the reverse pattern is apparent. In particular, comparison with the stable population model suggests that rather too few women are being reported as aged 30–39. It has already been mentioned that the sex ratio for the 35–39 year old age group indicates that too few women relative to men were enumerated as belonging to this age group.

3.2 THE INDIVIDUAL SURVEY

It was pointed out in chapter 2 that a comparison of the age distribution of women obtained from the phase 2 household screening with that obtained from the phase 1 household survey reveals a deficit of women in the age range eligible for inclusion in the individual survey. While this affects all age groups except the 15–19 year old women, the size of the discrepancy increases with age as can be seen from table 5. In other words, women of eligible ages tend to be younger in phase 2 than the equivalent group of women enumerated in the household survey.

There is a particularly sharp dip in the phase 2 age distribution at ages 45–49 and a corresponding surplus of women aged 50–54. This strongly suggests that in the phase 2 household screening the ages of women in their forties were exaggerated, either by themselves or by the enumerators, so as to avoid the lengthy interview involved in the individual survey. This conclusion is strengthened if we examine the sex ratios in the relevant age groups obtained from the two phases of the survey and the 1976 census. These, calculated on a *de jure* basis because of the importance of labour migration, are presented in table 6. The sex ratios for respondents in their twenties are lower in the household screening than in the census or household survey. This could be indicative of the over-reporting of these ages by women in phase 2. Perhaps more plausibly, it could also result from greater omission of absentee males from the sample. The sex ratio for the 45–49 year old age group in phase 2 is 114, far higher than the ratios of 99 and 98 obtained in the household survey and census respectively. Equally the sex ratios of respondents in their fifties are very low in phase 2. Combined with the information already discussed, these ratios suggest that there was a shortfall of about 15 per cent in the number of 45–49 year old women included in the individual survey.

Table 6 Sex ratios in the *de jure* population for selected age groups

Age	1976 census	Household survey (phase 1)	Household screening (phase 2)
10–14	98	96	98
15–19	88	90	91
20–24	88	87	75
25–29	96	92	80
30–34	95	94	94
35–39	102	103	105
40–44	93	96	94
45–49	99	98	114
50–54	92	84	63
55–59	92	84	72
60–64	78	81	78

Matching of the individual households and women enumerated in phase 1 and 2 would have thrown more light on the nature and causes of the biases affecting the phase 2 age data. Unfortunately this has not yet been achieved. However, the degree of agreement between ages reported in the phase 2 household screening and in the individual interviews has been examined.[4] An identical age was reported on the two forms for 74 per cent of the women interviewed in the individual survey. An older age was reported in the individual survey for 18 per cent of women, and a younger age for the remaining 8 per cent. Only in 3 per cent of cases did the two reported ages differ by three or more years. That the two sources are so consistent does imply that they were collected with reasonable care. However, it also implies that the reservations we have expressed about certain features of the age distribution obtained from the household screening apply with equal strength to that of the ever-married women interviewed in the individual survey.

The per cent single-year age distribution of women aged 15–49 reported in phase 2 is shown in figure 3. The ages of married women have been taken from the individual questionnaire rather than from the household schedule. This distribution is compared with the equivalent age distribution obtained from the phase 1 household survey. The shortfall in the number of older women in the individual survey is clearly apparent. The individual data follow a pattern of age heaping similar to that in the household data. That is to say that there is preference for ages ending in the digits 0, 5, 2 and 7. In addition there is marked heaping on age 44 by women who associate their births with the 'Black Dust storm' and famine of 1933. It seems almost certain that a considerable number of 45–49 year old women reported age 44. The seven and two preference according to year of birth is stronger in the individual data than in the household data. This is to be expected as the individual questionnaire asked for date of birth rather than for age in completed years. Since the 0 and 5 preferences remain

[4] These are not independent estimates and will even have been reported by the same person or cross-checked by the interviewer in many cases. Unfortunately this is not a good reason for assuming *a priori* that the reports will agree.

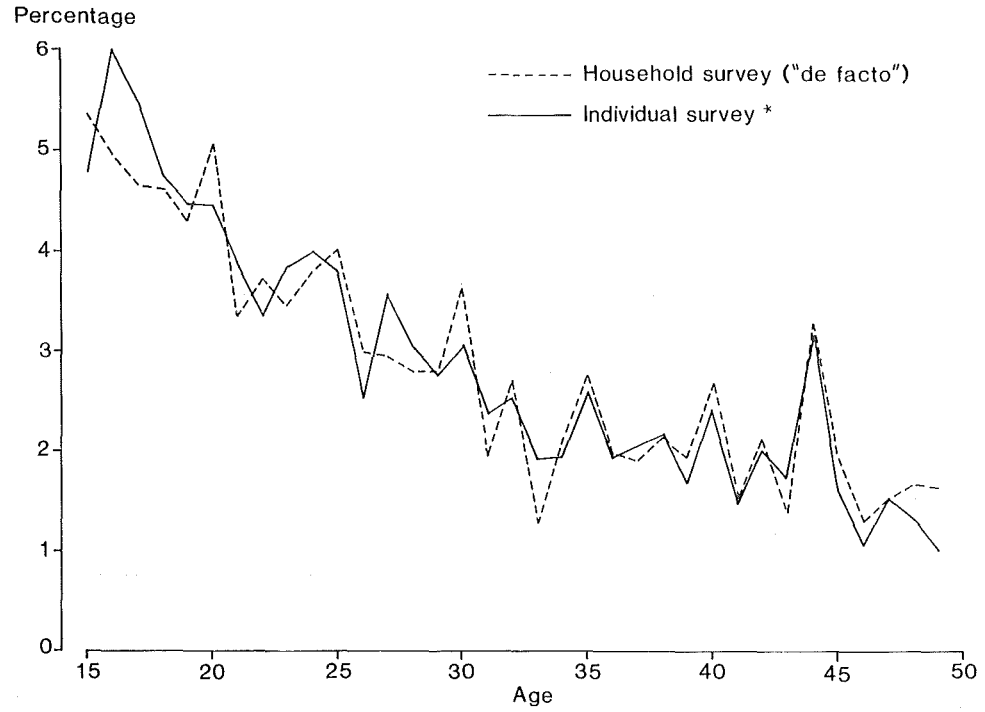

Figure 3 Per cent distribution of women aged 15–49 in the household and individual surveys

*Including single women enumerated in the phase 2 household screening

strong in the individual data, it seems that many of those who did not know their date of birth estimated it from what they believed to be their age. Figure 3 reveals that the degree of age heaping in the individual data is somewhat less than that in the household data. This suggests that age reporting was better in the individual survey than in the household survey. If so, the more implausible characteristics of the age distribution of women included in the individual survey must arise for the most part from the coverage errors discussed in chapter 2.

Let us try to summarize this rather confused picture. Up to age 40, age reporting in the individual survey appears to be fairly good. The degree of age heaping is modest and less than that in other sources of data on Lesotho. On average younger ages are reported than in the household survey. At older ages there are two problems with the data. First, there is very clear evidence of exaggeration of the ages of women during the household screening. This has resulted in women in their forties being severely under-represented in the individual survey. Secondly, the pronounced heaping on age 44 suggests that an appreciable number of those 45–49 year old women who were included in the sample will have been shifted into the 40–44 year old age group. Thus, not only are the older women under-represented in the sample as a whole, but in addition the age reporting of those who were interviewed is relatively poor. The implications of these features of the age data for estimates of fertility and mortality will be discussed in later chapters.

4 Nuptiality

In the household survey data were collected on the current marital status of all household members aged 15 and above. In the individual survey complete marriage histories, including the dates at which each union was formed and dissolved, were obtained from all ever-married women aged 15–49. This chapter concentrates on the information on female nuptiality collected in the individual survey. Moreover, evaluation is largely restricted to a study of the data upon the current marital status and the age at first marriage of respondents, although other topics are discussed briefly. Under 3 per cent of the women in the individual survey had married more than once. Therefore there is little scope for considering remarriages separately from first marriages.

Traditionally marriage in Lesotho is a prolonged process rather than an easily dated event. It involves substantial bridewealth payments ('bohali') and return gifts over a number of years and it may or may not be formally marked by a Christian ceremony. Moreover young couples often 'elope' so as to establish a union that is likely to be recognized as a marriage at a later date (Murray 1981). In the individual questionnaire the questions on dates of marriages asked 'In what month and year did you and your husband begin living together?'. This approach is likely to have minimized any difficulty that the respondents experienced in defining their marital status or date of marriage. Nevertheless such difficulties may have affected the LFS data on nuptiality in ways that are difficult to detect.

4.1 REPORTING OF CURRENT MARITAL STATUS

The marital status distributions by five-year age groups that women reported in the individual and household surveys and the 1976 census are shown in table 7. Single women were not included in the individual survey and the proportions single shown in the upper panel of the table were obtained from the phase 2 household screening. The results from the two phases of the LFS are very consistent. They also agree well with the census-based estimates. Marriage is almost universal in Lesotho and some 97–98 per cent of the women in the older cohorts have married. Moreover the great majority of women – in the younger cohorts at least – first marry in their teens or early twenties. Reporting of the current marital status of ever-married women in the three enquiries also agrees fairly closely. The inconsistencies that do exist between the three sets of results arise from two sources. Slightly higher proportions of women reported that they were divorced in the individual survey than in the household survey and in the household survey than in the census. Similarly reporting of widowhood was much more common in both phases of the LFS than in the census, while at younger ages more widowhood was reported in the individual survey than the household survey. These discrepancies probably indicate that reporting of marital status was more accurate in the smaller-scale enquiries, as a tendency for divorced and widowed women to be enumerated as single or married has been observed in many surveys. It should be noted that the distribution by marital status of women in their forties is very similar in the two phases of the LFS. We have suggested that older women are under-represented in the individual sample. Yet if the omitted women were selected by marital status this effect can have been only slight and offset by better reporting of divorce and widowhood in the individual survey.

Table 7 For women aged 15–49 in the individual and household surveys and 1976 census (a) the percentage single; (b) the per cent distribution of ever-married women according to current marital status

Survey	Age	Single[a]	Ever married		
			Married	Widowed	Divorced[b]
Individual survey	15–19	68.9	97.9	0.5	1.6
	20–24	16.7	95.1	1.2	3.7
	25–29	7.1	90.1	3.6	6.3
	30–34	5.4	86.5	7.6	6.0
	35–39	3.0	84.7	9.2	6.1
	40–44	2.0	77.8	15.7	6.5
	45–49	2.6	69.5	24.4	6.1
Household survey	15–19	68.4	96.5	0.5	2.9
	20–24	16.4	94.5	1.4	4.1
	25–29	7.2	91.3	2.5	6.2
	30–34	5.1	88.2	5.6	6.1
	35–39	3.1	85.9	8.7	5.4
	40–44	1.9	77.8	16.8	5.4
	45–49	2.6	70.6	24.8	4.6
1976 census (*de facto*)	15–19	70.5	98.8	0.5	0.8
	20–24	19.4	97.3	1.2	1.6
	25–29	8.6	95.4	2.3	2.2
	30–34	5.3	92.6	4.7	2.7
	35–39	4.1	89.5	7.6	2.9
	40–44	3.7	83.6	13.3	3.2
	45–49	2.9	76.6	20.3	3.1

[a] For phase 2 these figures have been obtained from the household screening.
[b] For the household survey these figures include the separated.

4.2 DATE OF FIRST MARRIAGE AND MARITAL DURATION

The marriage histories collected in the individual survey are an important source of data for the study of patterns and trends in nuptiality in Lesotho. Moreover marriage is an important background variable in demographic analyses of other topics. Many of the tables presented in the First Country Report disaggregate the results by age at marriage, marital duration or both. Because these statistics are obtained from the retrospectively collected marriage

Figure 4 Reported dates of first marriage for ever-married women aged 15–49

histories, which are prone to errors stemming from lapses of memory, evaluation of their accuracy is particularly important. Duration since first marriage can be calculated simply from reports of date of first marriage. The distribution of the individual sample by these dates is shown in figure 4. Fewer marriages occurred in 1977 than other recent years because fieldwork was conducted in August to October of that year. There is some digital preference in reporting of date of marriage. The distribution tends to peak on years ending in the digits 0 and 5 and exhibits troughs in years ending in the digits 1 and 6. These irregularities are for the most part slight. There is rather more pronounced heaping of first marriages on 1960 and an associated deficit for 1961. These years represent marriage durations of some 16–17 years. Therefore the errors are unlikely to introduce much bias into data aggregated into five-year duration groups. It is worth noting that there is little heaping on dates that represent a rounded interval before the survey, that is to say on years ending in the digits 2 and 7. This is encouraging. If it was occurring, such a pattern of heaping would tend to bias grouped data.

These data refer to women of all ages. When they are presented in this way it is difficult to detect errors other than digital preference. It is easier to assess the accuracy of reported age patterns of first marriage. Therefore for further evaluation the data are expressed in this way.

4.3 AGE AT FIRST MARRIAGE

To examine patterns and trends in age at first marriage before the date of the survey, the proportions ever married reported in the phase 2 household screening and the retrospective data on the timing of marriage collected in the individual survey must be combined. This enables the marital status distribution of any group of women included in the survey at any earlier date to be calculated. Similarly nuptiality rates can be calculated for any period or age group.

The proportions of women who first married by each exact age for five-year age cohorts of women are shown in table 8. Women's experience is truncated at their current age and the last four proportions presented for each of the younger cohorts are based on progressively smaller numbers. As is to be expected with such small samples the marriage rates at individual ages, and therefore to a lesser extent the proportions of women ever married, fluctuate erratically between cohorts. Nevertheless the overall impression is one of consistent reporting and of an age pattern of first marriage that persists unchanged from the older to the younger cohorts. Estimates of the proportion of women marrying by exact age 25 vary between 89 per cent and 93 per cent and those of the proportion of women marrying by exact age 20 between 66 per cent and 70 per cent. Neither set of figures shows any consistent trend over time. However, concentration on the proportions of women who reported that they had married by their mid-teens causes some modest but consistent differences between cohorts to emerge. First, women who are currently in their forties report more early marriages than younger women. For example 28 per cent of them report an age at first marriage of 16 or less as opposed to a mean estimate of 24 per cent for the younger cohorts. Considering that the marriages that the older women are reporting occurred on average some 30 years before the survey and that the sample of older women is somewhat biased, it seems likely their ages at first marriage have been slightly underestimated. Secondly, the youngest cohort, that of women who are still in their teens, reports fewer first marriages at young ages than any of the older cohorts. For example only 10 per cent of the cohort reports an age at first marriage of 15 or less as opposed to a mean value of 13.5 per cent for cohorts aged 20–39. On the face of it this indicates that this cohort is marrying at older ages than earlier ones. However, if this is so the trend did not affect women who were 18 or 19 at

Table 8 Cumulative proportions of women ever married by exact ages according to age group at interview[a]

Age	Age group at interview						
	15–19	20–24	25–29	30–34	35–39	40–44	45–49
11	0.001	0.007	0.007	0.014	0.008	0.004	0.013
12	0.001	0.018	0.015	0.023	0.014	0.014	0.023
13	0.006	0.023	0.024	0.025	0.037	0.034	0.036
14	0.016	0.034	0.038	0.032	0.045	0.053	0.068
15	0.036	0.062	0.084	0.068	0.066	0.097	0.095
16	(0.100)	0.140	0.136	0.141	0.125	0.182	0.171
17	(0.223)	0.251	0.246	0.261	0.225	0.281	0.283
18	(0.405)	0.388	0.363	0.427	0.357	0.401	0.454
19	(0.550)	0.549	0.518	0.566	0.529	0.538	0.582
20		0.693	0.667	0.695	0.664	0.676	0.688
21		(0.755)	0.762	0.784	0.760	0.751	0.793
22		(0.813)	0.832	0.823	0.801	0.796	0.872
23		(0.852)	0.870	0.850	0.842	0.838	0.908
24		(0.871)	0.895	0.877	0.871	0.866	0.921
25			0.912	0.897	0.906	0.893	0.934
26			(0.923)	0.906	0.922	0.903	0.941
27			(0.938)	0.924	0.936	0.917	0.947
28			(0.952)	0.932	0.947	0.929	0.951
29			(0.953)	0.942	0.951	0.933	0.957
30				0.945	0.953	0.939	0.957
31				(0.945)	0.955	0.949	0.964
32				(0.953)	0.957	0.958	0.964
33				(0.956)	0.961	0.958	0.964
34				(0.956)	0.961	0.958	0.967
35					0.963	0.960	0.967
Number of women	377	764	683	526	473	496	297

[a] Proportions contained in brackets are based upon the reduced sample of women of at least the age concerned.

the time of the survey. This, while not impossible, might suggest that the trend is a spurious one. Interpreting the data in the latter way implies that there is a tendency among respondents to exaggerate the interval since all first marriages that occurred more than a very few years before the survey and thus to report too low an age at first marriage.

Examination of the consistency of the dates of first marriage reported in the individual survey with estimates from other sources of data can help to establish whether or not they are biased by reporting errors. It is simpler to do this if the data are presented in a somewhat different fashion. In table 9 the marital status distribution that prevailed at the time of the 1966 census according to the marriage history data is compared with the current status data collected in the census itself. The estimates from the LFS are based on the reporting of women aged 26–49 at the time of the survey. For the moment we will discuss only the proportions of single women by age reported in the two sources. These are clearly incompatible. The proportion of single women is higher in every age group in the census-based estimates. The LFS data indicate a stable age pattern of marriage. Thus the reconstructed proportions of single women by age are similar to the current status data for 1976–7 shown in table 7. In contrast the 1966 census data suggest that the ages of women at their first marriages fell over the decade before the survey. Most notably they indicate that the proportion of 15–19 year

Table 9 Per cent distribution according to marital status by age group of women at the date of the 1966 census, as reconstructed from the marriage histories of the LFS and as recorded in the census[a]

Age group in 1966	Single		Married		Widowed		Divorced/separated	
	LFS	Census	LFS	Census	LFS	Census	LFS	Census
15–19	67.2	78.0	32.1	21.7	0.2	0.1	0.4	0.2
20–24	18.7	20.8	77.9	76.2	1.7	1.3	1.7	1.7
25–29	6.5	7.6	87.2	90.3	2.7	3.0	3.7	2.0
30–34	3.5	4.4	84.2	85.6	7.3	6.6	5.0	3.4
35–39	2.7	3.0	85.3	82.5	10.1	9.9	1.9	4.0

[a] The census figures exclude the small number of non-Africans resident in Lesotho.

old women who have married already rose from 22 per cent to around 31 per cent between 1966 and 1977. This discrepancy between the two sources could well result from respondents understating their age at first marriage in the LFS. Because entry into marriage is very rapid at young ages a quite modest reporting bias could explain the differences between the census and LFS results. Of course the 1966 census data could be in error. However, they are based on a simple question on current status. Such questions usually yield more reliable results than retrospective ones that rely on the accuracy of respondents' memories. Moreover certain economic and social trends could well have encouraged a fall in women's ages at first marriage in Lesotho. In particular Basotho employment and earnings in the South African mining sector grew rapidly between the late 1960s and late 1970s. If this made bridewealth easier to accumulate, it could well have produced a fall in the average age at marriage of both sexes.

Table 10 Proportions of women ever married by age group at five-year intervals before the survey

Age	Years before the survey						
	0	5	10	15	20	25	30
A All women							
15–19	0.311	0.318	0.284	0.331	0.279	0.388	0.349
20–24	0.833	0.832	0.819	0.820	0.813	0.874	
25–29	0.929	0.920	0.934	0.929	0.955		
30–34	0.946	0.960	0.956	0.964			
35–39	0.970	0.974	0.971				
40–44	0.980	0.971					
45–49	0.974						
B No schooling							
15–19	0.536	0.456	0.488	0.438	0.303	0.398	0.303
20–24	0.843	0.877	0.902	0.740	0.808	0.820	
25–29	0.947	0.902	0.906	0.869	0.972		
30–34	0.953	0.972	0.882	0.972			
35–39	0.972	0.944	0.972				
40–44	0.969	0.972					
45–49	0.972						
C Lower primary							
15–19	0.337	0.482	0.341	0.392	0.307	0.434	0.386
20–24	0.907	0.888	0.859	0.877	0.846	0.922	
25–29	0.954	0.928	0.954	0.961	0.971		
30–34	0.954	0.967	0.984	0.982			
35–39	0.978	0.991	0.988				
40–44	0.991	0.988					
45–49	0.988						
D Upper primary							
15–19	0.354	0.282	0.249	0.288	0.271	0.316	0.301
20–24	0.876	0.847	0.805	0.807	0.771	0.812	
25–29	0.935	0.927	0.927	0.915	0.935		
30–34	0.951	0.965	0.953	0.945			
35–39	0.971	0.966	0.956				
40–44	0.972	0.956					
45–49	0.966						
E Secondary +							
15–19	0.101	0.045	0.037	0.090	0.069		
20–24	0.532	0.427	0.545	0.524			
25–29	0.803	0.862	0.841				
30–34	0.862	0.871					
35–39	0.904						

Corresponding to the earlier marriage of women, the current status data indicate a fall in the singulate mean age at marriage of men from 25.8 to 25.0 years between the 1966 and 1976 censuses. Thus, there is strong evidence that the LFS estimates of age at first marriage are somewhat biased for those women passing through the ages of rapid entry into marriage in 1966. Moreover, assuming that ages at marriage declined fairly steadily over the decade before the survey and not abruptly in the late 1960s, similar errors must be affecting the estimates for younger women. As there is little evidence of appreciable bias in the sample of women aged 35 or less, the most likely explanation is that women tended to report too early a date of marriage. There are no independent sources of data upon marriage patterns before 1966. It is, therefore, difficult to assess the quality of the reporting of those women aged 35 or more at the time of the survey who had for the most part married before this date. However, the tendency to report too young an age at first marriage does seem to be a general one and the estimates for older women are probably as inaccurate as, if not more inaccurate than, those for the young.

If the ages at first marriage reported by respondents tend to be too young, it seems likely that the bias will be smaller among more educated respondents. In table 10 proportions of ever-married women are reconstructed for five-year intervals before the survey for different educational groups. Interpretation of this table is somewhat complicated for two main reasons. First there are large differences between the age patterns of marriage of the different educational groups. This can clearly be seen from the current status data in the far left column. Secondly there have been steady improvements in the educational composition of Lesotho's female population. This means that caution must be exercised when comparing older and younger cohorts.

Among women with at least upper primary schooling there is very clear evidence of rising nuptiality at ages 15–29 over the 15 years before the survey and in particular over the last five years. This may in part result from the 'dilution' of the late marriage pattern of these women as their numbers increase. However, as can be seen from table 1, these increases in nuptiality are too great to be attributed solely to changes in the educational structure of the population. For example, nuptiality among 15–19 year old women with upper primary schooling has risen by between 25 and 40 per cent, while for 20–24 year olds the increase is one of about 10 per cent. Moreover, among women with secondary schooling the increase in nuptiality has been even more striking. Thus the retrospective reporting of the more educated women suggests trends in nuptiality similar to the overall national trends that we have inferred from comparison of the 1966 census with the 1976–7 current status reports. It therefore seems likely that their reporting is fairly accurate for at least recent marriages. Our failure to detect any fall in ages at first marriage in the national data results from less educated women misreporting their dates of marriage. The estimates in table 10 for these groups are more erratic and less satisfactory than those for the more educated. Examining those for women aged less than 30 over the last 15 years, it is difficult to identify any clear trend. However, the figures do not show the large rise in nuptiality at young ages that we believe must have occurred in light of the 1966 census data. As a result the trend towards younger marriages among the more educated is offset by the decline in the proportion of less educated, and therefore earlier marrying, women in the population to produce apparent stability in aggregate marriage patterns.

4.4 WIDOWHOOD AND DIVORCE

Because 85 per cent of all respondents in the individual survey were currently in their first union and most of the other women belong to the oldest cohorts, it is difficult to carry out a detailed evaluation of the quality of the retrospective reports of dates of widowhood and divorce that were collected in the marriage histories. One useful but partial check on the accuracy of these data is to compare the LFS figures with the 1966 census data presented in table 9. The estimates from the two sources agree moderately well. Certainly there is no consistent trend in the LFS data towards reporting either more or less marital dissolution than in the census. This suggests that there is no major bias affecting the retrospective reporting of the prevalence and dates of marital dissolution. However, it should be remembered that the comparison yields no direct evidence about the reports of the older women concerning the more distant past. Thus there could be inaccuracies in the estimates for these age groups and periods.

5 Fertility

This chapter examines the quality of the fertility data collected in the LFS. It is primarily concerned with the information obtained in the maternity history section of the individual questionnaire, but compares these data with those collected in the phase 1 household survey and in other enquiries. The maternity histories are more detailed than the other sources of data. They include the date and outcome of each pregnancy experienced by all eligible women, together with information upon the later survival of all live births. Because they collect the dates of each live birth, maternity histories make it possible to estimate fertility trends from a single, retrospective survey. However, not only trends but also estimates of the level of fertility may be distorted by errors of the type discussed in section 1.3: the omission of births, displacement of the dates of births and misreporting of age by respondents. This discussion examines the internal and external consistency of the LFS fertility data in an attempt to discover how far they are subject to such errors.

5.1 RECENT FERTILITY LEVELS AND TRENDS

Age-specific fertility rates for single calendar years for the period 1959–76 are presented in table 11. They are conventional age–period rates. As with all results from the individual survey reported on in this chapter, the denominators include the experience of single women. This was estimated using the proportions ever married obtained in the phase 2 household screening. As they do not include illegitimate births to the single women excluded from the individual sample, the rates slightly underestimate the level of fertility. The table includes estimates of the total fertility rate for the period 1964–76. The fertility data for older women are truncated progressively as the rates extend back in time. Therefore in order to estimate the total fertility rates the missing cells have been assigned the average of the rates for the last three years for which data are available. This approximation will have little impact upon the total fertility rate if there has been no consistent trend in the fertility of older women.

Table 11 does not reveal any change in the level of total fertility over the 13-year period up to the time of the survey. However, there are large fluctuations in the total fertility rate from year to year around the average value of about 5.7. To some extent these may result from sampling errors. However, the very low rates observed for certain years are indicative of reporting errors in the data. In particular, the low total fertility rates for the years 1974, 1971, 1969 and 1966 (5.3, 4.7, 5.3 and 5.2 respectively) almost certainly result from digital preference in the reporting of dates of birth. That is to say that some births that occurred in these years were reported as occurring in other years, above all those ending with digits divisible by

Table 11 Age-specific (per 1000 women) and total fertility rates for calendar years

Year	15–19	20–24	25–29	30–34	35–39	40–44	45–49	TFR[a]	Three-point moving average
1976	108	281	241	235	164	92	35	5.8	
1975	100	228	274	264	162	91	31	5.8	5.6
1974	96	272	222	201	175	87	10	5.3	5.7
1973	93	255	274	229	179	117		5.9	5.7
1972	118	270	251	234	184	89		5.9	5.5
1971	76	198	213	199	129	99		4.7	5.6
1970	96	270	281	229	190	121		6.1	5.4
1969	76	221	289	205	139	113		5.3	5.8
1968	84	302	261	256	177			6.1	5.7
1967	79	236	253	196	222			5.6	5.6
1966	115	250	230	178	138			5.2	5.6
1965	88	274	286	232	202			6.1	5.9
1964	137	278	291	192	225			6.3	
1963	94	249	247	232					
1962	100	284	254	221					
1961	103	229	208	179					
1960	101	282	258	223					
1959	110	197	230	181					

[a] For the years with incomplete information the TFR has been obtained using the mean of the rates for the last three years for which information is available.

Table 12 Age-specific fertility rates (per 1000 women) and percentage change in the rates, 1967–71 and 1972–6

Age	Age-specific fertility rates		Percentage change
	1972–6	1967–71	
15–19	103	82	+ 26
20–24	261	244	+ 7
25–29	252	259	− 3
30–34	233	216	+ 8
35–39	173	167	+ 4
40–44	95	108	− 12
45–49	27	(27)	–
Total fertility rate	5.72	5.52	+ 4

five. As the survey was conducted in 1977, this pattern of digital preference will have little impact on rates calculated for five-year periods before the survey. Use of a three-point moving average to smooth these fluctuations in the observed total fertility rates produces a very stable series. This reinforces the impression that the level of fertility has remained constant in Lesotho during recent years. Estimates from the two earlier demographic surveys conducted in Lesotho suggest that in this respect the LFS data are reliable. The unpublished results of the prospective Demographic Survey conducted in 1971–3 show the total fertility rate to be 5.6. The Report on the Demographic Component of the Rural Household Consumption and Expenditure Survey 1967–1969 (1973) obtained a total fertility rate of 5.7 after application of the P/F method for adjusting recent fertility data (Brass 1975). Both of these estimates are very close to those calculated from the LFS birth histories.

There are large and erratic fluctuations in the fertility rates for individual age groups that make it difficult to detect whether or not there has been any recent change in the age pattern of fertility in Lesotho. To smooth the data, fertility rates have been calculated for two five-year periods, 1967–71 and 1972–6. The results are shown in table 12. At the peak ages of childbearing the fertility rates for the two periods are rather similar. The apparent decline in the fertility of women aged 40–44 could well be explained by biases in the sample of women in their forties or by age misstatement. It is unlikely to represent a real trend and does not necessarily imply that older women are subject to error in their reporting of the number and timing of their recent births. The sharp rise in the fertility of teenage women between the two periods is more likely to be a genuine change in behaviour. The increase is one of just over 25 per cent when the data are aggregated in the way adopted here. Alternative approaches to the smoothing of the single-year rates also suggest a substantial increase of 8–29 per cent in the fertility of 15–19 year olds over recent years. Moreover the 1967–9 and 1971–3 surveys yielded fertility rates for this age group of only 75–80 per thousand. These estimates are somewhat lower than those obtained from the birth histories and suggest that, if anything, the latter underestimate the increase in teenage fertility. This implies that women may report too early a date for their first births – excepting those in the very recent past – and thus over-report births to teenage mothers. In chapter 4 it was suggested that the proportion of women aged 15–19 who have married rose by about 50 per cent between 1966 and 1977. In this light a rise in the fertility of teenage women over recent years at least as large as that indicated by the birth history data seems very plausible. It is worth noting however that its impact on the total fertility rate is very small, around 0.1 children per woman.

A further way of assessing the reliability of the information on the recent level and pattern of fertility collected in the individual survey is to compare it with data obtained from other sources. In table 13 it is compared with the results of the household survey and the 1976 census. The rates were all calculated from births in the year before the enumeration. The age groups to which they refer are half a year younger than those in the tables already discussed. All three sources suggest very similar levels and age patterns of fertility. The total fertility rate obtained from the birth histories, 5.95, is slightly higher than those obtained from the household survey and census. However, this probably reflects sampling errors rather than errors in the dating of births in any of the surveys. Individual survey estimates obtained from longer periods and larger numbers of births, for example that of 5.72 in table 12, fall in between the other two indices. The census data yield slightly higher fertility rates for women in their forties than either phase of the LFS. Also the level of fertility among 45–49 year old women according to the individual survey is noticeably lower than that reported in the household survey. We have suggested that all three enquiries are subject to similar patterns of age heaping. However, if there was a greater tendency for older women to exaggerate their ages in the census this would explain the higher fertility rates obtained for these age groups. In the individual survey the oldest age group was subject to selection biases and, in particular, uneducated women are under-represented in the

Table 13 Current age-specific fertility rates derived from the household and individual surveys and the 1976 census

Source of data		Age group at interview							
		15–19	20–24	25–29	30–34	35–39	30–44	45–49	TFR
Household survey	Rates	0.076	0.280	0.280	0.220	0.166	0.075	0.038	5.68
	Proportions	0.07	0.25	0.25	0.19	0.15	0.07	0.03	1.00
Birth history (12 months 1976–7)	Rates	0.067	0.293	0.289	0.242	0.186	0.087	0.026	5.95
	Proportions	0.06	0.25	0.24	0.20	0.16	0.07	0.02	1.00
1976 census	Rates	0.070	0.258	0.280	0.240	0.178	0.104	0.042	5.86
	Proportions	0.06	0.22	0.24	0.20	0.15	0.09	0.04	1.00

Table 14 Mean number of children ever born by age of women, LFS and other sources

Age	1967–9 survey	1971–3 survey	1976 census	1977 LFS HH survey[a]	1977 LFS I survey[b]	Single women HH survey
15–19	0.12	0.11	0.15	0.16	0.19	0.04
20–24	1.08	1.01	1.05	1.15	1.27	0.36
25–29	2.44	2.44	2.13	2.37	2.50	1.12
30–34	3.63	3.66	3.43	3.67	3.90	1.71
35–39	4.36	4.64	4.21	4.63	4.66	2.14
40–44	4.76	5.16	4.65	5.26	5.08	2.13
45–49	4.78	5.05	4.72	5.54	5.40	2.76

[a] Women with parity not stated assumed to be zero parity.
[b] Parity of the single assumed to be the same as in household survey phase 1. Proportions single taken from household screening phase 2.

sample. If under-represented groups of women have higher fertility at older ages than the rest of the population, this would explain the discrepancy between the rates obtained in the two phases of the LFS. Thus, although the rates yielded by these three sources of data agree closely, it seems probable that the best estimates of the level and pattern of fertility in Lesotho in the mid-1970s are those obtained from the household survey.

5.2 LIFETIME FERTILITY

Table 14 shows the mean numbers of children ever born to women by five-year age groups reported in the two phases of the LFS. These have been compared with the results of the 1976 census and the two earlier demographic surveys conducted in Lesotho. The data collected in the maternity histories have been adjusted to allow for the fertility of single women using information from the household survey. The effect of this is very small. In the household survey 28 per cent of women aged 15–19, 7 per cent of women aged 20–24 and 2 per cent of women aged 25–29 were enumerated as 'parity not stated'. Every indication is that almost all of these women were in fact childless. They have been treated as such.

There are a number of observations worth making about table 14. First, the mean parities reported in the 1976 census are lower in every age group than almost all those reported in the other enquiries. This strongly suggests that women tended to under-report their parity in the census. This is probably because standards of fieldwork were lower than in the smaller-scale surveys. Secondly, concen-

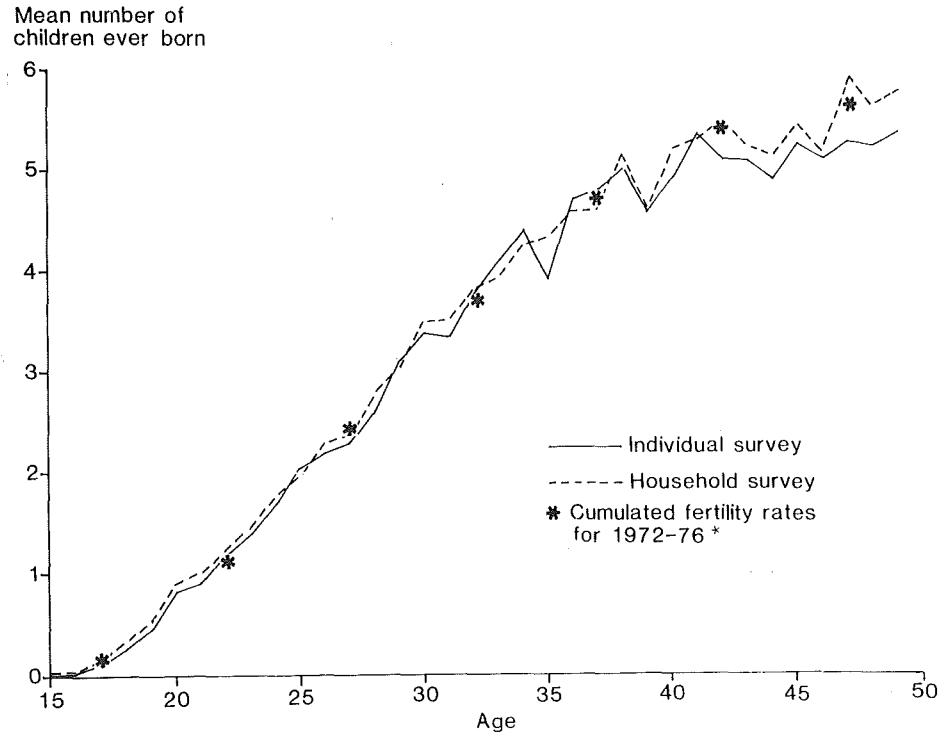

Figure 5 Mean number of children ever born by single years of age, individual and household surveys
*During cumulation the current fertility data have been adjusted to correspond to the parity data using Brass's fertility polynomial (Brass 1975)

trating on the younger age groups, the LFS and census indicate that women have more children early in life than were reported in the earlier surveys. We have argued that the fertility of young women rose between the mid-1960s and mid-1970s. These data support that conclusion. For women aged between 25 and 40 the LFS estimates agree very closely with those obtained from the earlier surveys. However, for older women the mean parities yielded by both phases of the LFS are much higher than previous estimates. While such results could be produced by a much earlier rise in the level of fertility, it seems more likely that women in their forties tended to understate their parity in the earlier surveys. The fact that in the 1968 survey the parity of 45–49 year old women is almost the same as that of 40–44 year olds and that in the 1971 survey it is lower also suggests this conclusion. Thus the data on lifetime fertility collected in the LFS seem to be of a reasonable quality. They are more accurate than those available from other sources.

Figure 5 presents the mean numbers of children ever born to women by single years of age reported in the two phases of the LFS. These are compared with cumulated fertility rates for 1972–6 calculated from the maternity history data. Up to about age 40 the results of the household and the individual surveys are very similar. They also agree closely with the cumulated current fertility rates. This further suggests the accuracy of all three series of estimates and confirms that the level of fertility remained more or less constant for a considerable period before the LFS.

According to both surveys, mean parity rises fairly smoothly with age up to about age 35. However, at older ages the graphs become rather irregular. In particular the mean parity of women aged 35 according to the individual survey and the mean parities of women aged 39 in both surveys are very low. There are also smaller but distinct dips in the graphs at ages 31, 44 and 46. These fluctuations probably result from age misstatement that is related to the parity of women. This relationship is, nevertheless, clearly not a simple one produced solely by greater digital preference either among high parity women or alternatively among women who tend to omit some births. For example, figure 3 suggests that ages 31, 39 and 46 are reported by too few women but that there is substantial heaping on ages 35 and 44. Thus both effects could be operating and in addition there are probably biases in the age data that are related to parity or the omission of births. For example, careful comparison of the individual survey data upon 30–34 year olds with estimates from other sources suggests that the mean parities estimated for them are slightly higher than one would expect. We have already suggested that there are rather too few 35–39 year old respondents in the sample. It seems likely that there is some tendency for women around these ages to understate their age. This has biased fertility estimates for the younger age group upwards. It could be related to the rather puzzling tendency for high parity women to avoid reporting age 35.

A more serious problem with the data presented in figure 5 is that from age 40 upwards the mean parities obtained from the individual survey tend to be lower than those calculated from the household survey data and by cumulating the fertility rates for the period 1972–6. For women in their late forties the discrepancy amounts on average to one-third to one-half of a child. Part of the explanation of this could be that older women tended to omit to report some of their births in the individual survey. We have mentioned that this seems to have occurred in earlier demographic surveys. It also seems to be true of the household survey. The mean parities reported in that survey also drop slightly below the values that the data on recent fertility suggest are accurate. Moreover we suggested in section 5.1 that, if anything, even the latter data tend to underestimate the fertility of older women. However, it is possible that the cohort fertility of women in their forties was in fact slightly lower than the level of fertility prevailing at present. It is also unclear why women should omit more births in the individual survey than they did in the household survey. Therefore, we believe that the main explanation of why the mean parities of older women in the individual survey are rather low is that high parity women are under-represented in the sample. In chapter 2 it was suggested that many potential respondents were enumerated as age 50 or more during the household screening. It is probable that interviewers would have been less likely to enumerate a woman as aged 50 or more if she had only a small family.

If there is some omission of children by older women as well as bias in the sample, it is likely that there will be differentials in omission by the sex of the child and whether or not it survived until the time of the survey. Table 15 looks at the proportions of children who have died classified by the age of their mother. Fewer dead children were reported by respondents of all age groups from the mid-twenties on in the individual survey than had been in the household survey. Child deaths are unlikely to be over-represented in the household survey data, so this might indicate omission of dead children in the individual survey. However, it could also be explained by biases in the sample of women. When the proportions of dead male and dead female children reported in the individual survey are compared, the former appear to be rather low among older respondents. The responses of younger mothers indicate that male mortality in childhood is higher than female mortality, which is what might be expected. However, the 45–49 year old women actually report a lower proportion of dead sons than daughters. This cannot be explained by biases in the sample of women. Sampling errors should be taken into account, but it appears possible that there was some omission of dead children, predominantly sons, in the individual survey. Further evidence for this can be found in the sex ratio of the births reported by respondents. Sex ratios are shown for different periods and cohorts in

Table 15 Proportion of children ever born that have died by age of women

Age	Individual survey			Household survey
	Males	Females	Both sexes	Both sexes
15–19	0.103	0.092	0.098	0.127
20–24	0.153	0.145	0.149	0.140
25–29	0.164	0.148	0.156	0.171
30–34	0.195	0.181	0.188	0.193
35–39	0.210	0.160	0.185	0.193
40–44	0.205	0.195	0.200	0.229
45–49	0.230	0.237	0.233	0.249

Table 16 Sex ratios at birth by current age of mothers and period before the survey (no of births in parentheses)

Years before the survey	Age group at interview				
	15–24	25–34	35–44	45–49	All
0–4	118 (1095)	100 (1699)	99 (808)	120 (90)	105 (3693)
5–9	99 (147)	99 (1367)	97 (1080)	80 (199)	95 (2792)
10–14	– (12)	93 (655)	93 (1228)	78 (296)	91 (2190)
15–19		158 (129)	104 (1057)	130 (328)	113 (1514)
20–24		– (7)	108 (490)	110 (364)	108 (862)
25–29			102 (113)	105 (265)	104 (377)
30–34			– (4)	100 (55)	100 (58)
All	116 (1272)	100 (3874)	99 (4789)	102 (1596)	101 (11531)

table 16. Sex ratios estimated from samples of births have large variances and, although these results are more erratic than might be expected, few differ significantly from values that can be considered plausible. However, the very low sex ratios reported for the period 10–15 years before the survey are unlikely to be explicable by sampling errors. The high sex ratio for births in the period 15–20 years before the survey suggests that much of the explanation lies in biases in the reporting of the ages of teenage children. Nevertheless the ratios provide further evidence of omission of male births by older respondents. Thus, although we believe that the main explanation of the low parities reported by women in their forties in the individual survey is bias in the sample, in addition these respondents probably omitted some births.

5.3 FERTILITY BY COHORT AND PERIOD

We have argued that the dates reported in the birth histories are fairly accurate for recent years. There is some digital preference in the reporting of year of birth but the estimates do not appear to be subject to major biases. This section considers the quality of date reporting in the birth histories as a whole. Fertility rates for five-year age cohorts and five-year periods before the survey are presented in table 17. It should be noted that such cohort–period rates are not comparable with conventional age–period rates. The same women are followed through time and each rate reflects the fertility experience of women over a ten-year age range centred on the lower limit of the age group at the end of the period. The cumulative fertility of real and synthetic cohorts is presented in the second and third panels of the table. The lowest panel contains P/F ratios obtained by comparing the mean parities of the real cohorts to those of the equivalent synthetic cohorts (Hobcraft, Goldman and Chidambaram 1982).

Cohort–period fertility rates for equivalent age groups, which are to be found by reading along the rows of the table, provide no evidence of significant trends in fertility over time. The P/F ratios for women under 40 only deviate from unity in a trivial and erratic way. However, the recent rise in the fertility of young women is apparent in the rates for women aged 20–24 at the end of a period if they are examined for the most recent two periods. It has a slight impact upon cumulated period fertility. Women who were in their forties at the time of the survey report rather lower fertility than younger cohorts but, as we have already suggested, this probably reflects errors and biases in the data rather than any real trend. Yet, even if the data supplied by older women are discounted, the fertility rates for individual age groups do seem to fluctuate somewhat erratically over time. The explanation becomes clear if the reporting of the different cohorts is examined. This can be done by reading up the diagonals of the first two panels of the table. The cohort aged 30–34 at the time of the survey reports slightly higher fertility than the immediately older and younger cohorts did at equivalent ages. This is reflected in the P/F ratios in the fourth panel. We concluded in section 5.2 that the fertility estimates for this age group are biased upwards because these ages are reported by a number of older and higher parity women. Moreover the fertility of 35–39 year old women could be slightly underestimated because of age exaggeration and omissions of the type that affect the data on respondents in their forties more severely.

Displacement of the dates of birth is liable to distort age patterns of fertility estimated from the maternity histories. It is easier to assess whether such errors are affecting the data if the rates in table 17 are presented graphically. This is done in figure 6. On the whole the cohorts aged less than 40 at the time of the survey report very similar age patterns of fertility to each other which suggests that the dating of births by these women was very reliable. However, the 30–34 year old women report slightly earlier fertility than all other cohorts except the youngest. For the latter group we believe the difference to be genuine but for the 30–34 year olds this is precisely the distortion to be expected in the estimates if the women are slightly older than they claim. Although the dating of births seems very accurate it is probably subject to minor errors, which might have implications for certain detailed analyses of fertility. For example, table 17 shows that the fertility rate centred on age ten is higher for women aged 25 or more at the time of the survey than for younger respondents. As we believe that the frequency of early marriage has increased, not declined, this suggests that there might be a tendency for women to slightly underestimate their age at first birth that corresponds to their tendency to understate age at first marriage.

The fertility schedules obtained from respondents in their forties are more difficult to interpret. On the face of it the shortfall in their fertility is concentrated in the central ages of childbearing. However, this pattern is likely to be the net result of the complex interaction of biases in the sample, age misstatement, omission of children and the misdating of births. The first factor is liable to affect all ages proportionately. The tendency of 45–49 year olds to report age 44 will produce too young an age pattern of fertility for the 40–44 year old women. Table 17 suggests that the fertility rates centred on age 15 are too high for respondents in their forties in 1977. It therefore seems likely that older respondents tended to displace the dates of births backwards. If recent births are dated relatively

Table 17 Cohort–period fertility rates, cumulative cohort and period fertility, and P/F ratios for five-year periods before the survey

Age group of cohort at end of period	Years before survey						
	0–4	5–9	10–14	15–19	20–24	25–29	30–34
A Cohort–period fertility rates							
10–14	0.000	0.000	0.003	0.004	0.003	0.001	0.002
15–19	0.032	0.035	0.034	0.043	0.030	0.045	0.038
20–24	0.198	0.178	0.198	0.184	0.166	0.172	
25–29	0.269	0.264	0.263	0.249	0.240		
30–34	0.246	0.240	0.227	0.215			
35–39	0.198	0.195	0.193				
40–44	0.126	0.129					
45–49	0.059						
B Cumulative fertility of cohorts at end of periods (P)							
15–19	0.160	0.190	0.187	0.232	0.156	0.234	0.192
20–24	0.181	1.079	1.221	1.078	1.064	1.054	
25–29	2.422	2.540	2.392	2.307	2.253		
30–34	3.773	3.589	3.442	3.328			
35–39	4.577	4.417	4.295				
40–44	5.045	4.940					
45–49	5.236						
C Cumulative fertility within periods (F)							
15–19	0.160	0.177	0.183	0.235	0.167	0.228	0.198
20–24	1.181	1.069	1.172	1.157	0.997	1.090	
25–29	2.494	2.389	2.485	2.400	2.196		
30–34	3.726	3.586	3.620	3.475			
35–39	4.714	4.561	4.587				
40–44	5.342	5.206					
45–49	5.638						
D P/F ratios							
20–24	1.026	1.009	1.042	0.932	1.067	0.967	
25–29	0.971	1.064	0.962	0.961	1.026		
30–34	1.012	1.001	0.951	0.958			
35–39	0.971	0.968	0.936				
40–44	0.944	0.949					
45–49	0.929						

accurately this could produce the substantial dip observed in the fertility schedules for the older women at around ages 25–35. Moreover it is possible that omission of births was concentrated at these ages and that fewer early and recent maternities were not reported upon.

Cohort–period fertility rates can be calculated for different birth orders. Such rates provide a very sensitive test of whether the birth history data are affected by the omission of births or the misdating of events. First birth rates, the proportions of each cohort that have become mothers and fertility rates for births of order four or higher are presented in table 18. The cumulative proportion of respondents who have had a child by various ages is very similar for the different cohorts. However if, as we have suggested, the dates of first births are displaced backwards, these proportions might conceal a recent rise in early fertility. The only slight inconsistencies in the first birth rates are that the cohort aged 30–34 at the time of the survey reports slightly earlier entry into motherhood than the others and that the pattern for older women seems slightly distorted. These features of the rates are consistent with the analysis of the errors affecting data on these cohorts that we have already offered.

The cohort–period fertility rates for high order births are rather disturbing. Reading along the rows of table 18 it is clear that the rates for almost every age group decline rapidly as the interval since the births increases. This trend affects women currently in their late twenties and thirties as well as respondents in their forties. Any rise in fertility in Lesotho is highly unlikely to be restricted to high order births alone. These rates therefore represent striking evidence of omission of births by high parity women of all

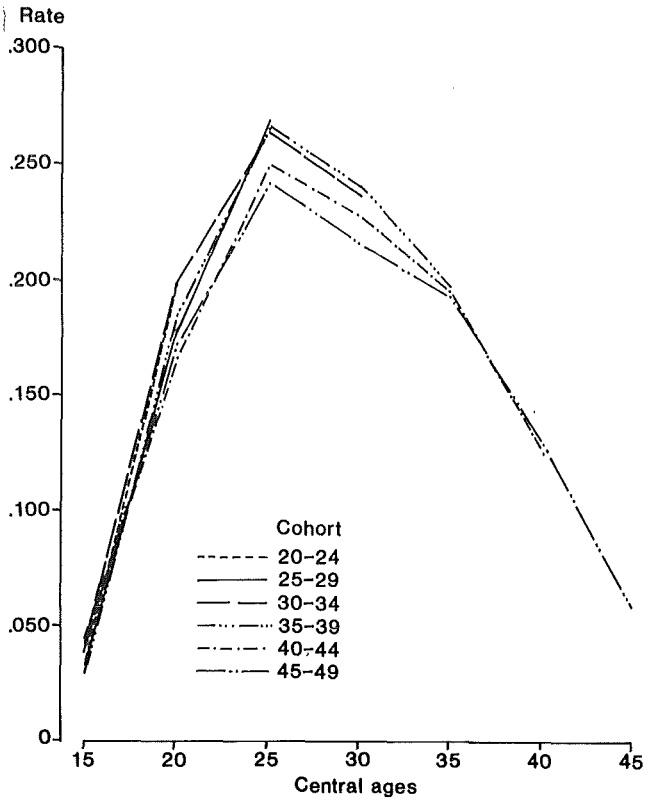

Figure 6 Cohort–period fertility rates re-aligned to compare cohort fertility at central ages

ages. We have concluded already that this is probably true of older women. It also seems to be the case for younger respondents. Of course those women aged less than forty who have had four or more births are a relatively small group whose characteristics will differ from those of the population as a whole. It is not particularly surprising that they supply rather poor information. These omissions of births have no detectable effect on fertility estimates for the population as a whole. Despite this they might seriously affect detailed studies of fertility in Lesotho, for example analyses of birth intervals.

5.4 EDUCATIONAL DIFFERENTIALS IN FERTILITY

The fertility data collected in the maternity histories seem reliable on the whole, despite evidence of some omission of births by high parity women. However, it is likely that the reports of subgroups of the population with differing social and economic characteristics will vary markedly in quality. Education is one factor likely to have an important influence upon the accuracy of the information that women supply. Such variations in data quality might affect studies of fertility differentials in Lesotho. This section examines the fertility data on women with differing levels of education in order to assess whether or not this is a problem.

The mean parities reported by women of different ages and levels of schooling are shown in table 19. As can be seen from table 1, the groups without any schooling and with secondary or higher education are rather small in size. The estimates are compared with those obtained from the household survey. Concentrating first upon women with some formal schooling, at ages less than 40 mean parities calculated from the two sources are very similar. They suggest both plausible age patterns of fertility within each educational group and plausible educational differentials in lifetime fertility. Women with secondary or higher education have much lower fertility than those with only primary schooling. However, the differential between the groups with lower primary and upper primary education is small although the former group appears to have higher fertility at early ages. For women in their forties the estimates from the two surveys agree less well. In particular the mean parities obtained in the individual survey seem too low for the 40–44 year old women with lower primary schooling and the 45–49 year old women who remained at school for the upper primary grades. We have suggested that there was a tendency to exaggerate the ages of older women, particularly those of high parity, during the household screening so that they were excluded from the individual survey. Perhaps this applied to younger women among the less educated groups. There are too few women with secondary or higher education included in the individual survey to permit calculation of mean parities for the older age groups. The rather erratic values obtained for this educational group from the household survey also probably reflect small numbers.

The estimates for women who have had no formal schooling seem much less plausible. Some of the inconsistencies, in the individual survey data at least, probably result from sampling errors. It seems likely that the fertility of this group is similar to that of women with lower primary education. On this basis not only the individual survey estimates of the parity of older women but also those from the household survey seem rather low. This suggests that omission of births was concentrated among this section of the population. Moreover the very low estimate of the parity of 35–39 year old women yielded by the individual survey indicates that the biases in the sample that result from overestimation of age during the household screening may extend to under-representation of uneducated high parity women of this age group.

Cohort–period fertility rates for the four educational groups are shown in table 20. For women with no schooling the rates reported by women aged 35 or more at the time of the survey are lower at all comparable ages than those reported by younger women. There is some suggestion that the discrepancy is more serious for more distant periods. This is probably indicative of omission of early births. The cohort–period rates for women with some schooling are more satisfactory. However, as in the national data, the fertility estimates for the oldest cohorts drop below those for younger women in the central ages of childbearing. Examination of the rates obtained from women aged less than 40 confirms the conclusions we came to on the basis of the cross-sectional data on lifetime fertility. Uneducated women and those with only lower primary schooling have similar age patterns of fertility. Women with upper primary schooling have a slightly later age pattern of fertility while those with secondary or higher education have much lower and later fertility than other groups. Table 20 suggests that even among the less educated sectors of Lesotho's population the dating of births by younger respondents is fairly reliable. The cohort–period fertility rates for the highly educated group suggest that the fertility of these women is

Table 18 Cohort–period fertility rates for first births and births of order four or higher and cumulative proportions of cohorts becoming mothers for five-year periods before the survey

Age group of cohort at end of period	Years before survey						
	0–4	5–9	10–14	15–19	20–24	25–29	30–34
A First birth rates							
15–19	0.028	0.028	0.026	0.033	0.023	0.033	0.029
20–24	0.106	0.103	0.098	0.105	0.088	0.099	
25–29	0.042	0.041	0.045	0.047	0.042		
30–34	0.008	0.010	0.010	0.010			
35–39	0.001	0.003	0.006				
40–44	0.002	0.001					
45–49	0.000						
B Cumulative proportion becoming mothers							
15–19	0.14	0.15	0.15	0.18	0.12	0.17	0.15
20–24	0.68	0.66	0.67	0.64	0.61	0.64	
25–29	0.88	0.87	0.87	0.85	0.85		
30–34	0.91	0.92	0.90	0.90			
35–39	0.93	0.91	0.93				
40–44	0.92	0.94					
45–49	0.94						
C Birth rates for orders $\geqslant 4$							
15–19	0.018	0.038	0.032	0.012	0.003	0.001	0.000
20–24	0.061	0.040	0.024	0.014	0.011	0.009	
25–29	0.105	0.084	0.081	0.069	0.058		
30–34	0.199	0.166	0.159	0.145			
35–39	0.196	0.187	0.176				
40–44	0.134	0.133					
45–49	0.078						

declining. These estimates are based upon very small numbers but are unlikely to be greatly affected by reporting errors. With the exception of the most recent rate for women aged 20–24 at the end of the period, which will be affected by rises in nuptiality, all the rates suggest substantial fertility decline. At the time of the survey the mean parity of 30–34 year old women was half a child less than that of 35–39 year old women at equivalent ages. Moreover the decline in the fertility of women aged 25–29 in 1977 looks likely to be even more substantial.

Table 19 Mean parities by age group and education of women in the individual (I) and household (HH) surveys

Age	No schooling		Lower primary		Upper primary		Secondary +	
	I	HH	I	HH	I	HH	I	HH
15–19	0.4	0.4	0.2	0.2	0.1	0.1	0.0	0.1
20–24	1.3	1.4	1.5	1.3	1.2	1.2	0.5	0.5
25–29	2.6	2.4	2.6	2.6	2.4	2.4	1.4	1.5
30–34	4.0	3.7	3.9	3.9	3.7	3.7	2.9	3.0
35–39	3.8	4.7	4.7	4.7	4.6	4.6	4.4	3.9
40–44	4.8	4.8	4.9	5.4	5.4	5.1	–	5.3
45–49	5.0	5.5	5.5	5.6	5.1	5.7	–	4.4

Table 20 Cohort–period fertility rates for five-year periods before the survey by level of education

Age group of cohort at end of period	Years before survey						
	0–4	5–9	10–14	15–19	20–24	25–29	30–34
A No schooling							
15–19	0.08	0.04	0.08	0.07	0.03	0.02	0.04
20–24	0.22	0.19	0.21	0.13	0.17	0.13	
25–29	0.25	0.26	0.21	0.24	0.21		
30–34	0.26	0.23	0.22	0.20			
35–39	0.16	0.20	0.15				
40–44	0.10	0.18					
45–49	0.11						
B Lower primary							
15–19	0.04	0.06	0.04	0.05	0.03	0.06	0.05
20–24	0.23	0.19	0.23	0.20	0.18	0.19	
25–29	0.29	0.25	0.27	0.23	0.24		
30–34	0.25	0.22	0.21	0.22			
35–39	0.21	0.18	0.21				
40–44	0.13	0.14					
45–49	0.06						
C Upper primary							
15–19	0.03	0.03	0.03	0.04	0.03	0.03	0.02
20–24	0.21	0.18	0.18	0.19	0.15	0.15	
25–29	0.27	0.28	0.26	0.28	0.27		
30–34	0.25	0.26	0.26	0.23			
35–39	0.19	0.23	0.19				
40–44	0.13	0.11					
45–49	0.04						
D Secondary +							
15–19	0.01	0.01	0.00	0.01	0.01		
20–24	0.10	0.07	0.09	0.12			
25–29	0.21	0.28	0.27				
30–34	0.20	0.28					
35–39	0.21						

6 Mortality

The LFS is an important source of information upon mortality in Lesotho. The maternity histories included a question on the age at death of all deceased children. Moreover the household schedule included the entire WFS mortality module. This comprises a question on deaths in the household during the two years before the survey and questions on the proportions dead of children ever born and on the survival of respondents' parents and first spouses. These yield data which can be used to estimate mortality levels and trends by indirect methods. Thus estimates of both childhood and adult mortality can be obtained from the LFS data in several more or less independent ways.

6.1 INFANT AND CHILDHOOD MORTALITY

It was mentioned in section 2.2 that the age at death of 6.2 per cent of all the child deaths reported in the maternity histories is unknown. It can be seen from table 21 that these deaths are fairly evenly distributed between groups of respondents and child deaths with different characteristics. While omission of these deaths from the analysis will affect the overall level of mortality, it is unlikely to bias the estimates greatly in other ways. The individual questionnaire asked for the age at death of dead children in completed years and months. However 60 per cent of deaths at age one and 86 per cent of all deaths at ages two to four are heaped on the exact age in years. It seems likely, and is assumed for the purposes of this analysis, that age was usually reported in completed years. This means that, if there was a tendency to round the age at death of children up to an exact age in years, the results we present will underestimate the concentration of child deaths in early life.

In our discussion of table 15 in chapter 5 we pointed out that women of the same age reported a lower proportion of dead children among those ever born in the individual survey than in the household survey. It seems improbable that too many child deaths were reported in the household survey which implies that estimates of infant and childhood mortality based upon the maternity history data tend to be too low. This is probably a result of the biases which affect the individual survey sample. It includes too few uneducated respondents and the children of such women are likely to experience higher than average levels of mortality. It is clear from table 15 that the discrepancy between the two phases of the LFS is greater among older respondents than among younger ones. It is at older ages that the biases in the individual survey sample are most serious.

Life-table probabilities of death for different ages in childhood and periods before the survey are shown in table 22. The estimates for the two sexes combined suggest that there was a steady decline in the infant mortality rate over the 15-year period before the survey. This was accompanied by a much smaller decline in the level of mortality later in childhood. On the face of it these trends seem plausible. The estimates for earlier periods, however, are less believable. They suggest that there was an abrupt rise in mortality between birth and exact age two in the early 1960s and that this was preceded during the 1950s by a rapid fall in mortality between exact ages one and five from very high levels. There is no reason to suppose that this occurred. The estimates for these more distant periods are based upon a small and selected sample of births. Many

Table 21 Percentage of deaths for which age at death was not stated by characteristics of the birth and the respondent

A Years before the survey at which the birth occurred

0–4	5–9	10–14	15–19	20–24	25–29	30–34
6	7	6	7	7	5	0

B Sex of the birth

Male	Female
6	7

C Age of the mother at interview

15–19	20–24	25–29	30–34	35–39	40–44	45–49
0	6	6	4	8	6	9

D Level of education of the mother

No schooling	Lower primary	Upper primary	Secondary +
5	7	6	6

Table 22 Probabilities of death in infancy and childhood for five-year periods before the survey according to sex, individual survey data[a,b]

Probability of death	Years before the survey				
	0–4	5–9	10–14	15–19	20–24
A Both sexes					
$_1q_0$	0.126	0.133	0.148	0.121	0.142
$_1q_1$	0.029	0.031	0.032	0.023	0.046
$_3q_2$	0.027	0.030	0.030	0.034	(0.050)
$_5q_0$	0.174	0.185	0.199	0.171	(0.222)
B Males					
$_1q_0$	0.129	0.137	0.148	0.127	(0.168)
$_1q_1$	0.032	0.040	0.035	0.019	(0.055)
$_3q_2$	0.030	0.028	0.029	(0.037)	(0.052)
$_5q_0$	0.182	0.195	0.201	(0.176)	(0.255)
C Females					
$_1q_0$	0.122	0.130	0.148	0.114	(0.113)
$_1q_1$	0.026	0.022	0.029	0.027	(0.035)
$_3q_2$	0.028	0.031	0.031	(0.031)	(0.048)
$_5q_0$	0.165	0.175	0.198	(0.165)	(0.185)

[a] This table has been extracted from Rutstein (1983). All deaths for which age at death is unknown are assumed to be infant deaths.
[b] Estimates in brackets are based upon less than 500 children exposed.

of these will have been reported upon by the biased sample of older women. They will include a disproportionate number of first births and births to teenage mothers. Both of these are factors likely to have adverse effects on the child's chance of survival. An examination of trends and differentials in mortality by sex broadly supports this view of the data. The most recent estimates suggest a consistent and plausible sex differential in the level of mortality. The estimates for the two sexes separately suggest the same steady decline in mortality, concentrated in infancy, over the past 15 years. Mortality up to age two in the period 15–19 years before the survey seems rather low for both sexes and the data for the more distant past suggest very improbable trends and differentials in mortality by sex. Even in the period 5–14 years before the survey the sex differential in the probability of death at certain ages seems implausible. Sampling errors must be allowed for, but close study of table 22 suggests that male mortality is underestimated in the period 10–14 years before the survey. It was argued in sections 5.2 and 5.3 both that the sex ratio at birth for this period is rather low and that estimates of the fertility of older women during it are biased downwards. We therefore suspect that the level and trend of infant and child mortality can be estimated reliably from the maternity history data only for about the ten years before the survey.

The appreciable number of child deaths for which age at death was unstated or only incompletely supplied make it important to assess the plausibility of the age pattern of mortality obtained from the maternity history data. Comparison of the relationship between $_1q_0$ and $_4q_1$ with that found in each of the four Coale and Demeny model life-table families suggests that the pattern of mortality in Lesotho falls in between East and West and is rather closer to the former. Table 23 shows the levels of mortality in the East family model life tables that fit the reported values of $_1q_0$ and $_4q_1$ for five-year periods before the survey. The

Table 23 The level of mortality in the East family model life tables corresponding to $_1q_0$ and $_4q_1$ for five-year periods before the survey

Years before the survey	Level of the East model life table	
	$_1q_0$	$_4q_1$
0–4	15.2	14.3
5–9	14.7	13.7
10–14	13.9	13.6
15–19	15.5	15.0
20–24	14.2	10.7

patterns of mortality reported for the two most recent periods are very similar indeed. However, either the relationship between infant and childhood mortality has changed somewhat over time or, as we have already suggested, there are errors in the estimates for periods more than ten years before the survey. It is characteristic of the East family model life tables that early mortality is heavily concentrated in infancy. It is often thought that the reverse situation applies in Africa and that childhood mortality after infancy is relatively high. The 1976 census report, for example, suggests that mortality in Lesotho follows the North pattern. We believe it implausible that such consistent results could be concealing such gross errors as those implied if a North pattern of childhood mortality in fact prevails in Lesotho.

Levels of and trends in childhood mortality can also be estimated by indirect means from the proportions of children ever born that have died. This information is available from both the individual and the household surveys. Because the individual survey data on child deaths appear to be biased downwards we concentrate upon the latter source of information. The proportions of children that have died by their sex and the age of their mothers at the time of the survey are shown in table 24. The data on both male and female children suggest that women aged 35–39 report too few child deaths and women aged 30–34 slightly too many. This probably arises from age misstatement. We have argued that, in the individual survey at least, some older women, who will have a higher proportion of dead children on average, reported ages 30–34; moreover in chapter 3 we suggested that rather too few women were enumerated as aged 35–39. Our analysis of the fertility data did not find evidence to suggest that the bulk of women aged 35–39 were omitting births or that the data on them were otherwise biased. However, in their thirties and forties the number of children ever born

Table 24 Proportions of children who have died by age of their mothers, household survey data (*de jure*)

Age	Males	Females	Sex ratio of deaths
15–19	0.1308	0.1218	109
20–24	0.1459	0.1337	114
25–29	0.1756	0.1624	110
30–34	0.2016	0.1817	114
35–39	0.2016	0.1823	112
40–44	0.2386	0.2147	114
45–49	0.2544	0.2349	111

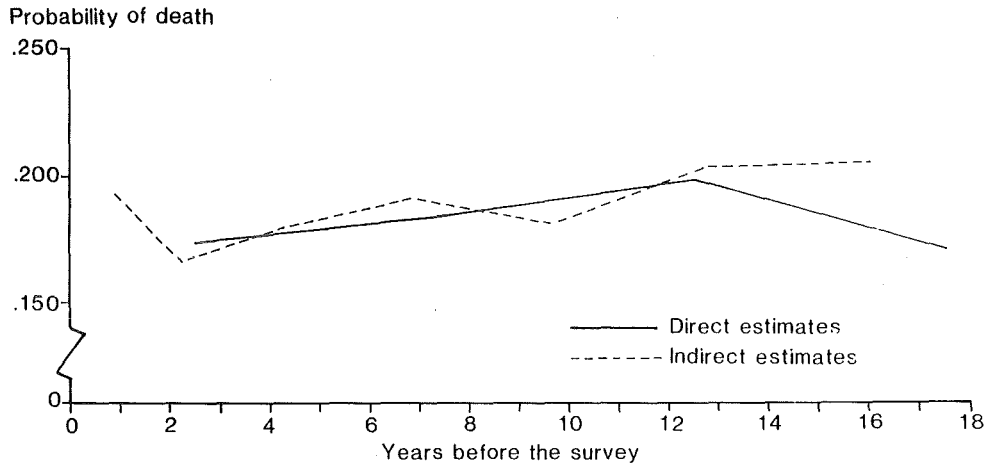

Figure 7 Probability of death by age five ($_5q_0$) according to the direct estimates (individual survey) and indirect estimates (household survey)

women have increases relatively slowly with age. Thus the mortality data presented here will be more sensitive to the effects of biased age reporting than the fertility data.

The sex ratios of child deaths according to the age of their mother seem fairly plausible. They suggest that there are 9–14 per cent more deaths of sons than daughters. This is compatible with a sex ratio of 103–105 at birth and slightly higher male than female mortality. The sex ratio of deaths could be expected to increase slightly with the respondent's age and, although there are erratic fluctuations in the index, this is what tends to occur.

Various methods have been developed for estimating conventional life-table indices and the dates to which they apply from proportions of dead children. For the present analysis Trussell's East family regression equation was used (United Nations 1983). Estimates of $_5q_0$ for both sexes obtained from the household survey data in this way are compared with the direct estimates from the individual survey data in figure 7.[5] On the whole the two sets of estimates agree very closely as to the level and trend of childhood mortality. The most recent indirect estimate of $_5q_0$ is obtained from the responses of 15–19 year old women and reflects the high mortality of the children of young mothers. The low proportion dead of children ever born reported by 35–39 year old women produces an estimate that falls below the general trend. Otherwise the two sources agree that there was a steady but slow decline in the level of child mortality over the 15 years before the survey. The indirect estimates tend to confirm that the increase in mortality registered by the birth history data immediately before this period is spurious. Thus reports of the proportions dead of children ever born in the household survey seem to be of a high quality and to yield reliable estimates of mortality in childhood.

[5] The decision to use East family regression equations was made in light of our discussion of the age pattern of mortality reported in the maternity history data. Circularity in the argument is avoided by expressing the results in terms of $_5q_0$ in the fitted life table. Estimates of this index are only slightly affected by assumptions about the age pattern of mortality.

6.2 ADULT MORTALITY

The most straightforward way of estimating the level of adult mortality from data collected in the LFS is to calculate age-specific death rates from the reports of deaths in the household during the two years before the survey that were collected in the household survey. Figure 8 shows the number of deaths by sex reported in each month for which data are available. Substantially greater numbers of deaths were reported in the 12 months before the survey than in the year before that. This probably results from both the omission of more distant deaths and the dissolution of households. There is also considerable heaping of the dates of deaths on times exactly one year before the household was interviewed. This analysis includes deaths in the period 0–11 months before the survey in the numerators of the death rates together with deaths at 12 months in those households interviewed in the first half of a month. Age–sex specific death rates calculated in this way are shown in table 25. The rates may be considered plausible in a very general way in that they suggest higher male than female mortality and increase rapidly with age. However, they are very erratic. This reflects both sampling errors and heaping and biases in the reporting of age at death. It suggests that it is impossible to estimate the age pattern of mortality in adulthood from these data although by chaining the rates it might be possible to estimate the level of adult mortality over a broader age range.

Under favourable conditions the growth balance equation can be used to assess the completeness of death reporting in data such as these. The technique is based on the fact that in a stable population the number of deaths above any age is related to the size of the population of that age (Brass 1975). Plots of the death rate above each age against the ratio of the population at that age to the population at older ages are shown in figure 9. In a stable population growing at 2.3 per cent per annum the points would fall on the solid line added to the graphs. Incomplete death reporting is suggested if a line fitted through the points has a steeper slope. The results of the test are inconclusive. Migration and biases in the age and age at death data are distorting the trend of the points. They offer no strong

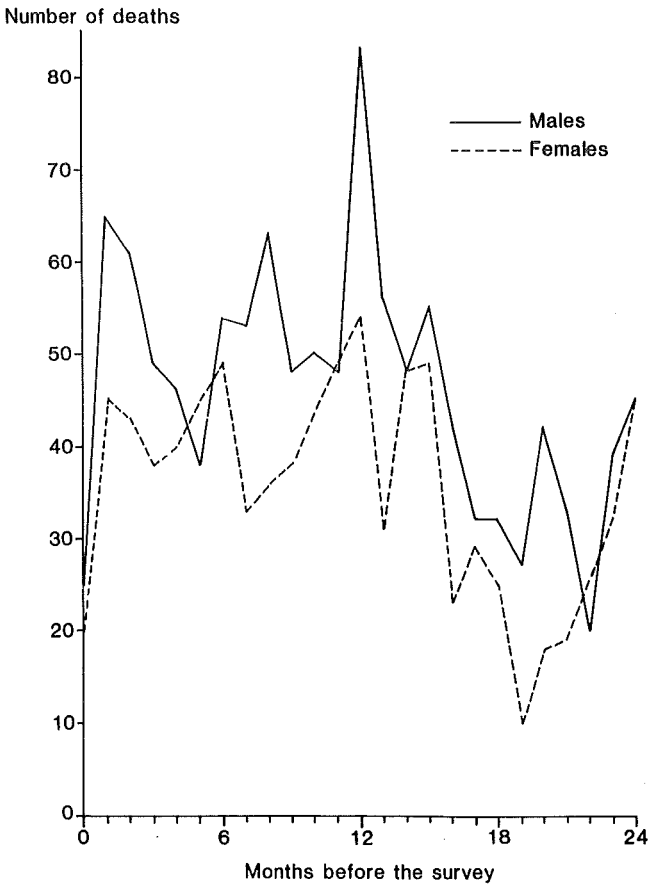

Figure 8 Deaths in the enumerated households by time of occurrence and sex

evidence that death reporting is incomplete but, because a variety of lines could be fitted to them, they also fail to confirm the accuracy of the data.

Estimates of the level of and trend in adult mortality can be obtained indirectly using the results of the orphanhood and widowhood questions asked in the household survey. The proportions of male and female respondents with living mothers and fathers are shown in table 26. The proportions decrease steadily with age and in each age group respondents report considerably more living mothers than fathers. This is to be expected both because male mortality is usually heavier than female mortality and because on average men have children at considerably later ages than women in Lesotho. However, the tendency for male respondents to report considerably higher proportions of living mothers and slightly higher proportions of living fathers than female respondents suggests that there are errors in the data. It could indicate a tendency to under-report orphanhood on the part of male respondents. However, the same pattern would be produced if males exaggerate their ages relative to females or females understate their ages relative to males. Poor reporting by males is suggested by the fact that the reporting of the two sexes upon maternal orphanhood differs more than their reporting upon paternal orphanhood. However, the large discrepancies between the reporting of the two sexes at older ages suggests that age misstatement is also an important factor.

The proportions of respondents who reported that their first spouse is alive are shown in table 27. One problem with these data is that the household schedule was designed in such a way that the question of widowhood was only asked of respondents who had been married more than once. This means that it is not known whether or not the first spouse of divorced and separated respondents who have been married only once is alive. Such individuals have been excluded from both the numerators and the denominators of the proportions. In the age groups of interest 3–5 per cent of male respondents and 4–6 per cent of female ones have been omitted in this way. It seems unlikely that the mortality of their spouses is sufficiently different from that of the population in general to substantially affect the figures in table 27. The proportions appear reasonable. They decrease steadily with age. Moreover, for the same age groups they indicate that many more husbands have died than wives. This reflects the fact that on average men are older than their wives and probably in addition sex differentials in mortality that favour women.

Life-table measures of conditional survivorship in adulthood calculated from the recent deaths, orphanhood and widowhood data are presented in table 28. The indirect estimates were obtained using weighting methods (Brass and Hill 1974; Hill 1977) and the direct ones from the death rates in table 25. The estimates measure the subsequent mortality of those who attain a variety of ages

Table 25 Age-sex specific death rates (per 1000) calculated from deaths in the household in the year before the survey

Age	Males	Females
5–9	1.9	1.1
10–14	1.7	0.9
15–19	2.1	3.2
20–24	4.2	3.9
25–29	8.3	0.9
30–34	6.2	7.5
35–39	11.4	2.7
40–44	13.4	8.5
45–49	12.9	4.2
50–54	21.7	9.5
55–59	21.5	7.8
60–64	35.2	15.7
65–69	52.8	16.7
70–74	73.0	34.3

Table 26 Proportions of respondents by sex who have living parents

Age	Mothers alive		Fathers alive	
	Males	Females	Males	Females
15–19	0.9372	0.9362	0.7598	0.7449
20–24	0.9138	0.8887	0.6846	0.6434
25–29	0.8719	0.8357	0.5761	0.5577
30–34	0.8005	0.7559	0.4487	0.4552
35–39	0.7068	0.6723	0.3510	0.3380
40–44	0.6130	0.5498	0.2357	0.2231
45–49	0.4948	0.4601	0.1797	0.1570
50–54	0.3650	0.3390	0.1116	0.0839
55–59	0.2703	0.1964	0.0568	0.0423
60–64	0.1707	0.1186	0.0412	0.0213

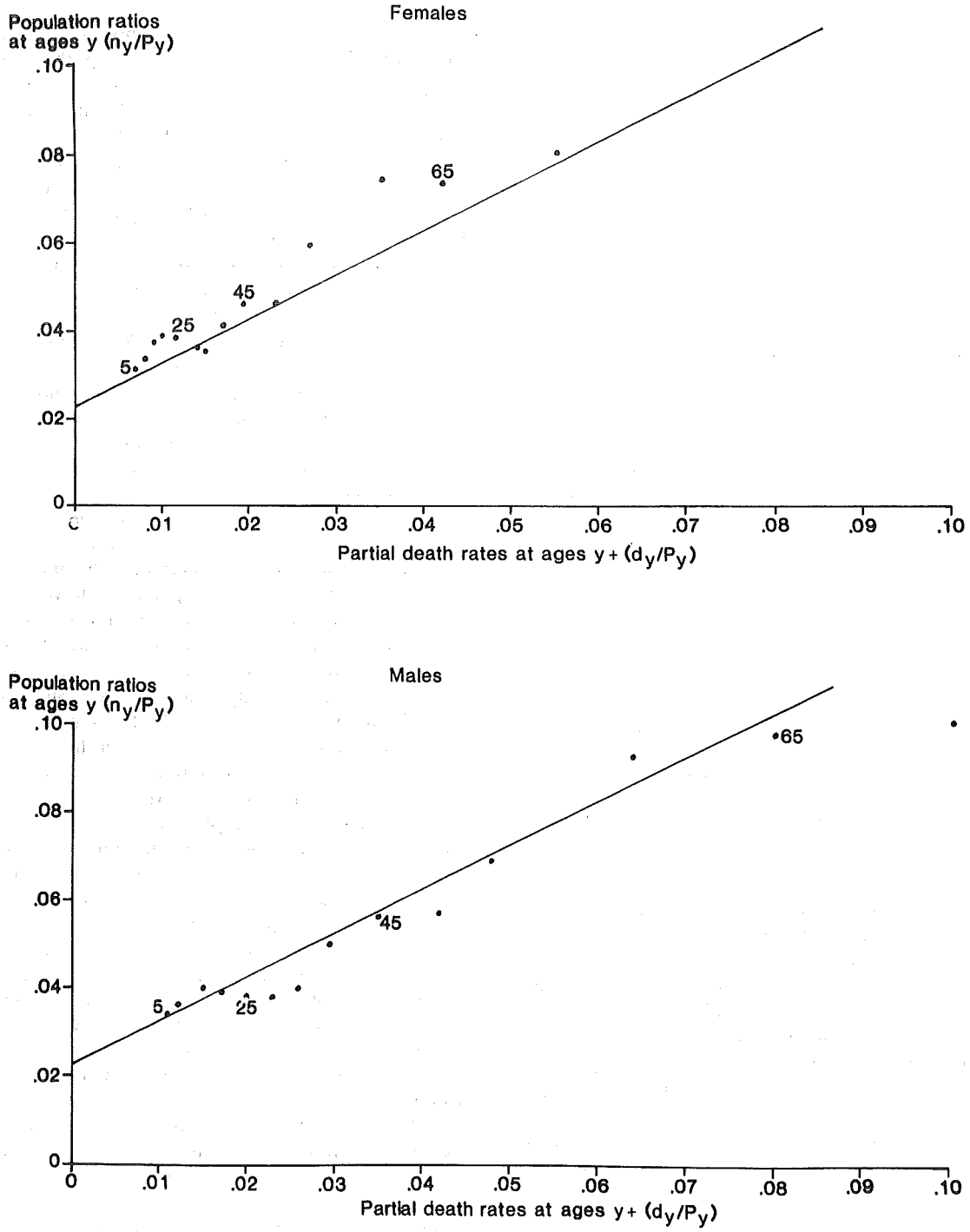

Figure 9 Population ratios at ages y and death rates above ages y by sex

in early adulthood. Only the estimates obtained from the orphanhood and recent deaths data for females can be directly compared. Fitted values of alpha, the level parameter of the relational model life-table family based upon the General Standard (Brass 1971), are also presented alongside each estimate to ease further comparisons. Low values of alpha indicate light mortality and in all the series of measures, except those estimating male mortality from widowhood, the estimates obtained from the oldest respondents indicate lighter mortality than those obtained from respondents in the central ages of adulthood. This probably results from a general tendency among respondents in their fifties and sixties to exaggerate their ages. The recent deaths data refer to 1976–7 and are unlikely to overestimate mortality levels. On this basis the alpha value of -0.62 obtained from the survivorship proportion $1_{55}/1_{25}$ represents a lower limit to the level of mortality experienced by adult women at the time of the survey. This suggests that the orphanhood and widowhood data, which reflect more distant mortality, yield slight underestimates. Values of alpha rise slowly but consistently with age for the survivorship proportions obtained from the orphanhood data. This suggests that there has been some decline in female adult mortality levels. Estimates from the widowhood data fluctuate erratically with age. They are not accurate enough to support or conflict with the suggestion

Table 27 Proportions of ever-married respondents whose first spouse is alive

Age	Male respondents	Female respondents
15–19	0.9835	0.9934
20–24	0.9949	0.9811
25–29	0.9908	0.9669
30–34	0.9752	0.9293
35–39	0.9692	0.8965
40–44	0.9358	0.8110
45–49	0.9120	0.7287
50–54	0.8886	0.6365
55–59	0.8569	0.5071
60–64	0.8344	0.3839
65–69	0.7763	0.3257

that mortality may be declining. The estimates of the level of mortality among adult males obtained from orphanhood data are very consistent. They do not suggest any improvement in the mortality of adult males. They also agree closely with the estimates made from the recent deaths data which, we have suggested, represent a lower limit to the level of mortality in 1976–7. Both series of survivorship proportions suggest that male mortality in adulthood is very considerably higher than female mortality. The widowhood-based estimates for males are less satisfactory. They suggest that there has been a rapid decline in mortality levels over time. The estimates from younger respondents are far lower than those obtained from the recent deaths data. None of the other evidence on adult and childhood mortality suggests that such a major decline could have occurred. It seems that the estimates are biased, presumably because younger women under-report deaths of first husbands.

To summarize this discussion, the data collected in the household survey that can be used to estimate male and female mortality in adulthood appear to be of a fairly high quality. However, it seems likely that both recent deaths in the household and deaths of parents and spouses were slightly under-reported. The data supplied by women on the deaths of their first husbands are particularly badly affected and are less accurate than the other sources of adult mortality estimates. In addition age exaggeration by respondents in their fifties and sixties reduces the usefulness of the information obtained from these age groups. If these deficiencies in the data are borne in mind, they appear sufficiently reliable to enable the study of levels, trends and differentials in adult mortality. However, they yield little information concerning the age pattern of mortality within adulthood.

Table 28 Estimates of conditional survivorship in adulthood and corresponding values of α by sex

Age	Females						Males					
	Orphanhood		Recent deaths		Widowhood		Orphanhood		Recent deaths		Widowhood	
N	$1_N/1_{25}$	α	$1_N/1_{25}$	α	$1_N/1_{17.5}$	α	$1_N/1_{32.5}$	α	$1_N/1_{25}$	α	$1_N/1_{27.5}$	α
25					0.976	−0.60						
30					0.970	−0.77			0.959	−0.06	0.983	−0.17
35			0.959	−0.52	0.943	−0.61			0.930	−0.18	0.965	−0.45
40			0.946	−0.63	0.919	−0.59			0.878	−0.09	0.926	−0.34
45	0.932	−0.72	0.906	−0.52	0.898	−0.61			0.821	−0.05	0.884	−0.31
50	0.898	−0.68	0.888	−0.62	0.872	−0.64			0.770	−0.09	0.793	−0.12
55	0.854	−0.66	0.846	−0.62	0.846	−0.70	0.736	−0.07	0.691	−0.06	0.700	−0.04
60	0.782	−0.60	0.814	−0.71	0.810	−0.75	0.647	−0.08	0.620	−0.12	0.586	−0.03
65	0.692	−0.59	0.752	−0.76			0.536	−0.10	0.520	−0.14	0.444	−0.11
70	0.577	−0.59	0.692	−0.87			0.404	−0.10	0.399	−0.15	0.349	−0.03
75	0.450	−0.66					0.258	−0.08				
80	0.295	−0.74					0.164	−0.26				
85							0.075	−0.40				

7 Conclusions

The aim of this report has been to evaluate the quality of the demographic data collected in the Lesotho Fertility Survey. We believe that the survey is an important and in most respects reliable source of information upon the demography of the country. It provides accurate measures of the demographic status of the population at the time of the survey and yields good estimates of fertility and mortality trends for the decade before the survey. However, there are problems with some aspects of the data, particularly those concerning older respondents and more distant periods. These need to be taken into account during detailed analysis of the results.

The most serious problems with the individual survey data are linked to the shortfall in the size of the sample. Interviewers appear to have adopted a variety of stratagems to minimize the number of women they interviewed. The most important of these was to return ages of 50 or more for respondents who were in fact eligible for inclusion in the survey. The result of the exclusion of a number of potential respondents is that older women and uneducated women are under-represented in the sample. Apart from this problem, and compared with other enquiries conducted in sub-Saharan Africa, reporting of age appears to have been very good in both the household and the individual surveys. The data are subject to only moderate heaping and do not appear to be greatly biased apart from some exaggeration of age among the elderly. However, there are some minor errors that have a perceptible effect on certain demographic estimates. In particular we believe that in the individual survey ages 35–39 were subject to slight under-reporting and that there was a net movement of older women into the 30–34 year old age group. Additionally there was substantial heaping on age 44. This suggests that appreciable numbers of 45–49 year old respondents will have been included in the 40–44 year old age group.

These biases in the sample and errors in the age data have an appreciable effect upon certain fertility and mortality estimates obtained from the LFS. The estimates are further biased by a tendency for high parity women to omit births and by displacement of the dates of births on the part of older women. However, every indication is that these errors are of little importance for respondents aged less than 40 at the time of the survey. The omitted births are few in number and even uneducated women appear to report the dates at which their children were born fairly accurately. Estimates of the level, trend and pattern of fertility obtained from the birth histories of women aged less than 40 seem very reliable. They indicate that fertility remained constant for a considerable period before the survey and that the total fertility rate is about 5.7. The only noticeable problem with the data is that 30–34 year old women report slightly too high and early a fertility distribution. This probably results from age misstatement. Fertility estimates for women in their forties are far less reliable. The individual survey data underestimate the level of fertility both because of biases in the sample and because of birth omissions. These women also tend to displace births in time. In particular they appear to exaggerate the intervals since their early births occurred.

The retrospective information on marriage, widowhood and divorce collected during the individual survey is also of a reasonably high quality. However, we believe that many respondents underestimated their age at first marriage. The bias in the data is small. Nevertheless it has a large impact upon estimates of the proportions of teenagers who have married as entry into marriage is very rapid at these ages. On the face of it the marriage histories suggest that nuptiality patterns have not changed. We believe that in fact the mean age at marriage of women fell slightly during the decade before the survey. This produced a rise in fertility at young ages.

Estimates of the level and pattern of mortality in childhood obtained from the birth histories seem reliable for the decade before the survey. They suggest that a slow but steady decline in the infant mortality rate has taken place. However, further back in time they become increasingly inaccurate owing to selection effects and the poor reporting and biased sample of older women. Because age at death is not known for 6.2 per cent of child deaths and uneducated women seem to be slightly under-represented in the sample even at young ages, the mortality indices for recent periods are probably slightly too low.

The age and fertility data collected in the household survey appear to be of a high quality. However, it is the data upon mortality collected in this survey that is of most interest. Indirect estimates of childhood mortality obtained from these data agree closely with estimates calculated directly from the birth history data. They are very plausible although they fluctuate slightly because of age misstatement. As far as can be ascertained, reports of deaths in the household in the year before the survey are almost complete although there were many omissions for the year preceding that. Mortality rates calculated from them are affected by sampling errors and by biases and heaping in reported ages and ages at death. However, they probably measure the overall level of adult mortality fairly well. The orphanhood data seem very accurate although they cannot be relied upon at high ages. It is likely that male respondents slightly underestimate the proportion of their mothers who have died. The widowhood data are less satisfactory. They yield rather erratic mortality estimates and female respondents at least appear to underestimate the proportion of their first spouses who have died.

In short there are no errors in the LFS likely to obstruct further in-depth analysis so long as the biases and reporting errors that distort data supplied by respondents aged 40 or more are allowed for. The retrospective reporting of births, marriages and deaths by younger women is remarkably accurate compared with most data collected in Africa. However, there are slight biases in the reports of age at first marriage and the timing of early births and some omission of high parity births. These might affect detailed analyses of birth intervals and certain other aspects of fertility.

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