Scientific Reports

NUMBER 27 FEBRUARY 1982

MASITAH MOHD. YATIM

Evaluation of the Malaysian Fertility and Family Survey 1974

INTERNATIONAL STATISTICAL INSTITUTE
Permanent Office. Director: E. Lunenberg
428 Prinses Beatrixlaan, PO Box 950
Voorburg
Netherlands

WORLD FERTILITY SURVEY
Project Director:
Dr Dirk J. van de Kaa
35–37 Grosvenor Gardens
London SW1W 0BS, UK

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.
This publication is part of the WFS Publications Programme which includes the WFS Basic Documentation, Occasional Papers and auxiliary publications. For further information on the WFS, write to the Information Office, International Statistical Institute, 428 Prinses Beatrixlaan, Voorburg, The Hague, Netherlands.

L'Enquête Mondiale sur la Fécondité (EMF) est un programme international de recherche dont le but est d'évaluer l'état actuel de la fécondité humaine dans le monde. Afin d'atteindre cet objectif, des enquêtes par sondage sur la fécondité sont mises en oeuvre et financées dans le plus grand nombre de pays possible, Ces études, élaborées et réalisées de façon scientifique, fournissent des données représentatives au niveau national et comparables au niveau international.
L'Institut International de Statistique avec l'appui des Nations Unies, a été chargé de la réalisation de ce projet en collaboration avec l'Union Internationale pour l'Etude Scientifique de la Population. Le financement est principalement assuré par le Fonds des Nations Unies pour les Activités en matière de Population et l'Agence pour le Développement International des Etats-Unis.
Cette publication fait partie du programme de publications de l'EMF, qui comprend la Documentation de base, les Documents Non-Périodiques et des publications auxiliaires. Pour tout renseignement complémentaire, s'adresser au Bureau d'Information, Institut International de Statistique, 428 Prinses Beatrixlaan, Voorburg, La Haye, Pays-Bas.

La Encuesta Mundial de Fecundidad (EMF) es un programa internacional de investigación cuyo propósito es determinar el estado actual de la fecundidad humana en el mundo. Para lograr este objetivo, se están promoviendo y financiando encuestas de fecundidad por muestreo en el mayor número posible de países. Estas encuestas son diseñadas y realizadas científicamente, nacionalmente representativas y comparables a nivel internacional.
El proyecto está a cargo del Instituto Internacional de Estadística en cooperación con la Unión Internacional para el Estudio Científico de la Población y con la colaboración de las Naciones Unidas. Es financiado principalmente por el Fondo de las Naciones Unidas para Actividades de Población y por la Agencia para el Desarrollo Internacional de los Estados Unidos.
Esta publicación ha sido editada por el Programa de Publicaciones de la EMF, el que incluye Documentación Básica, Publicaciones Ocasionales y publicaciones auxiliares. Puede obtenerse mayor información sobre la EMF escribiendo a la Oficina de Información, Instituto Internacional de Estadística, 428 Prinses Beatrixlaan, Voorburg-La Haya, Países Bajos.

Scientific Reports

Evaluation of the Malaysian Fertility and Family Survey 1974

MASITAH MOHD. YATIM
National Family Planning Board
Malaysia

ERRATUM

The Jamaica Fertility Survey, 1975-76

A Summary of Findings (No. 27)

Page 13, the last sentence should read:-

"This observed breastfeeding pattern undoubtedly has contributed to significantly reducing age specific fertility rates; if all Jamaican women were to cease breastfeeding, age specific fertility rates could rise by as much as perhaps 10 per cent."

Contents

FIGURES

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 may 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 has initiated a systematic programme for a scientific assessment of the quality of the data from each survey. A series of data evaluation workshops are 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 second such workshop, involving researchers from five countries – Guyana, Indonesia, Jordan, Malaysia and Philippines – was held between January and April in 1980. The present document reports on the results of the evaluation of the data of the Malaysian Fertility and Family Survey of 1974 and was prepared by Masitah Mohd. Yatim, the participant from Malaysia. Abdullah Abdul-Aziz, Sundat Balkaran, Florentina Reyes and Bondan Supraptilah, 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. Dr Noreen Goldman provided valuable assistance as consultant.

DIRK J. VAN DE KAA
Project Director

1 Introduction

The Malaysian Fertility and Family Survey (MFFS) was conducted in 1974–5 in co-operation with the World Fertility Survey (WFS), an international programme undertaken by the International Statistical Institute (ISI) in collaboration with the International Union for the Scientific Study of Population (IUSSP) and the United Nations. This survey had both national and international objectives. One of its national objectives was to meet the need for reliable data on knowledge, attitude and practice (KAP) of family planning. Internationally, it was part of the WFS programme aimed at studying human fertility and reproductive behaviour. The main aims of the WFS are 'to provide scientific information which will enable participating countries throughout the world to describe and interpret the population's fertility; to increase national capacity for fertility and other demographic research particularly in developing nations; and to make analytical comparisons of fertility and the factors which affect it in different countries of the world' (Chander and Palan 1974).

This survey covers only West or Peninsular Malaysia, where the majority of the population is concentrated, and covers approximately 84 per cent of the total population. East Malaysia was not included in the sample because of the overall cost, the inability to have a tight operational control to ensure good quality data and the unavailability of an adequate sampling frame for this area.

Malaysia is a federation of 13 states (11 in West Malaysia, and Sabah and Sarawak in East Malaysia). In 1947 the population was 4.9 million with an annual population growth rate of 1.8 per cent. By 1974 it had a population of about 10 million with a population growth rate of 2.5 per cent annually. The CBR was 42.9 per thousand in 1947; it increased to 45.5 per thousand in 1956 but decreased to 33.3 per thousand in 1972 (ie from 1947–56 the CBR increased by approximately 6 per cent but from 1956–72 it declined by 27 per cent). The annual rate of population increase until after the Second World War was influenced more by immigration and emigration than by births and deaths. Since 1957, however, it has mainly been due to a high birth rate and a low death rate. It has been established by several studies (eg Cho, Palmore and Lyle 1967) that the change in the fertility pattern in Malaysia was initially caused by changes in marriage patterns and that the decline in CBR from 1957–70 was due both to changes in age at marriage and a decline of marital fertility. In this period 67 per cent of the decline in the CBR was estimated to be due to marital patterns and 28 per cent to marital fertility decline.

Like that of most developing countries the population of Malaysia is very young, with almost 56 per cent (in 1970) below the age of 20 and only 4 per cent above age 65. As for literacy levels, the 1970 census showed that about 61 per cent above the age of 10 were literate. Ethnically, Peninsular Malaysia has three major groups, Malays, Chinese and Indians. The Malays compose 53 per cent of the total population, the Chinese 35 per cent and the Indians 11 per cent. In terms of religious affiliation, the Malays are mainly Muslims, the Chinese are mainly Buddhists, and the Indians are Hindus. Malay is the national language of the country, although other languages are also spoken extensively within each community group.

Geographically, Malaysia lies within the tropics and, economically, the country is dependent on agriculture. A large proportion of the population live in the rural areas and are engaged in agricultural activities, although rural-urban migration is now occurring at a rapid rate.

The sample selection for the MFFS was done by utilizing the available sampling frames such as the Primary Area frame used for the 1973–4 Household Expenditure and Income Survey, the Primary Sampling Unit frame and census enumeration blocks. In all, 8103 living quarters were selected and 7008 screenings were completed. From these, 7770 households were identified and the total number of persons screened in the selected households were 41 858. A total of 6368 ever-married women aged 15–49 were identified for detailed interview and, of these, 6321 were successfully interviewed.

The data collection instruments used in the MFFS were based on recommendations by the WFS with some modifications made in order to suit national requirements. Briefly, they consisted of two major sections – the household schedule and the individual questionnaire. The household schedule consisted of questions on such characteristics of all household members as sex, age, marital status, education, ethnic group and household facilities. In the individual questionnaire there were sections on respondent's background, marriage history, pregnancy history, family planning knowledge and use, family planning services, fertility planning, work history and opportunity, current (or last) husband's background, and cost and benefits of children.

With regard to the results of both the household and individual survey, analysis in the First Country Report (Department of Statistics 1977) was confined to a few basic variables such as sex, age, marital status, ethnicity, education, place of residence, and income groups. Though some preliminary data evaluation was done on the distribution of the sample by sex, ethnic group, age and marital status, in comparison with the 1970 census, no detailed evaluation has been carried out. The main objective of this paper is to evaluate the quality of the data obtained in the MFFS. The evaluation will begin by examining the quality of reporting of respondent's date of birth or age. Both heaping and the possibility of age transference will be examined. The next major chapter concerns nuptiality data and concentrates particularly on the accuracy of stated dates or ages of first marriage. The longest and perhaps most important chapter is devoted to a critical appraisal of the fertility data collected

in the MFFS. The problems of omission of live births and of their displacement in time are critically assessed. This leads to a short chapter on infant and child mortality as derived from the birth history data collected in the individual survey. Throughout the evaluation, both tests of internal consistency and plausibility and checks against external sources of data are employed.

2 Age Reporting

Accurate age reporting is essential for evaluating fertility estimates and other demographic variables because misreporting of age can cause distortions in these estimates. Table 1 shows the five-year age distribution at the 1970 census and the MFFS.

One can deduce from this table that the overall pattern of the five-year age distribution of the total population in the household schedule of the MFFS and the 1970 census are similar except at ages below ten, where the census recorded a higher proportion than the household schedule of the survey. This may be clearly seen from the five-year age distribution of males and females in figure 1 which shows a pyramid of the five-year age distribution by sex. This pyramid indicates that the 1970 census recorded higher proportions of both sexes aged under ten years than the MFFS, a difference that may be due to a recent decline in fertility. However, this point needs further investigation in the fertility section of this report.

A comparison of the sex ratios of the population enumerated in the MFFS household schedule with that in the census (see table 2 and figure 2) shows that the sex ratios in the MFFS are lower except for the youngest and oldest age groups. Since the MFFS household survey was concerned mainly with identifying ever-married women, it is not very surprising that the sex ratios within the younger ages, especially within the childbearing ages, are much lower than in the census.

Figure 3 shows the single-year age distribution of females aged 0–85 from the household survey; from this figure it is evident that there is a concentration of females at ages divisible by 2 and 5 although the largest concentration is at ages 45, 50 and 55. When compared with the female single-year age distribution in the 1970 census, the patterns appear to be very close to each other, except for the concentrations at ages 45, 50 and 55 which are prominent only in the MFFS.

Heaping can be measured by indices of preference for terminal digits, for example Myers' Blended Index measures the preference for, or avoidance of, each of the ten possible terminal digits in the reporting of age. According to Myers' Index, the degree of heaping is higher in the MFFS (19.0) than in the census (7.4) and the digit preference in the former (shown in figure 4) is for digits 0, 5, 1, 2 and 3 in that order. Heaping on age 5 may have come from the preceding and succeeding digits (ie 4 and 6 respectively) and perhaps partly from digit 7. In the census, the digit preference is almost identical to that of the MFFS except for the slight heaping at ages ending in 6 and 7 and none at ages ending in 3 and 5.

Level of education seems to have some effect on age reporting. As shown in table 3, there is a higher degree of heaping among the females with no education than those with some education. There is, however, no significant difference in the digits preferred between the two groups, because both appear to have preference for digits ending in 0, 2, 3, 5 and 9 which are divisible by 2, 3 and 5.

As West Malaysia has three distinct ethnic groups which

Table 1 Five-Year Age Distribution at the Time of the Census (1970) and the MFFS Household Survey (1974)

Age group	Male		Female		Total	
	Census	MFFS	Census	MFFS	Census	MFFS
0–4	16.1	14.9	15.7	13.8	15.9	14.3
5–9	15.9	14.6	15.5	14.1	15.7	14.4
10–14	13.5	14.2	13.3	13.9	13.4	14.0
15–19	10.7	11.6	11.1	11.5	10.9	11.5
20–24	8.1	7.6	8.5	8.7	8.3	8.1
25–29	6.2	6.4	6.4	7.0	6.3	6.7
30–34	6.0	5.6	6.1	5.7	6.1	5.6
35–39	4.7	5.4	5.0	5.5	4.9	5.4
40–44	4.2	3.9	4.3	4.3	4.3	4.1
45–49	3.5	3.7	3.6	3.7	3.5	3.7
50–54	3.2	3.1	3.1	3.2	3.1	3.2
55–59	2.6	2.6	2.4	2.9	2.5	2.8
60–64	2.2	2.3	2.1	2.4	2.2	2.3
65–69	1.5	1.8	1.2	1.5	1.3	1.6
70–74	1.0	1.2	0.9	0.8	0.9	1.0
75+	0.8	1.0	0.9	1.0	0.8	1.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

Table 2 Sex Ratios at Census (1970) and MFFS Household Survey (1974) for Five-Year Age Groups

Age group	Census	MFFS
0–4	104.1	104.4
5–9	104.3	100.3
10–14	103.1	94.0
15–19	97.5	97.9
20–24	96.1	85.3
25–29	98.6	89.1
30–34	98.7	94.2
35–39	95.6	94.0
40–44	100.7	88.2
45–49	95.2	97.8
50–54	104.1	92.4
55–59	111.7	88.1
60–64	109.2	93.0
65–69	123.0	114.4
70–74	105.7	138.4
75+	90.0	101.0

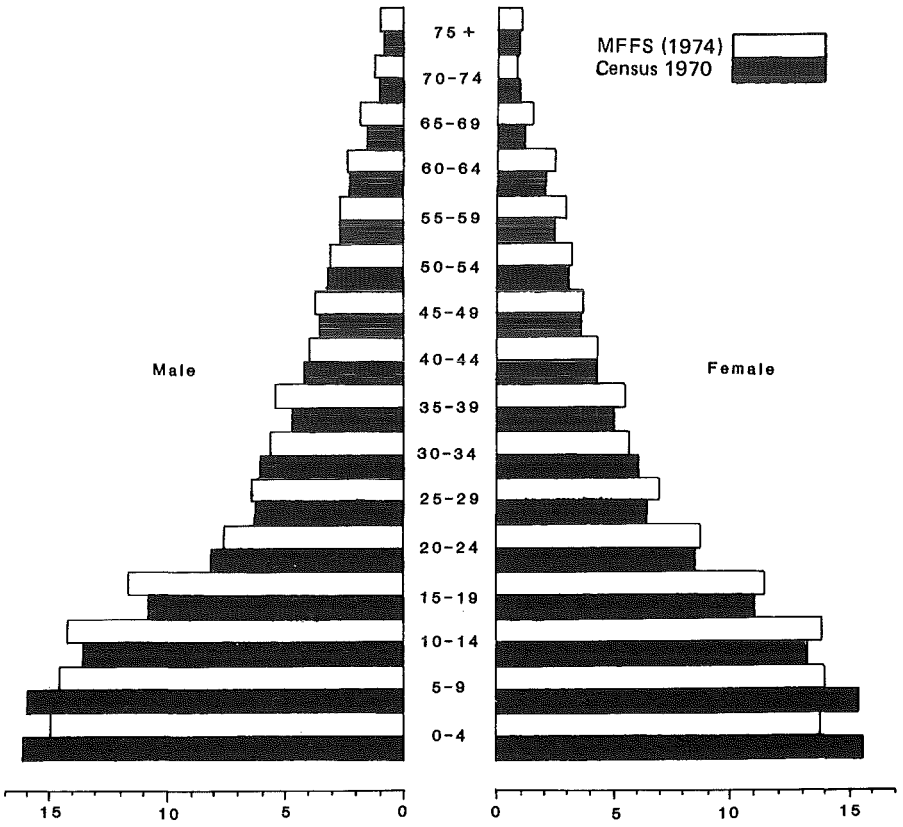

Figure 1 Five-Year Age Distribution by Sex at Census (1970) and MFFS Household Survey (1974)

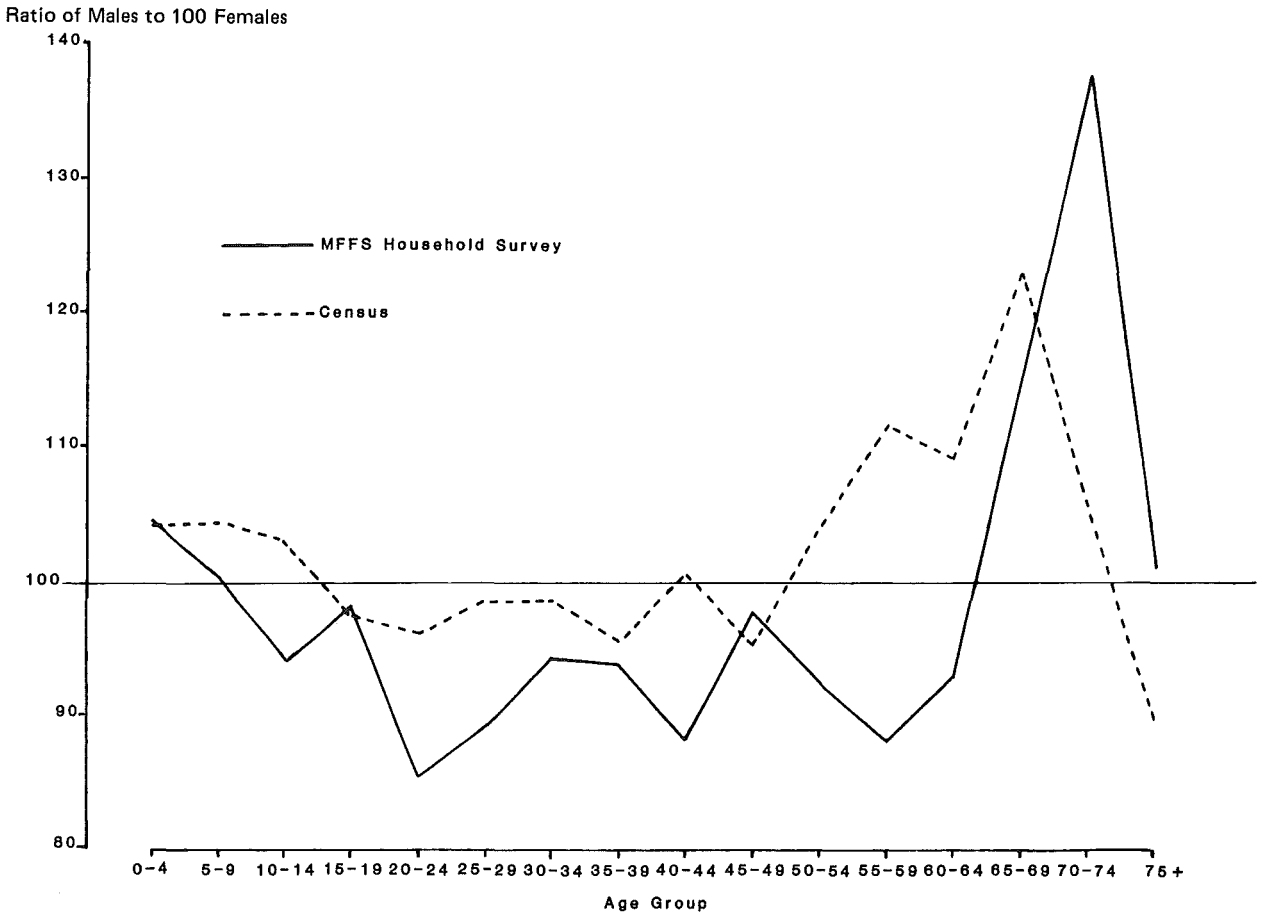

Figure 2 Sex Ratios at Census (1970) and the MFFS Household Survey (1974) for Five-Year Age Groups

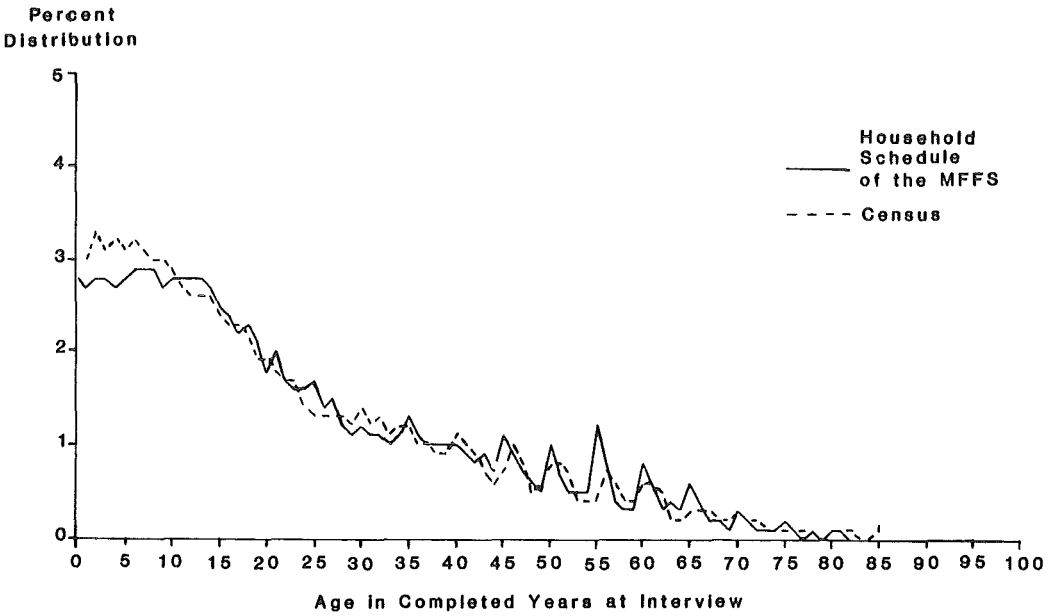

Figure 3 Single-Year Per Cent Age Distribution of Females at Census (1970) and the MFFS Household Survey (1974)

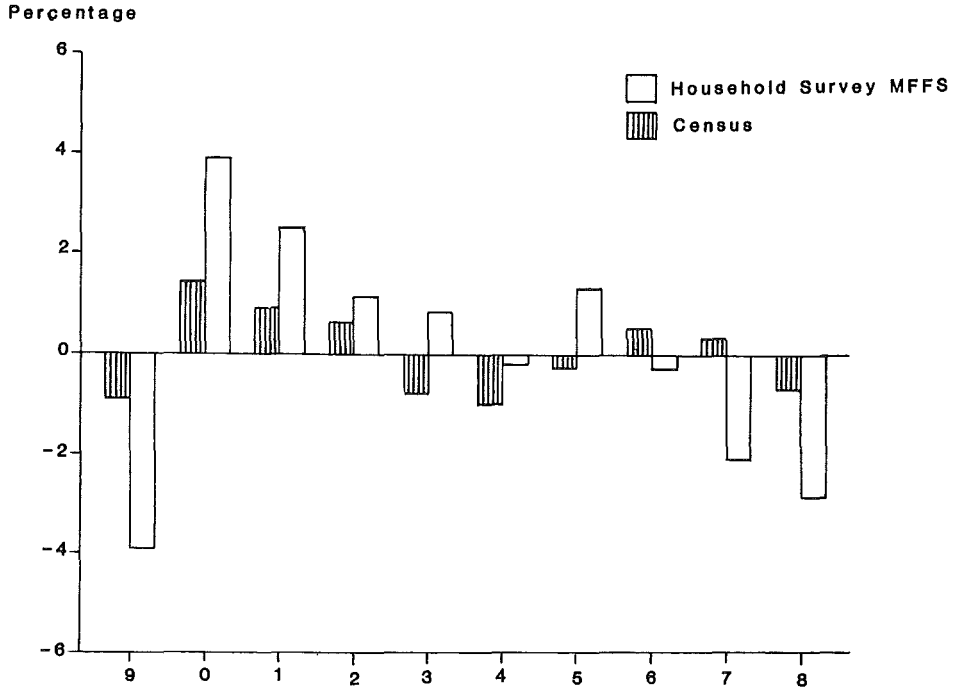

Figure 4 Digit Preference in the Census (1970) and the MFFS Household Survey (1974) for Females Aged 10–79

have their own behavioural characteristics, it is relevant to examine any possible differences in digit preference that may exist between these ethnic groups. Table 4 indicates that the Chinese have the lowest Myers' Index (3.7), compared to the Malays who have a Myers' Index of 17.7 and the Indians who have a Myers' Index of 11.2. Apparently education and area of residence do have some significance in age reporting. Not unexpectedly, the Malays have the highest Myers' Index because educational standards in the rural areas, where the majority of the Malays reside, are comparatively lower than in the urban areas.

In the individual questionnaire, the method employed in collecting information on age differed slightly from that in the household schedule, in the sense that, for the latter, most of the reporting was done by either the head of the household or one of the members of the household whereas, for the former, age was reported by the respondent herself. In addition, the respondent was also asked to show her identity card and, of the 6321 interviewed, almost all were able to supply their year of birth. One would not expect to observe any heaping in the age distribution in the individual sample, considering the efficient manner in which information on age was collected. However, figure 5 does not correspond to this expectation, because there is still heaping

Table 3 Digit Preference for Females Aged 10 Years and Over by Level of Education, MFFS Household Survey (1974)

Last digit	Education			
	None	Incomplete primary	Completed primary	Secondary[a] or higher
0	14.3	10.7	8.0	8.6
1	10.7	11.9	9.3	8.6
2	7.8	12.7	8.3	7.5
3	9.1	9.0	14.4	6.7
4	8.2	9.0	11.0	9.9
5	15.2	10.2	10.6	12.3
6	11.6	9.9	10.2	11.6
7	8.1	9.1	10.1	12.0
8	8.1	8.6	9.4	11.6
9	6.8	8.8	8.9	11.1
Myers' Blended Index[b]	23.7	11.1	12.4	17.3

[a]Secondary includes Incomplete Junior, Completed Junior and Senior +.
[b]Myers' Blended Index is the sum of deviations from 10 per cent.

Table 4 Digit Preference for Females Aged 10 Years and over by Ethnic Group, MFFS Household Survey (1974)

Last digit	Ethnic group			
	Malay	Chinese	Indian	Others
0	12.7	9.3	8.4	13.4
1	10.5	9.6	11.8	10.5
2	8.2	10.3	9.5	12.1
3	9.0	10.4	10.6	8.1
4	8.5	10.0	10.6	14.8
5	14.1	10.5	11.5	9.7
6	11.5	10.2	10.7	9.5
7	9.2	10.2	8.1	11.3
8	8.5	10.3	8.4	6.6
9	7.8	9.3	10.4	4.0
Myers' Blended Index	17.7	3.7	11.2	24.2

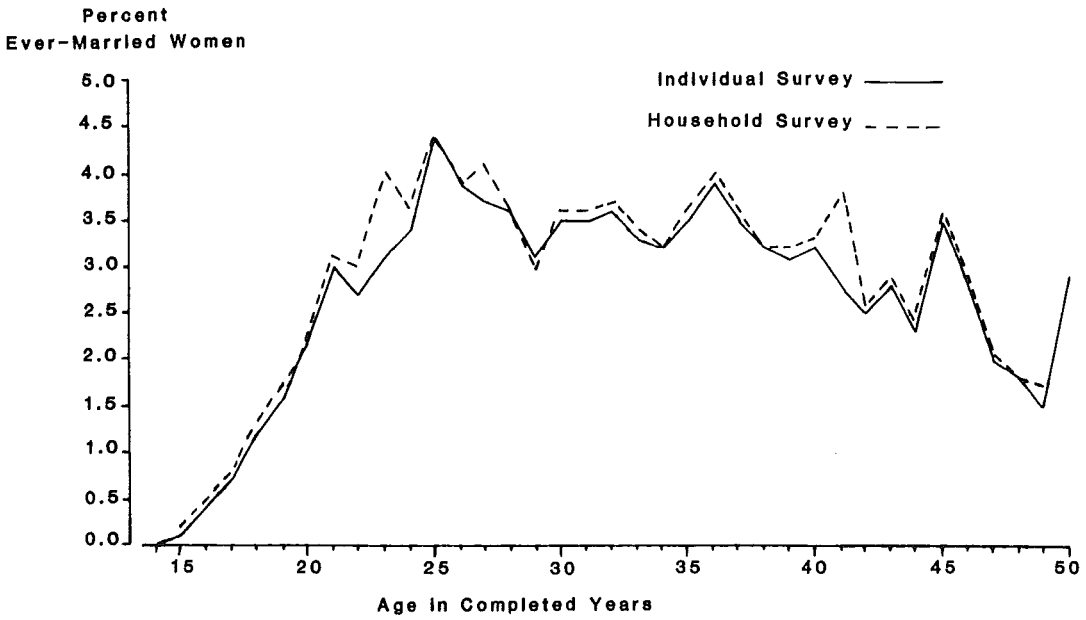

Figure 5 Distribution of Ever-Married Women by Age, Household and Individual Survey, MFFS (1974)

at ages 25, 36 and 45. Misreporting of age could still be a possible reason for these heapings, because one cannot exclude the possibility of errors that might have occurred in the reporting of birth dates by the applicants when applying for their identity cards. Besides, the reliability of vital registration immediately after the Second World War was also questionable.

Looking at digit preference, shown in figure 6, it may be observed that there is digit preference in the individual survey for digits ending in 0, 5 and 6, although the Myers' Index is not very high (11.6). A comparison of heaping between the household and individual surveys by selected background characteristics (table 5) shows, contrary to expectations, that digit preference is slightly more pronounced in the individual than in the household survey.

To ascertain the extent to which the information given in the household schedule corresponds with that in the individual questionnaire, the data records of ever-married women in both surveys were matched. It was found that 472 out of 6321 women in the individual questionnaires could not be matched at all with the household schedule, but this represents only 7.5 per cent of the total women interviewed. For comparison between the two sources, only information on the remaining 5849 ever-married women

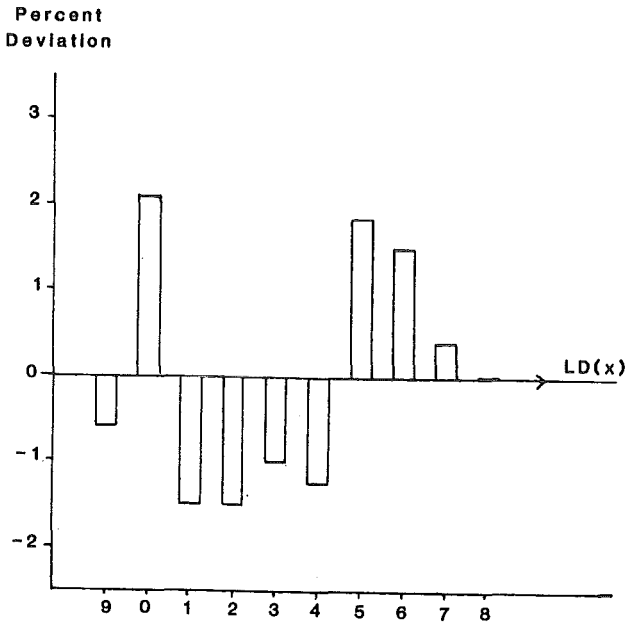

Figure 6 Digit Preference for Ever-Married Women Aged 15–49, Individual Survey MFFS (1974)

will be used. As indicated by table 6, there are slight differences between the two ages reported: 0.7 per cent were reported older and 2.0 per cent younger in the household schedule than in the questionnaire but 97.3 per cent were reported with the same ages in both. This high level of consistency, however, may reflect the fact that the same interviewer usually completed both schedule and questionnaire on the same visit to a household and may have cross-checked the two answers. The pattern of discrepancies is not as expected because the younger age groups (35 and below) were more likely to be reported as younger in the household schedule than were older women.

So far, most of the discussion in this chapter has concerned digit preference or age heaping as opposed to the potentially more dangerous but less easily detected problem of age displacement, namely a systematic tendency to over- or understate age. Visual inspection of the population pyramid in figure 1 suggests the possibility of a deficit in the female cohort aged 25–29 and a surplus at ages 35–39, though the sex ratios in table 2 lend no support to this view. In an attempt to examine further the female age structure, a West-model stable population with an expectation of life of 69 years and a rate of growth of 0.025 was compared to the reported age distribution. No major deviations between the two distributions were observed, which suggests the absence of pronounced age displacement.

Another approach, illustrated in figure 7 was to compare the female age structure in conventional five-year age groups with an unconventional five-year grouping. As may be seen, there is little difference between the two distributions, though the apparent surplus in the cohort 35–39 is again visible. Heaping at exact age 35 may be the main cause of this phenomenon.

Pending further evidence from the chapters on nuptiality and fertility, there appears to be no convincing evidence of important age errors in the MFFS. Age heaping is certainly present, but is insufficiently pronounced to cause concern.

Table 5 Myers' Blended Index for Ever-Married Women Aged 20–49 by Background Characteristics, MFFS Household and Individual Survey (1974)

Background	Household survey	Individual survey
Education		
No education	13.0	15.2
Incomplete primary	8.8	9.9
Completed primary	14.8	15.8
Secondary or higher	7.6	8.9
Ethnic group		
Malay	15.2	18.2
Chinese	8.3	5.8
Indian	13.8	12.9
Others	28.2	30.6
Type of place of residence[a]		
Metropolitan	–	9.8
Town	–	13.8
Rural	–	13.1
Total		11.6

[a] At the time of writing this report it was not possible to define type of place of residence for the household survey.

Table 6 Per Cent Distribution of Respondents According to the Difference in Reported Age between the Household and the Individual Survey, MFFS (1974)

Age difference[a]	Age group (individual)							
	Under 20	20–24	25–29	30–34	35–39	40–49	45+	Total
+1	0.0	0.0	0.1	0.7	1.4	1.2	0.8	0.7
Same	96.7	95.9	95.3	97.8	97.7	98.3	99.0	97.3
–1	3.3	4.1	4.6	1.5	0.9	0.5	0.2	2.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[a] (+) Women reporting older in the household survey. (–) Women reporting younger in the household survey.

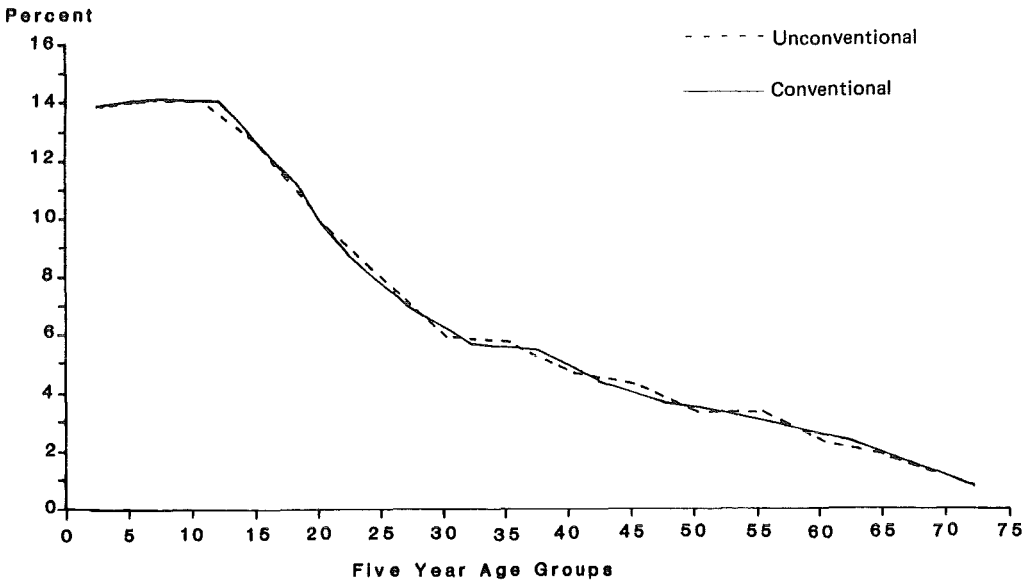

Figure 7 Percentage Distribution of Females by Conventional and Unconventional Age Groups, Household Survey MFFS (1974)

3 Nuptiality

In the MFFS individual questionnaire, there was a marriage history which included current marital status, date of first marriage or union (month and year), outcome of first marriage and number of times married, all of which provide useful information for the estimation of trends in age at marriage. Before arriving at these estimates, it is essential to assess the accuracy of the data because inaccurate reporting of the above items can invalidate any analysis of nuptiality.

3.1 REPORTING OF DATE AND DURATION OF FIRST MARRIAGE

Of the 6321 eligible women interviewed, 61.8 per cent were able to supply their month of marriage and 100 per cent supplied their year of marriage. Unlike many other WFS surveys there was no provision for asking age at marriage for those women unable to recall the calendar year of marriage. Figure 8 illustrates the distribution of ever-married women by year of first marriage and from this figure it is possible to see heaping in the years 1969 and 1973 and, to a lesser extent, in the years 1949 and 1957, which induce heaping in duration since first marriage at 5 years, 1 year, 25 years and 17 years, respectively, as shown in figure 9. The heaping at 1949 and 1969 could be due to the manner in which the information on the year of marriage was obtained. Normally, the interviewer would ask the respondent to supply her date of marriage but, if the respondent was not able to do so, then she (the respondent) was asked to estimate the duration of her marriage which was then subtracted from the date of survey to obtain her calendar year of marriage. However, it is equally plausible that respondents calculated their date of marriage themselves. Most of the heapings are at dates associated with certain national events such as after the Second World War (1949), Malaysian Independence (1957), and a significant political event (1969). This tendency to associate dates of vital events with such national events is quite common, particularly among illiterates, as affirmed by figure 10 which indicates more severe heaping at these significant dates among illiterate than literate women.

The distribution of ever-married women by age at first marriage according to literacy indicates that both categories have similar patterns of heaping except for slight deviations in the peaks which occur at ages 15 and 18 for illiterates and 17 for literate women (see figure 11). These peaks reflect the heaping observed in the reporting of year of marriage.

3.2 DISTRIBUTION BY AGE AND MARITAL STATUS IN THE MFFS: A COMPARISON WITH THE 1970 CENSUS

The distribution of the individual sample of ever-married women according to marital status shows that 91.8 per cent were currently married, 4.5 per cent widowed and 3.6 per cent divorced (see table 7). A distribution according to the

Figure 8 Distribution of Ever-Married Women According to Year of First Marriage, MFFS (1974)

Figure 9 Distribution of Ever-Married Women According to Duration of Marriage, MFFS (1974)

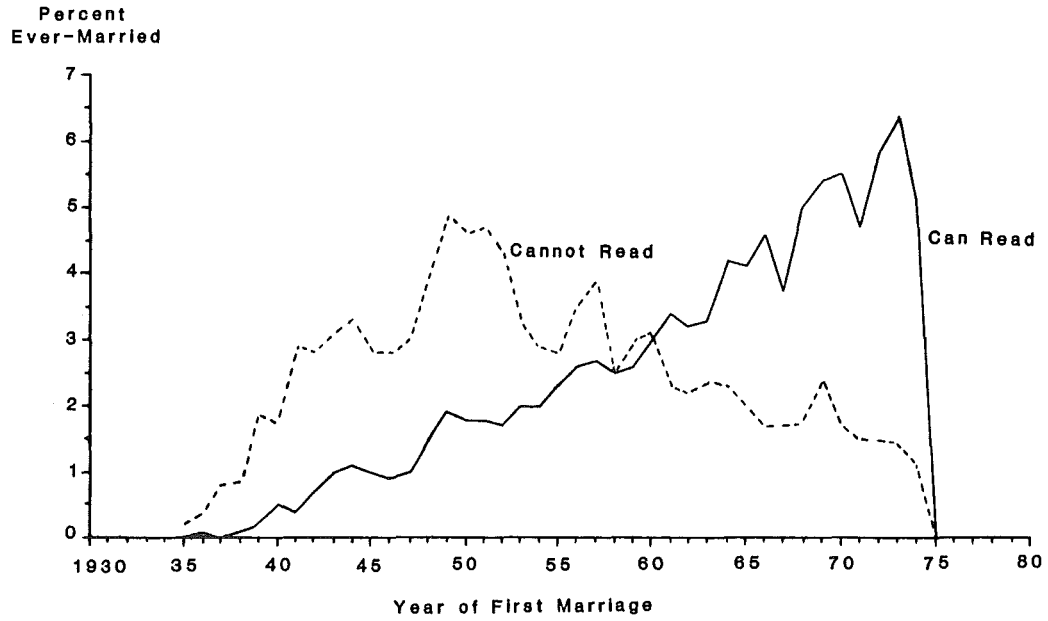

Figure 10 Distribution of Ever-Married Women According to Year of First Marriage by Literacy, MFFS (1974)

non-conventional age groups (figures not shown) does not alter the pattern of the distribution by conventional age groups.

In order to compare the nuptiality data of the MFFS with the 1970 census, the distribution of women at the time of the MFFS was reconstructed for the census date in 1970 by using the individual survey data on date of first marriage and the household survey data on proportions single. Figure 12 shows the comparison between the percentage ever married in each five-year age group from the MFFS and the census, and both agree very closely. Table 8 gives a more detailed comparison between the reconstructed distribution of women aged 15 to 49 in the MFFS with that of the census, according to marital status at the time of the census. All four categories agree closely except for a slight tendency for the proportion widowed to be slightly lower and the proportion divorced slightly higher in the survey than the census figures. The correspondence between census and survey data, particularly at young ages, suggests that no serious reference period error has occurred in the MFFS for recent marriages.

3.3 AGE AT FIRST MARRIAGE

In order to examine the pattern of age at first marriage, household survey data on proportions ever married and individual survey data on age at first marriage are combined to

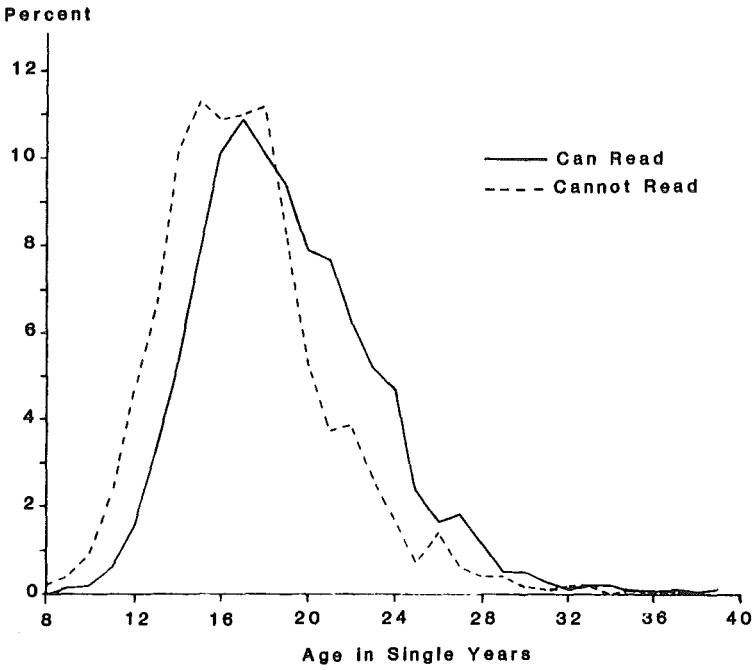

Figure 11 Distribution of Ever-Married Women According to Age at First Marriage by Literacy, MFFS (1974)

Table 7 Per Cent Distribution of Respondents in the Individual Survey According to Current Marital Status by Current Age, MFFS (1974)

Age group	Current marital status			Total
	Married	Widowed	Divorced	
Under 20	95.0	0.4	4.6	100.0
20–24	96.3	0.4	3.3	100.0
25–29	96.0	0.9	3.1	100.0
30–34	95.2	1.7	3.1	100.0
35–39	93.1	3.3	3.7	100.0
40–44	87.7	7.4	4.9	100.0
45+	80.0	16.2	3.8	100.0
Total	91.8	4.5	3.6	100.0

show the proportions marrying by successive ages for different cohorts of women. The results, displayed in figure 13 and table 9, indicate comparatively lower proportions married at younger ages among the younger cohorts. For example, the percentage entering marriage by age 20 among the cohort 20–24 at the time of survey is 42, as compared to 70, 77 and 81 among the older cohorts 35–39, 40–44 and 45–49, respectively. The trend for rising age at marriage is as expected, ie a progressive increase in the proportion entering marriage by a specific age from the youngest cohort to the oldest cohort. As can be seen in figure 14, there is, however, a slight discrepancy in that the proportions entering marriage by ages 15 and 16 among the cohorts 35–39 and 40–44 are close.

Table 10, showing the mean number of marriages, indi-

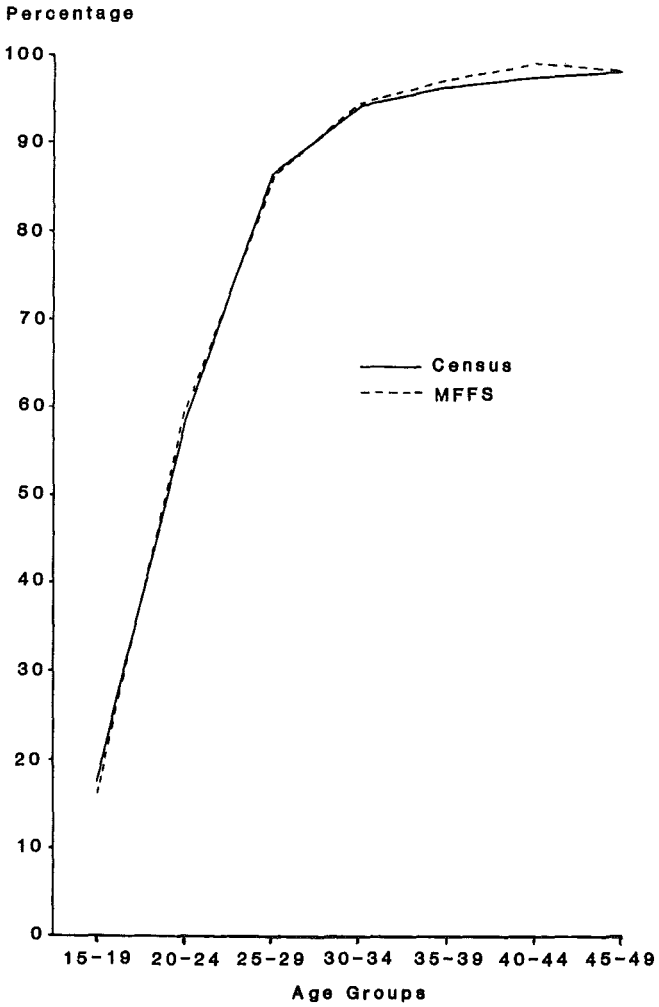

Figure 12 Percentage of Women Ever-Married by Age Groups at the Time of the Census (1970)

Table 8 Per Cent Distribution of Women According to Marital Status at the Time of the 1970 Census by Age Groups, According to the Census (1970) and the MFFS (1974)

Marital status at the time of the 1970 census	Age group at the time of the 1970 census														Total	
	15–19		20–24		25–29		30–34		35–39		40–44		45–49		15–49	
	MFFS	Census	MFFS	Census	MFFS	Census	MFFS	Census	MFFS	Census	MFFS	Census	MFFS	Census	MFFS	Census
Married	15.7	16.6	57.5	56.3	84.3	83.3	89.4	89.7	88.9	89.5	85.3	85.8	83.4	80.2	64.0	63.3
Widowed	0.0	0.5	0.3	1.3	0.8	2.2	2.4	3.4	4.7	5.5	10.6	10.2	13.3	16.0	2.7	4.0
Divorced	0.4	0.4	1.8	0.9	1.5	1.2	2.9	1.3	3.9	1.4	3.5	1.8	1.7	2.2	2.0	1.1
Not married	83.8	82.5	40.4	41.4	13.5	13.4	5.3	5.7	2.6	3.5	0.6	2.2	1.5	1.6	31.2	31.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

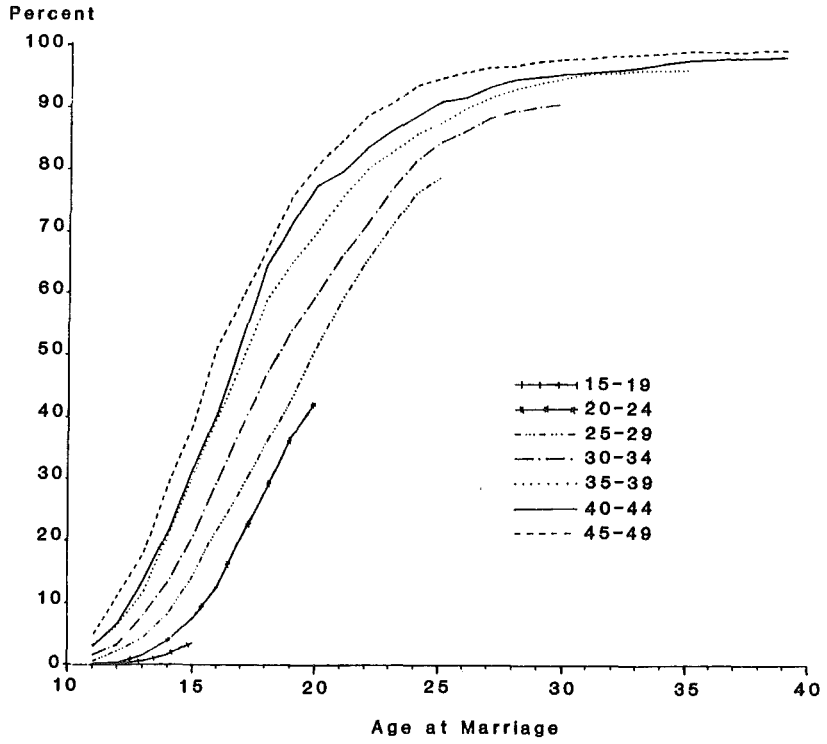

Figure 13 Cumulative Percentage of Women Entering Marriage by Current Age, MFFS (1974)

cates the expected trend of a progressive increase as current age increases. There is thus no evidence of omission of previous marriages.

Errors in a particular data set may often be identified by comparison with a model or reference distribution. The nuptiality model applied in this section was developed by Coale (1971). Essentially, it is derived from patterns of first marriages which occurred among populations of western Europe, USA, Australia and Taiwan in the late 19th until mid-20th century. Coale's findings suggested that there is a common pattern of proportions ever married by age in different populations and that first-marriage frequency curves differ only in origin (ie ages at which marriages first occur), horizontal scale (ie the rate at which the proportion married increases with age) and vertical scale (ie the proportion eventually marrying). When these parameters are adjusted accordingly, the data for any country should fit fairly well to the model.

This model is applied to the MFFS data using the maximum likelihood method recently developed by the WFS (Rodríguez and Trussell 1980) to obtain estimates of the mean age at first marriage of each cohort for the whole childbearing period and to detect deviations between the observed data and the model which might indicate the presence of errors in the MFFS data.

Table 11 shows the results obtained after fitting the household and individual data to the model by fixing C (the proportion eventually marrying by age 50) at .990. The P-values in column 10 indicate that the data fit the model quite well in the younger cohorts (age 29 and below) but not in the older cohorts (30 and above). Figure 14 shows the proportions married by given age for five-year

Table 9 Cumulative Percentage of Women Ever Married by Specified Ages According to Current Age Group, MFFS (1974)

Specified age	Current age group						
	15–19	20–24	25–29	30–34	35–39	40–44	45–49
11	0.0	0.2	0.7	1.6	3.3	3.1	4.9
12	0.2	0.5	2.4	3.4	6.4	6.7	11.2
13	0.8	1.7	4.5	8.0	11.8	13.8	17.9
14	1.9	4.1	8.4	13.4	20.9	21.2	29.2
15	3.6	7.7	14.4	20.5	30.4	31.2	38.9
16		12.8	21.8	29.3	39.8	40.4	51.3
17		20.6	28.3	38.4	48.9	52.2	59.2
18		28.0	35.6	46.7	59.0	64.2	67.0
19		36.9	42.5	53.9	65.0	71.3	75.7
20		42.4	51.0	59.8	70.0	77.3	80.8
21			58.6	66.0	75.7	79.8	84.6
22			65.2	71.1	80.1	83.6	88.7
23			70.8	76.9	82.9	86.2	90.8
24			76.4	81.5	85.9	88.6	93.5
25			78.7	84.4	87.6	91.0	94.6
26				86.3	90.0	91.7	95.7
27				88.5	91.7	93.4	96.4
28				89.8	93.1	94.6	96.8
29				90.2	94.1	95.0	97.4
30				90.9	94.9	95.4	97.9
31					95.7	95.7	98.0
32					95.8	96.1	98.4
33					96.2	96.5	98.5
34					96.2	97.3	98.8
35					96.3	97.8	99.1
36						97.9	99.1
37						98.2	99.1
38						98.2	99.4
39						98.4	99.4

Table 10 Mean Number of Marriages by Current Age

Age group	Mean number of marriages
Under 20	1.03
20–24	1.04
25–29	1.08
30–34	1.13
35–39	1.24
40–44	1.25
45+	1.42
Total	1.18

cohorts, according to the Coale nuptiality model with the parameter C fixed at 0.99. The figure indicates a rising age at marriage for all cohorts except for the cohorts 35–39 and 40–44, which appear to be close to each other. This discrepancy is probably a reflection of the pattern seen in figure 13. The estimated mean ages at first marriage also indicate a rising age at marriage.

3.4 CONCLUSIONS

The scrutiny of MFFS nuptiality data, described in this chapter, has revealed no major defects. Heaping in dates of first marriages is not pronounced. The reconstructed survey data for 1970 compare remarkably well with the census data for that year. Cohort comparisons and application of the Coale model give a consistent picture of a long-standing and fairly steady increase in age at marriage.

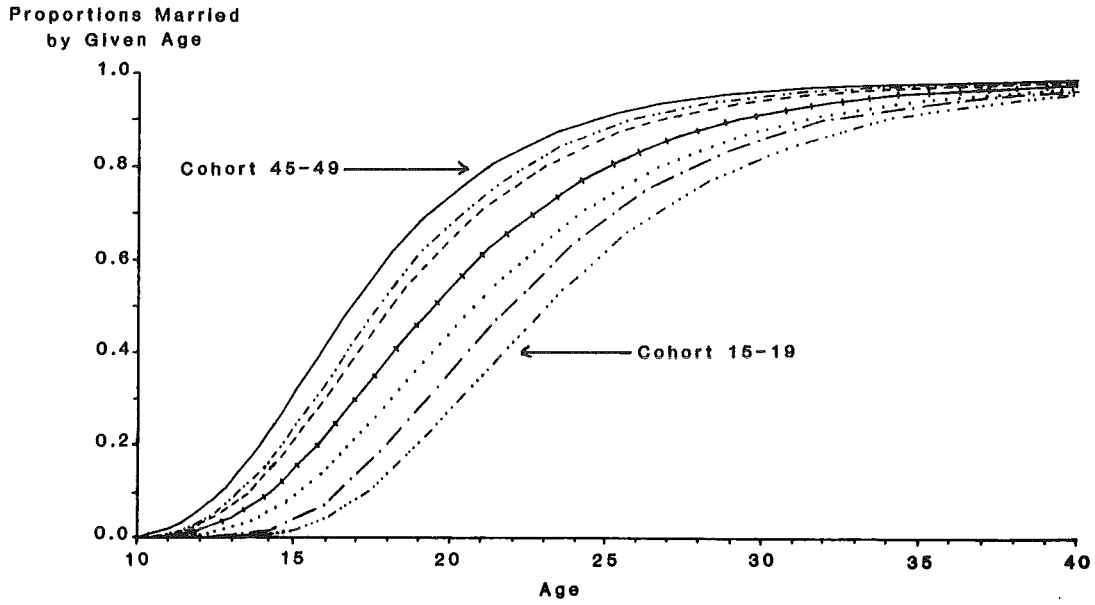

Figure 14 Proportions Married by Given Age for Five-Year Age Cohorts, According to the Coale Nuptiality Model (Parameter C Fixed at 0.99)

Table 11 Estimates of Parameters of Coale's Model Fitted to Data from the Household and Individual Surveys of the MFFS (1974)

Ages	Estimates					Standard errors		Goodness of fit			Homogeneity		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	$\hat{\mu}$	$\hat{\sigma}$	$\hat{c}$	a_o	k	s.e. $\hat{\mu}$	s.e. $\hat{\sigma}$	χ^2	υ	P	χ^2	υ	P
15–19	24.4	6.78	.99	12.7	1.03	.368	.313	18.8	18	.403	9.1	14	.826
20–24	23.1	6.45	.99	12.0	0.98	.172	.156	60.3	53	.230	49.1	42	.211
25–29	22.0	6.58	.99	10.6	1.00	.162	.093	102.0	88	.146	66.8	70	.586
30–34	20.6	6.15	.99	10.0	0.93	.185	.155	165.9	113	.001	126.4	90	.007
35–39	19.2	5.42	.99	9.8	0.82	.160	.118	160.0	137	.087	110.1	110	.479
40–44	18.7	5.99	.99	9.7	0.79	.173	.148	222.6	148	.000	149.4	120	.036
45–49	17.8	4.91	.99	9.3	0.75	.173	.143	156.0	148	.310	109.3	120	.748

NOTES

$\hat{\mu}$ – maximum likelihood estimate (m.l.e.) of mean
$\hat{\sigma}$ – m.l.e. of standard deviation
$\hat{c}$ – proportion eventually marrying by age 50
a_o – age at which marriage starts
k – rate of marriage
s.e. $\hat{\mu}$ – standard error of mean
s.e. $\hat{\sigma}$ – standard error standard deviation
χ^2 – likelihood ratio chi-squared
υ – degrees of freedom
P – P-value

4 Fertility

The birth history data contribute the most important subset of information collected in the individual questionnaire of the MFFS because they form the basis for calculating fertility levels and trends, and in addition are a major source of information on infant and child mortality. Inaccurate reporting of these vital events would result in the biased estimation of fertility rates. Such inaccuracy has been observed in previous fertility surveys. Respondents, particularly the older ones, have a tendency to omit and displace vital events which occurred in the more remote past, owing to lapse of memory or misunderstanding of the intent of the question or a combination of both factors.

For these reasons, it is necessary to examine the extent of errors that may be present in the data collected. Although there is no perfect method that can be used to detect omission of births, substantial omissions or displacement may be isolated by examining the increase in mean parity across age groups or by comparing the MFFS data with other independent national estimates such as the census and vital registration, which is considered to be almost 100 per cent complete in West Malaysia.

4.1 COMPARISON WITH EXTERNAL SOURCES OF DATA

Table 12 shows the mean number of children ever born to ever-married women at the 1970 census as compared with that of the MFFS and its reconstructed version at the time of the census. As expected from this table, one can see that mean parities across age groups in all the three estimates increase with increasing age. There is also close agreement between the 1970 census and the reconstructed MFFS estimates except for the older age groups 40–44 and 45–49, where the census shows a lower number of children ever born particularly at the latter age group. This is probably due to under-enumeration of children ever born in the census. The estimates of the children ever born at the time of the 1974 MFFS are slightly lower for women aged 40 and below than the 1970 census figures, suggesting that there has been a slight decline in marital fertility during this period.

Figure 15 shows the age-specific fertility rates derived from births in the year preceding the MFFS and that of the vital registration for the corresponding period. The former appears to deviate from the latter with slightly higher rates in the two youngest age groups but slightly lower rates than the vital registration figures at older ages. However, the total fertility rates agree with each other, as can be seen in table 13, which gives the age-specific fertility rates and total fertility rates for all women by calendar years derived from the MFFS and from the vital registration for the past five years. The general observation from this table is that of declining age-specific fertility rates in almost all the age groups in both the MFFS and vital registration estimates. The fertility rates for the age group 15–19 in the vital registration are lower for all the years (1969–73), but the differences are not large and it is impossible to ascertain which set of figures is more correct.

Table 12 Comparison of MFFS (1974) and Census (1970) Estimates of Mean Number of Children Ever Born to Ever-Married Women by Age Group

Age group	Census 1970	MFFS	
		Reconstructed as of 1970 census date	Observed in 1974
15–19	0.72	0.73	0.83
20–24	1.79	1.74	1.66
25–29	3.14	3.16	2.81
30–34	4.51	4.51	4.25
35–39	5.53	5.66	5.47
40–44	5.90	6.10	6.12
45–49	5.66	6.27[a]	6.23

[a] 45–46 only.

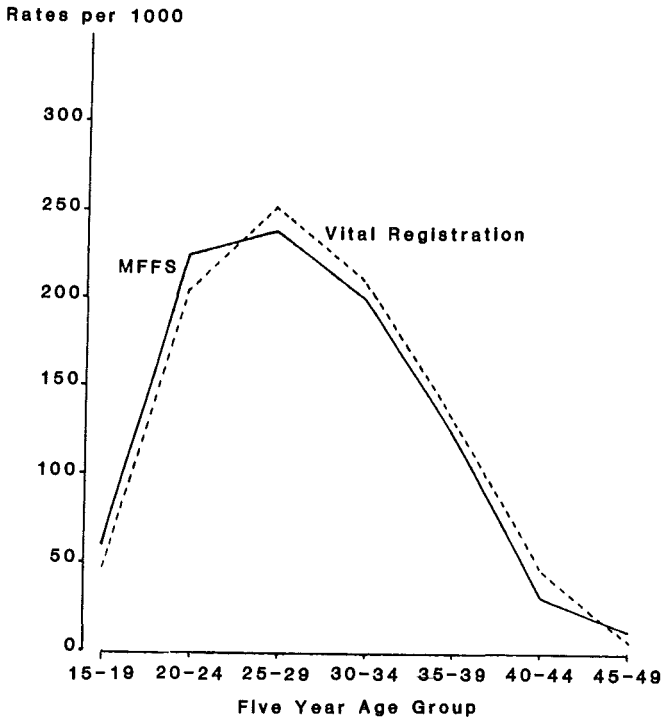

Figure 15 Age-Specific Fertility Rates According to MFFS and Vital Registration for the Period mid-1972 to mid-1973

Table 13 Age-Specific and Total Fertility Rates by Calendar Year Derived from MFFS and Vital Registration

Calendar year[a]	Age-specific fertility rates per 1000 women														Total fertility rates	
	15–19		20–24		25–29		30–34		35–39		40–44		45–49			
	MFFS	VR	MFFS	VR	MFFS	VR	MFFS	VR	MFFS	VR	MFFS	VR	MFFS	VR	MFFS	VR
1969	75	57	243	232	258	249	211	229	120	129	59	56	12	25	4.9	4.8
1970	69	53	239	233	274	236	207	216	120	126	44	54	12	12	4.8	4.7
1971	63	52	230	230	246	241	212	216	134	133	34	54	14	10	4.7	4.7
1972	60	52	224	217	255	269	200	221	129	144	32	54	13	10	4.5	4.8
1973	61	48	224	205	239	252	200	210	124	137	32	48	13	9	4.5	4.5

[a] Figures based on two-year moving averages, except for 1973.

Table 14 Age-Specific Fertility Rates per Calendar Year, MFFS (1974)

Calendar year	Age specific fertility rates per 1000 women[a]							Total fertility rate[b]
	15–19	20–24	25–29	30–34	35–39	40–44	45–49	
1946	149	276						
1947	152	315						
1948	190	316	(283)					
1949	180	311	(297)					
1950	168	306	319					
1951	112	330	287					
1952	162	332	320					
1957	152	306	285	(268)				
1958	135	310	315	(244)				
1959	135	307	282	298				6.35
1960	144	285	314	264				6.28
1961	129	319	297	270				6.32
1962	113	209	306	243	(170)			6.02
1963	106	299	290	241	(162)			5.91
1964	99	282	314	240	175			5.96
1965	93	258	287	238	153			5.56
1966	93	268	304	249	143			5.70
1967	78	256	292	214	138	(66)		5.28
1968	89	246	307	204	143	(74)		5.37
1969	79	244	255	209	126	67		4.96
1970	70	241	261	213	113	50		4.80
1971	67	236	287	202	128	39	(11)	4.85
1972	60	224	206	223	139	28	(17)	4.49
1973	62	223	273	177	118	35	8	4.48

[a] Figures in brackets denote rates affected by incomplete exposure.
[b] Total fertility rates were compiled by assigning rates for nearest preceding period to truncated cells.

Table 14 shows the full set of age-specific fertility rates by single calendar years derived from the MFFS, while figure 16 illustrates the total fertility rates calculated from the age-specific fertility rates. For years with curtailed age-specific fertility schedules, the total fertility rates were computed by assigning the corresponding values for the nearest preceding period. Both the table and the figure indicate a declining fertility which is linear in pattern from the years 1959–73.

This trend can be seen more clearly when presented in five-year periods, as shown in table 15 and figure 17. In the period 1959–63 the total fertility rate was 6.2; this declined to 5.6 in the period 1964–8 and declined further to 4.7 in the period 1969–73. The per cent declines are 10 and 15, respectively and the overall decline is 24 per cent. The pattern of the distribution of the percentage decline between 1964–8 and 1969–73 by age groups appear to be fairly consistent except for the age groups 15–19 and 40–44 with relatively larger falls in fertility. This substantial decline at ages 15–19 is probably due to the rising age at marriage while the large decline for age group 40–44 may be due to omission of live births rather than a genuine trend. This point, however, will be further investigated in the examination of cohort fertility.

4.2 COHORT FERTILITY

Fertility rates by cohort and periods are derived from the

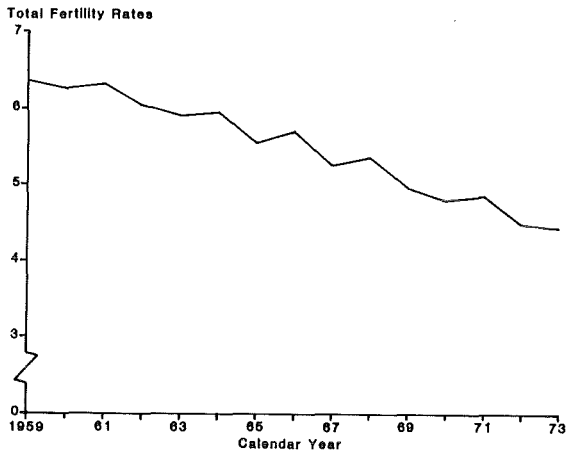

Figure 16 Total Fertility Rates by Calendar Years, MFFS (1974)

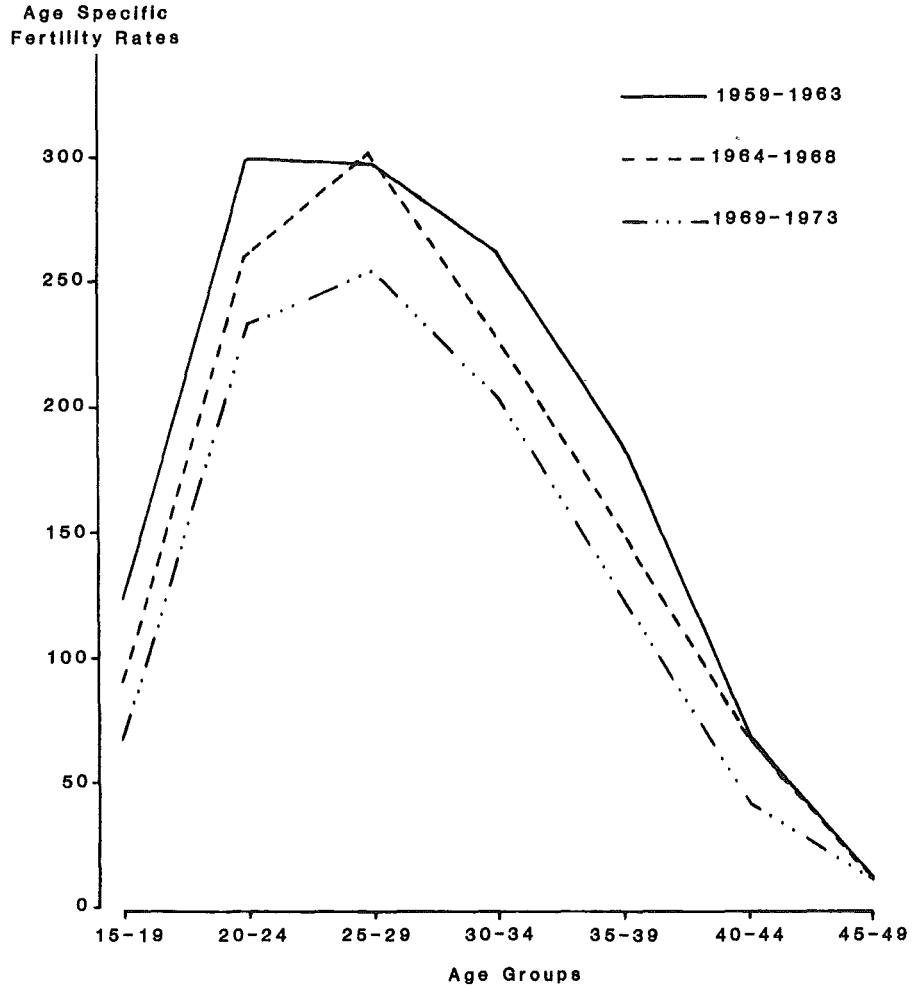

Figure 17 Age-Specific Fertility Rates by Five-Calendar Year Period, MFFS (1974)

maternity history data and tabulated in table 16. The sample of women who are representative of the female population of childbearing age (normally 15–49) is grouped into five-year cohorts according to their age at interview. All births are distributed to each cohort of women and allocated to different five-year periods preceding the survey date in accordance with the date of birth of the child. Period-specific fertility rates for each cohort are then calculated by dividing the total number of births occurring within the specified period to each cohort by the total number of women in that particular cohort.

Looking at panel A of table 16 horizontally, it is possible to see the fertility experienced by the cohort passing from one period to the next (and hence from one age group to

Table 15 Age-Specific Fertility Rates and Percentage Decline in the Rates by Periods 1959–63, 1964–68, 1969–73, MFFS (1974)

Age group	Periods before the survey			Percentage decline
	1959–63 (1)	1964–68 (2)	1969–73 (3)	(2)–(3)/(2)
15–19	125	90	68	25
20–24	300	262	234	11
25–29	298	301	256	15
30–34	263	229	205	11
35–39	166	150	125	14
40–44	70[a]	70	44	38
45–49	12[a]	12[a]	12	–
TFR	6.18	5.57	4.72	15

[a] Assigned on the basis of rates for preceding periods.

another). The cohort aged 40–44 at the time of the survey, for example, had a fertility rate of 286 births per thousand women 10–14 years ago (when passing from age group 25–29 to 30–34), 195 per thousand 5–9 years ago (when passing from age group 30–34 to 35–39) and 85 per thousand during the period 0–4 years before the survey.

Changes in fertility between different cohorts when they were at comparable ages can be examined by reading panel A of table 16 diagonally from the top left to the bottom right-hand corner. One general observation that could be made from this table is a trend of declining fertility: the 45–49 cohort, for example, had a fertility of 86 births per thousand during the period 30–34 years before the survey date, but the cohort 40–44 had a fertility rate of only 56 in the period 25–29 years before the survey. The cohort 35–39 appears to have had a fertility rate of 67 per thousand 20–24 years preceding the survey, which is slightly higher than the fertility of the previous cohort, although still lower than the fertility rates of the 45–49 cohort. One possible reason for the inconsistency in this decline from the 30–34 to the 25–29 period preceding the survey is displacement of births by the cohort 40–44 from the 25–29 period towards the 20–24 period, which consequently shows a higher rate than expected.

Some other inconsistencies are also apparent in the periods 25–29, 20–24 and 15–19 years preceding the survey for the 45–49 cohort. Reading diagonally, these three cohort-period rates are lower than the rates at corresponding age for the 40–44 cohort; in other respects the fertility rates for the different cohorts passing through different periods appear to have a consistent pattern of declining fertility. Omission of births is probably the reason for the lower fertility levels, for these three periods for the cohort 45–49. These omissions can be seen more clearly in figure 18 which illustrates the declining fertility by cohort at equivalent ages. For the more recent periods, 0–15 years preceding the survey date, the decline appears to be fairly constant except for the period 0–4 years preceding the survey for the cohort 15–19, which shows a substantial decline of 51.8 per cent (see table 17). There could be two possible reasons for this decline: (1) a genuine decline due to rising age at marriage, (2) displacement of births towards the 5–9 year period, or perhaps both. However, it can be asserted with reasonable confidence that a genuine decline is the cause, because of the evidence concerning rising age at marriage and because of the close correspondence between the MFFS and the vital registration of fertility estimates for the recent past.

Substantial omissions, displacement of births and current fertility trend may be detected by using the P/F ratio technique which has now become a common tool in the evaluation of the WFS data quality. The P_i values are obtained by cumulating horizontally from right to left (panel B of table 16 and footnote) and F_i values by cumulating down the columns (panel C of table 16). If fertility has remained constant and the data are accurate, the P/F ratios should be close to unity. A set of ratios that are consistently greater than, or less than, one may be an indication of reference period error in the reporting of births. Omission of births is indicated by a gradual decline in the ratios with increasing age, and a substantial decline in the ratios with increasing age may indicate declining fertility.

The P/F ratios presented in panel D of table 16 appear to have all the above indications. There is evidence of omissions for the cohort 45–49 during the periods 15–19, and 20–24 years prior to the date of the survey. However, the pattern of ratios could also be an indication of fertility decline, although the declines in the ratios with increasing age are not very substantial, thus making it very difficult to differentiate between omissions and a genuine decline in fertility. There are also some indications of displacement of births due to reference period error among the older cohorts, as can be seen in the period 0–4 years prior to the survey where the P/F ratios are consistently greater than one. But this trait more probably indicates a recent decline in fertility among the older age groups for this period, due to the effect of the intensive family planning programmes which have in fact been operating in Malaysia since 1967.

An analysis using the P/F ratio by marriage duration on WFS data (Chidambaram, Goldman and Hobcraft 1981) suggests that this procedure can provide a more concise insight into displacement of births than does the traditional P/F procedure by age, specially when age at marriage is increasing. As shown in table 18 the P/F ratios using this procedure also indicate a consistently increasing trend towards the longer marriage duration (25–29) and then drop slightly with the 30–34 marriage duration. A similar pattern is seen with the modified values thus giving the same indications of declining fertility and reference period error.

Another procedure for detecting real changes in fertility and possible errors in the data is by calculating the fertility rates for cohort and period by birth order, because it is assumed that first birth rates do not change as much as high birth order rates and presumably the former are more completely reported by the respondents.

Fertility rates by cohort and period for first order births are presented in table 19. This table indicates that first births rates have declined over time. For example, the cohort 45–49 had a first birth rate of 55.2 in the period 30–34 years before the survey, whereas the first birth rates for other cohorts going through comparable ages in more recent periods are successively lower, ie 39.7 for the cohort 40–44, 46.3 for the 35–39 cohort and so on. This pattern is also reflected in the cumulative rates by periods (F_i) in

Table 16 Fertility Rates by Cohort and Period and Cumulative Rates by Cohorts (P_i) and Periods (F_i) and their Ratios (P/F), MFFS (1974)

Cohort	Years before the survey						
	0–4	5–9	10–14	15–19	20–24	25–29	30–34
A Cohort-period rates (per 1000 women)							
15–19	12						
20–24	147	26					
25–29	255	168	36				
30–34	225	292	219	51			
35–39	178	257	317	234	67		
40–44	85	195	286	324	255	56	
45–49	21	103	204	277	303	230	86
B Cumulative cohort rates (P_i)[a]							
15–19	0.06						
20–24	0.86	0.13					
25–29	2.29	1.02	0.18				
30–34	3.94	2.81	1.35	0.25			
35–39	5.26	4.37	3.09	1.51	0.34		
40–44	6.00	5.58	4.60	3.17	1.56	0.28	
45–49	6.11	6.01	5.50	4.48	3.09	1.58	0.43
C Cumulative period rates (F_i)							
15–19	0.06						
20–24	0.80	0.13					
25–29	2.07	0.97	0.18				
30–34	3.20	2.43	1.28	0.25			
35–39	4.09	3.71	2.86	1.42	0.34		
40–44	4.51	4.69	4.29	3.04	1.61	0.28	
45–49	4.61	5.21	5.31	4.43	3.12	1.43	0.43
D P/F ratios							
15–19	1.00						
20–24	1.08						
25–29	1.11	1.05					
30–34	1.11	1.16	1.06				
35–39	1.29	1.18	1.08	1.06			
40–44	1.33	1.19	1.07	1.04	0.97		
45–49	1.33	1.16	1.04	1.01	0.99	1.10	

[a] As the rates in panel A are annual rates per thousand women, they are multiplied by a factor of five to represent the five-year period and then divided by 1000 before cumulation across rows or columns.

Table 17 Percentage Decrease in the Cohort Fertility Rates for More Recent Periods (by Age at the End of each Period), MFFS (1974)

Age at end of each period	Percentage decrease between periods	
	(5–9) and (0–4)	(10–14) and (5–9)
15–19	51.8	28.9
20–24	12.6	23.5
25–29	12.8	7.8
30–34	12.2	10.1
35–39	9.0	4.1
40–44	17.4	–
Total[a]	12.9	13.5

[a] Decrease in fertility cumulated to the 35–39 age group.

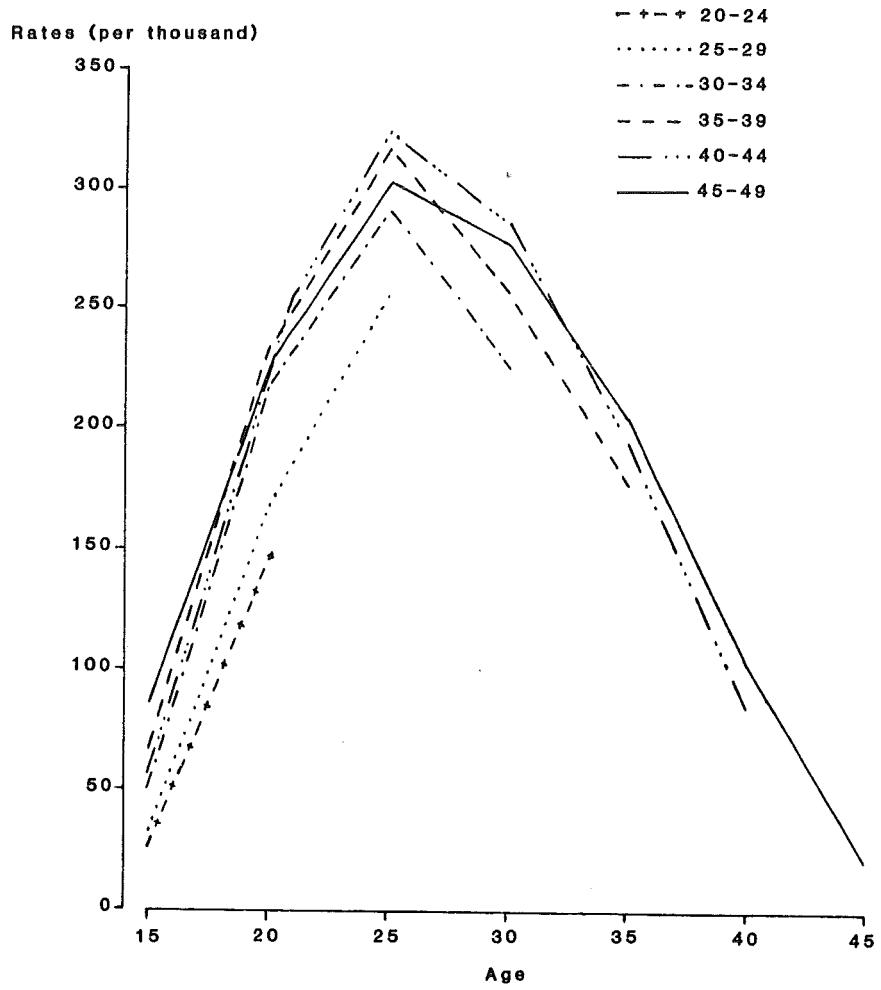

Figure 18 Cohort-Period Fertility Rates at Central Ages (Cohort-period rates re-aligned so as to compare cohort fertility at equivalent central ages)

Table 18 Children Ever Born (P), Cumulated Duration-Specific Fertility Rates in the Period 0–4 Years before the Survey (F), and P/F Ratios, by Years since First Marriage (for Ever-Married Women), Unmodified and Modified for Truncation by Age at Marriage, MFFS (1974)

Years since first marriage	Children ever born (P)	Unmodified cumulated rates in past 5 years (F)	(P/F)	Modified cumulated rates in past 5 years (F)	P/F
0–4	1.07	1.07	1.00	1.07	1.00
5–9	2.82	2.84	0.99	2.84	0.99
10–14	4.06	4.01	1.01	4.02	1.01
15–19	5.30	4.94	1.07	4.97	1.07
20–24	6.24	5.61	1.11	5.70	1.10
25–29	6.80	5.94	1.14	6.30	1.08
30–34	6.44	6.02	1.07	6.82	0.94

Table 19 Fertility Rates for Cohort and Period According to Order of Birth, MFFS (1974) – First Order Births

Cohort	Years before the survey							
	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39
A Cohort-period dates								
15–19	81.9							
20–24	66.9	18.2						
25–29	55.0	69.2	25.1					
30–34	16.6	48.2	79.0	36.4				
35–39	4.1	16.1	37.6	84.2	46.3			
40–44	1.8	5.0	12.3	32.4	97.8	39.7		
45–49	0.2	0.9	3.0	7.7	35.8	82.3	55.2	
B Cumulative cohort rates								
15–19	4.5	0.1						
20–24	42.6	9.2	0.1					
25–29	75.0	47.5	13.0	0.4				
30–34	90.3	82.1	58.0	18.5	0.3			
35–39	94.6	92.6	84.6	65.8	23.7	0.5		
40–44	95.9	95.0	92.5	86.3	70.1	21.2	1.4	
45–49	95.8	95.7	95.3	93.8	90.0	72.1	30.9	3.3
C Cumulative period rates								
15–19	4.4	0.1						
20–24	37.8	9.2	0.1					
25–29	65.3	43.7	12.6	0.4				
30–34	73.6	67.9	52.1	18.6	0.3			
35–39	75.7	75.9	70.9	60.7	23.4	0.5		
40–44	76.6	78.4	77.0	76.9	72.3	20.4	1.4	
45–49	76.7	78.8	78.5	80.8	90.2	61.5	29.0	3.3
D P/F ratios								
15–19	1.01							
20–24	1.13	1.00						
25–29	1.14	1.09	1.03					
30–34	1.23	1.21	1.11	0.99				
35–39	1.25	1.22	1.19	1.08	1.01			
40–44	1.25	1.21	1.20	1.12	0.97	1.04		
45–49	1.25	1.21	1.21	1.16	1.00	1.17	1.07	

table 19, which show that the proportion who become mothers for the recent periods 0–9 years are lower than the remoter periods 10–14 and 15–19 years preceding the survey. This may be an indication of either rising age at marriage or postponement of first births.

The P/F ratios for births of order 4 or more shown in table 20 also show lower values in the younger age groups and comparatively higher values in the older cohorts, thus indicating a declining fertility among high parity women.

There are also some indications in table 19 of misplacement and omission of first births among the older cohorts 40–44 and 45–49. During the periods of 25–29 and 15–19 years before survey, the former cohort had a much lower level of first birth order rates, 39.7 and 32.4 respectively, than during the 20–24 years period which shows a much higher rate (97.8). In addition, this rate is high when compared with the cohorts 35–39 and 45–49 at the same age. Perhaps displacement of births into this period is the explanation for the low level of P/F values (ie below unity) for the cohort 40–44 during the period 20–24 shown in table 19.

4.3 FURTHER TESTS FOR OMISSION OF LIVE BIRTHS

Sex Ratios at Birth

Earlier we have produced evidence of omissions among the older cohorts (40+) and in the more remote periods. By examining the sex ratios at birth it is possible to detect differential omission of births according to sex of child. In table 21 sex ratios of births are shown by cohort and period, while in table 22 sex ratios by period are shown for different sub-groups.

The sex ratio at birth for all cohorts and all time periods shown in table 22 is 105.3, which is very close to the expected value of 105.0 and thus indicates no overall omis-

Table 20 Fertility Rates for Cohort and Period According to Order of Birth, MFFS (1974) – Births of Order 4+

Current age group	Years before the survey						
	0–4	5–9	10–14	15–19	20–24	25–29	30–34
A Cohort-period rates							
15–19	0.3						
20–24	9.3	0.0					
25–29	80.6	14.5	0.6				
30–34	148.7	121.4	23.9	0.3			
35–39	152.3	187.5	149.9	29.1	0.2		
40–44	77.5	174.0	225.8	159.0	23.3	0.2	
45–49	20.5	96.8	186.4	218.1	137.5	28.6	0.2
B Cumulative cohort rates (P_i)							
15–19	0.00						
20–24	0.04	0.00					
25–29	0.48	0.08	0.00				
30–34	1.47	0.73	0.12	0.00			
35–39	2.60	1.83	0.90	0.15	0.00		
40–44	3.30	2.91	2.04	0.91	0.12	0.00	
45–49	3.44	3.34	2.85	1.92	0.83	0.14	0.00
C Cumulative period rates (F_i)							
15–19	0.00						
20–24	0.05	0.00					
25–29	0.45	0.07	0.00				
30–34	1.19	0.68	0.12	0.00			
35–39	1.96	1.62	0.87	0.15	0.00		
40–44	2.34	2.49	2.00	0.94	0.12	0.00	
45–49	2.45	2.97	2.93	2.03	0.81	0.14	0.00
D P/F ratios between cumulative rates for cohorts and periods (P_i/F_i)							
15–19	1.00						
20–24	0.96						
25–29	1.06	1.04					
30–34	1.23	1.07	0.98				
35–39	1.33	1.13	1.03	0.99			
40–44	1.41	1.17	1.02	0.97	1.00		
45–49	1.41	1.13	0.97	0.95	1.03	1.00	

Table 21 Sex Ratios at Birth by Cohorts and Periods, MFFS (1974)

Cohort	All[a]	Years before the survey							
		0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39
15–29	99.2 (560)	99.9 (734)	89.7 (117)	–	–	–	–	–	–
25–34	107.4 (3829)	110.1 (1500)	104.1 (1429)	107.8 (741)	112.6 (143)	100.0 (2)	–	–	–
35–44	103.4 (5535)	104.7 (674)	103.6 (1135)	98.8 (1533)	108.7 (1315)	102.6 (739)	101.6 (125)	50.0 (8)	
45+	108.2 (2771)	76.4 (55)	94.8 (248)	111.8 (451)	101.1 (646)	115.3 (660)	111.4 (510)	122.8 (180)	78.9 (19)
Total	105.3 (12964)	105.7 (2963)	102.5 (2929)	103.4 (2725)	106.6 (2104)	108.5 (1401)	109.4 (635)	119.7 (188)	78.9 (19)

[a] Figures in parentheses show the number of female births on which the ratios are based.

Table 22 Sex Ratios at Birth by Periods and Subgroups, MFFS (1974)

Years before the survey	Total	Type of place of residence		Literacy		Order of birth		
		Urban	Rural	Can read	Cannot read	1	2	3
0–4	105.7	106.1	104.8	103.4	110.1	101.5	107.1	106.6
5–9	102.5	104.2	101.1	102.0	103.2	107.5	98.9	103.0
10–14	103.4	114.7	101.1	109.3	98.3	103.1	105.2	102.3
15–18	106.6	112.5	108.4	102.8	109.3	103.5	107.0	107.8
20–24	108.5	127.0	105.0	123.9	101.5	108.7	105.6	113.7
25–29	109.4	120.7	108.9	103.5	112.0	101.1	120.7	95.7
30–34	119.7	63.2[a]	120.1	90.9	128.5	139.8	84.9	–
Total	105.3	111.2	104.2	105.5	105.1	105.6	105.4	105.1

[a] 12 males and 19 females only.

sion of female births. The sex ratios by cohort in table 21 do not show a consistent pattern except for the oldest cohort, over 45, which appears to have higher sex ratios than younger cohorts for more distant periods. This observation suggests that there are slight omissions of female births among the oldest cohort. In table 22 it is also observed that the sex ratios are higher among the urban residents and this would indicate the presence of sex-selective omission. Otherwise there is not much difference in the sex ratios between the literate and non-literate or by order of births.

Proportion of Children Who Die

It is often asserted that children who died in their earliest years of life are more likely to be omitted from retrospective birth histories than surviving children, particularly when both their birth and death occurred in the remote past. Such omission may be sufficiently large to override the expected and normal observation that the proportion dead of children ever born increases with the current age of the mother and that the child and infant mortality is progressively higher for periods further in the past.

Table 23 showing the proportion dead of children ever born by sex and by current age of mother appears to agree with the expected pattern of increasing proportions dead with increasing age, both for males and females. This gives no grounds for believing that selective omission has occurred of children who died in the distant past or in their earliest years of life, but further investigation of infant mortality will be undertaken in the next chapter.

Table 23 Proportion Dead of Children Ever Born by Sex and by Current Age of Mother, MFFS (1974)

Current age group of mother	Proportion dead of children		
	Total	Male	Female
15–19	0.066	0.069	0.063
20–24	0.048	0.065	0.031
25–29	0.055	0.054	0.056
30–34	0.058	0.069	0.047
35–39	0.082	0.095	0.068
40–44	0.103	0.115	0.090
45–49	0.132	0.148	0.115
Total	0.087	0.099	0.068

4.4 CONCLUSIONS

The evaluation of fertility data has revealed very few defects. In general, a pattern emerges of plausible and consistent fertility decline across cohorts and periods. The close matching of MFFS and vital registration fertility estimates for the period 1969–73 precludes the possibility of reference period error for recent births. There are, however, indications of slight omission of births, particularly female births, for the cohort 45–49. Displacement of births from the period 25–29 years to the period 20–24 years before the survey is also apparent for the cohort 40–44.

5 Infant and Child Mortality

Information on each child's survival status and age at death was obtained together with the birth histories and these data can be used to estimate the level and trends of infant and child mortality, provided the reporting of these vital events is accurate. Incorrect reporting of the date of birth, age of child at death and omission of dead children will affect estimates of levels and trends of infant and child mortality.

Table 24 shows the calculated probabilities of infant and child death for single calendar year cohorts of births based on the birth history data. The general trend appears to be that of declining probabilities of both infant and child death, as can be seen clearly in figure 19. The probability of death for infants has declined from 88 per thousand in the period 1950–4 to 40 per thousand in the period 1965–9 and 37 in the period 1970–2.

A comparison is made between the probability of infant and child death in the MFFS and the infant and child mortality in the vital registration from 1967–73. In figure 20 and table 25 one can also see the declining trend in both the MFFS and the vital registration. The probabilities of death among infants in the MFFS are very slightly lower than the vital registration but the probabilities of death among one to four year olds are higher in the former. One possible reason for this discrepancy could be misreporting of age at death (ie infant deaths were being reported as one year and over by the respondents). The survey also shows the overall probabilities of death in the first five years of life ($_5q_0$) as slightly higher than indicated by vital registration (not shown).

Table 26 shows the probabilities of infant mortality for five-year periods prior to the survey and age of mother at the time of the child's birth. This table too illustrates a clear trend of declining probability of infant mortality with only a few minor discrepancies. As expected, risk of death exhibits a U-shaped relationship with age at maternity, being higher at ages 15–19 and ages 35 and over.

In conclusion, the brief scrutiny of mortality data collected in the birth histories of the MFFS has revealed no obvious flaws.

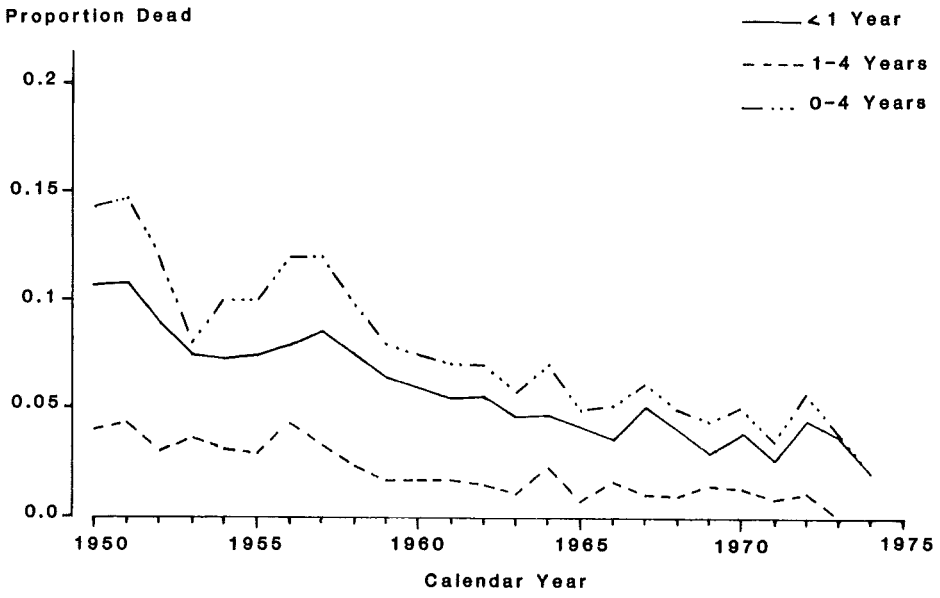

Figure 19 Probabilities of Infant and Child Death by Calendar Years, MFFS (1974)

Table 24 Probabilities of Infant and Child Death for Single-Year Birth Cohorts, Based on the Maternity History 1950–74, MFFS (1974)

Year	Births	Number of deaths by age of child			Probability of death		
		less than 1 year	1–4 years	0–4 years	$_1q_0$	$_4q_1$	$_5q_0$
1950	441	47	16	63	0.1066	0.0406	0.1429
1951	530	57	21	78	0.1075	0.0444	0.1472
1952	613	55	18	73	0.0897	0.0322	0.1191
1953	666	50	23	53	0.0751	0.0373	0.0796
1954	730	54	22	76	0.0740	0.0325	0.1041
1955	719	54	19	73	0.0751	0.0286	0.1015
1956	893	71	36	107	0.0795	0.0438	0.1198
1957	869	75	27	102	0.0863	0.0340	0.1174
1958	939	71	21	92	0.0756	0.0242	0.0980
1959	1003	65	16	81	0.0648	0.0171	0.0808
1960	1048	62	17	79	0.0592	0.0172	0.0754
1961	1108	61	18	79	0.0551	0.0172	0.0713
1962	1090	61	16	77	0.0560	0.0155	0.0706
1963	1133	54	12	66	0.0477	0.0111	0.0583
1964	1183	57	27	84	0.0482	0.0240	0.0710
1965	1139	49	8	57	0.0430	0.0073	0.0500
1966	1215	44	19	63	0.0362	0.0162	0.0519
1967	1165	59	13	72	0.0506	0.0118	0.0618
1968	1235	51	12	63	0.0413	0.0101	0.0510
1969	1185	36	17	53	0.0304	0.0148	0.0447
1970	1195	46	(16)	(62)	0.0385	(0.0139)	(0.0519)
1971	1245	33	(12)	(45)	0.0265	(0.0099)	(0.0361)
1972	1181	54	(15)	(69)	0.0457	(0.0133)	(0.0584)
1973	1241	(47)	(1)	(48)	(0.0379)	(0.0008)	(0.0387)
1974	1076	(23)	(0)	(23)	(0.0214)	(–)	(0.0214)

NOTES: Figures in brackets denote incomplete exposure to risk.
$_1q_0$ = probability of death between birth and first year of life.
$_4q_1$ = probability of death between first and fifth year of life.
$_5q_0$ = probability of death before the age of five.

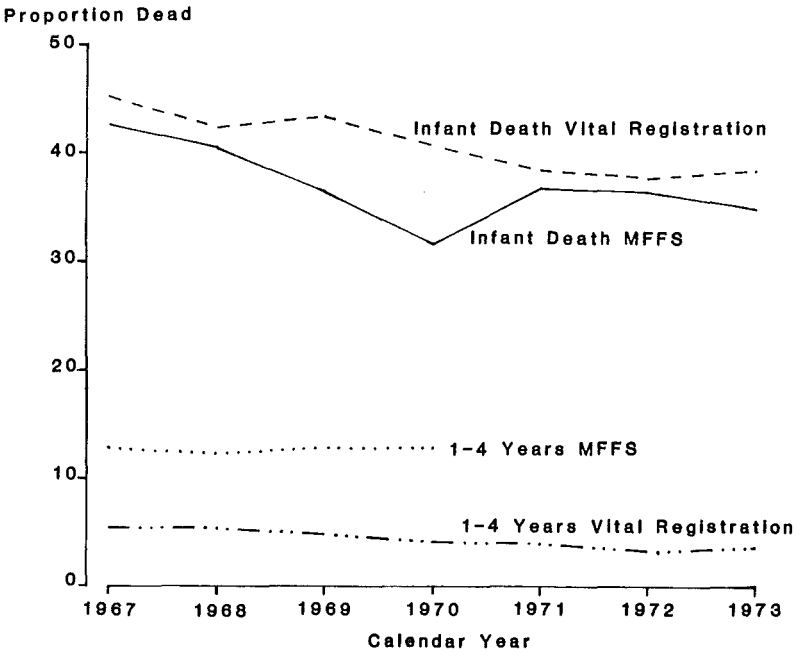

Figure 20 Comparison of Probability of Death in the MFFS and in the Vital Registration by Calendar Years

Table 25 Probability of Infant and Child Death: Comparison between MFFS (1974) and Vital Registration by Calendar Year

Calendar year	$_1q_0$		$_4q_0$	
	MFFS[a]	Vital registration	MFFS[a]	Vital registration
1957	80.5	75.5	34.0	10.7
1967	42.7	45.1	12.9	5.4
1968	40.8	42.2	12.2	5.4
1969	36.7	43.2	12.9	4.9
1970	31.8	40.8	–	4.2
1971	36.9	38.5	–	4.0
1972	36.7	37.9	–	3.4
1973	(35.0)	38.5	–	3.7

NOTE: Figure in brackets denotes incomplete exposure.
[a] All figures under this heading are based on three-year moving averages.

Table 26 Probability of Death in the First Year of Life According to Periods prior to Survey and Age of Mother at the Time of the Birth of the Child, MFFS (1974)

Age group of mother at birth of child	Probability of infant death by period							
	1–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39
15–19	.046	.061	.069	.091	.100	.135	.120	.222
20–24	.036	.034	.052	.067	.082	.092	.097	
25–29	.028	.037	.046	.076	.091	.071		
30–34	.027	.038	.059	.072	.154			
35–39	.040	.038	.057	.083				
40–44	.036	.039	.125					
45–49	.074							

6 General Summary and Conclusions

Age Reporting

The quality of age reporting in the MFFS in relation to the 1970 census is comparatively good. Although age heaping among females is slightly more prominent in the MFFS than in the census, on the whole the survey age distribution is comparatively close to that of the census except for a slight deviation at ages below ten where the census recorded a higher proportion than the MFFS. This difference, however, reflects declining fertility in the years 1970–4.

The heaping of ages as measured by the Myers' Index is 19 in the MFFS and only 7 in the census. Digit preferences in the former are for numbers ending in 0, 5, 1, 2 and 3 in that order. Apparently level of education has some influence on age reporting because the degree of heaping among the uneducated females is higher (24) than their educated counterparts (10). Ethnicity is still a very significant variable in Malaysia, and the MFFS data indicates that age heaping is highest among the Malays and lowest among the Chinese.

When comparing the data reported in the household schedule with that of the individual schedule, it is found that 97.3 per cent reported the same ages in both schedules. Of the remaining 2.7 per cent, 0.7 per cent of respondents reported themselves older and 2.0 per cent younger in the household schedule. No clear signs of age transference were found. From this evidence, it may be concluded that age misreporting in the MFFS is not a significant problem.

Nuptiality

Though 62 per cent of respondents were able to provide the month as well as the calendar year of their first marriage, there is still some evidence of heaping in the distribution of year of first marriage at certain years associated with important national events such as 1949, 1957 and 1969. This tendency to heap year of first marriage is more common among illiterate women. There is also evidence of heaping in the reporting of age at first marriage which coincides with the heaping observed in the reporting of year.

When examining age at first marriage, a declining trend across cohorts was found in the proportions entering marriage by age 15, 20 etc thus indicating a rising age at first marriage. With few exceptions, the trend was consistent and plausible. This was further confirmed by the estimates using the Coale nuptiality model which showed a reasonably good fit.

Fertility

In evaluating the information on fertility collected by the MFFS, both the current levels and recent trends in fertility, and cohort-period rates were studied. When comparing the mean parity across age groups in the MFFS with the 1970 census estimates, it was found that the estimates of the former were very close to the latter and the mean parity in both estimates, as expected, increased with older age groups. However, there was a slight divergence at older ages (40–44 and 45–49) where the census showed a lower number of children ever born. This is probably due to underenumeration of children ever born in the census for these age groups and indicates a higher quality of data in the survey than in the census.

It was found that the MFFS age-specific fertility rates estimated for the year preceding the survey were lower than in the vital registration for the corresponding period at ages 25–29, 30–34 but higher than the vital registration at ages 15–24.

These discrepancies were of minor magnitude and the total fertility rates were very close to each other. It was also observed that the age-specific and total fertility rates were declining in a consistent manner.

The fertility rates for cohorts and periods also indicated declining fertility. A similar picture was obtained through the P/F ratio and birth order techniques, thus further confirming the reliability of the MFFS data. The only defects detected were slight omission of births by cohort 45–49 and probable displacement of births towards the survey date by the cohort 40–44.

Infant and Child Mortality

In this section, a comparison was made between the probability of infant and child death in the MFFS with that of the vital registration for the years 1967–73. It was observed that there is a declining trend in the probability of infant and child mortality in both estimates although there are some discrepancies in the mortality levels between the two sources. Probability of death among infants in the MFFS was slightly lower than in the vital registration but vice versa for the childhood mortality. This discrepancy could be due to misreporting of age of child at death in the MFFS (ie infant deaths were being reported as 1–4 year old deaths) but the possibility of errors in vital registration cannot be ruled out. Further analysis by period and age at maternity revealed no systematic deficiencies in the data.

Conclusions

Generally, the MFFS data do not show any serious misreporting of age, age at first marriage, duration of marriage, fertility or mortality that preclude serious further analysis on these aspects of the survey. It is fair to conclude that the quality of the data is good and that the risk of spurious findings caused by errors is minor.

References

Chander, R. and V.T. Palan (1974). *Malaysian Family and Fertility Survey.*

Chidambaram, V.C., N. Goldman and J. Hobcraft (1981). Advances in the P/F Ratio Method for the Analysis of Birth Histories. WFS Tech. Paper 1619.

Cho, Lee Jay, J. Palmore and L. Saunders (1967). *Report on West Malaysian Family Survey 1967.*

Coale, A.J. (1971). Age Patterns of Marriage. *Population Studies* 25: 193–214.

Department of Statistics (1977). *Malaysia Fertility and Family Survey, 1974: First Country Report.* Malaysia.

Rodríguez, G. and J. Trussell (1980). Maximum Likelihood Estimation of the Parameters of Coale's Model Nuptiality Schedule for Survey Data. *WFS Technical Bulletins* no 7.