DHS REGIONAL ANALYSIS WORKSHOP
FOR ANGLOPHONE AFRICA

Fertility Trends and Determinants in Six African Countries

DHS
Demographic and Health Surveys
Macro International Inc.

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Macro International Inc.
11785 Beltsville Drive
Calverton, Maryland 20705 USA

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The Demographic and Health Surveys (DHS) program assists developing countries to conduct national surveys on population and maternal and child health. The DHS program is implemented by Macro International Inc. in Calverton, Maryland. Additional information may be obtained by writing to: DHS, Macro International Inc., 11785 Beltsville Drive, Calverton, MD 20705, U.S.A. (Telephone 301-572-0200; Fax 301-572-0999).

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PREFACE

As a consequence of the fact that fertility has started to decline in a few sub-Saharan African countries and among some sub-groups in numerous countries, the need for high quality fertility data and skillful analysis of these data is greater than ever. This volume contains papers on fertility patterns in six sub-Saharan African countries. The papers were written by participants in the Demographic and Health Surveys Program (DHS) Regional Analysis Workshop for Anglophone Africa. This workshop represents one component of the DHS Program's mandate to promote the utilization of data for policy development and evaluation and to make contributions to substantive knowledge in the areas of family planning and health. A series of three regional workshops have been conducted. The first, for participants from countries conducting DHS surveys in Latin America and the Caribbean was held in Santiago, Chile in early 1992. This volume is the result of the second workshop held June 22-August 7 in Harare, Zimbabwe. The third workshop, for participants from French-speaking Africa, took place in Bamako, Mali in mid-1993.

The primary objectives of the Regional Analysis Workshop for Anglophone Africa were for participants to carry out an analysis of the course of fertility and its determinants in their countries, to interpret this evidence in the context of the policy and socioeconomic environment, and to identify and explore in depth fertility-related topics of particular policy or program relevance.

The workshop was attended by twelve participants from six countries that have conducted surveys under the DHS Program: Kenya, Nigeria, Tanzania, Uganda, Zambia, and Zimbabwe. The workshop agenda was divided into three sections. The first section focussed on the analysis of trends and sub-national differences in fertility using the DHS birth history. This section included topics such as the evaluation of data quality, the calculation and interpretation of period and cohort fertility rates, parity progression ratios, and first marriage/first birth life tables. The importance of looking at a variety of measures and supporting evidence before making conclusions about the course of fertility was stressed.

The second part of the workshop concentrated on using additional data from the DHS for understanding fertility trends and differentials. Specifically, the proximate determinants of fertility (marriage, contraceptive use, postpartum insusceptibility) were examined and the parameters of Bongaarts' model were estimated. In the final section of the workshop, each team identified a specific research issue in order to examine in more depth selected findings generated during the first two parts of the workshop. Appropriate multivariate analysis techniques were applied to answer the country-specific research questions. Throughout the workshop, emphasis was placed on the clear and effective presentation of results.

The Demographic and Health Surveys Program is funded by the United States Agency for International Development (USAID). The USAID mission in Zimbabwe assisted with local arrangements for the workshop. Collaborating institutions were the University of Zimbabwe (Population Studies Program) and the Zimbabwe National Family Planning Council.

WORKSHOP PARTICIPANTS

Kenya

Dr. Zibeon Muganzi
Population Studies and Research Institute
University of Nairobi

Mr. Timothy Takona
National Council for Population and Development
Ministry of Home Affairs

Nigeria

Dr. Bamikale J. Feyisetan
Dept. of Social Statistics and Demography
Obafemi Awolowo University

Dr. Paulina K. Makinwa-Adebusoye
Population Research Unit
Nigeria Institute of Social and Economic Research

Tanzania

Mr. Said M. Aboud
Census Office
Bureau of Statistics

Mrs. Aldegunda S. Komba
Census Office
Bureau of Statistics

Uganda

Ms. Josephine K. Kalule
Population Secretariat
Ministry of Planning and Economic Development

Ms. Molly Kisanje
Evaluation and Research
Family Planning Association of Uganda

Zambia

Mr. Kumbutso Dzekedzeke
Dept. of Census and Statistics
Central Statistical Office

Mr. Nelson Nyangu
Women in Development Section
National Commission for Development Planning

Zimbabwe

Mr. Ityai Muvandi
Evaluation and Research Unit
Zimbabwe National Family Planning Council

Mr. William Muhwava
Population Studies Program
Dept. of Sociology
University of Zimbabwe

WORKSHOP COORDINATORS

Dr. Ann K. Blanc
Demographic and Health Surveys Program

Mr. Trevor N. Croft
Demographic and Health Surveys Program

Dr. Ian Diamond
University of Southampton

Dr. Charles R. Hammerslough
University of Michigan

Ms. Susan McInturff
Demographic and Health Surveys Program

Dr. Naomi Rutenberg
Demographic and Health Surveys Program

Research Assistance

Ms. Andrea L. Piani
Demographic and Health Surveys Program

Fertility Decline and Demand for Family Planning in Kenya

Zibeon Muganzi
Population Studies and Research Institute
University of Nairobi
Nairobi, Kenya

Timothy Takona
National Council for Population and Development
Nairobi, Kenya

1 Background

Kenya held its first population census in 1948. The census data showed a total population size of 5.4 million and a growth rate of 2.5 percent per annum. In 1962 and 1969, the total population had risen to 8.6 million and 10.9 million, respectively (CBS, 1977). By 1979, this figure had risen to over 15 million, indicating that the population had trebled in 31 years (KCPS, 1984). The 1989 Census provisional results estimate Kenya's population to have been 21.4 million with an intercensal growth rate of 3.3 percent per annum (CBS, 1990). The increase in population and some summary demographic indices are shown in Table 1.1.

Table 1.1 Demographic indicators, Kenya 1948-1988

Indicators	1948	1962	1969	1979	1989
Population (millions)	5.4	8.6	10.9	16.9	21.4
Total fertility rate	66.0	6.8	7.6	7.9	6.7
Crude birth rate (per 1000)	50.0	50.0	50.0	52.0	50.0
Crude death rate (per 1000)	25.0	20.0	17.0	14.0	13.0
Infant mortality rate (per 1000)	184.0	146.0	118.0	104.0	80.0
Growth rate	2.5	3.0	3.3	3.8	3.3

The rapid increase in population has been attributed to the decline in mortality and sustained high fertility rates. For example, infant mortality declined from 184 deaths per 1,000 population in 1948 to the current 65 deaths per 1,000 population. Fertility rates as reported by various surveys have been high and constant until recently when they were reported to be on the decline. The total fertility rate (TFR) increased from 6.0 in 1948 to 7.9 in 1979--said to be one of the highest in the world (CBS, 1977/78). The TFR is now estimated to be 6.7.

The first official concern about high fertility (rapid population growth) and its impact on resources was noted in the Sessional Paper No. 10 of 1965 on "Kenya's National Goals and Development Philosophy." In this document the government stated that there was a need to plan and to control the population growth rate in consonance with the rate of economic development. Then two years later, in 1967, the government announced the adoption of family planning as part of its development policy and the Ministry of Health

was given responsibility for implementing the programme. That programme, however, had limited success due to a lack of coordinating machinery, which, in turn, led to the 1982 formation of the National Council for Population and Development (NCPD).

1.1 CURRENT STATUS OF FAMILY PLANNING IN KENYA

The NCPD mandate is to formulate population policies and strategies and to coordinate the activities of government ministries, Non-government organizations (NGOs) and donors. The Division of Family Health of the Ministry of Health provides family planning services through the network of MCH/FP clinics in government hospitals, health centres and clinics, and has overall responsibility for national family planning service statistics and logistics management information systems. The Division of Family Health continues to sponsor radio programmes, organize the training of health personnel, and produce materials as it has for several years.

The Ministries of Culture and Social Services, Labour, and Agriculture, the Kenya Institute of Mass Communication (KIMC), the Kenya Institute of Education (KIE), the Kenya Institute of Administration (KIA) and other government ministries and departments are involved in various training programs and IEC activities in support of population education and family planning.

NGOs play a major role in providing family planning services in Kenya through a variety of hospital, clinic, mobile clinic, community-based distribution (CBD), and private sector family planning programmes. According to the 1989 Kenya Demographic and Health Survey (KDHS), non-government sources provided almost one-third of all family planning services in the country. This proportion is increasing. The Family Planning Association of Kenya (FPAK), National Council Churches of Kenya (NCCK), Family Planning Private Sector (FPPS), and other NGOs also produce a large variety of calendars, posters, booklets, and other materials to educate people on family planning. Some of the NGOs support community based distribution programmes for contraceptives. Radio programmes on family planning related issues are broadcast both regionally and nationally on a regular basis.

1.2 THE KENYA DEMOGRAPHIC AND HEALTH SURVEY (KDHS)

Many demographic studies carried out in Kenya have shown that the country has gone through a period of sustained high fertility followed by a recent decline (NCPD and IRD, 1989; Kelley and Nobbe, 1990). As already indicated, the TFR has declined from 7.9 in 1979 to an estimated 6.7 in 1989. This dramatic decline in fertility is of crucial importance not only to the government but also to other policy making organizations in terms of understanding both the factors contributing to fertility decline and how this decline will affect the future demographic profile of the country. The Kenya Demographic and Health Survey (KDHS) was carried out in part to shed more light on this decline in fertility.

Kenya has had a long history of data collection since 1948 when the first census was conducted. There have been five population censuses in Kenya, carried out in 1948, 1962, 1969, 1979 and the latest in 1989. There have been also numerous demographic surveys, including three National Demographic Surveys carried out in 1977, 1978 and 1983, the 1978 Kenya Fertility Survey, the 1984 Kenya Contraceptive Prevalence Survey, and most recently, the 1989 Kenya Demographic and Health Survey. All of these surveys and population censuses have provided important and consistent information that shows a gradual rise in fertility from an estimated TFR of 6.7 in 1968 to 8.2 in 1979, followed by a gradual decline to 6.7 in 1989.

The KDHS was conducted by the National Council for Population and Development (NCPD) with assistance from the Central Bureau of Statistics (CBS). The U.S Agency for International Development (USAID) provided financial assistance for the survey through Macro International Inc.

The primary objective of the KDHS was to provide information on fertility, awareness, approval and use of family planning methods as well as information on the basic indicators of maternal and child health. The survey results were to be used by policy makers and programme administrators in their implementation of various population related projects. A total of 7,150 women aged 15-49 were interviewed. Details may be found in the final report of the survey (NCPD and IRD, 1989).

1.3 BACKGROUND CHARACTERISTICS OF THE RESPONDENTS

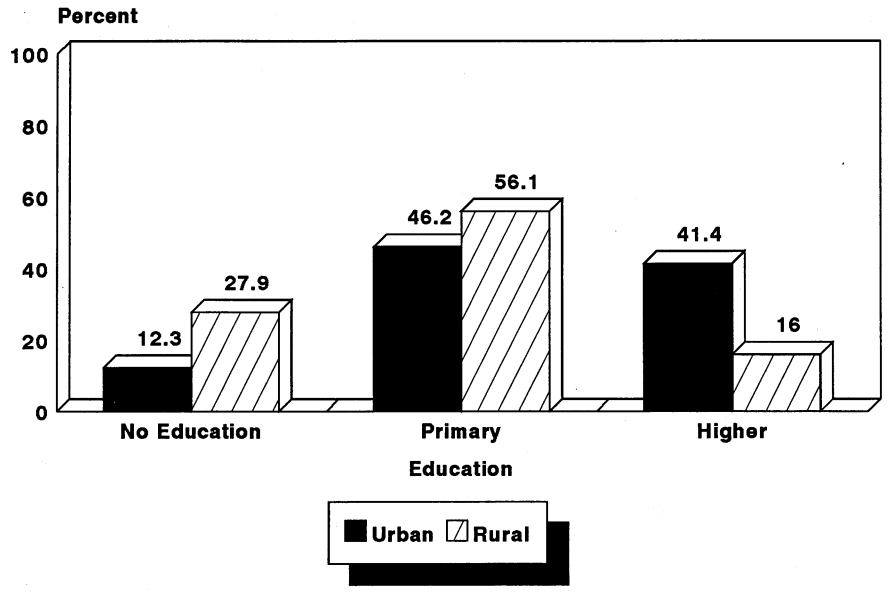
This section describes the distribution of respondents by various background characteristics. Table 1.2 presents the distribution of all women and currently married women by various background characteristics. With respect to age, over half of the respondents (58 percent) were almost equally allocated to the three age groups below age 30, with decreasing proportions in the older age groups. As expected, the 45-49 year group had the lowest proportion of respondents. In terms of the type of place of residence, 83 percent of the respondents resided in rural areas and 17 percent were urban residents.

Table 1.2 Percent distribution of all women and currently married women by background characteristics, Kenya 1989

Background characteristic	All women		Currently married women	
	Number	Percent	Number	Percent
Age				
15-19	1497	20.9	276	5.8
20-24	1321	18.5	827	17.3
25-29	1334	18.7	1104	23.2
30-34	982	13.7	833	17.5
35-39	898	12.6	781	16.4
40-44	674	9.4	576	12.1
45-49	445	6.2	369	7.7
Residence				
Urban	1236	17.3	748	15.7
Rural	5914	82.7	4018	84.3
Region				
Nairobi	554	7.7	335	7.0
Central	1120	15.7	648	13.6
Coast	498	7.0	350	7.3
Eastern	1269	17.8	804	16.9
Nyanza	1218	17.0	872	18.3
Rift Valley	1519	21.2	1047	22.0
Western	971	13.6	710	14.9
Education				
No education	1797	25.1	1506	31.6
Primary	3887	54.4	2449	51.4
Secondary+	1457	20.4	804	16.9
Religion				
Catholic	2480	34.7	1656	34.8
Protestant	4107	57.4	2706	56.8
Muslim	253	3.5	165	3.5
Others	115	1.6	79	1.7
No religion	184	2.6	151	3.2
Total	7150	100.0	4765	100.0

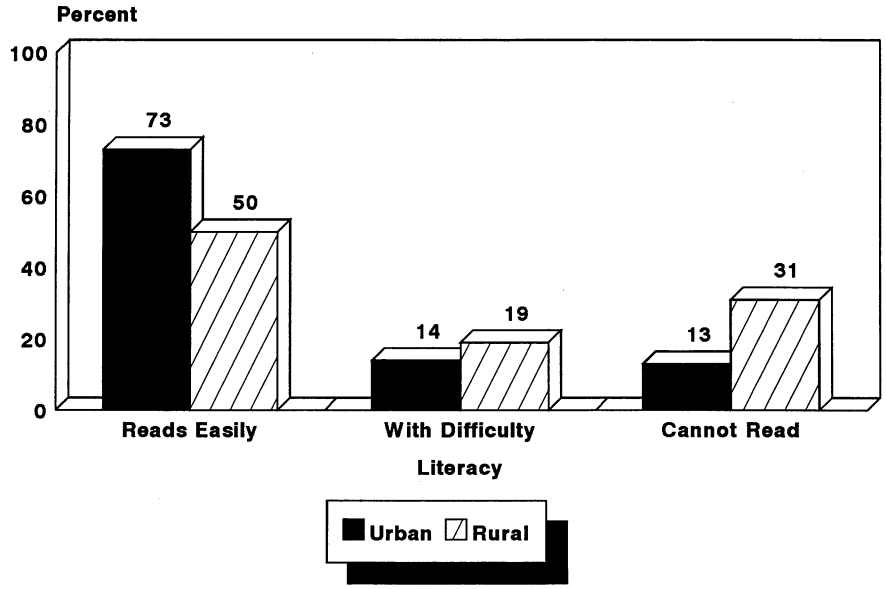
One quarter of the respondents had received no education, over half (54 percent) had attained primary education and 20 percent had secondary or higher education (only 1 percent of these had higher education). Within region of residence, Figure 1.1 shows that in both urban and rural areas, a large proportion of the respondents had attained primary level education, implying that government efforts to provide primary education for all are bearing fruit. It is also not surprising that over 40 percent of the urban respondents had attained secondary or higher education, as people with secondary education will usually be concentrated in urban areas where better school facilities and good job prospects are found.

Figure 1.1
Distribution of Respondents by Level of Education According to Type of Residence



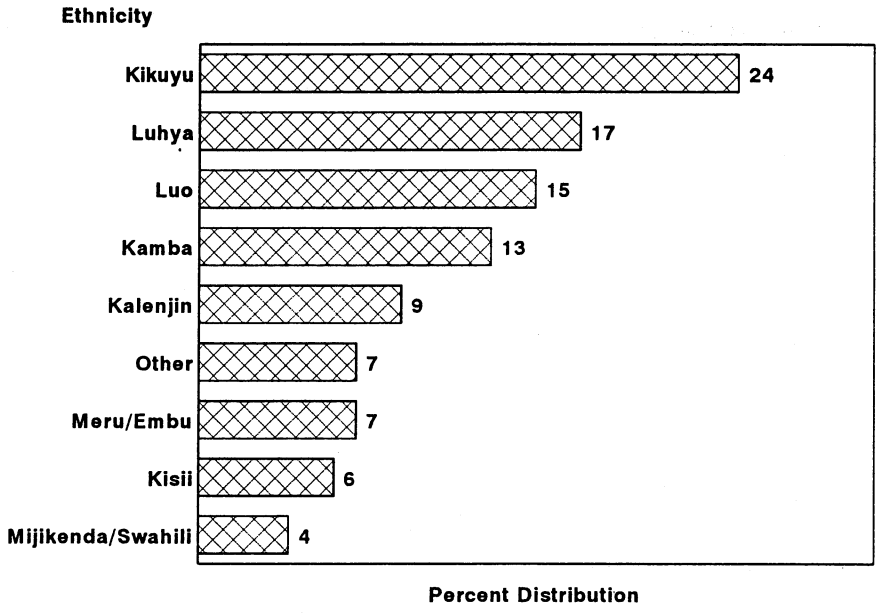
It is evident from Figure 1.2 that literacy levels are quite high in both rural and urban areas. Over 70 percent of the urban respondents indicated that they could read easily, while 50 percent of the women interviewed in rural areas indicated the same. A further 19 percent of rural respondents could read with difficulty, compared with 14 percent of the urban sample, while 31 percent of the rural sample could not read at all. It should be noted, however, that these distributions could give an inflated impression of the national literacy levels if not considered in the light of Table 1.2 which shows that 83 percent of the DHS respondents resided in rural areas, while a far smaller percentage (17 percent) were urban residents.

Figure 1.2
Distribution of Respondents by Level of Literacy According to Type of Residence



In all, over 9 ethnic groups were represented in the KDHS sample. As illustrated in Figure 1.3, about one quarter of the respondents were from the Kikuyus, while the representation of other ethnic groups ranged from 4 to 17 percent.

Figure 1.3
Distribution of Respondents by Ethnicity



KDHS 1989

Figure 1.4 shows that Kenya DHS respondents were predominantly Christian. Over 55 percent of the women interviewed were Protestant; 35 percent were Catholic. Muslims formed about 4 percent of the sample. These respondents were mainly found in the Coast Province which is predominantly Afro-Arabic and Swahili--groups generally known to be Muslim.

Figure 1.4
Distribution of Respondents by Religion

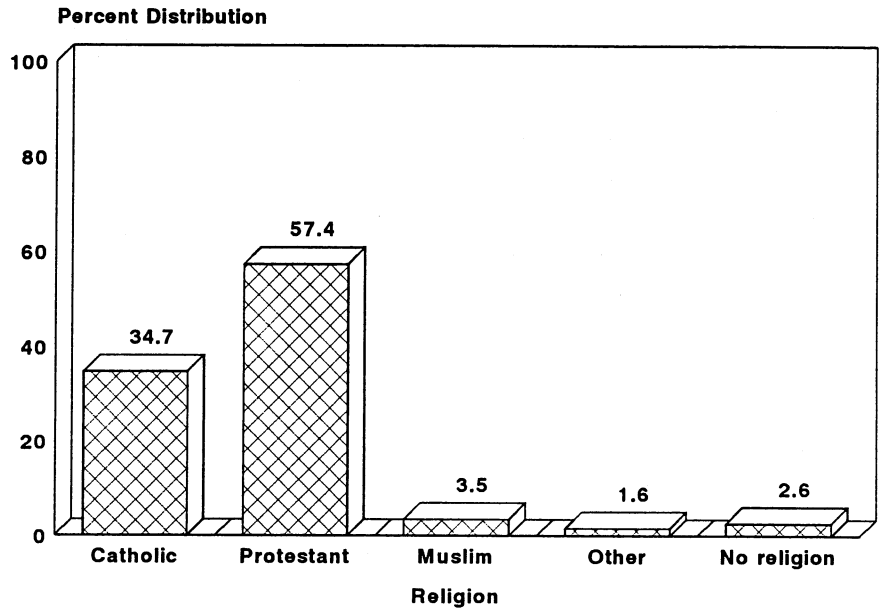


Table 1.3 shows the distribution of respondents by facilities available in their households. As one would expect, the majority of respondents in the urban areas (56 percent) had piped water in their houses as compared with only 12 percent in the rural areas. Almost two-thirds of women in rural areas used a source of water other than piped or public tap or well; these included rivers, streams, pools, etc. Most Kenyan households have some kind of toilet facility. Only 17 percent of households in rural areas and 3 percent in urban areas had no toilet facilities. However, the majority of urban respondents use pit latrines and other traditional toilet facilities.

Table 1.3 Percent distribution of respondents by household facilities, Kenya 1989

	Place of residence	
Household facility	Urban	Rural
Source of water		
Piped into house	56.2	11.6
Public tap/Well	39.2	25.0
Other	4.6	63.4
Total	100.0	100.0
N	1235	5908
Toilet facilities		
No facilities	3.1	16.8
Flush toilet	44.4	1.5
Other (pit latrine, etc.)	52.5	81.7
Total	100.0	100.0
N	1233	5908
Ownership of TV, radio, or refrigerator, etc.		
Yes	84.2	65.9
No	15.8	34.1
Total	100.0	100.0
N	1236	5914

Note: In this and the following tables, the variation in the sample numbers for each variable reflect missing values due to nonresponse.

There is considerable variation in terms of ownership of household consumer goods for urban and rural areas. For example, whereas 84 percent of urban respondents lived in households with either a TV, radio or refrigerator, only 66 percent of households in the rural areas contained at least one of these items. The ownership of radio and television is important in facilitating access to family planning information.

2 Completeness of Information

2.1 INTRODUCTION

The validity of estimates from survey or census data is determined to a large extent by the completeness and accuracy of the reported information. Of particular interest in analyzing the KDHS data on fertility is the reporting of the respondent's birth date and age and the birth dates and ages of her children. In terms of age reporting, it is common for ages to be reported with digits ending in 0 or 5, a practice referred to as age-heaping. Inaccuracy in the data may also result from incomplete reporting of the dates of birth. In DHS surveys, missing dates of birth are imputed following a set of logical rules. If it becomes necessary to impute a large proportion of dates the estimates might become biased.

Another factor which may contribute to biased estimates is the under-reporting of births by women, especially of infants who subsequently died. Another source of error in the reported number of children could be the inclusion of stillbirths.

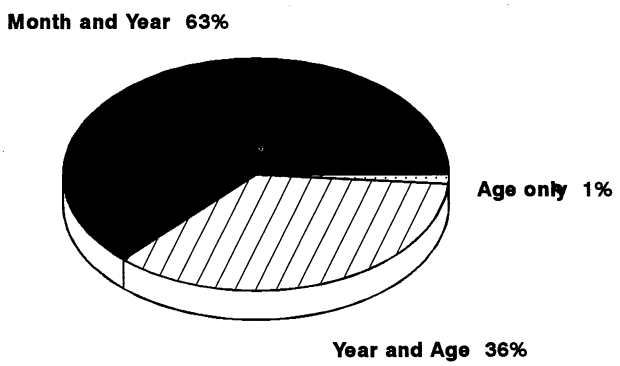
2.2 COMPLETENESS OF INFORMATION

Figure 2.1 shows the extent to which respondents gave complete information about their birth dates. A majority of women (63 percent) provided complete information on their month and year of birth. Thirty-six percent provided the year and age, whereas 1 percent knew only their age. For this group, the year of birth was calculated and the month of birth imputed.

The distribution of women by single years of age is shown in Figure 2.2. It is evident that there was a preference for digits 0 and 5, especially among young women between the ages of 20 and 30. This digit preference is smoothed out by aggregating women into five-year age groups. Therefore, the rest of the analysis in this report is based on five-year age groupings.

An assessment of the accuracy of the reporting of children's birth dates was undertaken using information on the number of births tabulated by calendar year (see Figure 2.3). The general trend is an increasing number of births over time. However, the greatest numbers of births are reported for the years 1980 and 1982. The heap in 1982 could be attributed to the shifting of reported births by the interviewers to avoid collecting information asked about births in the five calendar years before the survey--excluding children born since January 1983. The excess of births in 1980 is probably due to estimating the year of birth with a bias towards years ending with 0.

Figure 2.1
Distribution of Women by Information Reported on Date of Birth

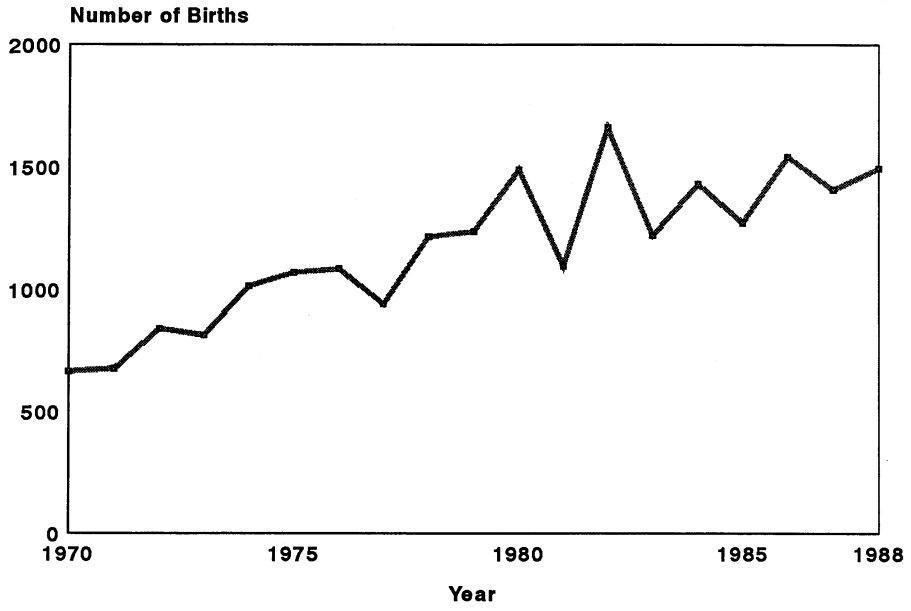


KDHS 1989

Figure 2.2
Single-Year Age Distribution of Women

KDHS 1989

Figure 2.3
Reported Number of Births per Year



KDHS 1989

Table 2.1 shows the completeness of age reporting of women by various background characteristics. A larger proportion of women in the urban areas (75 percent) gave complete information, compared with those in rural areas (61 percent). This result is expected as the more educated women are found in the urban areas.

Table 2.1 Percent distribution of respondents by completeness of age reporting, according to background characteristics, Kenya 1989

Background characteristic	Completeness of information (women)			
	Month and year	Year and age only	Age only	No. of women
Residence				
Urban	74.5	24.8	0.7	1236
Rural	60.6	38.1	1.4	5914
Region				
Nairobi	76.5	22.8	0.7	554
Central	62.3	36.4	1.3	1120
Coast	40.8	59.0	0.2	498
Eastern	57.2	42.1	0.7	1269
Nyanza	72.8	24.4	2.8	1218
Rift Valley	54.9	44.0	1.1	1519
Western	75.5	23.7	0.8	971
Education				
No education	35.9	62.3	1.8	1797
Primary	66.1	32.6	1.3	3887
Secondary	87.9	11.7	0.4	1437
Marital Status				
Never married	81.3	18.4	0.4	1861
Currently married	56.8	41.6	1.6	4765
Formerly married	54.1	44.6	1.2	523

The completeness of age reporting shows considerable variation across regions. Reporting is complete for more than 50 percent of women in all provinces except Coast Province. The low level of completeness for Coast Province could be attributed to the high proportion of women with no education (47 percent). The impact of education on complete reporting of dates of births is well demonstrated here. Eighty-eight percent of women with higher education (i.e., secondary and above) gave complete information, compared with only 36 percent of women with no education. However, most women with no education (62 percent) were able to provide information on age and year of birth.

In terms of marital status, the results show a high proportion of never married women (81 percent) to have provided complete reporting. This trend may be due to the fact that the never married group was composed of young women who were probably better educated and therefore could easily furnish the information requested.

Table 2.2 shows completeness of date reporting on births as provided by the respondents in the survey. For both urban and rural areas, there was nearly complete reporting of information on births—98 percent for urban and 96 percent for rural areas. This is especially encouraging for analysis of data from rural areas, which comprise the majority of the sample.

Table 2.2 Percent distribution of births by completeness of birth date reporting, according place of residence, Kenya 1989

Completeness of information	Place of residence			
	Urban		Rural	
	Number	Percent	Number	Percent
Month and year	2810	97.9	22424	96.02
Year and age	33	1.2	585	2.5
Year only	14	0.5	202	0.9
Age only	8	0.3	66	0.3
Month only	0	0.0	9	0.0
None	4	0.1	76	0.3
Total	2870	100.0	23362	100.0

3 Fertility Levels, Trends and Differentials

3.1 INTRODUCTION

Of the three components of population change--migration, mortality and fertility--fertility is currently the major determinant of population growth in Kenya. Thus, levels and trends in fertility are important for both short-term and long-term policy planning. Recent estimates suggest that Kenya has started a fertility transition that is taking place after a long period of sustained high levels of fertility. Thus, it becomes important to identify the underlying factors driving the observed declines in fertility, as well as the sub-groups among whom the decline is taking place.

3.2 AGE-SPECIFIC FERTILITY RATES

Figure 3.1 shows trends in the national age-specific fertility rates (ASFRs) for five-year periods up to twenty years before the DHS survey. It is evident that the ASFRs for all periods peak at age group 20-24 and then decline in the older age groups. The trend in ASFRs for 15-19 year old women is striking: ASFRs have gradually declined from a level of over 200 per 1000 population in the period 15-19 years prior to the survey to a level of 152 per 1000 population in the five years prior to the interview.

Figure 3.1
Age-Specific Fertility Rates for Five-Year Periods Prior to the Survey

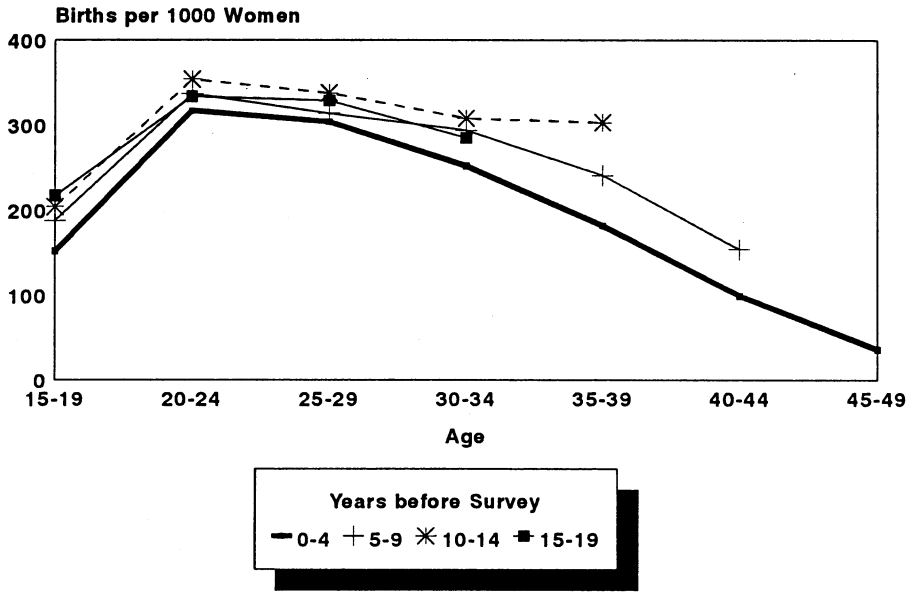
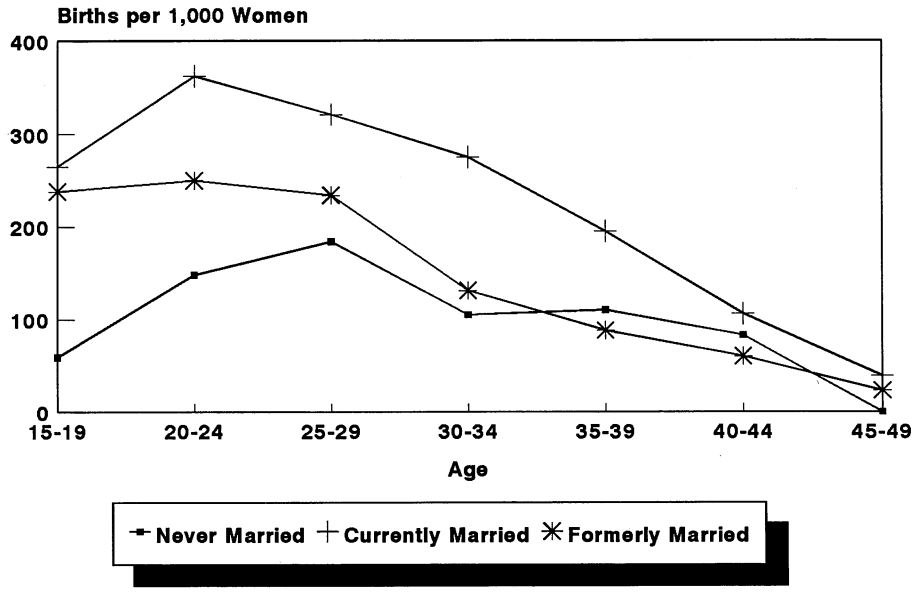


Figure 3.2 shows a high degree of childbearing outside marriage among the respondents for the five-year period prior to the interview, which later sections of this paper discuss in detail. As expected, the fertility rate is higher for currently married women because of the higher degree of exposure to the risk of pregnancy in marriage. The ASFR for this category of women peaks at over 350 births per 1000 women in the 20-24 age group and then gradually declines to 35 births per 1000 women in the 45-49 age group.

Figure 3.2
Age-Specific Fertility Rates by Marital Status for the Five-Year Period Prior to the Survey



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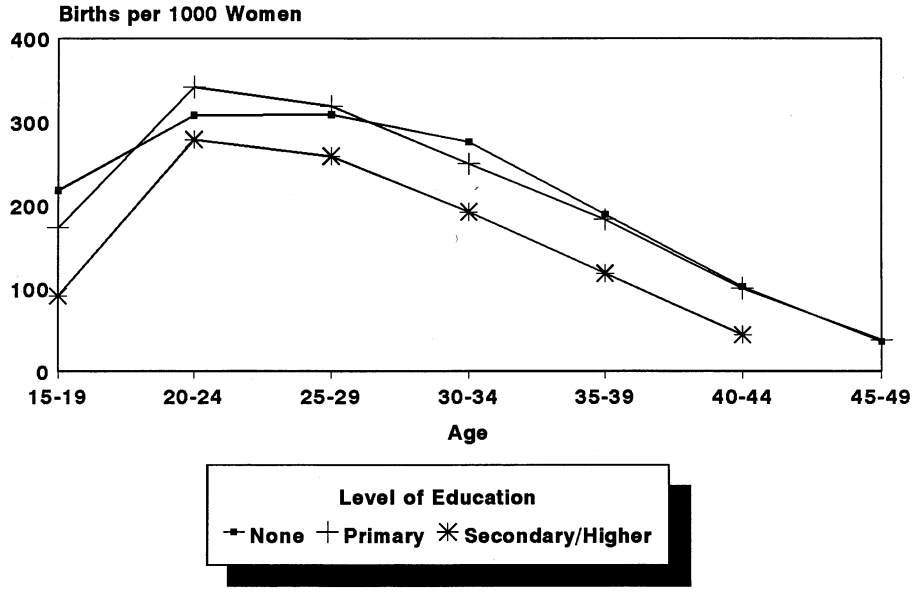
The significant fertility levels of never married women are perhaps due to the fact that the proportion of women who are not in marital unions is increasing in Kenya. These high levels could be due to accidental pregnancies, particularly among women in the younger ages. Older women who reach say 30, may choose single motherhood. This theory, however, is supported by very little empirical evidence, suggesting a need for a deeper analysis of ASFRs among women with different marital statuses.

ASFRs also vary according to levels of education (Figure 3.3). Whereas fertility is low for all age groups among women with secondary and higher education, it is moderately high for those with no education or only primary education. An explanation for this pattern might be derived from the fact that schooling usually delays marriage and/or pregnancy among women with secondary education and thus limits their eventual fertility. In the case of women with no or only primary education, who in most cases start families early, the observed moderate to high age-specific fertility rates are a result of low contraceptive use and cultural traditions which promote high fertility.

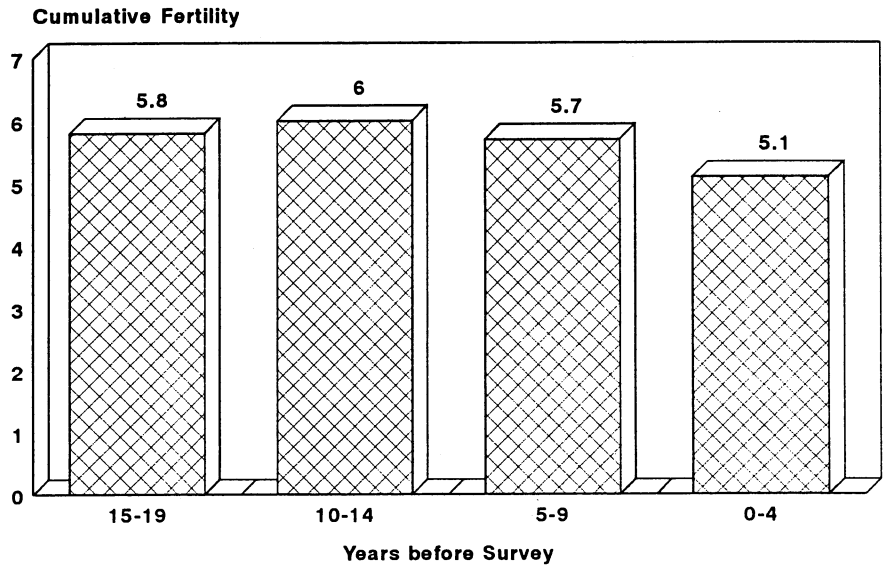
Figure 3.3
Age-Specific Fertility Rates by Level of Education for the Five-Year Period Prior to the Survey



KDHS 1989

Figure 3.4 shows the ASFRs cumulated up to age 34 for four five-year periods going back 20 years before the survey. Rates are cumulated up to age 34 only, because the rates are progressively truncated for older women as one moves back in time. It is shown that from an estimated rate of 5.8 children 20 years before the survey fertility up to age 34 dropped to a level of 5.1 children in the five years before the KDHS.

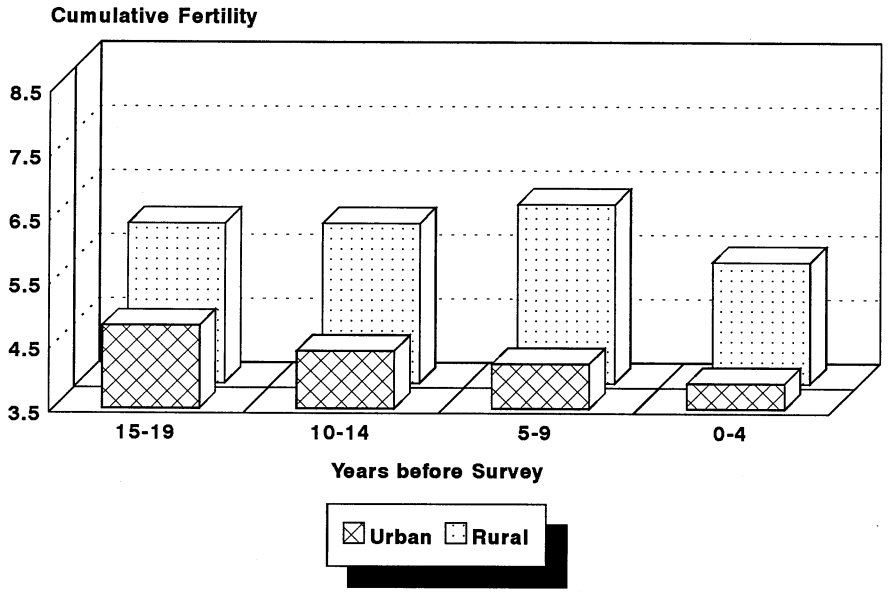
Figure 3.4
Cumulative Fertility to Age 34 for Five-Year Periods Prior to the Survey



KDHS 1989

Figure 3.5 shows cumulative fertility according to current type of residence. Fertility in rural areas remained consistently high relative to fertility in urban areas. For example, while fertility up to age 34 in urban areas declined from 4.8 children in the period 15-19 years prior to the survey to 4.2 children in the 5-9 years before the survey, fertility in rural areas remained stable at about 6.0 children over the same periods. This could be attributed to improved health and nutrition programmes in rural areas initiated by the government and relevant NGOs. Interpretation is limited by the fact that place of residence refers only to current place.

Figure 3.5
Cumulative Fertility to Age 34 by Residence for Five-Year Periods Prior to the Survey



KDHS 1989

3.3 COMPARISON WITH OTHER DATA SOURCES

Table 3.1 shows the trends in ASFRs for Kenya since the 1962 Census. It is evident that the sample surveys show higher estimates of TFRs--ranging from 6.7 to 8.0--as opposed to the censuses which estimated TFRs between 5.3 and 6.6. This can be attributed in part to higher quality data from the sample surveys compared with census data, which, as discussed in an earlier section, do not include birth histories and thus often underestimate fertility levels.

Table 3.1 Age-specific fertility rates from various data sources, 1962-1989

Age	1962 Census	1969 Census	1977 NDS	1977-78 KFS	1979 Census	1984 KCPS	1989 KDHS
15-19	83	111	135	177	98	143	152
20-24	207	284	365	369	264	358	314
25-29	223	290	361	356	276	338	303
30-34	203	253	316	284	226	291	255
35-39	163	200	231	216	173	233	183
40-44	109	121	133	132	91	109	99
45-49	63	60	56	51	41	66	35
TFR	5.3	6.6	8.0	7.9	5.9	7.7	6.7

The KDHS age-specific and total fertility rates compare favourably with those of the other sources listed in the table which chart out a clear drift in national fertility levels and trends. The KDHS findings provide the most recent evidence of the country's gradually declining fertility rates.

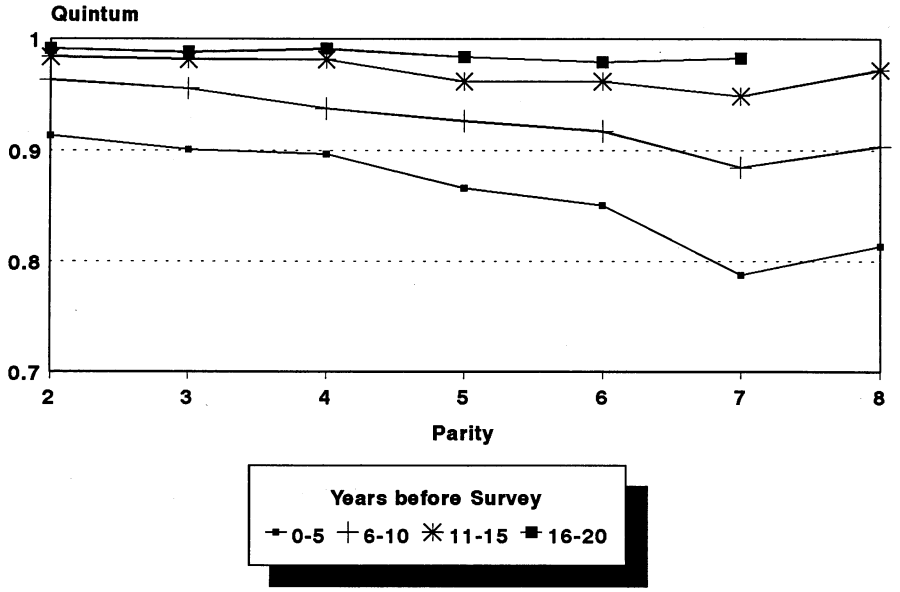
3.4 PARITY PROGRESSION RATIOS

In the last section, fertility trends and levels in Kenya were analyzed according to the age of the woman. In this section, the parity or the number of live births a woman achieves is used as a summary indicator of fertility levels among the KDHS respondents. The family-building process is a series of stages and one can focus on the proportion of women who move from one stage to the next and the length of time it takes them to do so. For example, the proportion of all women who have had one live birth who go on to have another is usually referred to as a Parity Progression Ratio (PPR). An operational definition is the proportion of women having a birth within 60 months of a previous birth or the "Quintum."

The estimation of PPRs from the KDHS data has not, to our knowledge, been done previously. Because of the lack of completed reproductive histories for all women, life table techniques were used to derive the parity progression ratios. The parity progression ratios were calculated for periods of time stretching back 20 years before the survey.

The analysis provides some interesting results. Figure 3.6 shows that the proportion of women who had a subsequent birth in the period 16-20 years before the survey was almost constant at all parities through to parity 7. This can be attributed to the strong cultural and social norms which existed at the time in which ideas of limiting fertility were overruled by the values communities placed on children. In the period 11-15 years before the survey, there was a slight decline in the proportion of women at parities 5 and above who had a subsequent birth.

Figure 3.6
Proportion of Women having a Birth within Five Years of a Previous Birth



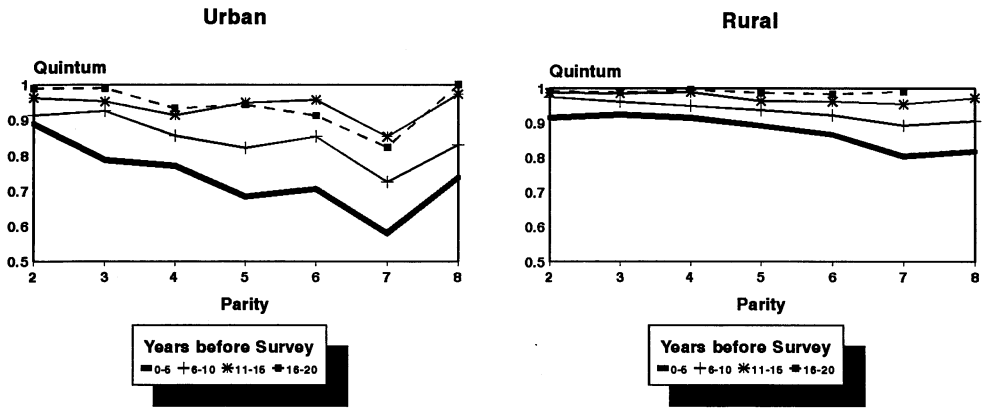
KDHS 1989

A distinct difference can be seen between the PPRs of women in the two earlier periods and those in the periods 6-10 and 0-5 years before the interview. In the two most recent periods, declines in the quintums are evident at all parities but are particularly sharp at parities 5 and above.

The most interesting finding of this analysis is the decline in the percentage of women having subsequent births after parity 6 in the five years preceding the DHS interview. This decline supports other DHS evidence of fertility decline in Kenya in recent times.

In a more specific analysis, urban and rural differentials in the parity progression ratios were plotted. The PPRs for urban women in the 10 years before the DHS survey demonstrate a marked trend toward fewer children. For instance, in the period 0-5 years before the interview, Figure 3.7 shows a consistent decline in the proportion of women having a subsequent birth, compared with the proportion doing so in the period over ten years before the survey.

Figure 3.7
Proportion of Women having a Birth within Five Years of a Previous Birth



KDHS 1989

Over the last twenty years, trends in the percentage of women having a subsequent birth in rural Kenya have remained constant, especially up to parity 4. It is also clear in the figure that the PPRs for 10-20 years ago were generally high for parities up to 7 or more children. However, in the last 10 years before the survey, the PPRs for rural women have declined slightly. The descending curves for this period imply that fewer women have actually had a subsequent birth. The decline is more apparent after parity 6.

4 Proximate Determinants of Fertility

4.1 INTRODUCTION

For many populations, fertility is known to covary with various socioeconomic and cultural factors. For example, it has been shown that women with higher levels of education have fewer children, compared with women who have no education. The same has also been observed for place of residence, whereby urban women generally have lower fertility than those in rural areas.

However, while these factors are important in identifying different sub-groups with different reproductive performance, the effect they have on fertility can only be measured indirectly through more direct variables referred to as the proximate determinants of fertility. These determinants are the only factors that directly influence and therefore determine fertility levels and change (Davis and Blake, 1956; Bongaarts, 1978). Changes in one or more of the proximate determinants should affect fertility assuming that other variables remain constant.

4.2 THE PROXIMATE DETERMINANTS OF FERTILITY MODEL

In order to further our understanding of fertility in Kenya, the proximate determinants are examined using the Bongaarts model. This model estimates the relative importance of marriage, contraception, abortion, and postpartum infecundability in determining the observed level of fertility.
The model is presented below:

$$TFR = TF \times C_i \times C_c \times C_a \times C_m$$

where TFR = the total fertility rate
TF = total fecundity (biological maximum number of children)
C_i = the index of postpartum insusceptibility
C_c = the index of contraception
C_a = the index of abortion
C_m = the index of marriage.

These indices measure the extent to which each of the proximate determinants reduces fertility from its biological maximum (TF). The value of the indices range from 0 to 1; the closer to 0, the greater the fertility inhibiting effect of the determinant. The index of abortion is not included here due to the lack of data on abortion in the KDHS.

This model has been applied previously to Kenya data collected from various surveys. Ferry and Page (1984) applied the model to the 1977/78 Kenya Fertility Survey (KFS) data. They concluded that lactational amenorrhoea was the main fertility-inhibiting factor, followed by marriage patterns. Contraception had a minor impact on fertility.

Kalule-Sabiti (1984) also used the model with 1977/78 KFS Data. The model was found to fit well for all women, except for those who lived in the Nairobi and Coast provinces and among Muslim groups where model fertility estimates were higher than the observed rates, differences that were attributed to induced abortion and secondary sterility among other factors.

The proximate determinants of fertility model as applied to KDHS data is presented in Table 4.1. The results indicate that, overall, postpartum infecundity (C_i) is the determinant that has the greatest impact on reducing fertility from its biological maximum, followed by contraceptive use (C_c), and marriage (C_m). Among women with secondary education, however, it is notable that contraceptive use has the greatest fertility-inhibiting effect.

Table 4.1 The proximate determinants of fertility by background characteristics, Kenya 1989

Background characteristic	TFR	C_i	C_c	C_m
National	6.7	.67	.74	.79
Residence				
Urban	4.8	.69	.70	.76
Rural	7.1	.64	.75	.83
Education				
No education	7.2	.61	.83	.88
Primary	7.0	.65	.73	.85
Secondary/Higher	5.4	.69	.61	.79

The proximate determinants model has been applied recently to both KFS and KDHS data sets (Kizito et al., 1991) in order to explain the decline in fertility between 1977/78 and 1989. They found that contraceptive use was the most important determinant of fertility decline, explaining 62 percent of the aggregate fertility decline. It also accounted for the largest proportion of the decline across sub-groups. The contribution of contraceptive use was shown to be more significant in the urban areas, among women who had the highest levels of schooling and among respondents who lived in the Central, Coast and Rift Valley Provinces.

The changing proportion of women who were exposed to the risk of childbearing through marriage is the second most important determinant of fertility decline. Change in marital patterns accounted for 26 percent of the fertility decline. This variable was particularly important among women in the Coast and Central Provinces. It is important to note that the impact of this variable on fertility decline would have been greater than observed if exposure to the risk of childbearing had been confined only to marriage.

Even though earlier studies showed postpartum infecundability to be the most important determinant of fertility, in recent years its contribution to fertility decline has been less important. As already indicated, this is due to the recent rise in contraceptive use.

5 Fertility Regulation

As already noted, one of the major objectives of the KDHS was to seek information from the respondents about awareness, approval, and use of family planning in regulating their fertility. Knowledge of at least one method and where to get it is crucial to the practice of family planning. Questions on knowledge of family planning methods and sources for those methods were asked and the results are presented in Table 5.1.

Table 5.1 Percentage of all women and currently married women knowing a contraceptive method and knowing a source by specific method, Kenya 1989

Contraceptive method	AW Knows method	CMW Knows method	AW Knows source	CMW Knows source
Method				
Any method	90.0	92.4	88.1	90.8
Any modern method	88.4	91.3	86.5	89.9
Pill	84.4	88.4	81.6	86.3
IUD	62.0	67.0	60.0	65.1
Injections	76.3	81.9	74.2	79.9
Diaphragm/foam	24.4	26.7	23.2	25.5
Condom	53.4	55.7	49.2	51.7
Female sterilization	68.2	72.5	65.9	70.6
Male sterilization	19.8	21.7	19.0	21.2
Any traditional method	54.8	55.8	44.4	44.8
Abstinence	50.7	50.8	44.6	44.8
Withdrawal	16.8	18.2	-	-
Other	5.1	6.3	-	-

AW = All Women (7150); CMW = Currently Married Women (4765)

The results from the table show that 90 percent of Kenyan women know at least one contraceptive method. This compares with the 88 percent reported by the 1977/78 Kenya Fertility Survey and the 81 percent from the 1984 Kenya Contraceptive Prevalence Survey. Even more importantly, a larger percentage of women (88 percent) indicated knowledge of at least one modern method than of at least one traditional method (55 percent).

The survey also asked whether women were using any contraceptive method and, if so, what method. The responses to this question, grouped by type of method, are presented for all women and for currently married women in Figure 5.1. Tables 5.2 and 5.3 present the same distribution according to the background characteristics of the respondents.

Figure 5.1
Distribution of Respondents by Contraceptive Use

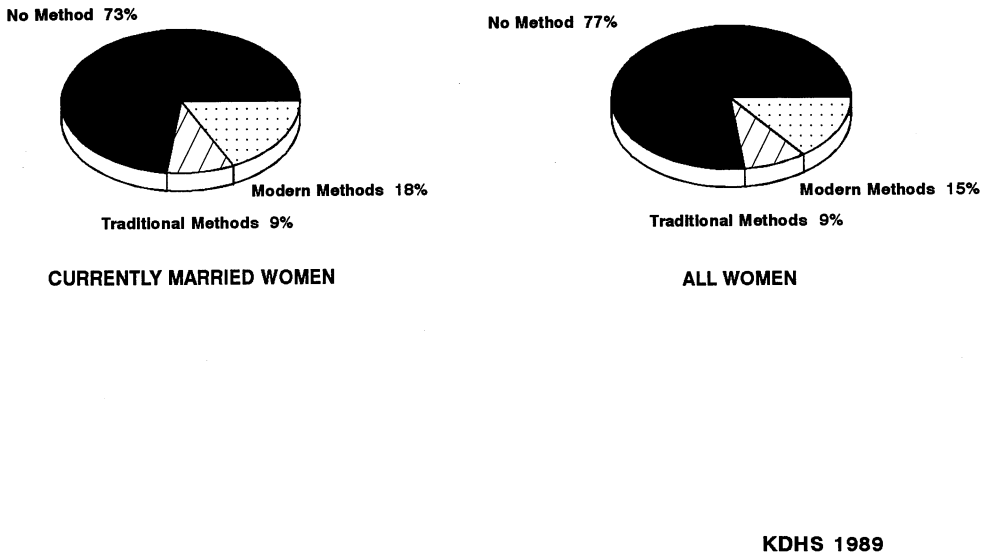


Table 5.2 **Percent distribution of contraceptive use among all women and currently married women by type of method, according to age and number of living children, Kenya 1989**

Age	No Method	Traditional	Modern	Total	Number
All women					
15-19	92.5	5.7	1.8	100.0	1497
20-24	79.3	9.2	11.5	100.0	1321
25-29	72.8	9.7	17.5	100.0	1334
30-34	67.9	9.6	22.5	100.0	981
35-39	65.9	10.9	23.1	100.0	898
40-44	72.2	8.2	19.7	100.0	674
45-49	77.7	5.6	16.7	100.0	445
Currently married women					
15-19	87.0	6.3	6.7	100.0	276
20-24	79.9	8.3	11.8	100.0	827
25-29	73.9	9.3	16.8	100.0	1104
30-34	68.5	9.2	22.2	100.0	833
35-39	65.8	11.3	22.9	100.0	781
40-44	69.4	9.4	21.2	100.0	576
45-49	76.3	6.2	17.5	100.0	369
Number of living children					
All women					
0	92.9	6.2	0.9	100.0	1683
1	80.2	9.6	10.1	100.0	895
2	73.7	7.7	18.6	100.0	786
3	71.3	9.0	19.6	100.0	752
4	68.4	9.1	22.5	100.0	725
5	68.3	11.2	20.4	100.0	577
6	73.5	6.5	20.1	100.0	614
7	69.4	10.1	20.5	100.0	404
8	66.6	10.9	22.5	100.0	714
Currently married women					
0	95.3	3.8	0.8	100.0	290
1	83.1	8.3	8.6	100.0	497
2	75.8	8.2	16.0	100.0	613
3	71.5	9.9	18.5	100.0	649
4	68.7	8.9	22.3	100.0	641
5	67.7	10.4	21.9	100.0	487
6	72.3	7.0	20.7	100.0	557
7	70.2	10.8	19.0	100.0	359
8	65.4	11.6	23.0	100.0	671

Table 5.3 Percent distribution of contraceptive use among all women by background characteristics, Kenya 1989

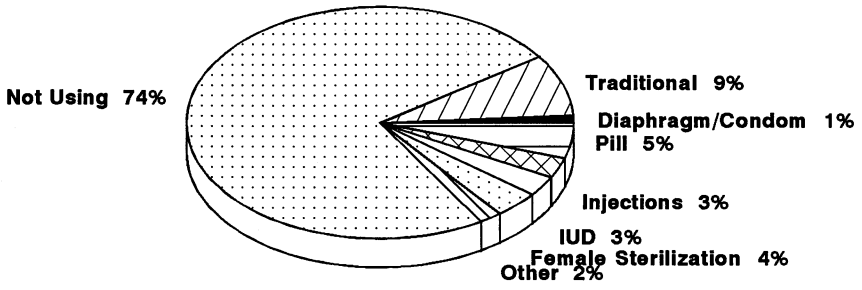
Background characteristic	No method	Traditional	Modern	Total	Number
Residence					
Urban	72.7	6.0	21.3	100.0	1236
Rural	77.7	9.0	13.3	100.0	5914
Region					
Nairobi	71.6	6.2	22.2	100.0	554
Central	69.2	8.2	22.5	100.0	1120
Coast	82.5	3.4	14.1	100.0	498
Eastern	67.1	17.5	15.3	100.0	1269
Nyanza	88.0	3.8	8.2	100.0	1218
Rift Valley	75.3	10.2	14.5	100.0	1519
Western	86.8	4.1	9.1	100.0	971
Education					
No education	82.1	8.1	9.8	100.0	1797
Primary	77.3	8.0	14.6	100.0	3887
Secondary	69.6	9.9	20.4	100.0	1437
Marital status					
Never married	86.4	7.9	5.7	100.0	1861
Currently married	73.1	9.0	17.9	100.0	4765
Formerly married	77.0	5.8	17.1	100.0	523

Table 5.3 shows that a larger proportion of women in urban areas used modern methods, compared with women in rural areas. The most urbanized regions of the country--Nairobi and Central provinces--are shown to have a higher percentage of modern contraceptive use.

Prevalence of modern methods is correlated with education. The percent of users with secondary education is double that for those without education. The results further show that a larger proportion of married and formerly marrried women were using a modern contraceptive method than those women who never married. Nonetheless, 14 percent of never married women were using a contraceptive method--modern or traditional--at the time of the survey.

The distribution of currently married women by the various methods used is given in Figure 5.2. Approximately 9 percent of married women were using a traditional method, mostly periodic abstinence. Among the modern methods, the pill is the most commonly used, followed by female sterilization, injections, and the IUD.

Figure 5.2
Percent Distribution of Married Women by Contraceptive Method



KDHS 1989

5.1 CONTRACEPTION AND FERTILITY PREFERENCES

Contraception and future fertility preferences are addressed in Table 5.4. A total of 47 percent of women were not currently using any type of contraceptives and wanted another child. More importantly, an equally large number of women who were not using contraception wanted no more children (44 percent). The large number of women not using but who want no more children should be targeted for family planning services.

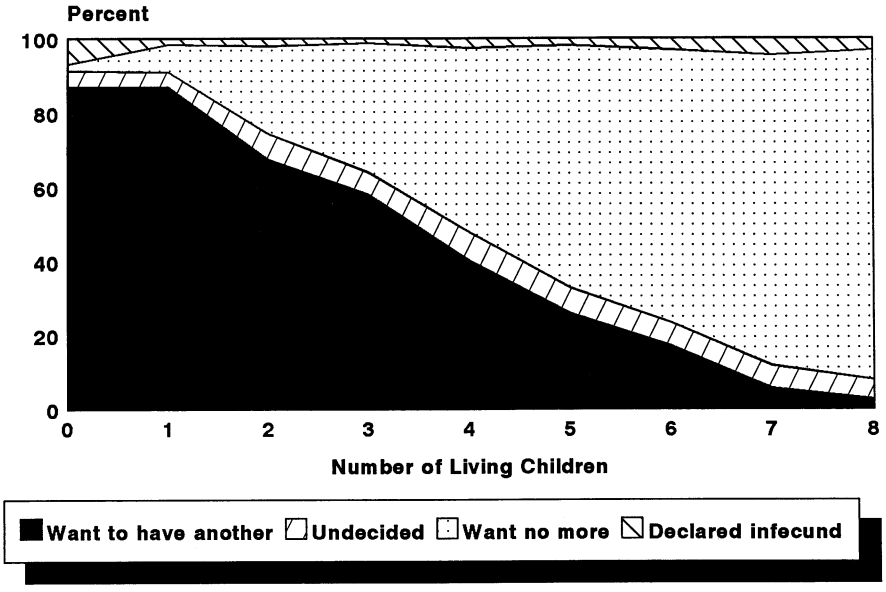
Table 5.4 Fertility preference by current contraceptive method use (currently married women), Kenya 1989

Contraceptive method	Have another	Undecided	No more	Declared infecund	Total	Number
Not using	46.7	7.0	43.8	2.4	100.0	3471
Pill	40.1	3.5	55.9	0.4	100.0	247
IUD	26.1	3.8	70.2	0.0	100.0	177
Injection	17.4	7.1	75.0	0.6	100.0	159
Diaphram	5.0	6.2	88.8	0.0	100.0	21
Condom	45.6	13.7	37.9	2.8	100.0	23
Abstinence	42.0	3.0	54.7	0.4	100.0	354
Withdrawal	59.4	5.6	35.0	0.0	100.0	11
Other	30.4	0.8	63.7	5.1	100.0	63

The proportion of contraceptive users who wanted to stop childbearing varies according to the method being used. For example, among users of the IUD, injection, and diaphragm/foam/jelly, more than 70 percent said that they wanted no more children. In contrast, fewer than 65 percent of those using the pill, condom, abstinence, withdrawal, and other methods said they wanted to stop childbearing. The percent of women who wanted to have another child were 30 percent or more for the latter group of methods, but 26 percent or less for the former group of methods. This pattern suggests that the IUD, injection, and diaphragm/foam/jelly are methods that are used more often for stopping childbearing, while the other methods may be used more for spacing births.

Fertility preferences tabulated by number of living children are shown in Figure 5.3. The figure shows that as the number of living children increased, the percentage of women who wanted to have another child decreased, while the percentage who wanted no more children increased. The undecided group remains comparatively small at all parity levels.

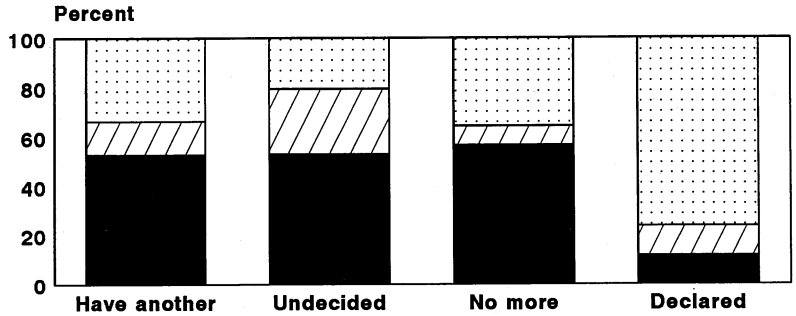
Figure 5.3
Fertility Preferences of Women by the Number of Living Children



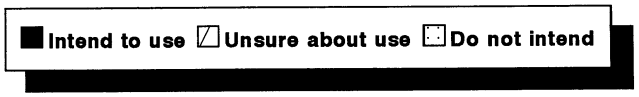
KDHS 1989

Figure 5.4 shows the percent of nonusers of contraception by whether they intend to use, according to their fertility preferences. Intention to use contraception does not vary much by fertility preferences. Among those women who wanted no more children, 57 percent intended to use contraception, while 53 percent of those who wanted to have another child planned to use some type of contraception.

Figure 5.4
Intention to Use Contraception by Fertility Preference



	Have another	Undecided	No more	Declared infecund
	100	100	100	100
Do not intend	33.6	20.5	35.6	76.3
Unsure about use	13.5	26.4	7.6	12
Intend to use	52.9	53.1	56.8	11.7



KDHS 1989

From the foregoing, it is evident that there is a clear demand for family planning among women in Kenya. The increase in contraceptive prevalence from 7 percent in 1978 to 27 percent in 1989 is a clear indicator of this demand. Moreover, the proportion of Kenyan women who say that they want no more children has changed rapidly over the past 10 years--from 17 percent in 1978 to 49 percent in 1989.

Further evidence is provided by women who say that they want no more children but are not currently using a contraceptive method. This number increased from 10 percent in 1978 to 22 percent in 1989. The next section addresses this unmet demand for family planning in Kenya.

6 Determinants of Unmet Demand for Family Planning

6.1 INTRODUCTION

As mentioned in the preceding section, the available evidence points to the fact that there is a demand for contraception among Kenyan women that has not been satisfied. The unmet need for family planning is derived by comparing current use of contraceptive methods with the desire to have no more children or to delay the next pregnancy (Westoff, 1988; Westoff and Ochoa, 1991).

The demand for family planning and whether the demand is satisfied differs among various categories of women. In order to assess the factors that determine demand and unmet need for family planning, a multivariate analysis has been carried out. All currently married women have been classified in one of the following categories:

1) Unmet need for limiting: women who want no more children but are not using contraception;
2) Unmet need for spacing: women who want to delay their next birth at least two years but are not using contraception;
3) Using for limiting: women who want no more children and are using contraception;
4) Using for spacing: women who want to delay their next birth at least two years and are using contraception;
5) No need: women who want to have a child within the next two years and are not using contraception

6.2 METHODOLOGY

A multinomial logistic regression model was fitted to the KDHS data. In this technique, a number of simultaneous regression models are fitted where the dependent variable is a categorical variable with more than two categories (Choe and Retherford, 1993). This technique permits estimation of the probability that a woman will fall into one of a number of categories controlling for various characteristics. Table 6.1 presents the estimated probabilities that a woman will have an unmet need for spacing or for limiting, will be using for spacing or limiting, or will have no need, by background characteristics, controlling for all of the other variables in the model. The probability for each category is evaluated relative to the mean of the other variables in the model. For reference, the regression coefficients and their respective standard errors, as well as the mean and standard deviation of each variable, are presented in Appendix Table 1.

Table 6.1 **Estimated probabilities of unmet need for spacing and limiting among currently married women and current contraceptive users, controlling for selected background characteristics, Kenya 1989**

Variable name	Unmet need for spacing	Unmet need for limiting	Current users spacing	Current users limiting	No need
			PROBABILITY		
Constant	0.33	0.19	0.11	0.15	0.22
Age					
Over 30	0.24	0.25	0.09	0.23	0.18
Below 30	0.42	0.14	0.12	0.09	0.23
Region					
Nairobi	0.22	0.27	0.10	0.23	0.18
Coast/East	0.29	0.14	0.17	0.17	0.24
Nyanza/West	0.41	0.18	0.07	0.07	0.26
Rift Valley	0.32	0.18	0.13	0.18	0.20
Central	0.29	0.23	0.11	0.24	0.13
Education					
None	0.35	0.23	0.06	0.10	0.26
Primary	0.34	0.20	0.11	0.15	0.21
Secondary	0.27	0.12	0.21	0.22	0.18
Minutes to source					
0-29	0.30	0.20	0.11	0.14	0.25
30-59	0.38	0.17	0.09	0.13	0.22
60-119	0.34	0.21	0.10	0.15	0.21
120 or more	0.32	0.19	0.14	0.19	0.17
Discussed family planning with partner					
Never discussed	0.41	0.15	0.06	0.06	0.32
Once/twice	0.34	0.20	0.10	0.17	0.20
More often	0.24	0.20	0.17	0.26	0.15
Association membership					
Yes	0.30	0.20	0.13	0.17	0.20
No	0.35	0.10	0.20	0.12	0.23
No. of living children					
0	0.31	0.06	0.03	0.00	0.59
1	0.36	0.02	0.14	0.02	0.46
2	0.39	0.10	0.16	0.08	0.27
3	0.32	0.12	0.15	0.17	0.24
4+	0.24	0.31	0.07	0.27	0.12
Currently ammenorheic					
No	0.33	0.06	0.04	0.04	0.53
Yes	0.27	0.26	0.13	0.22	0.12

6.3 RESULTS

Age is an important determinant of unmet need as well as of contraceptive use. Women aged 30 and above were significantly more likely to be using contraception for limiting than younger women, while younger women were more likely to use contraception for spacing. Table 6.1 also shows that the probability of having an unmet need for spacing was higher among women who were less than 30 years-old, while women aged 30 and above were more likely to have an unmet need for limiting.

The provinces were grouped into 5 regions which share geographic and cultural characteristics: Nairobi, Coast/East, Nyanza/West, Rift Valley and Central. Controlling for other variables, residents in Nyanza and Western provinces had the highest probability of an unmet need for child spacing. This is an expected finding given the fact that contraceptive prevalence rates were very low in those regions. Both the use of contraception for limiting and unmet need for limiting is greatest in Nairobi and Central provinces. These regions are largely urban, have relatively high contraceptive prevalence rates and have been observed to have low desired family size norms.

Education is an important determinant of contraceptive use and unmet need. Women with some secondary education were twice as likely to use contraception for limiting and more than three times more likely to use for spacing than women with no education. In addition, those with no education were almost twice as likely have an unmet need for limiting and 30 percent more likely to have an unmet need for spacing as women with secondary education.

The likelihood of using contraception or of having an unmet need for family planning does not appear to vary according to the amount of time it would take a respondent to get to a source of family planning. Discussion of family planning issues between couples, however, is associated with a greater probability of using contraception and a lower probability of having an unmet need for spacing.

The higher the number of children, the higher the demand (use and unmet need) for contraception for limiting. Both use and unmet need for spacing were higher among women with 1-3 living children, compared with women with no children and those with 4 or more children.

It is also shown that for women who are currently amenorrhoeic, there is a higher probability that they have an unmet need for limiting relative to women who are not amenorrhoeic. This result suggests that amenorrheic women were more likely to have recently had a birth that was either the last one they wanted or an unwanted birth.

7 Conclusion and Recommendations

Kenya has started to experience a decline in fertility. An increase in age at marriage and at first birth has contributed to this decline, but even more importantly, the decline has been attributed to the increase in the use of family planning, whose prevalence rose from 7.7 percent in 1978 to 27 percent in 1989. Due to higher literacy levels, more women are now adopting modern family planning methods for either spacing or limiting their families. This has resulted in a decline in the TFR from 7.9 in 1979 to 6.7 in 1989.

However, as our analysis has shown, there is still a high unmet demand for contraception across the population. This calls for urgent policy issues to be addressed if the current fertility decline is to be sustained through improved and increased contraceptive use.

There is a need to increase accessibility and availability of family planning services both in quality and quantity, especially in the rural areas where the majority of the population is found. This is true because

a majority of the women have to walk long distances to reach sources of family planning where only one or two contraceptive methods may be available.

There is also a need to intensify programmes which benefit women in terms of knowledge and use of contraception. Many women aged 30 years and above who want to limit the size of their families have an unmet need for family planning. These women should be targeted in the various regions of the country where contraceptive prevalence is still low, especially in Western, Nyanza, Eastern and Coast provinces.

At a more general level, there is a need to intensify training of family planning field nurses who will be able to reach the remote rural areas where women need but cannot get to the services. There is even more need to involve and encourage dialogue on family planning issues between husbands and wives so that they can make appropriate joint decisions on adopting contraception.

Some methods are used more often than others by different groups of women. There is a need to investigate why sterilization is more on the rise in the rural areas than the pill or IUD.

Hopefully with the collaboration of relevant government agencies, NGOs and donor agencies, efforts will be made to address these and other issues for the success of family planning in Kenya.

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APPENDIX 1

Summary statistics for the multinomial logistic regression application to the measurement of unmet need for family planning in Kenya.

Variable name	Coefficient	Standard error	Mean of x	Standard deviation
Unmet need - spacing				
Constant	1.495	0.247	1.000	0.000
Age >30	-0.384	0.135	0.492	0.500
Nairobi	-0.552	0.227	0.117	0.321
Coast/East	-0.634	0.198	0.220	0.415
Nyanza/West	-0.350	0.178	0.325	0.469
Rift Valley	-0.306	0.206	0.157	0.364
None	-0.153	0.173	0.268	0.443
Primary	0.061	0.141	0.519	0.500
30-59 minutes	0.367	0.129	0.258	0.438
60-119 minutes	0.319	0.140	0.226	0.419
120 or more minutes	0.466	0.165	0.146	0.353
Never discussed	-0.214	0.137	0.315	0.465
Once/twice	0.045	0.140	0.304	0.460
Association membership	-0.053	0.117	0.371	0.483
No child	-1.322	0.202	0.064	0.244
One child	-0.935	0.184	0.102	0.303
Two children	-0.342	0.169	0.129	0.335
Three children	-0.408	0.164	0.144	0.351
Currently amenorrheic	-1.291	0.116	0.302	0.459
Unmet need - limiting				
Constant	2.213	0.297	1.000	0.000
Age >30	0.738	0.159	0.492	0.500
Nairobi	-0.155	0.266	0.117	0.321
Coast/East	-1.154	0.228	0.220	0.415
Nyanza/West	-0.948	0.205	0.325	0.469
Rift Valley	-0.686	0.240	0.157	0.364
None	0.207	0.223	0.268	0.443
Primary	0.349	0.196	0.519	0.500
30-59 minutes	-0.028	0.166	0.258	0.438
60-119 minutes	0.208	0.170	0.226	0.419
120 or more minutes	0.325	0.203	0.146	0.353
Never discussed	-1.016	0.166	0.315	0.465
Once/twice	-0.309	0.164	0.304	0.460
Association membership	0.151	0.138	0.371	0.483
No child	-3.208	0.297	0.064	0.244
One child	-4.052	0.450	0.102	0.303
Two children	-1.994	0.250	0.129	0.335
Three children	-1.609	0.221	0.144	0.351
Currently amenorrheic	-2.914	0.153	0.302	0.459

APPENDIX 1

Summary statistics for the multinomial logistic regression application to the measurement of unmet need for family planning in Kenya.

Variable name	Coefficient	Standard error	Mean of x	Standard deviation
Using for Spacing				
Constant	2.317	0.304	1.000	0.000
Age >30	-0.120	0.189	0.492	0.500
Nairobi	-0.361	0.270	0.117	0.321
Coast/East	-0.194	0.240	0.220	0.415
Nyanza/West	-1.169	0.234	0.325	0.469
Rift Valley	-0.254	0.258	0.157	0.364
None	-1.633	0.254	0.268	0.443
Primary	-0.812	0.169	0.519	0.500
30-59 minutes	-0.034	0.181	0.258	0.438
60-119 minutes	0.087	0.198	0.226	0.419
120 or more minutes	0.607	0.224	0.146	0.353
Never discussed	-1.801	0.197	0.315	0.465
Once/twice	-0.862	0.172	0.304	0.460
Association membership	0.400	0.160	0.371	0.483
No child	-2.340	0.368	0.064	0.244
One child	-0.665	0.248	0.102	0.303
Two children	-0.018	0.229	0.129	0.335
Three children	0.040	0.222	0.144	0.351
Currently amenorrhoeic	-2.645	0.185	0.302	0.459
Using for limiting				
Constant	3.514	0.284	1.000	0.000
Age >30	1.162	0.164	0.492	0.500
Nairobi	-0.324	0.260	0.117	0.321
Coast/East	-0.976	0.220	0.220	0.415
Nyanza/West	-1.915	0.210	0.325	0.469
Rift Valley	-0.671	0.234	0.157	0.364
None	-1.141	0.213	0.268	0.443
Primary	-0.545	0.176	0.519	0.500
30-59 minutes	0.068	0.168	0.258	0.438
60-119 minutes	0.233	0.176	0.226	0.419
120 or more minutes	0.670	0.206	0.146	0.353
Never discussed	-2.283	0.183	0.315	0.465
Once/twice	-0.744	0.160	0.304	0.460
Association membership	0.365	0.141	0.371	0.483
No child	-6.217	1.025	0.064	0.244
One child	-4.243	0.432	0.102	0.303
Two children	-2.032	0.242	0.129	0.335
Three children	-1.188	0.207	0.144	0.351
Currently amenorrheic	-3.337	0.164	0.302	0.459

The Quantum and Tempo of Fertility in Nigeria

Paulina K. Makinwa-Adebusoye
Nigerian Institute for Social and Economic Research
Ibadan, Nigeria

Bamikale J. Feyisetan
Department of Demography and Social Statistics
Obafemi Awolowo University
Ile-Ife, Nigeria

1 Introduction

1.1 THE NIGERIA DEMOGRAPHIC AND HEALTH SURVEY[1]

Objectives

The Nigeria Demographic and Health Survey (NDHS) is a national sample survey of women of reproductive age whose primary objectives were:

(i) To collect data for the evaluation of family planning and health programmes;
(ii) To assess the demographic situation in Nigeria; and
(iii) To support dissemination and utilization of the results in planning and managing family planning and health programmes.

To achieve the objectives, the NDHS was designed to collect data on socioeconomic characteristics, marriage patterns, fertility histories, child feeding patterns and the nutritional status of children under five years of age, use of contraception, pre- and postnatal health care services, accessibility to health and family planning services and treatment of children during episodes of illness.

Sample Selection

In order to have a nationally representative survey, the NDHS sample was drawn from the national master sample for the 1987/1992 National Integrated Survey of Households (NISH) of the Federal Office of Statistics (FOS). The NISH master sample was created in 1986 on the basis of the 1973 census enumeration areas. The sample was drawn from all the states of the federation. For the NDHS sample, two sectors were created from the three sectors usually adopted by the FOS. The urban and semiurban sectors of NISH were combined into one category--urban--while the rural sector retained the NISH classification. A sample of about 10,000 households was designed with two fold oversampling of the urban stratum, yielding 132 urban enumeration areas and 167 rural enumeration areas. The NDHS sample is thus a weighted sample and was designed to provide national estimates as well as estimates for the four health zones of the Federal Ministry of Health. The four health zones are: Northeast, Northwest, Southeast and Southwest.

Survey Instruments

Information was collected through structured interviews with respondents. Three questionnaires were used: the household questionnaire, the individual questionnaire and the service availability questionnaire. The service availability questionnaire was, however, administered during the service availability survey which was separated from the main fieldwork. In addition to obtaining information on age, sex, education and

[1]A detailed description of the NDHS is found in: Federal Office of Statistics and IRD/Macro International Inc., 1992. *Nigeria Demographic and Health Survey 1990.*

relationship to household head of every member of the household, the household questionnaire was also used to identify women eligible for the individual questionnaire. The individual questionnaire was administered to women aged between 15 and 49 years who spent the night preceding the household interview in the selected household. Unlike the household and individual questionnaires, the service availability questionnaire was administered at the community level and information was collected from two sources: groups of four or five knowledgeable informants in the selected community and informants interviewed at facilities visited by the interviewers.

Fieldwork

Fieldwork for the Nigeria Demographic and Health Survey was conducted in two phases between April and October 1990: in the Southern States between April and July and in the Northern States between July and October 1990. In January and February of 1990, a pretest exercise was carried out in both urban and rural enumeration areas and in each of the four regions to ensure that the questions were in a logical sequence, that the translations were comprehensible, appropriate and meaningful and that the precoded answers were adequate. While the interviewers and editors were newly recruited for the survey, the supervisors were experienced FOS staff. At the end of the survey, interviews were successfully conducted in 8,999 households and 8,781 of 9,200 eligible women were successfully interviewed.

1.2 ASSESSMENT OF DATA QUALITY

In this study, we are primarily concerned with an assessment of the quality of data generated from the individual questionnaires. In order to assess the quality of data on variables which are related to fertility estimation, we examined the following: the percentage of women with complete information on their dates of birth; the percentage of children with complete information on dates of birth; displacement of children's birth dates; age heaping; mean number of children born by age and the proportion of children dead by age.

Table 1.1 Percentages of respondents and of children with complete information on birth dates, Nigeria 1990

% with complete information on birth date	Place of residence		Region of residence				Education			
	Urban	Rural	South East	South West	North West	North East	None	Primary	Sec.& Higher	Total
Women	72.6	49.5	65.6	72.0	35.2	46.1	40.3	64.1	89.5	55.3
Children	63.1	58.1	64.7	61.6	48.3	60.2	56.3	64.3	72.1	59.1

Percentages of Women and Children with Complete Information on Dates of Birth

In addition to stating their ages and those of their children at the time of the survey, the respondents were asked to state their month and year of birth, as well as the month and year of birth of all their children, where applicable. While many women, especially those from traditional backgrounds, might not be able to state their exact month and year of birth, we expected that greater proportions of the children would have complete information on birth dates. This expectation is based on the fact that while many NDHS respondents may lack information on their dates of birth because their own parents might not have provided them, these women should be able to remember when they gave birth to their own children. Table 1.1 confirms our expectation at the national level and among some subgroups. While 55 percent of the women were able to provide complete information on their birth date, 59 percent of children had complete information on birth dates. The percentages of women with complete information on birth dates vary, however, by respondents' place and

region of residence, and by education. Women in the rural areas, in the Northwest and with no formal education are least likely to provide complete information on birth dates.

Displacement of Children's Birth Dates

In order to have an accurate estimate of fertility rates by specified time intervals, it is essential that children's birth dates are accurately reported. In the absence of serious displacement of birth dates, it is expected that the annual number of live births will increase as the year of birth approaches the year of the survey. This is because, in a fast growing population like Nigeria, the number of childbearing women increases over time. Each year, more women enter the childbearing ages than in the preceding year. In addition, the number of women who can report on births is progressively truncated as one moves back in time. Table 1.2 shows the reported and estimated[2] number of births between 1970 and 1989. The difference between reported and estimated number of births, coupled with the irregular pattern of change in the number of births over the years, indicate that a significant displacement of birth dates exists. More births are generally reported for years ending with even digits. This is attributable to imprecise responses such as "about two years old, about four years old or six years old" which could have been construed by the interviewers (who were in the field in 1990) as indicating 1988, 1986 and 1984 as years of birth. In comparison with the 1983 and 1985 figures, the number of births reported for 1984 is too high. One explanation is that interviewers, who were required to collect a lot of information on all births occurring within the five years preceding the survey, could reduce their workload by shifting birth dates. Since 1985 is the beginning of the period, the relatively low number recorded for 1985 and the relatively high number recorded for 1984 might have resulted from the possibility that many births in 1985 were pushed back to 1984 by the interviewers in order to reduce the amount of work to be done.

Table 1.2 Reported and estimated number of births in the 20 years preceding survey, Nigeria 1990

Year	Reported births	Estimated births	Year	Reported births	Estimated births
1970	727		1981	1279	1580
1971	470	633	1982	1806	1541
1972	702	625	1983	1536	1805
1973	704	740	1984	2072	1681
1974	814	828	1985	1434	1725
1975	967	949	1986	1668	1600
1976	1067	1006	1987	1700	1631
1977	986	1098	1988	1527	1652
1978	1243	1099	1989	1730	
1979	1070	1322			
1980	1654	1334			

[2] The estimated values were calculated using a three-year moving average.

Age Heaping

Women were asked to state their ages at the time of the survey. Because many women might not be able to determine their ages correctly there is the tendency to report ages ending in preferred digits, resulting in age heaping. The greater the amount of age heaping, the greater the degree of inaccuracy and hence the lower the quality of the data on age. Myers' and the Whipple's indices were used to determine the degree of age heaping in the NDHS age data. In the absence of digit preference, Myers' index is 0 and Whipple's index is 100. The further the index is from 0 (in the case of Myers') or from 100 (in the case of Whipple's) the greater the degree of inaccuracy in the age data. Table 1.3 shows these two indices by background characteristics of the women.

Table 1.3 Whipple's and Myers' Indices of age heaping, Nigeria 1990

	Total	Urban	Rural	South East	South West	North West	North East	No education	Primary	Sec. & Higher
Whipples 23-42										
0	265.98	229.86	277.48	232.62	189.41	325.08	318.49	339.44	173.65	82.43
5	229.73	195.10	240.50	183.38	191.20	286.79	266.27	259.84	176.22	179.73
0 & 5	247.85	212.48	258.99	208.00	190.31	305.93	292.38	299.64	174.94	131.08
Whipples 19-48										
0	280.86	243.45	292.98	242.27	202.40	344.26	339.37	327.77	227.88	180.18
5	207.66	169.36	219.87	171.24	182.80	249.73	235.51	255.18	147.88	114.66
0 & 5	244.27	206.41	256.42	206.75	192.60	296.99	287.44	291.47	187.88	147.42
Myers 15-44	52.23	37.29	57.18	36.99	30.04	75.52	69.76	73.38	28.29	13.53

The indices were computed for different age ranges to ensure that all age groups are covered. In each case, it was ensured that each digit has an equal chance of occurring. Three features are discernible from Table 1.3: firstly, there is a lot of preference for ages ending in 0 or 5 in Nigeria. Secondly, there is a greater preference for ages ending in 0. Thirdly, digit preference varies according to place and region of residence and education of respondent. Women who reside in rural areas, in the northern region, and women with no education are more likely to give ages ending in either 0 or 1. The use of five-year age groupings has been used here in an attempt to reduce the impact of age heaping on the analysis.

Mean Number of Live Births by Age

In order to assess the quality of data on fertility, we estimated the number of live births by age of mother. The expectation is that in the absence of distortions, the mean number of live births will increase with age of mother. Panel 1 of Table 1.4 shows the expected pattern for the entire country and for each of the subgroups. This finding implies that significant confidence can be placed on the reported number of births.

Proportion of Children Dead

We also examined the proportions of live births that are dead by age of mother. In the absence of serious distortions, it is expected that the proportions of children that are dead will increase with age of mother. The second panel of Table 1.4 shows that, except for some minor deviations in the age group 40-44, there is an increase in the proportions of live births that are dead as the age of the mothers increases.

Table 1.4 Mean number of live births and proportions of live births that are dead by age

		Place of residence		Region of residence				Education			
		Urban	Rural	South East	South West	North West	North East	None	Primary	Sec.& Higher	Total
1	15-19	0.19	0.36	0.20	0.10	0.55	0.51	0.59	0.23	0.10	0.31
		(462)	(1150)	(570)	(381)	(308)	(352)	(545)	(523)	(543)	(1612)
Mean children ever born	20-24	1.02	1.60	1.27	0.82	1.72	1.95	1.87	1.57	0.76	1.44
		(464)	(1212)	(487)	(377)	(412)	(401)	(705)	(450)	(522)	(1676)
	25-29	2.62	3.09	2.89	2.41	3.24	3.23	3.39	3.12	1.74	2.97
		(424)	(1245)	(503)	(333)	(456)	(376)	(907)	(398)	(364)	(1669)
	30-34	4.31	4.67	4.67	4.68	4.41	4.58	4.61	4.96	3.25	4.58
		(328)	(1082)	(423)	(270)	(378)	(338)	(987)	(309)	(114)	(1409)
	35-39	5.41	5.56	5.81	5.59	5.31	5.21	5.46	6.08	4.72	5.53
		(219)	(735)	(333)	(225)	(204)	(192)	(692)	(192)	(69)	(954)
	40-44	5.88	6.34	6.88	6.72	5.65	5.57	6.09	7.10	5.92	6.27
		(175)	(661)	(263)	(192)	(205)	(176)	(653)	(150)	(33)	(836)
	45-49	6.21	6.92	7.15	7.02	7.06	5.94	6.80	6.74	**	6.79
		(115)	(509)	(190)	(136)	(135)	(163)	(530)	(77)	**	(624)
2	15-19	0.13	0.14	0.11	0.12	0.20	0.11	0.15	0.11	0.10	0.14
		(68)	(310)	(79)	(35)	(125)	(139)	(237)	(96)	(45)	(378)
Proportion of children dead	20-24	0.11	0.15	0.11	0.10	0.19	0.15	0.18	0.11	0.10	0.14
		(241)	(895)	(292)	(184)	(321)	(338)	(572)	(338)	(226)	(1135)
	25-29	0.10	0.17	0.13	0.12	0.18	0.17	0.18	0.14	0.08	0.15
		(354)	(1127)	(421)	(276)	(432)	(352)	(866)	(366)	(249)	(1481)
	30-34	0.11	0.18	0.13	0.13	0.21	0.18	0.18	0.14	0.07	0.16
		(309)	(1042)	(403)	(265)	(363)	(321)	(946)	(302)	(104)	(1352)
	35-39	0.13	0.22	0.16	0.16	0.24	0.25	0.22	0.17	0.08	0.20
		(208)	(702)	(324)	(218)	(195)	(174)	(656)	(187)	(67)	(910)
	40-44	0.15	0.21	0.18	0.19	0.19	0.24	0.21	0.17	0.11	0.20
		(165)	(633)	(258)	(191)	(190)	(158)	(617)	(149)	(32)	(798)
	45-49	0.15	0.24	0.20	0.18	0.31	0.21	0.24	0.13	**	0.22
		(111)	(488)	(188)	(135)	(128)	(148)	(506)	(76)	**	(599)

** less than 25 cases;
Number of cases are in brackets.

2 Background Characteristics

In this section, we undertake a brief description of the distribution of women according to some of the characteristics which may be expected to have some impact on fertility. These characteristics include place (urban or rural) and region of residence, marital status, educational attainment and religion.

Place and Region of Residence

The first and last panels of Table 2.1 show the distributions of women according to place and region of residence. While three-quarters of the women reside in the rural areas, the percentages of women in each region are, with the exception of the Southeast, identical. While the rural-urban composition of the sample might be representative of the population, the sample size from each region, especially from the Southeast might have been an artefact of the sample design.

Age Composition

The percentage age distributions of respondents are shown in Panel 2 of Table 2.1 for the total country and for place and region of residence. In an expanding society, a decline in the relative size of women is expected as age increases. In the rural and northern populations the percentages of women aged 15-19 are lower than those in the age group 20-24. This unexpected finding is, perhaps, due to the difficulty in locating women aged 15-19 in the rural areas and in the northern regions. However, after age 20, the table shows the expected pattern.

Marital Status

In order to examine the extent of exposure to sexual intercourse, we examined the prevalence of marriage at the time of the survey. It is discernible from Table 2.1 that the majority of the women were married or living with a partner at the time of the survey. However, the percentages of women in such unions vary significantly between the rural and urban areas and between the southern and northern regions. While over 90 percent of women in the northern regions were in a union, less than 70 percent of women in the southern regions were in a union at the time of the survey. The percentages of the women who had never married are higher in the southern regions and in the urban areas.

Percentage Married by Age

While marital status indicates exposure to sexual relations, age at marriage indicates the duration of such exposure during the childbearing years. It is thus important to examine the age and rate at which women enter into marriage. The percentages of women in the different age groups that have ever been married are also shown in Table 2.1. It is evident from the table that: (i) The percentages of women who enter into marriage unions at early ages (below 20 years) are higher in the rural areas and in the two northern regions. While 95 percent and 96 percent of women aged 25-29 in the Northeast and Northwest, respectively, have been married, the corresponding figures for the Southeast and Southwest are 66 and 57 percent, respectively[3]; (ii) Almost every woman in Nigeria enters into marital union before the end of her reproductive life, indicating universality of marriage.

[3] The median ages of marriage for women between 20 and 49 years of age are: Urban 19.0; Rural 16.3; Northeast 15.2; Northwest 15.4; Southeast 18.3 and Southwest 19.7.

Education

Panel 5 of Table 2.1 shows the distribution of women by educational attainment. For the total population, the majority of the women had no education. However, significant variations exist between the northern and the southern regions and between the rural and the urban populations with respect to educational attainment. While 84 percent and 88 percent of women in the Northeast and Northwest, respectively, had no education, the corresponding percentages for the Southeast and Southwest are 36 and 26, respectively.

Table 2.1 Percentage distribution of women aged 15-49 by background characteristics, Nigeria 1990

Background characteristic		Residence		Region				
		Urban	Rural	South East	South West	North West	North East	Total
1 Total number		2187	6594	2768	1915	2098	1999	8781
2 Age	15-19	21.1	17.4	20.6	19.9	14.7	17.6	18.4
	20-24	21.2	18.4	17.6	19.7	19.6	20.0	19.1
	25-29	19.4	18.9	18.2	17.4	21.7	18.8	19.0
	30-34	15.0	16.4	15.3	14.1	18.0	16.9	16.1
	35-39	10.0	11.1	12.0	11.7	9.7	9.6	10.9
	40-44	8.0	10.0	9.5	10.0	9.8	8.8	9.5
	45-49	5.3	7.7	6.9	7.1	6.4	8.2	7.1
3 Marital status	Never married	28.1	13.6	26.2	28.7	6.0	5.7	17.2
	Currently married	61.3	74.1	56.6	58.5	84.7	88.3	70.9
	Living together	6.2	7.8	8.4	8.8	7.9	4.2	7.4
	Previously married	4.5	4.4	8.8	4.1	1.4	1.9	4.4
4 Percentage married by age	15-19	21.9	45.3	20.5	10.2	65.7	74.8	38.6
	20-24	61.1	84.9	65.5	57.3	96.4	95.0	78.3
	25-29	86.9	93.8	84.3	86.5	99.1	99.0	92.1
	30-34	97.5	99.6	97.3	99.8	100.0	99.8	99.1
	35-39	96.2	99.6	96.6	100.0	100.0	100.0	99.8
	40-44	99.8	99.7	99.2	100.0	100.0	100.0	99.7
	45-49	99.3	100.0	100.0	100.0	99.4	100.0	99.9
5 Educational status	None	31.2	65.8	36.2	26.1	87.8	83.7	57.2
	Primary	26.7	23.0	40.6	29.8	8.0	11.8	23.9
	Secondary/Higher	42.2	11.2	23.1	44.1	4.3	4.5	19.0
	% Total	24.9	75.1	31.5	21.8	23.9	22.8	100.0

Religion

There are two dominant religious groups in Nigeria: Christians (consisting of Protestants and Catholics) and Moslems. The women are equally divided among these two religious groups. While Christians constitute 48 percent (34 percent Protestant and 14 percent Catholic), Moslems constitute 48 percent of the population. As with education and marital status, there are regional variations in the distribution according to religion. While 94 percent and 81 percent of women in the Northwest and Northeast, respectively, are Moslems, the corresponding percentages for the Southeast and Southwest are 1 and 29, respectively. In the Southeast, 89 percent are Christians and in the Southwest 67 percent are Christians.

3 Fertility Levels and Trends

3.1 CURRENT FERTILITY

Table 3.1 shows four-year age-specific fertility rates (ASFRs)[4] for two periods preceding the survey: 0-3 years and 4-7 years. A four-year reference period is used instead of the traditional five-year period in order to minimize sampling errors and to avoid errors that may arise from the displacement of births from five years preceding the survey to six years.[5] The use of four-year rates is expected to minimise the effects of displacement since, for most of the children, shifting their birth date will not cause them to be transferred across the age boundary as most of the births should fall within the period 4-7 years prior to the survey. As shown in Table 3.1, the TFR for the whole country (in the 0-3 years prior to the survey) is 6.2.[6] In other words, if current fertility rates were to remain constant, a Nigerian woman would give birth to an average of about 6 children during her reproductive life. However, this national average masks large variations in fertility levels between subgroups in the country. The regional difference is particularly noticeable; higher fertility levels among women in the Northeast and Northwest result in a TFR that is higher (by nearly one child) than the TFR of women in the Southeast and Southwest. Similarly, fertility levels are higher among rural women, resulting in a TFR which is more than one child higher than that of urban women. Moreover, better educated women who have attained secondary or higher education have the lowest fertility levels with TFRs that are two children less than the TFR of women with no education or who have been educated only up to the primary school level. The age-specific fertility rates of women 15-19 range from 61 per 1000 women among the most educated women (who have completed secondary or higher education) to 212 among women in the Northeast.

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[4] Age-specific fertility rates (ASFRs) are calculated from the birth history by dividing the number of births to women in a specified age group, during a specified time period, by the number of woman-years of exposure during the same period. The total fertility rate (TFR) at a specified time is calculated by summing the age-specific fertility rates for five-year age groups and multiplying by 5.

Because of the few number of cases in the age group 45-49, especially in the 4-7 year period preceding the survey, we decided to calculate TFR for the age group 15-44 for which we have adequate comparative data for the two periods.

[5] Displacement of births and its possible cause is covered in Section 1.

[6] The TFR for the 15-44 age range is 5.8 in the 0-3 year period before the survey and 6.9 in the 4-7 year period.

Table 3.1 Age-specific fertility rates (per 1000 women) and total fertility rates for the periods 0-3 and 4-7 years before the survey, Nigeria 1990

Background characteristic	Age of woman							TFR	TFR
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	15-44	15-49
Place of residence									
Urban: 0-3	91	211	267	227	141	63	40	5.0	5.2
4-7	123	282	309	258	163	97	*117	6.2	6.8
% change[1]	-26.2	-25.2	-13.7	-12.1	-13.3	-34.8	*-65.2	-19.4	-22.9
Rural: 0-3	164	286	275	227	167	102	73	6.1	6.5
4-7	197	302	317	262	220	124	*107	7.1	7.6
% change	-16.7	-5.1	-13.2	-13.1	-24.2	-17.4	*-32.1	-13.2	-14.5
Region									
SE : 0-3	107	277	291	224	160	72	49	5.7	5.9
4-7	149	276	336	261	227	107	*0	6.8	6.8
% change	-27.9	0.3	-13.4	-14.1	-29.2	-32.2	*-	-16.2	-13.2
SW 0-3	71	213	275	229	187	79	73	5.3	5.6
4-7	90	286	340	297	227	148	*323	7.0	8.5
% change	-21.7	-25.3	-19.2	-22.9	-17.3	-46.4	*-77.2	-24.3	-34.0
NW: 0-3	196	294	285	238	155	118	59	6.4	6.7
4-7	216	327	295	246	179	119	*166	6.3	7.7
% change	-9.2	-10.2	-3.4	-3.3	-13.3	-0.6	*-64.0	-7.3	-13.1
NE: 0-3	212	270	236	218	137	125	87	6.0	6.4
4-7	250	298	284	236	199	111	*0	6.9	6.9
% change	-15.0	-9.2	-16.7	-7.8	-31.2	12.7	*	-13.0	-6.6
Education									
None: 0-3	210	283	268	221	165	104	66	6.3	6.6
4-7	247	320	305	252	214	113	*123	7.3	7.9
% change	-14.9	-11.6	-12.2	-12.4	-22.8	-7.9	*-46.2	-13.7	-16.5
Primary 0-3	146	319	315	255	159	70	66	6.3	6.7
4-7	165	324	346	296	201	142	*0	7.4	7.4
% change	-11.5	-1.6	-8.9	-14.0	-20.7	-50.1	*-	-14.9	-9.5
Secondary/Higher									
0-3	61	185	236	203	105	13	8	4.0	4.5
4-7	72	184	317	248	135	186	*0	5.7	5.7
% change	-16.0	0.3	-25.6	-18.4	-22.4	-92.9	*-	-29.8	-21.1
Contraceptive use									
Ever-use									
0-3	96	195	264	205	147	79	*-	4.9	5.3
4-7	124	249	342	297	228	100	*-	6.9	7.0
% change	-22.6	-21.7	-22.8	-31.0	-35.5	-26.6	*	-29.0	-32.1
Never-use									
0-3	151	283	276	232	165	98	70	6.0	6.4
4-7	190	307	311	254	206	114	131	6.9	7.6
% change	-20.5	-7.8	-11.3	-8.7	-19.9	-14.0	-46.6	-13.0	-15.8
Total 0-3	143	266	273	227	161	95	67	5.8	6.2
4-7	177	297	315	261	209	119	109	6.9	7.4
% change	-19.0	-10.2	-13.3	-12.9	-22.9	-20.1	-38.7	-15.9	-17.1

1. Percentage change from 4-7 years to 0-3 years before survey
**Indicates that number of exposure-years for the 4-7 year period before survey is too small.

3.2 FERTILITY TRENDS

Assessment of fertility trends is necessary to monitor changes in fertility levels. As shown in Table 3.1 the TFR (15-49) declined from 7.4 in the 4-7 years before the survey to 6.2 in the 0-3 years before the survey. Similarly, the TFR (15-44) declined from 6.9 to 5.8 in the same period. These figures indicate a decline of between 15 and 17 percent in the TFR during the two periods. Figures 3.1, 3.2, 3.3 and 3.4 show that this decline is evident in varying degrees among subgroups of the population. It is particularly significant that this decline is evident among women who have ever used a contraceptive method and among those who have never used.

3.3 PARITY PROGRESSION RATIOS

In order to determine the processes leading to the observed fertility decline, estimates of the proportions having a birth within five years of the previous birth were obtained for four time periods preceding the survey.[7] The periods for which these estimates were obtained are: 0-5, 6-10, 11-15 and 16-20 years prior to the survey. Figures 3.5 to 3.8 show the proportions of women having a child within five years of the previous birth (*Quintum*) according to certain characteristics.[8] As shown in Figures 3.5 to 3.8, the overall levels achieved by the birth function are high; there is a high probability (closer to 1 in the two earliest periods: 11-15 and 16-20 years prior to the survey) of moving from one birth order to another. Moreover, the curves, for the two earlier periods are fairly flat, reflecting a lack of deliberate fertility control with aging responsible for the fall off at higher birth orders.

However, in the five years immediately preceding the survey, there has been a reduction in the proportion of women making the transition from one parity to the next. Moreover, the proportion of women having the sixth birth within five years of having the fifth shows a marked decrease when compared with the transition from (for example) second to third birth or fourth to fifth birth. This reduction may be due to the tendency to control fertility through contraceptive use and (or) longer birth intervals. It is plausible that the observed declines in proportions having a sixth birth within five years of having the fifth birth reflects a desire to control family size.

Figure 3.6, which shows parity progression ratios for each of the four regions, vividly portrays the difference in fertility trends between the North and the South. The evidence of fertility decline in the Southeast and Southwest is absent from the two northern regions: the Northwest and the Northeast. Similarly, Figure 3.7 indicates some declines in fertility levels of highly educated women in the past 20 years. Figure 3.8, showing parity progression ratios for users and nonusers of contraceptives, highlights the importance of contraception in bringing about fertility reduction. This underscores the point that contraception has great potential as a fertility-reducing agent if adopted on a large scale.

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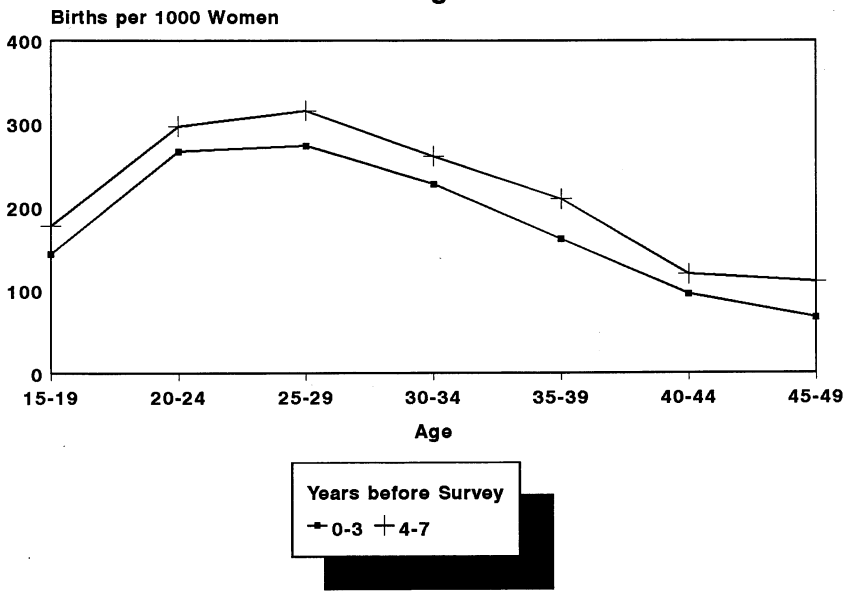
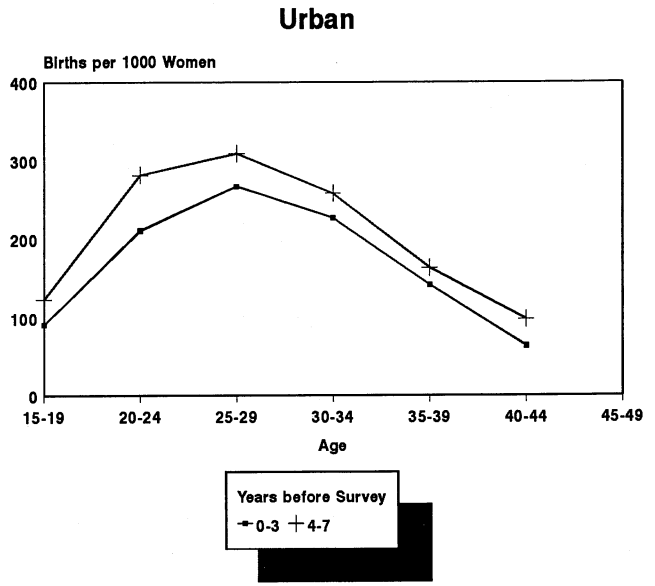
[7]Because of the near universality of marriage and motherhood in Nigeria, analysis started from parity 2. Separate estimates were obtained for the transition to first marriage and first birth.

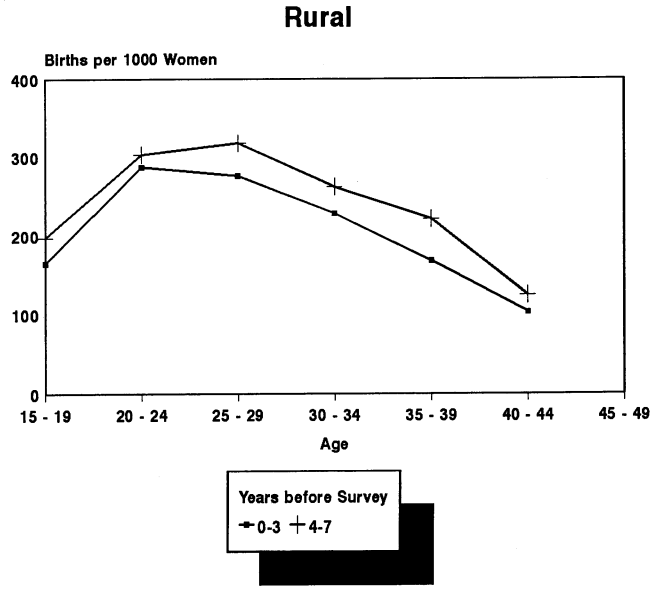
[8]*Quintum* is an approximation of the proportion of women who will eventually close the birth interval. Quintums measure two things: deliberate control (or lack of it) of fertility and postponement of childbearing both of which influence overall fertility level at a certain point in time.

This analysis stops at the seventh parity due to insufficient number of cases for the more remote periods.

Figure 3.1
Age-Specific Fertility Rates for Total Nigeria and by Place of Residence







NDHS 1990

Figure 3.2
Age-Specific Fertility Rates by Region of Residence

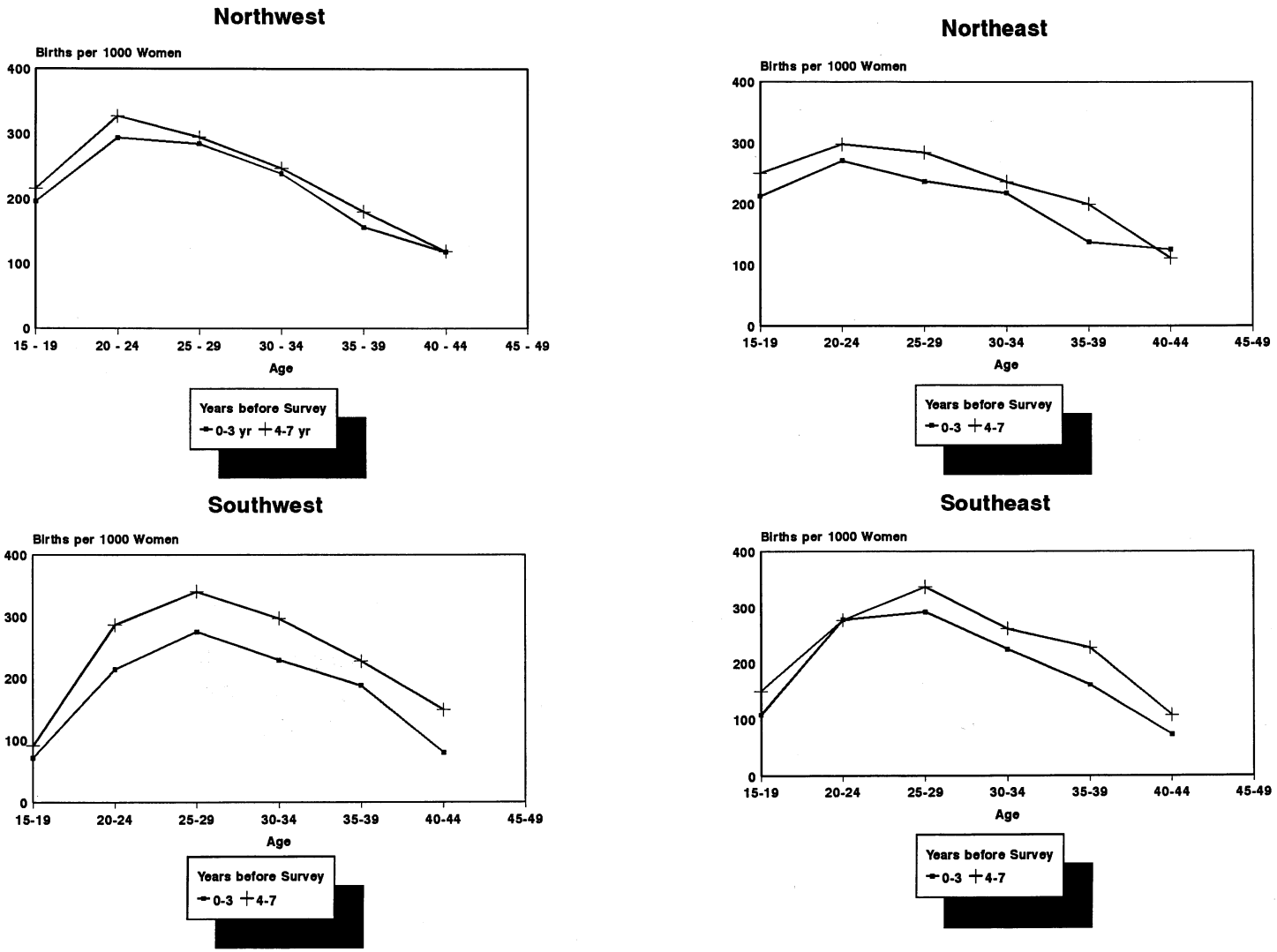


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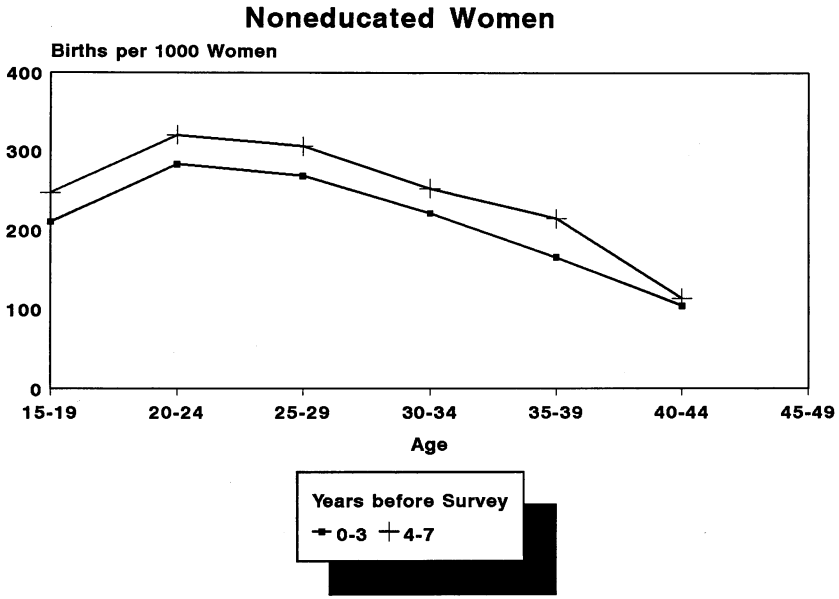
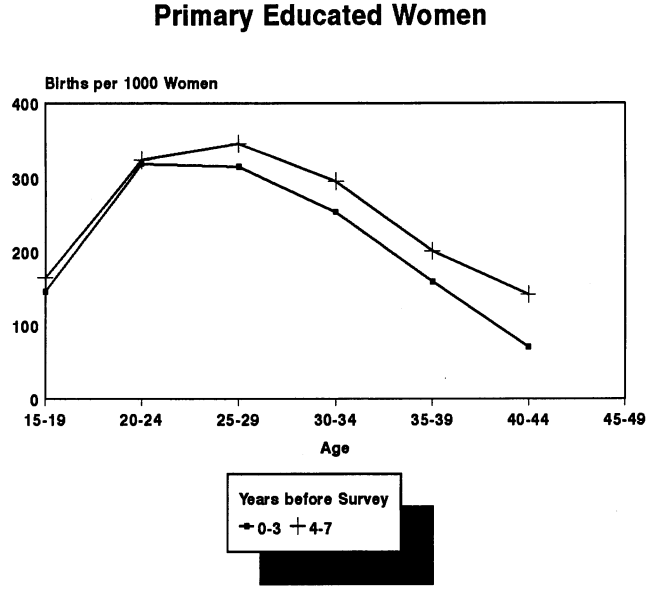
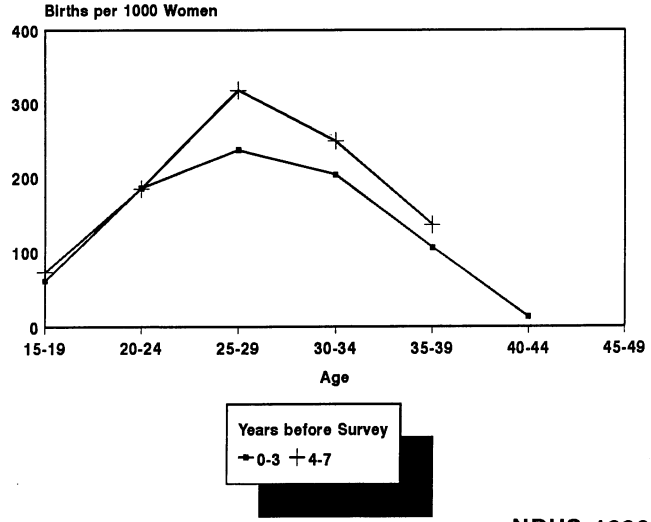
Figure 3.3
Age-Specific Fertility Rates by Level of Education

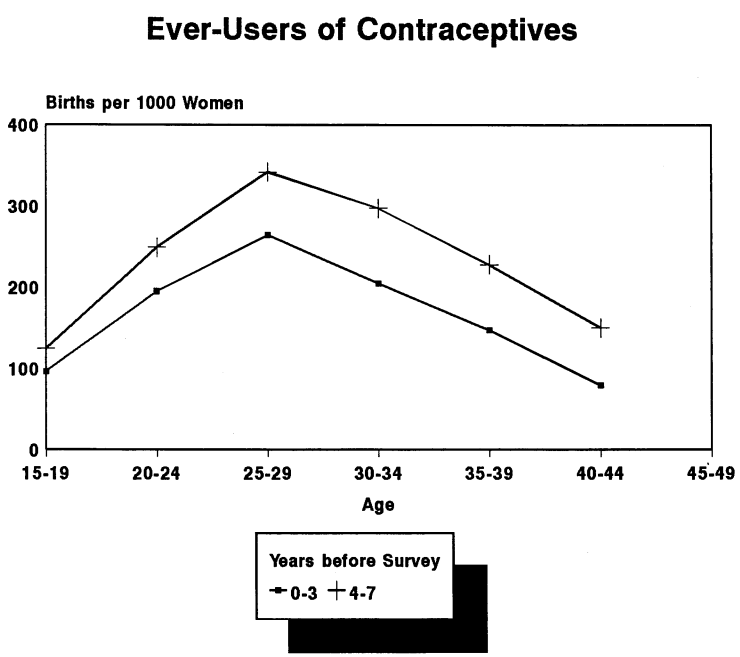


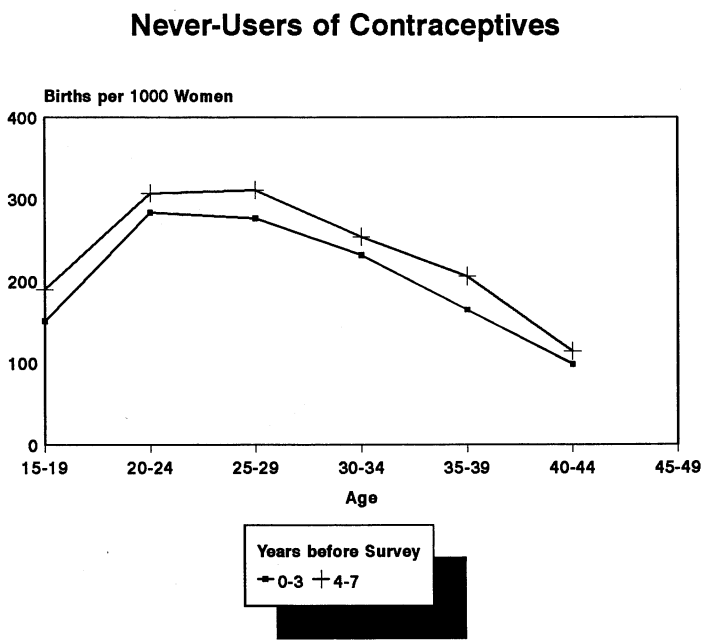




NDHS 1990

Figure 3.4
Age-Specific Fertility Rates by Ever Use of Contraception

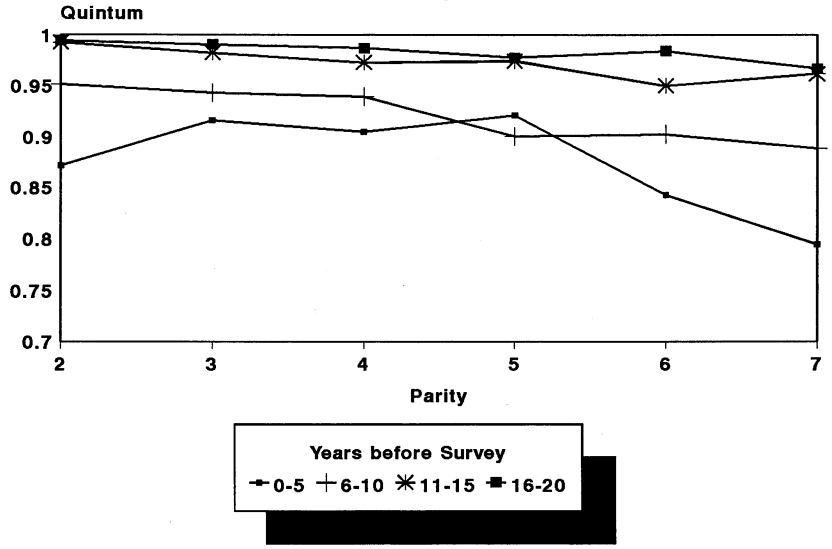




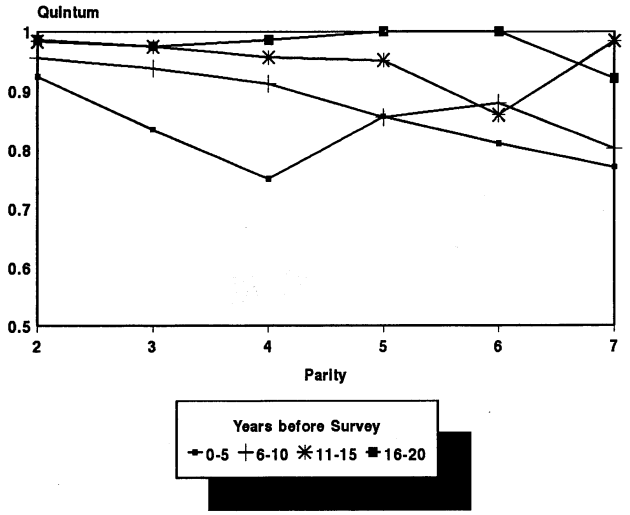
NDHS 1990

Figure 3.5
Parity Progression Ratios for Total Nigeria and by Place of Residence

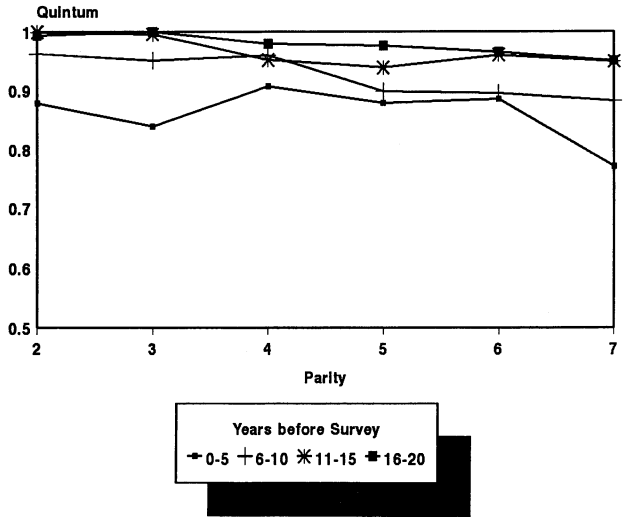
Total Nigeria



Urban

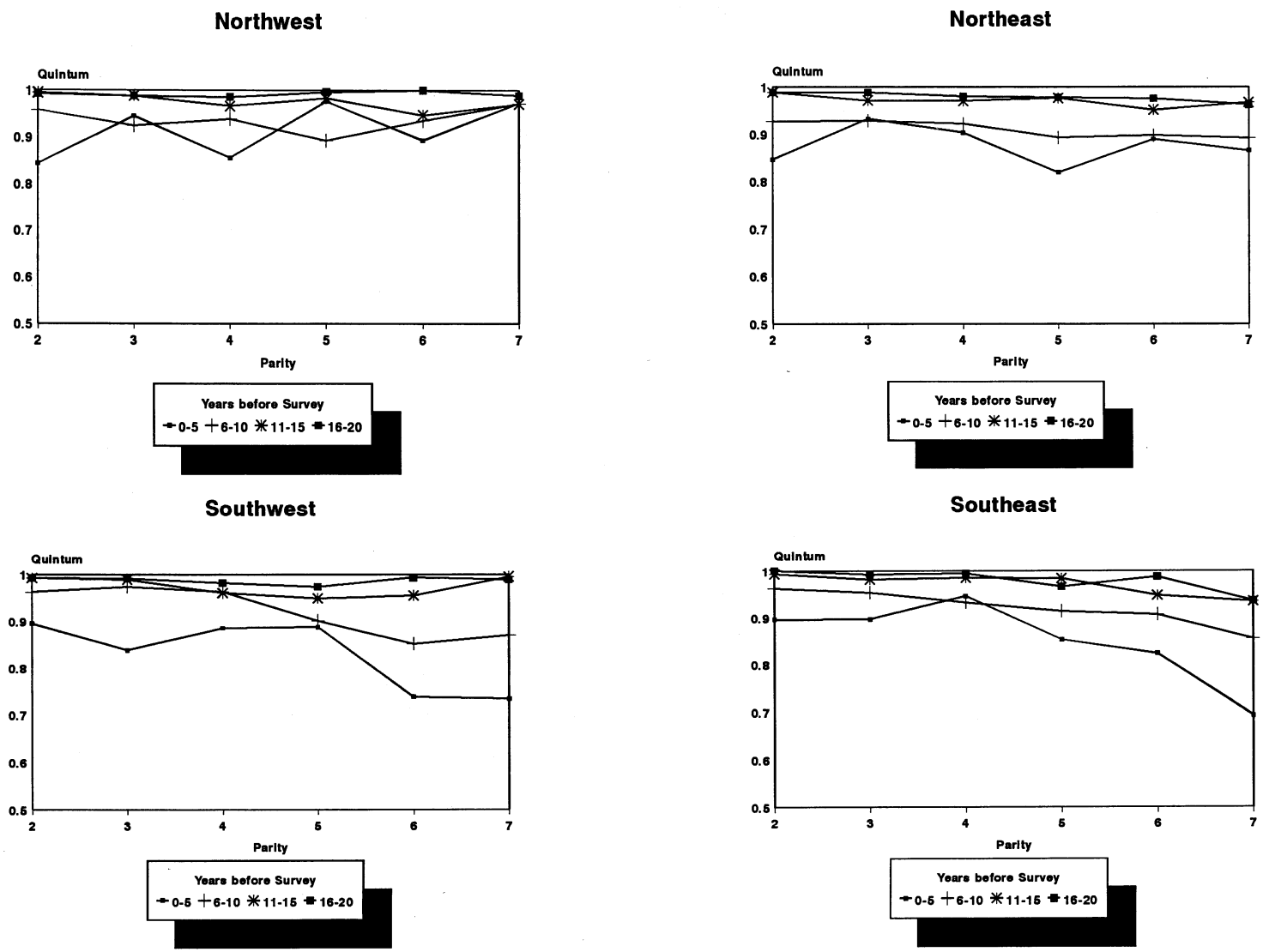


Rural



NDHS 1990

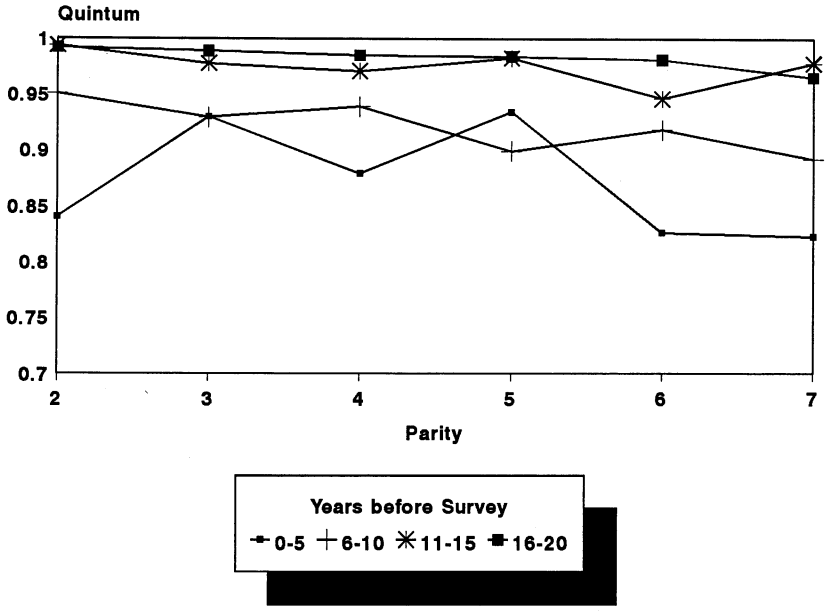
Figure 3.6
Parity Progression Ratios by Region of Residence



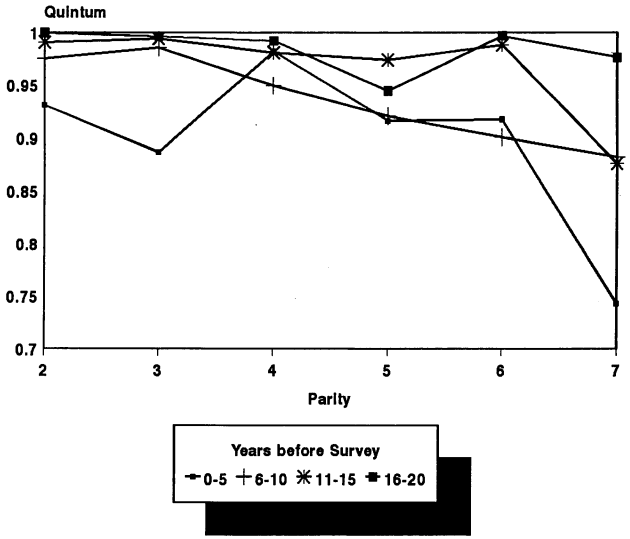
NDHS 1990

Figure 3.7
Parity Progression Ratios by Level of Education

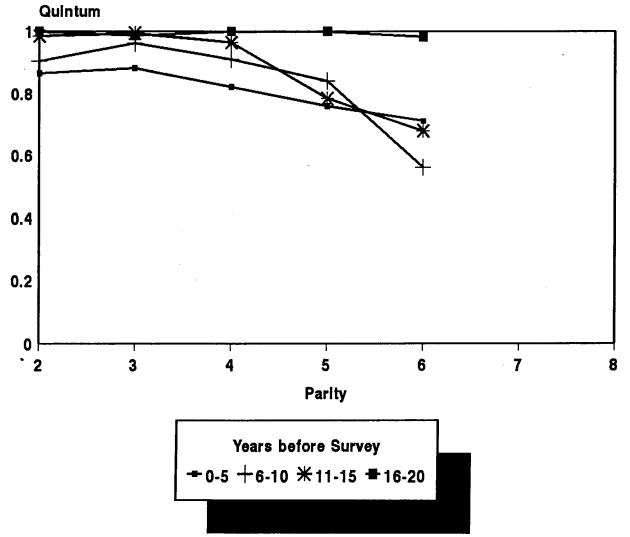
Noneducated Women



Primary Educated Women

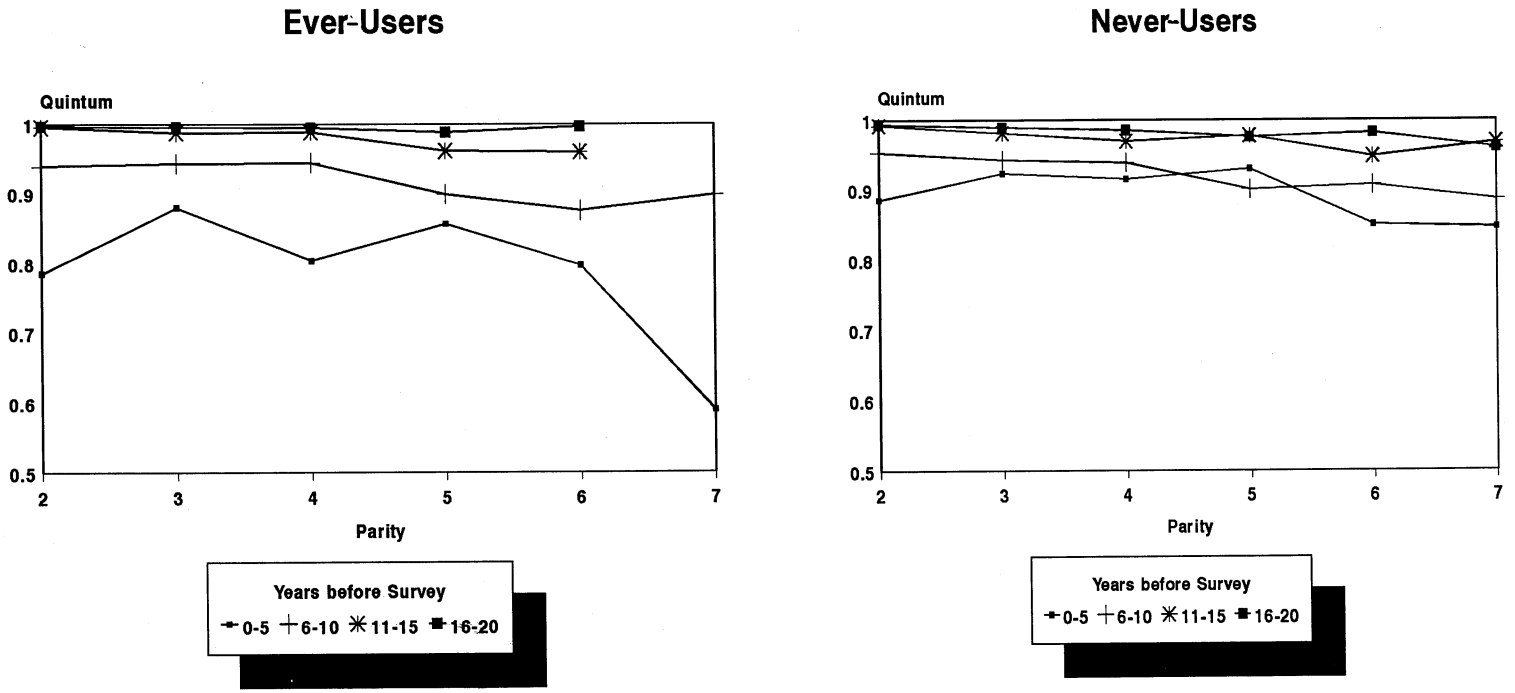


Secondary and Higher Educated Women



NDHS 1990

Figure 3.8
Parity Progression Ratios by Contraceptive Use



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Separate life table functions were calculated for the transition to first marriage and first birth. Figure 3.9 shows national median ages at marriage and first birth for different birth cohorts. This figure reveals that age at first marriage usually precedes age at first birth. However, the national average masks regional differences in the interval between age at first marriage and age at first birth. Estimates of the median ages of first marriage and first birth for different birth cohorts in each of the four regions are shown in Figure 3.10 and reveal a distinct North and South pattern. In contrast to high and increasing ages at first marriage in the Southeast and the Southwest, both the Northeast and the Northwest maintain stable and low median ages at first marriage.

Figure 3.9
Median Age of Transition to First Birth and First Marriage by Birth Cohort

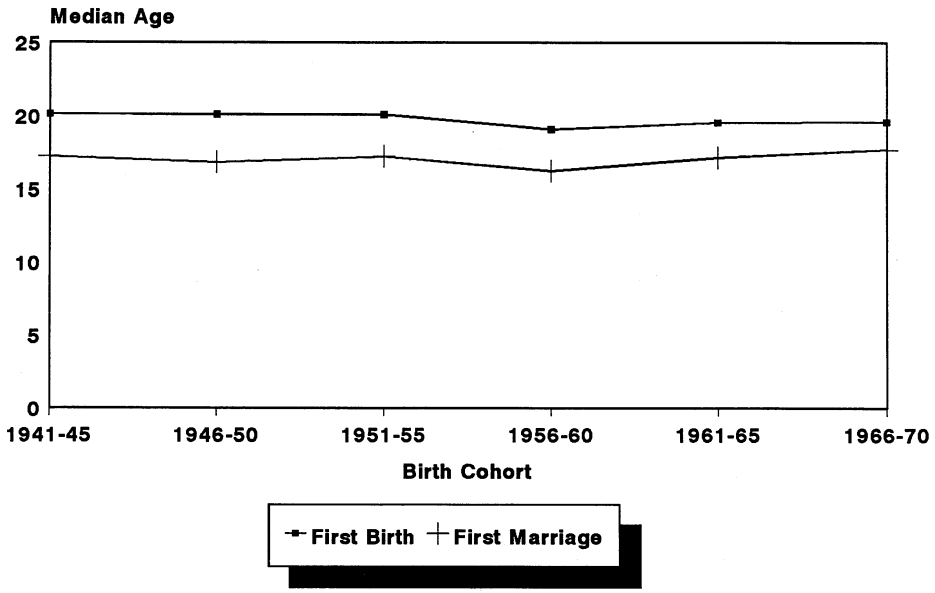

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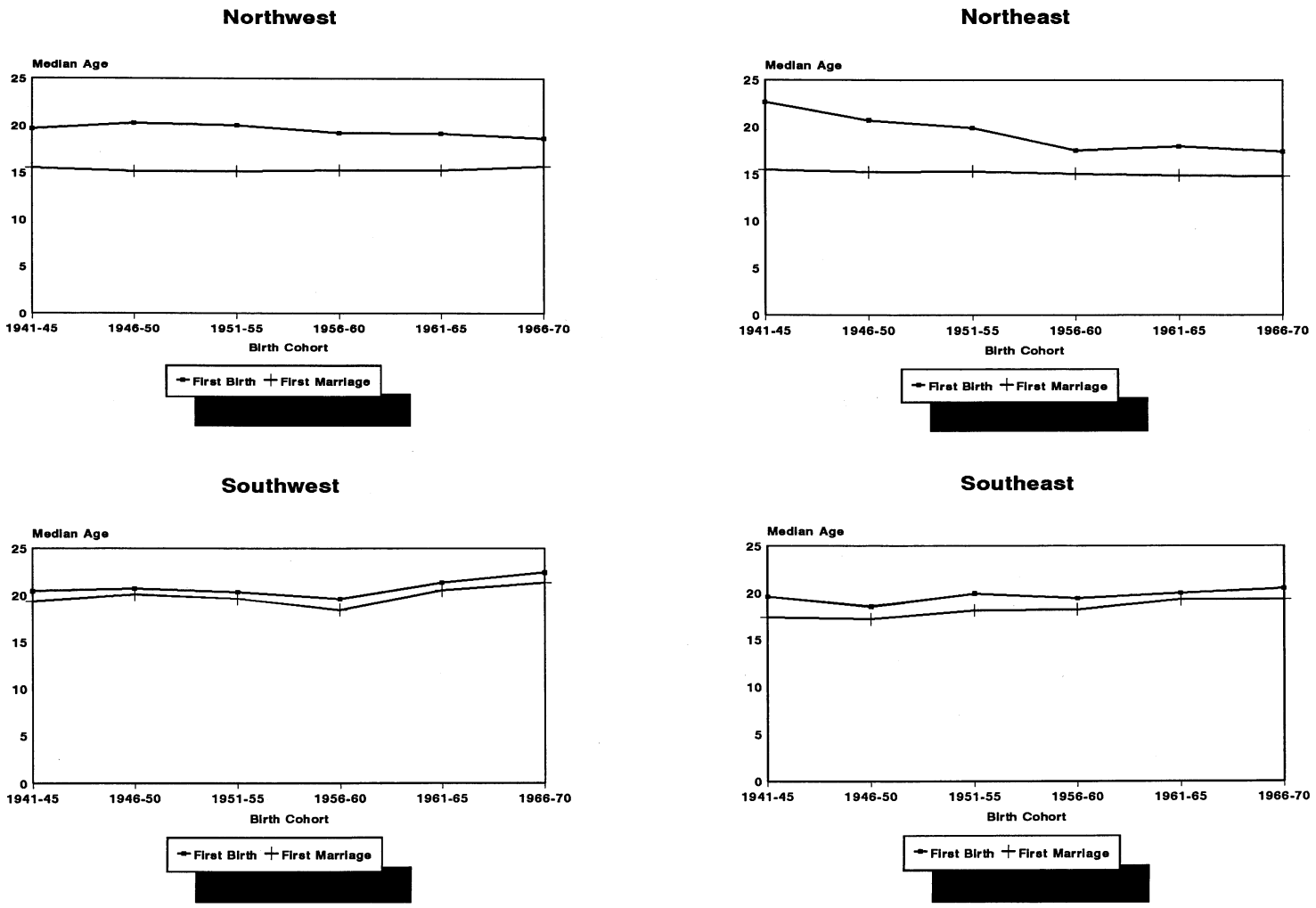
Figure 3.10
Median Age of Transition to First Birth and First Marriage by Region and Birth Cohort



NDHS 1990

3.4 PROXIMATE DETERMINANTS OF FERTILITY

To improve the understanding of the causes of fertility variations already noted among various subgroups of the Nigerian population, it is necessary to examine the mechanisms through which certain demographic and socioeconomic variables influence fertility. Fertility differentials among population subgroups and changes in fertility over time can be traced to one or several of the "proximate determinants" of fertility. According to Bongaarts (1981) and Bongaarts and Potter (1983), the proximate determinants constitute three main determinants of fertility. These are:

i) The natural marital fertility factors which are the length of period of nonsusceptibility to conception after birth, frequency of intercourse, extent of involuntary sterility, extent of spontaneous intra-uterine mortality and duration of viability of ova and sperm. These factors together determine the amount of postpartum infecundability.

ii) Deliberate marital fertility control factors are the use or nonuse of contraception and the use or nonuse of induced abortion. These factors determine the prevalence of contraceptive use and abortion.

iii) Exposure factors which include age at entry into sexual unions, extent of permanent celibacy and amount of reproductive period spent after or between unions. These factors are summarised by the prevalence of marriage.

The three main proximate determinants are measured by: an index of the length of postpartum infecundability (C_i), an index of conception (C_c), an index of induced abortion (C_a) (where available), and an index of the prevalence of marriage (C_m). Each of these indices is equal to 1 if the fertility-inhibiting effect of the component to which it refers is nonexistent. Therefore, the closer the index is to 1 the smaller the fertility-inhibiting effect of the proximate determinant.

In order to estimate the contributions of each of the three main proximate determinants to the total fertility rate, Bongaarts developed a model of fertility which utilises four fertility rates: the total fertility rate (TFR), the total marital fertility rate (TMFR), the total natural marital fertility rate (TN) and the total fecundity rate (TF).[9] According to the model, the total fecundity rate will always exceed the total natural marital fertility rate, which in turn will always exceed the total marital fertility rate which in turn will always exceed the total fertility rate. Given these relationships (between the four measures of fertility) the value of the total fertility rate is a residual value resulting from the multiplicative fertility-inhibiting effect of the index of postpartum infecundity (C_i), the index of contraception (C_c), the index of abortion (C_a), and the index of the prevalence of marriage (C_m). This is usually presented in the following summary equation:

$$TFR = TF * C_i * C_c * C_a * C_m$$

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[9]TMFR is "the number of births a married woman would have at the end of the reproductive years if she were to bear children at prevailing age-specific marital fertility rates and to remain married during the entire reproductive period" (Bongaarts, 1978:108).

The TN is equal to the total marital fertility rate "in the absence of contraception and induced abortion" (Bongaarts, 1978:111).

The TF is the biological maximum value and it is equal to the total natural marital fertility rate in the absence of lactation and postpartum abstinence" (Bongaarts and Potter, 1983:79).

To ascertain the relative contribution of the differences in the prevalence of marriage, postpartum infecundability (determined by the duration of breastfeeding and abstinence), and contraceptive usage to the observed differences in fertility levels among the various population subgroups and in the whole country in the recent past, the Bongaarts model was applied to the data.[10]

The results[11], presented in Table 3.2, show that for the country as a whole, postpartum infecundability has the greatest inhibiting effect on the total fertility rate. Age at marriage or the proportion remaining single has less effect while contraceptive use has the least effect, a reflection of current, low contraceptive prevalence rate in the country. There are, however, differences among various population sub-groups. As shown in Table 3.2, the fertility-inhibiting effect of contraception ranges from a low 1 percent among women in the Northwest and 2 percent among women in the Northeast and women with no education, to 22 percent among women who had attained secondary and higher education levels. Similarly, the index of marriage is highest (and therefore has the lowest fertility-inhibiting effect) among women in the Northeast, the Northwest and women with no education. The index of marriage is lowest and has the highest fertility-inhibiting effect among women with secondary and higher education and women who are resident in urban areas or in the Southeast and the Southwest.

[10] Induced abortion is omitted from the calculations because there were no data.

[11] Based on a total fecundity rate (TF) of 15.3, and excluding an index of abortion for which we had no data, the total natural marital fertility TN (the biological maximum fertility) is estimated to be about 15.3 (Bongaarts and Potter, 1983:87).

Table 3.2 Proximate determinants of fertility and their indices, Nigeria 1990

Background characteristic	Place of residence		Region of residence				Education			
	Urban	Rural	South East	South West	North West	North East	None	Primary	Sec. & Higher	Total
Percentage married	67.5	82.0	65.0	67.2	92.6	92.5	91.8	71.9	45.8	78.4
Median age at marriage[1]	19.4 19.0	16.4 16.3	18.5 18.3	** 19.7	15.4 15.4	15.2 15.2	15.7 15.8	18.4 18.5	** 22.2	17.1 16.9
Average duration of breastfeeding and postpartum abstinence	20.00	23.07	20.30	21.43	24.43	23.16	23.46	21.85	18.23	22.42
Percentage using contraception	14.8	3.6	8.8	15.0	1.2	2.0	2.0	9.6	23.6	6.0
Total fertility rate	5.22	6.49	5.92	5.65	6.74	6.45	6.60	6.67	4.47	6.2
Index of postpartum amenorrhea (C_i)	0.52	0.48	0.52	0.50	0.47	0.48	0.48	0.50	0.54	0.49
Index of contraception (C_c)	0.86	0.97	0.92	0.86	0.99	0.98	0.98	0.92	0.78	0.95
Index of marriage (C_m)	0.64	0.79	0.59	0.55	0.91	0.92	0.91	0.71	0.46	0.75

1. First entry indicates median age at marriage for women aged 20-49 while second entry indicates median age at marriage for women aged 25-49.

** Median age at marriage not calculated because less than 50 percent of the women in the group were first married by age 20.

4 Fertility Regulation and Reproductive Preferences[12]

In the foregoing section we have shown that extensive and prolonged breastfeeding and lengthy periods of postpartum abstinence are mostly responsible for keeping fertility levels in Nigeria below the biological maximum. Modern methods of contraception are relatively new.[13] A decade ago, the Nigeria Fertility Survey (NFS) 1981/82, found that less than 1 percent of women aged 15 to 49 years were using modern methods. Since then, organized family planning has received great impetus from two related developments: the recognition of family planning as part of the state public health system and, since 1983, a major

[12]This section includes extracts from Makinwa-Adebusoye, P. 1992. Levels and Patterns of Contraceptive Knowledge and Use in Nigeria. Paper presented at the 1992 Annual Meeting of the PAA, Denver, Colorado.

[13]Concern about the number of illegal induced abortions led to the establishment of the first family planning clinic in Lagos in 1958. However, only this single clinic existed until 1964 when the Family Planning Council of Nigeria was formed by the National Council of Women's Societies with assistance from the Pathfinder Fund, the International Planned Parenthood Federation (IPPF) and the Unitarian Universalist Service Committee. This council was subsequently reorganized and renamed Planned Parenthood Federation of Nigeria (PPFN), an affiliate of IPPF. Until recently, activities of the PPFN were restricted, due to inadequate funding and supply of commodities, to a few large urban centers.

collaborative effort between the Federal Ministry of Health[14], USAID and UNFPA. The former led to the establishment, in 1987, of the position of a family planning coordinator in each state, and the latter resulted in the massive distribution of large quantities of pills, injectables, IUDs, vaginal foaming tablets and condoms. These activities have been greatly facilitated by the adoption, in 1988, of a national population policy which was formally launched in 1989 as the "National Policy on Population for Development, Unity, Progress and Self Reliance."[15]

The period from 1983 to 1989, therefore, marks the beginning of a government-sponsored national family planning programme, including the availability of large quantities of commodities. Therefore, organized family planning, on a national scale, had been in existence for only about five years at the time of the 1990 Nigeria Demographic and Health Survey.

4.1 EVER USE OF CONTRACEPTION

The recency of a government-supported family planning program and a large population base are partial explanations for Nigeria's low level of use of modern contraceptive methods. As shown in Table 4.1, only 15 percent of all women had ever used any contraceptive method. About three-fifths of these (ever-users) or 9 percent of all women had used an efficient (modern) method. Table 4.2 also shows that only 14 percent of all currently married women had ever used any contraceptive method. Of these, 8 percent had used an efficient (modern) method. Although the percentage of ever-users is the same as was recorded in the 1981/82 National Fertility Survey (NFS), the proportion using modern methods had increased fourfold from the 2 percent recorded in the NFS. However, the percentage of ever-users ranks very low even by African standards. Comparative ever-use percentages in other countries are 79 percent in Zimbabwe, 45 percent in Kenya and 37 percent in Ghana (Rutenberg et al., 1991:10). Table 4.1 also shows that women in the middle childbearing years, 25-39, are more likely to have used a method of contraception than younger or older women. Moreover, perhaps due to the urban bias (discussed below) in the present distribution of family planning services in the country, the urban-rural differential is very large; 32 percent of urban women as opposed to only 10 percent of rural women reported ever using a contraceptive method. Ever-use of contraception is highly correlated with schooling. From a low 6 percent of women who had not attended any school, the percentage of ever-users increases to 19 percent among women who had attended primary school

[14]This Ministry (recently renamed Federal Ministry of Health and Human Services) is charged with the responsibility of implementing the country's population policy, which, in practice, is being equated with a family planning program.

[15]The policy has set the following demographic targets:

1. to reduce the proportion of women who get married before the age of 18 years by 50 percent by 1995 and by 80 percent by the year 2000;
2. to reduce pregnancy to mothers below 18 years and above 35 years of age by 50 percent by 1995 and by 90 percent by the year 2000;
3. to reduce the proportion of women bearing more than four children by 50 percent by 1995 and by 80 percent by the year 2000;
4. to extend the coverage of family planning service to 50 percent of women of child-bearing age by 1995 and 80 percent by the year 2000;
5. to reduce the infant mortality rate to 50 per 1000 live births by the year 1990 and 30 per 1000 live births by the year 2000 and the crude death rate to 10 per 1000 by the year 2000.

and rises to 39 percent of women who had attended secondary or higher level educational institutions. Data shown in Table 4.1 reveal marked regional differences. The percentage of women who had ever used a contraceptive method is higher in the southern than the northern regions of the country. Although 31 percent of women in the Southwest and 19 percent in the Southeast had used a contraceptive method, only 4 percent of women in the Northwest and 6 percent of women in the Northeast had ever used contraception.

Table 4.1 Percentage of all women who have ever used contraception by background characteristics, Nigeria 1990

Background characteristic		Place of residence		Region of Residence				Education			Total
		Urban	Rural	South East	South West	North West	North East	None	Primary	Sec.& Higher	
Age	15-19	14.9	5.6	9.1	15.8	2.7	3.7	2.5	7.7	15.6	8.3
	20-24	37.1	10.7	22.2	42.3	4.5	4.0	3.7	10.8	43.7	18.0
	25-29	38.9	11.9	26.4	39.2	4.8	7.2	4.8	20.6	51.4	18.7
	30-34	34.4	8.0	18.2	33.9	3.4	5.3	5.0	25.2	63.5	14.1
	35-39	41.5	11.4	23.8	32.5	5.2	6.0	8.1	38.9	62.8	18.3
	40-44	28.7	12.2	17.1	30.8	4.3	10.2	8.5	35.1	69.3	15.7
	45-49	21.5	10.7	15.2	20.1	8.0	7.4	9.1	28.31	53.8	12.7
Living children	None	27.9	10.0	17.3	30.5	2.5	3.7	1.3	10.8	30.4	16.0
	1	32.6	7.3	18.7	34.3	3.7	4.9	3.2	12.3	44.6	12.7
	2	33.7	6.6	20.2	33.0	3.1	2.7	3.3	12.2	47.0	12.1
	3	32.6	7.4	16.4	27.3	4.3	6.8	5.0	20.9	50.7	12.5
	4	36.5	9.1	20.4	33.2	3.8	6.1	5.5	24.3	62.6	15.7
	5+	31.7	15.1	20.5	31.8	9.1	10.9	11.1	34.0	57.1	18.9
All (ever-use)		32.3	9.8	18.9	31.4	4.4	5.8	5.7	18.9	39.0	15.2

In spite of the low percentage of women who have ever used a method, the observed pattern of use conforms with the general pattern; ever-use is lowest among young women below the age of 25, reaches its peak in the middle childbearing years and then drops off among older women.

Table 4.2 Percentage of currently married women who have ever used contraception by background characteristics, Nigeria 1990

Background characteristic		Place of residence		Region of residence				Education			Total
		Urban	Rural	South East	South West	North West	North East	None	Pri-mary	Sec.& Higher	
Age	15-19	11.2	3.1	9.5	15.9	2.5	2.2	1.2	9.0	18.8	4.4
	20-24	30.4	8.8	21.8	35.6	4.1	4.3	3.7	10.2	43.8	13.4
	25-29	36.8	9.6	23.0	36.0	4.9	6.8	4.9	19.8	49.3	16.0
	30-34	32.8	8.1	18.0	33.0	3.4	5.4	4.9	25.7	61.5	13.7
	35-39	39.6	10.8	22.6	31.6	5.3	5.7	7.5	38.4	61.6	17.3
	40-44	27.7	13.2	20.6	31.3	4.0	10.4	8.8	37.4	70.4	16.2
	45-49	21.3	10.1	13.2	20.3	8.2	7.9	8.8	28.1	51.8	12.1
Living children	None	22.8	5.9	20.1	37.4	1.8	1.8	0.7	11.8	45.1	9.4
	1	30.4	6.5	16.0	33.7	3.7	4.9	3.2	11.4	44.8	11.3
	2	32.7	6.5	20.0	31.4	3.1	2.8	2.9	11.8	46.2	11.7
	3	32.6	7.7	18.1	27.6	4.1	6.9	5.1	21.4	49.8	12.8
	4	35.8	9.4	22.1	32.3	2.8	6.2	5.5	25.0	61.8	15.8
	5+	32.3	14.9	21.0	31.9	8.9	11.2	11.0	34.8	56.0	19.0
All (ever-use)		31.6	9.1	19.9	31.9	4.4	5.7	5.6	21.5	49.3	14.0

4.2 CURRENT USE OF CONTRACEPTION

As shown in Table 4.3, the contraceptive prevalence rate (CPR)--percentage of married women who were using any method--is a low 6 percent. Of these, about 59 percent, were using modern contraceptive methods, while 41 percent were using traditional methods which are considered less effective for prevention of unwanted pregnancy (see also Figure 4.1). Therefore, the contraceptive prevalence rate (modern methods only) is only 3.5 percent, which is very low in comparison with the CPR in some other African countries such as Kenya and Zimbabwe, where 18 and 36 percent of currently married women, respectively, were using modern methods (Rutenberg et al., 1991:13).

Figure 4.1
Patterns of Contraceptive Use and Method Mix for Currently Married Women

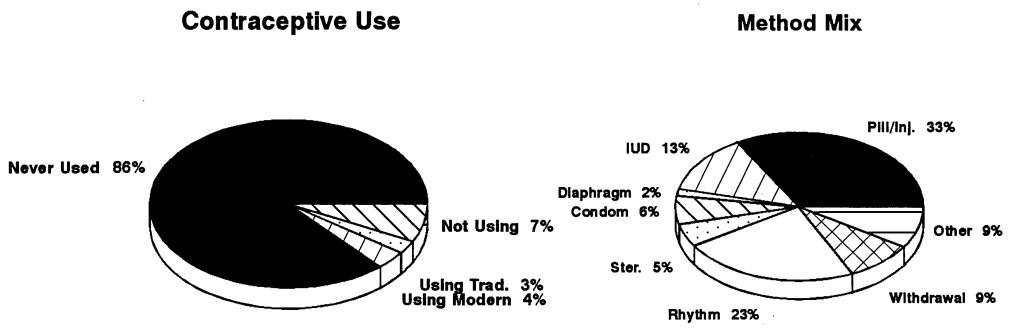

Table 4.3 Percentage of currently married women who are currently using a contraceptive method by selected sociodemographic characteristics, Nigeria 1990[1]

Background characteristic		Place of residence		Region of residence				Education			Total
		Urban	Rural	South East	South West	North West	North East	None	Primary	Sec.& Higher	
Age	15-19	4.3	0.8	2.7	8.5	0.9	0.1	0.4	1.9	8.2	1.3
	20-24	12.0	3.4	8.1	13.8	1.7	1.8	1.4	2.0	19.8	5.2
	25-29	12.5	4.1	9.2	15.0	0.6	2.4	1.6	6.0	21.6	6.0
	30-34	17.8	3.2	9.1	16.4	1.2	1.9	2.3	12.3	28.8	6.5
	35-39	24.6	4.0	12.3	15.7	2.3	1.9	2.9	21.2	34.8	8.6
	40-44	17.2	6.1	10.6	19.1	1.7	3.0	2.5	24.3	55.5	8.4
	45-49	10.1	3.4	4.3	9.5	0.3	4.6	2.5	14.7	30.0	4.6
Living children	None	9.6	2.9	9.1	18.8	0.8	0.3	0.2	3.1	23.8	4.2
	1	8.8	2.3	5.6	9.7	0.7	2.1	1.1	1.7	16.9	3.6
	2	10.4	2.7	7.2	11.5	0.9	1.2	1.2	1.0	20.5	4.2
	3	14.8	2.7	8.9	10.3	1.8	1.7	1.3	8.3	26.1	5.1
	4	20.6	2.8	6.6	20.0	0.4	2.7	1.9	10.4	32.3	7.1
	5+	20.1	6.5	11.7	18.0	2.4	4.1	4.2	21.2	32.0	9.7
All (current use)		14.9	3.6	8.9	15.0	1.3	2.0	2.0	9.5	23.7	6.0

On the other hand, some groups of women are more likely than others to be using contraception. As shown in Table 4.3, women who reside in urban areas, educated women, and women who reside in the Southwest and the Southeast seem more likely than others to use contraceptives. For example, 15 percent of urban women were currently using any method, in contrast to slightly less than 4 percent of rural women. The percentage of married women who are currently using contraception also increases with age; beginning with a very low 1 percent among teenagers and peaking at 9 percent among women aged 35 to 39 years. Thereafter, it decreases to 8 percent among the 40-44 year age group and to 5 percent among women aged 45 to 49 years. Current use of contraception is positively correlated with education. The percentage of women currently using a method is 2 percent among women who have no formal education and 24 percent among women who have secondary or higher education. Not unexpectedly, women with 4 or more surviving children were more likely than others to be using a contraceptive method.

4.3 METHOD MIX

As shown in Table 4.4, more than half, 59 percent of current users were using modern methods; of these, the pill, IUD and injectables are the most widely used. One out of every 3 current users were using either the pill or injectables, while 13 percent were using the IUD. Another 6 percent were using condoms and 2 percent were using diaphragms. An appreciable proportion, 41 percent, preferred the less effective methods such as rhythm or withdrawal and other methods (see Figure 4.1). However, 5 percent of users chose sterilization. The characteristics of these women are discussed below.

Table 4.4 Percent distribution of currently married women who are currently using a contraceptive method by method, according to background characteristics, Nigeria 1990

Background characteristic	Pill/ injection	IUD	Diaphragm	Condom	Sterilization	Rhythm	Withdrawal	Other	All modern	All traditional	Total
Total	32.7	13.4	2.0	6.0	4.8	22.7	9.1	9.4	58.9	41.1	100.0
Place of residence											
Urban	33.4	17.3	3.7	7.7	2.4	23.7	7.5	4.3	64.5	35.5	100.0
Rural	31.9	9.0	0.1	4.0	7.6	21.5	10.8	15.2	52.5	47.5	100.0
Region											
SE	21.8	10.6	0.0	5.2	6.1	38.9	11.9	5.5	43.7	56.3	100.0
SW	37.6	16.9	4.3	8.0	3.0	15.8	7.4	7.1	69.8	30.2	100.0
NW	38.1	14.3	0.5	3.4	1.8	6.1	3.3	32.6	57.9	42.1	100.0
NE	50.3	6.7	0.0	0.0	10.8	0.0	9.4	22.8	67.8	32.2	100.0
Education											
No education	43.7	10.3	0.0	0.3	9.1	7.2	7.4	22.1	63.3	36.7	100.0
Primary	31.6	14.5	2.4	1.8	6.6	23.8	10.0	9.4	56.8	43.2	100.0
Sec.& Higher	28.0	14.1	2.7	12.1	1.2	29.6	9.2	3.0	58.2	41.8	100.0
Number of living children											
None	30.2	2.2	0.3	7.2	0.0	47.4	6.3	6.4	39.9	60.2	100.0
1	21.8	2.9	1.5	17.8	2.8	24.1	20.4	8.7	46.9	53.1	100.0
2	34.9	8.0	0.0	15.9	2.5	21.6	5.9	11.3	61.3	38.7	100.0
3	28.9	14.7	4.6	2.5	4.1	25.4	9.3	10.4	54.9	45.1	100.0
4	28.1	26.4	2.2	4.4	3.1	21.1	7.6	7.2	64.2	35.8	100.0
5+	38.0	14.4	2.2	1.7	7.8	17.5	8.3	10.1	64.0	36.0	100.0
Age											
15-19	13.3	0.0	0.0	32.6	0.0	12.2	21.0	20.9	45.9	54.1	100.0
20-24	38.7	4.2	1.7	7.4	0.0	31.2	8.3	8.6	52.0	48.0	100.0
25-29	25.1	11.4	1.5	10.7	2.3	32.5	10.8	5.9	50.9	49.1	100.0
30-34	31.2	17.2	3.2	3.7	1.8	21.3	9.8	11.7	57.2	42.8	100.0
35-39	40.1	12.5	1.9	4.1	4.6	19.8	7.0	10.0	63.2	36.8	100.0
40-44	26.0	22.8	2.6	0.7	16.7	11.7	11.0	8.5	68.8	31.2	100.0
45-49	49.2	15.2	0.0	3.2	10.7	8.2	0.5	13.0	78.2	21.8	100.0

Although urban women are more likely to use efficient methods, an appreciable percentage (36) of urban residents use less efficient methods. Moreover, excluding female sterilization, more educated women are more likely to use modern methods. The proportion of women using efficient methods increases appreciably after age 30, as it does with the number of living children. Besides its convenience and concealability, the popularity of injections may stem also from the belief, widespread among less educated Nigerians, in the efficacy of injections for all types of illness.

Female Sterilization

The women who have chosen voluntary female sterilization constitute a very small minority; about 5 percent of those who were currently using a method. The small number notwithstanding, the fact that female sterilization is presently the most widely used contraceptive method in the world (Dwyer and Haws, 1990), and the need to spread its acceptance in Nigeria justifies a closer look at the sociodemographic characteristics of these early acceptors. About one third of the women were sterilized in the last two years before the NDHS. The distribution of this small number of women, according to their state of residence, conforms with the observed situation in the country. The largest number, more than one quarter of the voluntarily sterilized women reside in Benue state, the home of the Tiv (who constitute about 2.5 percent of total Nigerian population). The predominance in Benue state is mainly due to the activities of the Nongo U Kristu U Ken Sudan Hen Tiv (NKST)[16] meaning, the Church of Christ in the Sudan among the Tiv. This missionary group has actively promoted family planning among the largely rural Tiv, through their numerous health facilities located in Benue, Plateau and Gongola states. NKST is assisted by the Association of Voluntary Surgical Contraception (AVSC). Availability of sterilization procedures in Oyo, Lagos and Plateau states is most likely due to AVSC support to the University Teaching Hospitals located in the capitals of these states.

The distributions of the women by their age at sterilization, current age and number of living children imply that future acceptors of voluntary sterilization would, in all probability, come from the ranks of older women who are above 30 years of age. It is noteworthy that included in this small sample are women from each of four major ethnic groups, Tiv, Igbo, Yoruba and Hausa (together accounting for about 60 percent of the nation's total population), despite the latter group's traditional aversion to contraception.[17] Also included are adherents of the three major religious denominations: Protestantism, Catholicism and Islam.

Although this is a small sample, the inclusion of women belonging to the major ethnic groups and the major religions lead to our hypothesis that sterilization can be accepted by Nigerian women if persuaded of its need for health or other reasons. There is evidence that some African women can accept a permanent contraceptive method; in Kenya, sterilization increased from 68 women in 1982 to more than 11,000 women in 1992 because of the increase in service points and quality care (Dwyer and Haws, 1990).

The fact that an appreciable proportion of the sterilized women (44 percent) reportedly found it difficult to get to the venue for the sterilization underscores the need for easy access. Moreover, because of the fear, which is widespread, of any surgical procedure requiring general anaesthesia, the program should lean more towards reliance on local anaesthesia.

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[16]The NKST health institutions comprise 8 hospitals and 111 primary health centers which are more than the combined total of all Federal- and state-owned health facilities in three states. Most of the NKST facilities are located in Benue state and some are in Gongola (now Taraba and Adamawa states) and Plateau states.

[17]The 1990 NDHS recorded only 27 Hausa women at risk (about 5 percent of total) as current users of any contraceptive method; 2 of these represent 8 percent of the small subsample of sterilized women. According to Callaway (1987), "while pronatal tendencies are strong in all Nigerian societies, they are most evident in the Islamic North, where family planning is not considered as a legitimate focus of public policy."

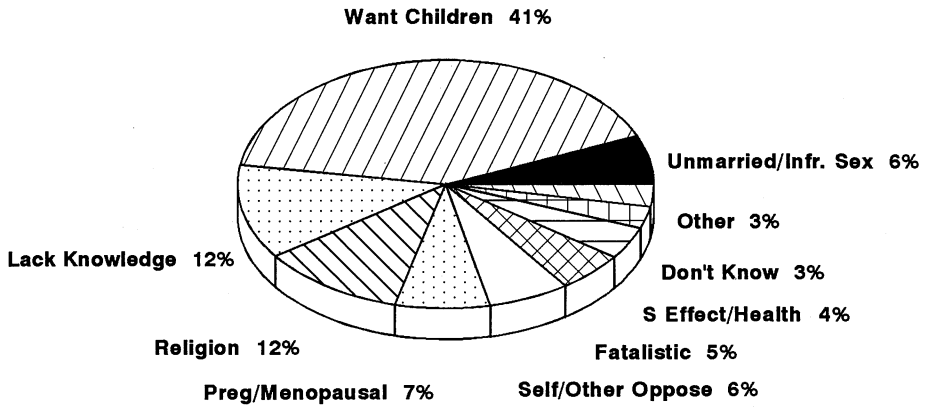
4.4 REASONS FOR USING

Child spacing was the reason most frequently given (by 28 percent of respondents) for using contraception. Appreciable percentages of respondents also mentioned stopping childbearing, health reasons and economic costs as reasons for using a contraceptive method. After the fifth birth most users use contraception for stopping childbearing; whereas more than half (57 percent) of women with up to 4 surviving children were using contraception for spacing, only about half of this proportion (29 percent) of women who had 5 or more surviving children used contraception for child spacing. Most women in the latter category were using contraception mainly for stopping childbearing. Eighteen percent of women with up to 4 surviving children were also using contraception for stopping childbearing.

4.5 REASONS FOR NOT WANTING TO USE

As shown in Figure 4.2, excluding those who wanted additional children (41 percent), who were having difficulty getting pregnant, or were menopausal or had hysterectomies (7 percent), the main reason given for not wanting to use any contraceptive method in the future is lack of knowledge, mentioned by 12 percent of respondents. Opposition to contraceptive use arising from religious, personal, partner's and other persons' viewpoint were mentioned by about 18 percent of respondents. Fear of side effects and other health reasons were mentioned by 4 percent of respondents. Other important reasons are a fatalistic outlook and inconvenience of obtaining methods.

Figure 4.2
Reasons for Not Intending to Use Contraception



NDHS 1990

In addition to those stated above, the tendency for most service points to be concentrated in a few urban centres is yet another impediment to the spread of contraceptive adoption. Although Table 4.3 shows that the proportion who were currently using any method is 20 percent among currently married urban women and only 5 percent among currently married rural women, this summary figure conceals the urban bias in existing family planning programmes and the primacy of Lagos metropolitan area (which, until recently, doubled as the national capital[18] and the capital of Lagos state). In fact Lagos state alone accounts for nearly 40 percent of current users.

Several women gave partners' opposition as their reason for not wanting to use a contraceptive method in future (see Figure 4.2). The importance of men's roles in female adoption of contraception is also evident in responses to two related questions: "Who would you talk to if you wanted to get factual information about using a contraceptive method?" and "Who would you talk to if you wanted to get personal advice about using a contraceptive method?" The first choice (mentioned by 26 percent and 38 percent of respondents to the first and second questions, respectively) was "husband/partner." The next favoured place to seek factual information or personal advice on contraceptive usage is a hospital which is mentioned by 26 percent and 19 percent of respondents to the first and second questions. Private doctors and family planning clinics were mentioned much less frequently. Therefore, it becomes necessary to focus attention and direct more resources to motivating men to accept family planning and encourage their wives to use contraceptives. Implementers of hospital based family planning services should also be equipped and encouraged to give quality service and well informed counselling to clients.

4.6 UNMET NEED FOR FAMILY PLANNING

Women who have an "unmet need" for family planning are those who are currently married, and who declare either that they do not want to have any more children (they want to limit their childbearing) or that they want to wait two or more years before having another child (they want to space births), but are not currently using contraception. It is estimated that 21 percent of currently married women fall into this category. For more details including differentials among population subgroups see *Nigeria Demographic and Health Survey 1990* (FOS and IRD, 1992).

[18]Lagos ceased to be the capital of Nigeria on December 12, 1991 when the seat of the Federal government was transferred to the new capital, Abuja which was selected because of its centrality and the opportunity it offers for future expansion.

5 Reproductive Preferences

5.1 IDEAL NUMBER OF CHILDREN

The main reason for the low levels of contraceptive use is the high demand for children. To derive the desired number of children which is regarded as a measure of a society's norms, the NDHS asked all women "If you could go back to the time you did not have any children and could choose exactly the number of children to have in your whole life, how many would that be?" A high proportion of women (61 percent) gave non-numeric answers to this question. Nearly ten years previously, the 1981/82 NFS had revealed that 33 percent of the women gave non-numeric answers to a similar question. The unexpected increase may be due to the fact that the NDHS interviewers failed to probe further once non-numeric responses were given.[19] Among those who gave numeric answers, the mean desired family size is 5.8. The apparent substantial reduction from the 8.4 (for currently married women) recorded in the 1981/82 NFS may be an artefact of a selection bias reflecting the characteristics of the lower percentage of respondents who gave numeric answers in the NDHS. However, as expected, the mean desired number of children shows strong differences between fertility aspirations of different segments of the population. As shown in Table 5.1, there is a marked regional difference; the mean desired number of children is 5.8 in the Southeast, 5.0 in the Southwest and 6.7 and 6.6 in the Northwest and the Northeast, respectively. Women who have attained secondary or higher education desired about two children less than their noneducated and primary school counterparts.

The tendency for the average desired number of children to increase with family size is also evident in Table 5.1. This tendency can be attributed to the tendency for women to rationalize unwanted births as desired or that women who wanted large family sizes are able to realize their goals and still desire more.

Table 5.1 Mean number of children desired by all women by selected sociodemographic characteristics, Nigeria 1990

Background characteristic		Mean number (s.d. in brackets)
Living children	None	5.05 (1.90)
	1	5.49 (2.42)
	2	5.84 (2.44)
	3	5.95 (2.15)
	4	6.20 (2.62)
	5+	7.10 (2.78)
Place of residence	Urban	5.01 (1.90)
	Rural	6.27 (2.60)
Region	SE	5.89 (2.35)
	SW	5.01 (1.78)
	NW	6.73 (3.00)
	NE	6.63 (2.93)
Education	None	6.93 (2.98)
	Primary	5.89 (2.26)
	Secondary/Higher	4.80 (1.48)
Marital status	Never married	4.93 (1.78)
	Married	6.20 (2.60)
	Previously married	6.01 (2.38)
Total		5.82 (2.45)

[19]Perhaps the percentages pertain to spontaneous responses only. Since most Nigerians believe that procreation, like death, is inevitable, "up to God," or "as many as God gives" are the most likely set of spontaneous responses to the query on ideal number of children. Numeric answers will usually be given after interviewer's probing.

5.2 INTENTIONS TO POSTPONE OR TERMINATE PREGNANCY

In order to gauge future fertility intentions, the NDHS asked all currently married women: "Would you like to have (a/another) child or would you prefer not to have any (more) children?"[20] Women who responded that they wanted another child were then asked: "How long would you like to wait from now before the birth of (a/another) child?"[21] Responses to these questions are tabulated in Table 5.2.

Table 5.2 Percent distribution of currently married women by reproductive intentions, according to selected sociodemographic characteristics, Nigeria 1990

Background characteristic	Desire for more children: Want no more	Want within 2 years	Want after 2 years	Others	Percent total
Living children					
None	1.3	7.5	23.4	67.8	100.0
1	3.5	13.1	42.8	40.6	100.0
2	5.2	13.3	38.5	43.0	100.0
3	9.4	10.5	36.1	44.0	100.0
4	17.7	9.6	33.4	39.3	100.0
5+	37.1	5.5	21.4	36.0	100.0
Place of residence					
Urban	20.1	7.3	32.2	40.3	100.0
Rural	13.7	10.3	31.9	44.1	100.0
Region of residence					
Southeast	21.3	13.0	29.9	35.8	100.0
Southwest	23.0	6.8	33.0	37.2	100.0
Northwest	10.0	10.9	31.9	47.1	100.0
Northeast	8.9	6.9	33.2	50.9	100.0
Education					
None	13.7	8.1	29.1	49.1	100.0
Primary	19.6	12.3	34.1	34.0	100.0
Sec.& Higher	14.9	13.5	45.0	26.6	100.0
Total	15.1	9.6	32.0	43.3	100.0

Note: Some percentages may not add up to 100 due to rounding.

[20]Pregnant women were asked: "After the child you are expecting, would you like to have another child or would you prefer not to have any more children?"

[21]Pregnant women were asked: "How long would you like to wait after the birth of the baby you are expecting before the birth of another child?"

As shown in Table 5.2, the majority of women who want more children want them after two years. Urban women are more likely than rural women to want no more children. Similarly, women in the Southwest and the Southeast are more likely than women in the Northwest and Northeast to want to stop childbearing. Not unexpectedly, the percentage of women who want to terminate childbearing increases with the number of living children. The relationship between the desire to stop childbearing and education is not very clear cut.

6 The Pace of the Birth Transition

It was shown in Section 3 that there was a 15 to 17 percent difference between the TFR for the more recent period (0-3 years before the survey) and the TFR for the period 4-7 years before the survey. Table 3.1 reveals that the decrease in TFR cuts across all population subgroups although the magnitude of the decline differs considerably. The role of each of the proximate determinants of fertility in bringing about the observed variations in fertility was examined by fitting Bongaarts' model to the data. The results, shown in Table 3.2, indicate that postpartum infecundability including breastfeeding is by far the most important fertility-inhibiting factor accounting for the reduction in natural fertility. Moreover, as shown in Table 5.2, 32 percent of the women who indicated they want more children also desire birth intervals that are longer than two years.

The existence of a positive correlation between the length of the postpartum infecundability and birth interval in a noncontracepting society on the one hand, and between birth interval and fertility on the other, led us to a closer examination of birth intervals as women progressed from one parity to the next. By disaggregating the childbearing process into a series of transitions, beginning with marriage and followed by first, second and successive births, we gain further insight into the underlying mechanisms of fertility change. We chose to commence analysis with the interval between first and second birth and to end at the interval between the fifth and the sixth birth. Because marriage is nearly universal and, among all Nigerian ethnic groups procreation is apparently the raison d'etre of marriage, we assume that for all fecund, married women, the transition to first parity is automatic. The decision to stop at the sixth parity is informed by the fact that the previous calculations of quintums show a marked decrease in the proportion of women progressing to seventh and higher order parities.

Two analytical techniques are employed. Separate life tables are calculated for each birth interval and for each of the four regions. Both the *quantum* of fertility, that is, the proportion of women who make the transition from one parity to the next, and the *tempo* of childbearing or the time it takes for a woman to move to the next parity are examined. Two corresponding measures are derived: the median duration (an indicator of the speed of transition) in the particular interval and the proportions of women having a birth longer than 30 months after their previous birth. Thirty months is used as the cut off point because it is close to the national median. These measures are obtained for each region and for other population subgroups. Proportions of women attaining the median birth interval in each region are used in the ensuing multivariate analysis. The multivariate analysis is based on proportional hazards models[22] which allow the evaluation of the effect of a selected set of covariates on the pace of transition from one parity to the next.

[22]The proportional hazards model used here depends on a strict assumption that the risk of having a birth for a woman in one socioeconomic category relative to another woman in a separate category of the same variable is independent of time. This assumption was tested by comparing across categories plots of $\log(-\log(S_{(t)}))$ where $S_{(t)}$ is the life table survival function. The conclusion from this exploratory analysis was that for these data the assumptions were satisfied.

Table 6.1 Median durations[1] of birth intervals by background characteristics, Nigeria 1990

Background characteristic		Parity transition 1-2	2-3	3-4	4-5	5-6
I Region	Southeast	27.50 (21.32)	27.42 (20.91)	27.60 (21.61)	28.59	28.98
	Southwest	30.11 (26.07)	29.15 (26.09)	30.86 (25.86)	29.07	31.53
	Northwest	28.23 (22.56)	29.02 (22.03)	28.17 (21.71)	31.11	30.26
	Northeast	28.14 (26.45)	28.48 (24.68)	27.30 (24.37)	28.14	26.92
II Education	No education	28.26	28.62	28.33	29.31	28.97
	Primary	27.69	27.74	28.27	28.23	29.53
	Secondary/Higher	30.24	28.66	27.89	32.15	43.31
III Place of residence	Urban	28.44	29.04	28.86	29.40	30.22
	Rural	28.21	28.29	28.17	29.19	29.13
IV Use of contraception	Never-use	28.36	28.49	28.53	29.27	29.42
	Ever-use	27.55	28.03	27.11	29.08	29.13
V Period before survey of the birth of preceding child	0-3 years	30.93	33.41	32.39	35.26	33.31
	4-7 years	29.61	29.76	29.21	31.09	32.41
	8 years and above	27.47	27.26	27.05	27.67	27.29
VI Age at birth of preceding birth	Below 15 years	28.67	**	**	**	**
	15-19	28.03	27.65	26.82	27.35	24.58
	20-24	28.00	28.37	27.74	28.39	27.21
	25-29	28.88	30.21	29.39	30.30	28.94
	30-34	32.77	33.24	31.66	30.47	32.15
VII Occupation	Not working	28.47	28.65	28.72	28.33	28.50
	Agriculture	27.39	28.30	27.81	28.91	28.90
	Professional etc.	30.08	29.18	28.42	33.43	34.14
	Sales	28.38	28.27	28.49	29.57	30.01
Total		28.26 (23.55)	28.42 (22.42)	28.29 (22.97)	29.23	29.37

1. Median durations are obtained from fitting survival models to the NDHS data. Numbers in brackets are derived from Adewuyi and Isiugo-Abanihe (op. cit).

** Indicated cells with no cases or cases below 20.

Median durations of birth intervals for several population subgroups are shown in Table 6.1.[23] A comparison with life table estimates of median durations of birth interval generated from the 1981/82 NFS data (in brackets, Table 6.1) and from the NDHS (1990) shows an increase in the median length of the interval across all transition stages for which there are comparative data, in the period between the two surveys. Median durations calculated from the NFS data are lower across all birth intervals and in each of the four regions.[24]

The data in panels I to IV of Table 6.1 show that median durations range between 27 and 34 months among all population subgroups excluding women with secondary and higher education who have a longer duration, and then, only after parity five. This indicates that the speed of childbearing is relatively fast and as the data show, remain at a uniform pace until the fourth parity after which birth intervals show a slight increase. This can be explained by the high demand for children such that both young and old mothers generally aim at parity four or more and so maintain almost the same pace until the desired parity is reached. For example, there is no appreciable difference in the median durations of birth intervals among women who have ever used a contraceptive method and those who have never used, or among rural or urban residents. However, among these groups, the birth intervals show a slight increase after parity four. Although women in the Southwest region seem to have a lower pace of progression from one parity to the other, median durations of birth intervals are almost uniform at every parity within each of the regions. Women who have completed secondary or higher education seem to have a slower pace than the noneducated women and those with primary education, of progression from parity four to five and from parity five to six. A similar pattern is evident among women in the "professional" category of occupation.[25] As shown in panel VII of Table 6.1, compared with women in other occupational groups, women in professional jobs have higher average birth interval between parity five and six. This is an indication that higher proportions of highly educated women and women who work as professionals are not closing the birth intervals after parity four or five.

It is important to note, as shown in panel V of Table 6.1, that median durations of birth intervals have been on the increase for some time (8 years or more), and that the median durations are highest for all parity transitions in recent years, 0-3 years before the NDHS or since about 1986. Panel VI shows that the median durations of birth intervals are positively correlated with women's age at the birth of the preceding child. In other words, the pace of childbearing slows down as women get older which is what one would expect.

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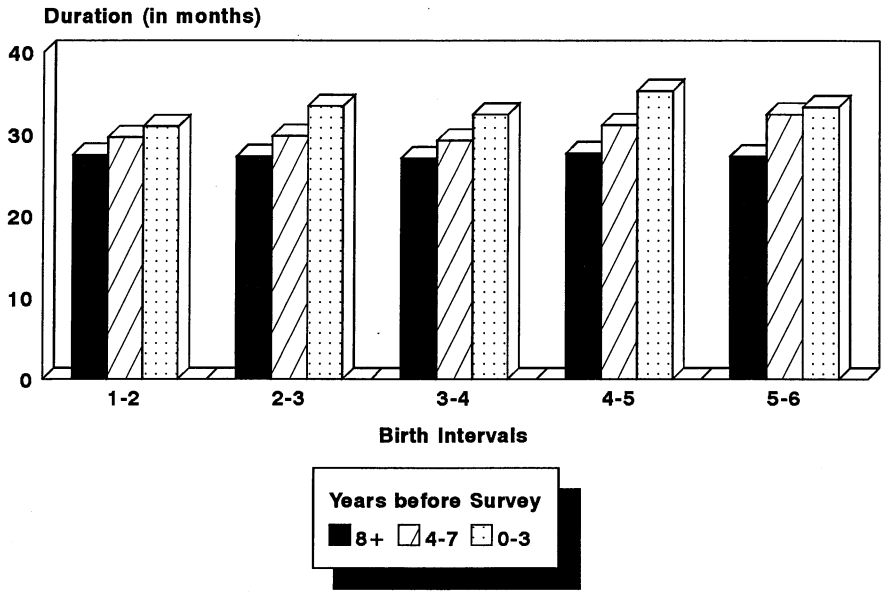
[23]Comparable NFS data were obtained from Adewuyi, Alfred A, and Uche C. Isiugho-Abanihe, 1991. "Regional Patterns and Correlates of Birth Interval Length in Nigeria."

[24]Although some changes have been made in regional boundaries since the NFS (for example, Benue State was placed in the Northeast region at the time of the NFS is now in the Southeast) these changes are not such that would affect the obvious conclusion from observed data, that median durations of birth intervals have increased by several months in the period between the NFS and the NDHS.

[25] This category includes types of wage-earning jobs that require some education and take the worker away from home each day.

In sum, Table 6.1 shows that median durations of birth intervals have increased since 1981 but with little variation among population subgroups. Not only has the pace of childbearing been decelerating, but also it has been slowest in recent years (since about 1986) and, as expected, the pace of childbearing slows as women grow older. The information in panel V of Table 6.1 is presented graphically in Figure 6.1 for five birth transitions. The figure shows that birth intervals have been increasing since some time in the past.

Figure 6.1
Median Durations of Birth Intervals for All Women Aged 15-49



To examine the relationship between the age of women at birth of the preceding child on birth intervals at various time periods, median durations are examined for each of mother's age group at the birth of the preceding child across three time periods before the survey and for each of the transition stages. The results which are presented in Table 6.2 reveal that, irrespective of age of women at birth of preceding child, the median duration of the birth interval has been on the increase. Thus, the pace of childbearing has been slowing down especially in the years since 1986.

Table 6.2 Median durations[1] of birth intervals by age at birth and period before survey of birth of the preceding child, Nigeria 1990

Age at birth of preceding child	Period before survey of birth of preceding child	Parity transition 1-2	2-3	3-4	4-5	5-6
Below 15 years	0-3 years	31.82	**	**	**	**
	4-7 years	30.98	**	**	**	**
	8 years and above	28.10	**	**	**	**
15-19	0-3 years	31.42	32.80	31.29	**	**
	4-7 years	29.98	28.88	31.73	29.96	**
	8 years and above	27.02	26.87	26.02	26.04	**
20-24	0-3 years	29.18	31.57	32.03	32.44	29.73
	4-7 years	28.77	29.17	27.95	30.25	31.03
	8 years and above	27.44	27.46	26.91	27.29	25.86
25-29	0-3 years	32.06	42.13	33.83	35.87	32.92
	4-7 years	26.88	32.17	29.76	31.37	30.73
	8 years and above	28.51	28.33	28.07	28.78	27.39
30-34	0-3 years	34.60	32.98	31.83	35.26	36.62
	4-7 years	39.96	48.64	35.09	34.52	36.47
	8 years and above	28.86	26.62	29.85	28.72	30.18
35 years and above	0-3 years	**	**	45.00	39.75	42.63
	4-7 years	**	**	26.71	32.14	37.41
	8 years and above	**	**	32.15	25.25	34.48

1. Median durations are obtained by fitting survival models to the NDHS data.
** indicates cells with no cases or too few cases

These findings lead to the conclusion that the observed decline in fertility is due mainly to longer birth intervals arising from longer spacing. Therefore we examine to what extent certain sociodemographic characteristics affect the likelihood of having a birth interval longer than 30 months, which is close to the national median. We have limited this analysis to two intervals: between parity 3 and 4, and between parity 4 and 5, because Nigeria's Population Policy advocates that women stop childbearing after the fourth child. The multivariate proportional hazards models permit the estimation of the proportion of women with a particular characteristic who have not had a fourth or fifth child, respectively, after a period of 30 months, controlling for a number of other relevant background characteristics. In this analysis, mother's age, education and occupation, and the period before the survey are controlled. To account for potential interactions between these variables and region, separate models are fitted for each region. The regression coefficients are displayed in Appendices A.1 and A.2 and Tables 6.3 and 6.4 present the estimated proportions without a fourth or fifth child, respectively, after 30 months.

Table 6.3 Percentages of women of parity 3 who have not had a fourth child after a period of 30 months by background characteristics[1], Nigeria 1990

Background characteristic		Region of residence			
		Southeast	Southwest	Northwest	Northeast
Age at the birth of the third child	Below 19	37.8	41.6	37.0	38.7
	20-24	39.9	48.9	38.6	41.8
	25-29	44.7	54.5	48.3	43.7
	30-34	51.2	57.4	59.7	48.4
	35 & above	55.5	71.6	53.8	56.0
Education	No education	43.6	54.2	43.0	41.9
	Primary	39.5	49.6	39.3	45.4
	Secondary/ Higher	38.4	52.7	24.9	50.5
Period before survey preceding child was born	0-3 years	50.9	54.6	50.3	56.2
	4-7 years	38.6	57.9	42.8	38.4
	8 years & above	41.1	49.1	39.2	39.2
Occupation	Not working	46.0	54.8	42.2	44.2
	Agriculture	41.0	45.2	42.1	34.0
	Professional	49.3	50.5	43.5	40.7
	Sales	38.3	53.9	42.3	42.0
Total		41.7	52.1	42.3	42.2

1. Percentages are obtained by fitting hazard models in which all other characteristics are controlled.

One variable that shows consistent and significant effect over median duration of birth interval in each of the regions and for the two transition stages, is the first time period, that is, 0-3 years before the survey. This finding suggests that there is something about recent times which is encouraging postponement of births or a delay in having the fourth or the fifth child. As shown in Tables 6.3 and 6.4 the significant effect of time (0-3 years before the survey) is manifested in the more than 50 percent of all women in each region who have not had the fourth or fifth child. Women's age at birth also affects length of interval but mainly when women are aged 35 or above. Not surprisingly, certain types of occupation exert some effect over length of birth interval in the Southeast and in the Southwest where women must earn a living in contrast to the northern regions where the practice of seclusion predominates. In the Southeast, engagement in professional activities influence the length of the birth interval between the fourth and the fifth child. Women in these jobs have longer median birth intervals than women in other jobs.

Table 6.4 Percentages of women of parity 4 who have not had a fifth child after a period of 30 months by background characteristics[1], Nigeria 1990

Background characteristic		Region of residence			
		Southeast	Southwest	Northwest	Northeast
Age at the birth of the fourth child	Below 19	39.0	37.6	51.1	42.4
	20-24	43.2	38.9	50.8	39.9
	25-29	47.0	48.6	54.3	48.0
	30-34	48.5	52.5	61.0	51.4
	35 & above	65.3	50.3	52.7	56.8
Education	No education	45.4	46.7	53.2	44.7
	Primary	46.7	41.6	53.8	41.4
	Secondary/ Higher	41.3	56.4	54.1	**
Period before survey when the fourth child was born	0-3 years	50.3	54.4	59.8	57.9
	4-7 years	46.5	49.1	57.0	50.8
	8 years & above	44.1	43.5	48.1	35.9
Occupation	Not working	46.7	49.9	53.6	43.1
	Agriculture	44.4	37.9	54.1	46.9
	Professional	59.8	51.4	49.9	46.5
	Sales	44.6	47.9	53.3	44.7
Total		45.6	46.9	53.3	44.3

** too few cases

1. Percentages are obtained by fitting hazard models in which all other characteristics were controlled.

6.2 SOCIOECONOMIC EXPLANATION

Two major principles of the Structural Adjustment Programme (SAP) are an overall cut in government expenditure on social services including health and education, and a massive devaluation of the Nigerian currency. The latter has led to drastic reductions in public expenditure on education resulting in increases in parents' share. Simultaneously, unabated inflation has also led to a general rise in the cost of virtually every consumer item, including food, drugs, books and school uniforms. These rising costs to parents at a time of massive unemployment appears to be causing a general re-evaluation by Nigerian parents and may be leading to postponement of childbearing. As previously mentioned, "economic costs" was the response of several women to the question (FOS and IRD, 1992): "What is the main reason you are using a method of family planning?" Indications of parents' perception of the rise in school-related costs are found in recent surveys in which parents attributed their heavier financial burden to the increasing cost of raising children,

mainly costs associated with children's schooling.[26] It is not unlikely that some postponements may eventually lead to permanent stoppage while other women might have stopped childbearing in these hard times.

Evidence from other developing countries has also shown that heightened parental aspirations to raise the quality of children through schooling which entails significant sacrifices in the form of rising school fees, levies, costs of uniforms and foregone opportunities by mothers, have been a major factor leading to reductions in family size (e.g., Knodel et al., 1985).

7 Conclusions and Programme Implications

There is some evidence of a decline in overall levels of fertility in recent years, particularly since about 1986. For the average Nigerian, however, the period since 1986 is characterised by worsening standards of living. Not only has massive currency devaluation ensured drastic cuts in the standard of living of salaried workers, but also unemployment rates are increasing at a period when aspirations for own children's education are very high. We conclude that prevailing economic crises at national and personal levels are largely responsible for the demonstrated increase in postponement of childbearing particularly by women who have had four or five births, and who reside in the southern part of the country. This, perhaps accounts for the observed differences in fertility since the 1981/82 NFS; in the Southwest, for example, TFR decreased from 6.25 to 5.46 (FOS and IRD, 1992:25).

It is perhaps premature to judge whether or not this decline will continue. What is certain is that the economic situation is not likely to improve in the foreseeable future. If the present economic situation and parents' attitude towards rearing high quality children (through education) persist, then it is reasonable to assume that women will keep up the observed practice of postponing births. Over a period of years, sustained addition of about four to six months to each birth interval (as the analyses suggest) will eventually lead to a reduction of one child in a woman's completed family size. If more and more postponements eventually translate into termination of childbearing, there will be further reduction in completed family size. If, on the other hand, the economy were to undergo a miraculous recovery, women could decide either to make up for lost time and attain high parities, or maintain fertility habits formed during hard times. In the case of the latter, the present decline will mark the beginning of a transition to smaller completed family size.

Regardless of future events, it is obvious that the present economic situation provides a conducive environment for the success of a family planning programme. The foregoing analyses strongly demonstrates that women who have ever used contraception are quite distinct in having marked and much higher declines in fertility than nonusers. While other attributes of contraceptive users have, no doubt, contributed to this difference, our analyses show that contraception would make a difference if the contraceptive prevalence rate can be raised from the present low level. The fact that 21 percent of women have an unmet need for family planning underscores the need to expand the existing programme.

Within the stipulated periods, between now and 1995 or 2000, the demographic goals set by the Population Policy are generally unrealisable.[27] The foregoing analyses of recent fertility levels and patterns provide some pointers to ways to improve existing programme.

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[26]Examples from Nigeria and other African countries are contained in Paulina Makinwa-Adebusoye, 1991.

[27]The demographic goals of the Population Policy are itemized in footnote 14.

First, the existing family planning programme would need to focus on reaching more of the population. It cannot be overemphasized that the present urban bias must be corrected since about 70 percent of Nigerians live and work in rural areas. The Federal Ministry of Health and Human services which is responsible for implementing the population policy has focused on Primary Health Centres which should be within easy reach of all. The ministry would have gone a long way in spreading the culture of family planning if it were to equip (with trained personnel and commodities) all such centres effectively.

The methods currently being used and which are preferred for future use are mainly the pill, injectables, IUDs and condoms. Nearly 5 percent of future users preferred sterilization. Although preference might have been dictated by availability, there is evidence that contraceptors use these methods and, therefore, there is the need to ensure regular supply of these commodities. For the reasons already mentioned, there is also the need to increase the service points for surgical contraception.

The analysis shows that among reasons for not wanting to use any method of contraception in future are: fear of side effects, inconvenience and lack of knowledge of methods and/or the source of such methods. There is also an apparent tendency for one-time acceptors to discontinue use or to shy away from future use. All these constraints to contraceptive usage need to be effectively countered by better designed and more intensive I.E.C. campaigns. This need to be complemented by well trained family planning providers.

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Table A.1 Proportional hazards estimates of the pace of transiting from third to fourth birth

Characteristic	Southeast b-coeff.	s.e.	Southwest b-coeff.	s.e.	Northwest b-coeff.	s.e.	Northeast b-coeff.	s.e.
Age at birth of third child								
<19	0.189*	0.095	0.368*	0.130	0.311*	0.112	0.138	0.107
20-24	0.132	0.077	0.165*	0.073	0.266*	0.097	0.053	0.103
25-29	R.C.[1]		R.C.		R.C.		R.C.	
30-34	-0.185	0.152	-0.090	0.114	-0.346	0.178	-0.132	0.169
35+	-0.313	0.252	-0.595*	0.250	-0.163	0.290	-0.356	0.215
Education								
None	R.C.		R.C.		R.C.		R.C.	
Primary	0.111	0.072	0.137	0.075	0.102	0.150	-0.099	0.146
Sec.& Higher	0.141	0.142	0.046	0.096	0.501*	0.247	-0.242	0.584
Occupation								
Not working	R.C.		R.C.		R.C.		R.C.	
Agriculture	0.136	0.092	0.279	0.145	0.002	0.145	0.281*	0.120
Professional	-0.095	0.171	0.127	0.143	0.037	0.166	0.098	0.221
Sales	0.212*	0.107	0.029	0.125	0.003	0.080	0.063	0.075
Period before survey when third child was born								
0-3 years	-0.276*	0.129	-0.162	0.130	-0.309*	0.132	-0.484*	0.135
4-7 years	0.067	0.069	-0.264*	0.078	-0.097	0.084	0.021	0.074
8+ years	R.C.		R.C.		R.C.		R.C.	

1 R.C. stands for Reference Category: coefficient constrained to zero.
* significant at 0.05 level

Table A.2 Proportional hazard estimates of the pace of transiting from fourth to fifth birth

Characteristic	Southeast b-coeff.	s.e.	Southwest b-coeff.	s.e.	Northwest b-coeff.	s.e.	Northeast b-coeff.	s.e.
Age at birth of third child								
<19	0.222	0.138	0.304	0.275	0.095	0.170	0.157	0.137
20-24	0.106	0.079	0.267*	0.089	0.102	0.097	0.226*	0.099
25-29	R.C.[1]		R.C.		R.C.		R.C.	
30-34	-0.043	0.120	-0.113	0.102	-0.211	0.148	-0.096	0.162
35+	-0.573*	0.251	-0.051	0.175	0.046	0.228	-0.261	0.233
Education								
None	R.C.		R.C.		R.C.		R.C.	
Primary	-0.038	0.081	0.140	0.084	-0.018	0.182	0.092	0.182
Sec.& Higher	0.113	0.176	-0.285*	0.116	-0.025	0.311	1.702	1.020
Occupation								
Not working	R.C.		R.C.		R.C.		R.C.	
Agriculture	0.065	0.105	0.332*	0.168	-0.017	0.167	-0.105	0.135
Professional	-0.391	0.202	-0.044	0.174	0.106	0.188	-0.094	0.262
Sales	0.064	0.123	0.058	0.151	0.008	0.092	-0.044	0.088
Period before survey when third child was born								
0-3 years	-0.175	0.132	-0.312*	0.140	-0.352*	0.144	-0.629*	0.150
4-7 years	-0.065	0.086	-0.155	0.088	-0.264*	0.095	-0.416*	0.094
8+ years	R.C.		R.C.		R.C.		R.C.	

1 R.C. stands for Reference Category: coefficient constrained to zero.
* significant at 0.05 level

Fertility Levels, Trends, and Socioeconomic Differentials: Findings from the Tanzania Demographic and Health Survey

Aldegunda S. Komba
Bureau of Statistics
Dar es Salaam, Tanzania

Said M. Aboud
Bureau of Statistics
Dar es Salaam, Tanzania

1 Background Information

The United Republic of Tanzania is a union of the former Tanganyika and the Islands of Unguja and Pemba (collectively referred to as Zanzibar). The country is located in East Africa, South of the Equator. Tanzania shares a border with eight other African countries; namely, Kenya on the northeast, Uganda on the north, Rwanda and Burundi on the northwest, Zaire on the west, Zambia and Malawi on the southwest and Mozambique on the south. On the east, the country is bordered by the Indian Ocean. Mount Kilimanjaro (the highest mountain in Africa) is located in the northeastern part of the country. The three great lakes in Africa are located on Tanzania's borders: Lake Victoria on the north, Lake Tanganyika (the second deepest in the world) on the west and Lake Nyasa on the southwest.

Tanzania is made up of twenty five regions; twenty are on the Mainland and five on the Islands. These regions are divided into districts (the largest region having 8 districts) which are in turn divided into divisions and then wards. In rural areas the wards are sub-divided into villages. On the Islands the districts are divided into branches.

These regions were formed mainly for administrative purposes. Development plans are initiated at the district level and discussed at the regional level before being submitted for final approval at the national level.

Since independence, Tanzania has been able to conduct three decennial censuses (1967, 1978, 1988) and two demographic sample surveys (1973, 1991/92) which collected information on the basic sociodemographic indicators.

This country, like many other developing countries, is characterised by a high fertility rate and a moderately high but declining mortality rate. With respect to age structure, the population is considered young, with about 46 percent of the population under 15 years of age. Table 1.1 gives some basic sociodemographic characteristics of the population of Tanzania.

The Tanzanian population, numbered around 23.1 million according to the 1988 census, is made up of many ethnic groups, each with its own characteristics. Nevertheless, the national language, Kiswahili, is understood by almost all ethnic groups in the country. The main religious denominations are Islam and Christianity.

Table 1.1 Demographic indicators, Tanzania 1978 and 1988

Indicator	1978	1988
Population (millions)	17.5	23.1
Population 0-14 (percent)	-	45.8
Population 15-64 (percent)	-	50.0
Population 65+ (percent)	-	4.3
Annual growth rate[1] (percent)	3.2	2.8
Crude birth rate (per 1000)	49	46
Crude death rate (per 1000)	19.1	15.1
Total fertility rate (per 1000)	6.9	6.5
Infant mortality rate (per 1000)	137	115
Under-five mortality rate (per 1000)	-	192
Expectation of life at birth (e_0)	44	49

[1] The growth rates are intercensal (1967/78 and 1978/88).
Source: Bureau of Statistics, Dar es Salaam, 1991.

1.1 THE DEMOGRAPHIC AND HEALTH SURVEY

The Tanzania Demographic and Health Survey (TDHS) was carried out between October 1991 and March 1992. The main objectives of the survey were:

i) To collect data on fertility and mortality, family planning, fertility preferences, and maternal and child health care for use by policy makers and programme managers to evaluate and improve existing programmes;

ii) To provide the basic information to be utilized in planning and managing family planning and health programmes; and

iii) To provide internationally comparable data from Tanzania to scholars and planners interested in the study of demographic and health behaviour in Tanzania as well as those conducting regional or cross national studies.

1.2 CHARACTERISTICS OF THE SAMPLE

The 1991/92 TDHS was designed to provide regional estimates. In drawing up the sample it was assumed that rural areas within each region were relatively homogeneous. To provide regional estimates, a minimum number of households for each region was fixed. A two-stage sample design was employed to select the households.

The sample frame for the 1991/92 TDHS comprised the enumeration areas demarcated for the 1988 census. For Mainland Tanzania, the 1988 census demarcated villages in the rural areas and wards in the urban areas into Enumeration Areas (EAs). However, in the Islands, branches were demarcated into EAs.

Urban EAs in Mainland Tanzania and all EAs on Zanzibar had around 400 people, whereas rural EAs in Mainland Tanzania had approximately 800 people.

In the first stage, enumeration areas were selected. With the exception of Dar es Salaam, for which 29 clusters (EAs) were selected, 15 or 16 EAs were selected for each Mainland region. Zanzibar and Pemba Islands shared a total of 30 EAs together.

A list of heads of households for each selected EA was prepared. These lists of heads of households were used for the second sampling stage. For each rural EA, an average of 30 households was selected for the female questionnaire, whereas in the urban areas 20 households were selected. In both rural and urban areas, one household out of every four of the selected households was selected for the additional male questionnaire.

1.3 CHARACTERISTICS OF RESPONDENTS

The Questionnaire and the Content of the Interview Schedule

In the 1991/92 TDHS, four types of questionnaires were used:

i) The *Service Availability Questionnaire* was used to collect data on the characteristics of the community and the availability of family planning and maternal and child health care (MCH) services.

ii) The *Household Questionnaire* was used to enumerate all usual members of the household. This questionnaire provided information on age, sex and relationship to the head of the household, as well as educational attainment for all household members. Other information collected using the household questionnaire includes source of water, sanitation facilities and availability of electricity. The information recorded on the household questionnaire was used to identify the eligible respondents for the individual interviews.

iii) The *Female Individual Questionnaire* was used to collect information on the respondent's background, her birth history, knowledge and use of contraception, maternal care and breastfeeding, immunisation and health care of children, marriage, AIDS, fertility preferences, husband's background,women's employment, as well as maternal and child anthropometry.

iv) The *Male Individual Questionnaire* was similar to that of the Female Individual Questionnaire but excluded the birth history and maternal and child health sections. A module on condom knowledge and use was included in this questionnaire.

The Respondents and the Enumerators

As mentioned above, the eligible respondents were identified from the household questionnaire. All women aged 15-49 who spent the night in the household the night before the interview, and, in one-quarter of the households, all men aged between 15 and 60 who spent the night in the household on the night before the interview, were considered eligible.

Nurses were chosen as enumerators because the implementing organisation felt that respondents trusted nurses and would provide the fullest cooperation to such enumerators. Female nurses interviewed female respondents and male nurses interviewed male respondents.

2 Data Quality

Before beginning data analysis it is important to evaluate the quality of the data collected. A key variable in the analysis of data quality is age. This is due to the fact that many demographic analyses depend to a large extent on the accuracy of age reporting. For instance, any information on economic activity, pregnancy history and contraceptive use is asked of individuals whose ages are above a certain age limit.

In societies where ages and dates are not required in daily life, individuals may have little idea of their own ages. This is most likely to occur among those with low levels of education. In the 1991/92 TDHS, respondents were asked to report their birth dates (year and month) and ages in completed years.

When the respondent failed to give either her birth date or her age, the interviewer was instructed to probe and to try to estimate the respondent's age in relation to national events, other members of the household, the date of the respondent's first marriage or first birth, or in any other way that would have been plausible. This procedure can lead to measurement error when the interviewer estimates the respondent's age on the basis of physical appearance, as this is sometimes influenced by both the respondent's as well as interviewer's background. Respondents were also asked to give the birth dates (i.e., month and year) and age for each surviving child and a birth date and age at death for each child who had died. Correct birth date information at the data collection stage would have ensured that the health and anthropometry information was collected for all children younger than the cut off date (January 1, 1986).

2.1 EXTENT OF HEAPING

A number of methods have been proposed by demographers to evaluate the quality of age data. Several of these methods are used here to assess the 1991/92 TDHS data. One of them is to examine the single-year age distribution of the respondents for the urban and rural areas. Figure 2.1 shows the percent distribution of female respondents by single years of age.

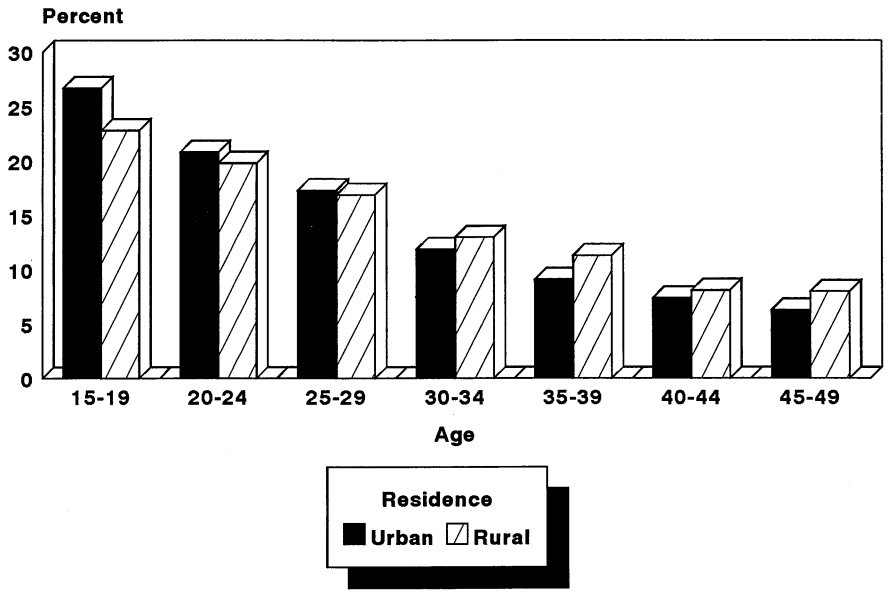
A common feature of age distributions is heaping at ages ending with 0 or 5 and to some extent those ending in even numbers. From the figure it can be observed that the Tanzanian data are not very different from other developing countries' data. The distribution is similar to the 1988 census data (Planning Commission, 1991).

The only exception to this trend is found in urban areas where the peak is observed at age 19. There are no specific reasons as to why there should be a heaping at age 19. By grouping the single-year ages into five-year age groups (Figure 2.2), the age distortions are greatly reduced.

Figure 2.1
Single-Year Age Distribution of Women by Residence

TDHS 1991/92

Figure 2.2
Grouped Age Distribution of Women by Residence



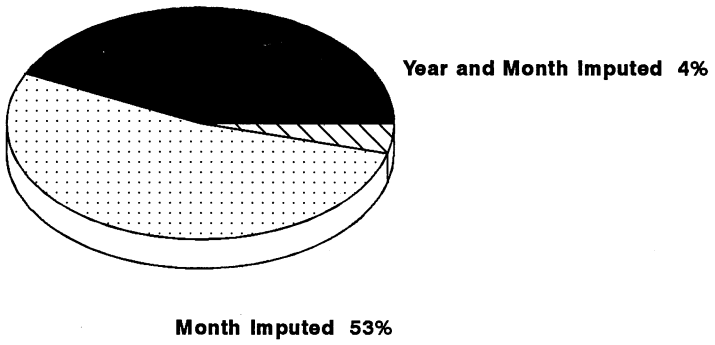
TDHS 1991/92

2.2 COMPLETENESS OF REPORTING

The second method used in evaluating the TDHS data is to examine the percent of respondents who were able to report complete birth dates and ages for themselves and their children. When complete information on year and month of birth was not reported, the dates were assigned by imputation. Figures 2.3 and 2.4 give the distribution of birth date reporting for the respondents and their children, respectively.

As shown in Figure 2.3, only 43 percent of all respondents were able to report both the month and the year of their birth dates, while about 53 percent were able to report only the year of their birth. In these cases the month of birth was imputed. About 4 percent of the respondents could report neither the month nor the year of their birth and their date of birth was imputed on the basis of the information in the questionnaire.

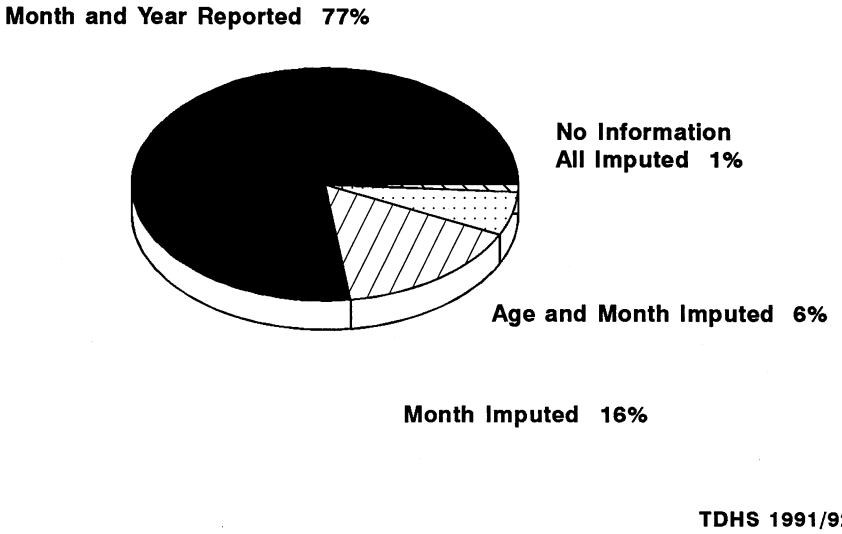
Figure 2.3
Completeness of Information on Respondent's Date of Birth



TDHS 1991/92

On the other hand, respondents were able to report both the month and the year of birth for about 77 percent of the children (Figure 2.4). For 16 percent of the children the respondents could report only the year and age, while for 6 percent they could only report the year of birth. The respondents could not report the birth date for only 1 percent of the children.

Figure 2.4
Completeness of Information on Children's Date of Birth



Comparing birth date reporting for children with other neighbouring countries from East and Southern Africa, for which the DHS data are available, it is found that the reporting in Tanzania is not as good as that of other countries, as there is still around 23 percent of children whose birth dates were not completely reported (Table 2.1).

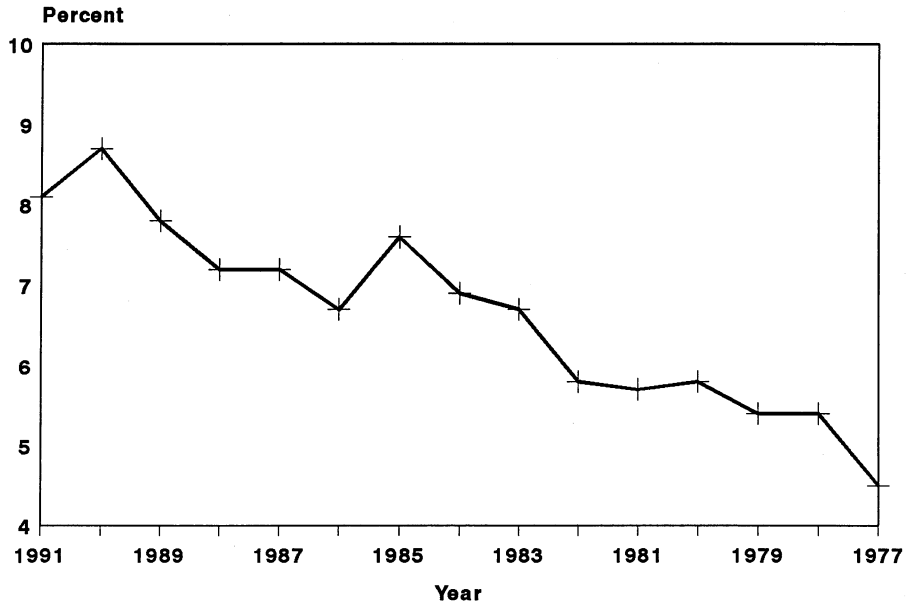
Table 2.1 Percent distribution of children born to survey respondents by completeness of information on date of birth and age of children, Tanzania 1991/92

Country	No imputation	Year and month reported	Year reported Month imputed	Age reported Year and month imputed	Year, age, and month imputed
Botswana	96.3	2.6	0.3	0.1	0.7
Burundi	78.6	13.7	7.4	a	0.2
Kenya	96.2	0.8	2.4	0.3	0.3
Tanzania	77.1	16.0	6.1	0.2	0.6
Uganda	99.9	a	a	a	a
Zimbabwe	99.4	0.1	0.2	0.1	0.2

a: Less than 0.05 percent
Source: DHS, Methodological Report 1, 1990.

On checking the quality of the reported births, it was important to look at the percentage distribution of births reported for the past 15 years (Figure 2.5). The figure shows that the births in 1985 appear to be over-reported. There is a possibility that some of the interviewers tended to push out some of the 1986 births to 1985 so as to avoid asking questions related to the health status of the children born between January 1986 and the date of interview. This type of displacement of births in time has been found to be severe in the majority of African DHS survey countries, especially in Botswana, Burundi, Liberia, Mali and Togo (Arnold and Blanc, 1990).

Figure 2.5
Percent of Births by Calender Year



3 Fertility Levels and Trends

Assessment of fertility trends is one of the most important objectives of demographic surveys. Since a decline in fertility is the primary goal of most national planning programs, reliable data on the current level of fertility, as well as past levels, are critical for monitoring change (Arnold and Blanc, 1990). In this section, the levels and trends of fertility are examined in relation to the socioeconomic characteristics of the population.

With respect to the fertility data from the TDHS, each respondent was asked for information on her age, her birth history, and the dates of birth of her children. Fertility rates are calculated from this information.

3.1 LEVELS AND PATTERNS AND TRENDS

Age-specific fertility rates (ASFRs) and the total fertility rate (TFR) measure the current levels and patterns of fertility in Tanzania. The TFR is the average number of births a woman would have at the end of her reproductive period if she experiences the age-specific fertility rates prevailing during a given period. Table 3.1 gives the ASFRs and the TFRs for Tanzania for the periods 0-3, 4-7 and 8-12 years prior to the survey.

Table 3.1 Age-specific fertility rates and total fertility rates for Tanzania for specific periods before the survey, Tanzania 1991/92

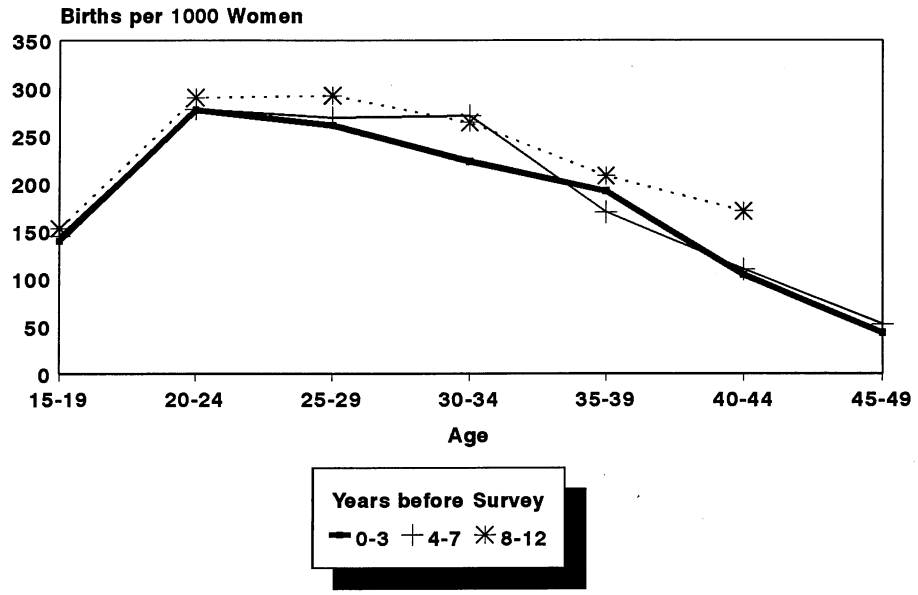
	Age-specific fertility rates (per 1000 women)		
Age group	0-3 years prior to survey	4-7 years prior to survey	8-12 years prior to survey
15-19	139	146	153
20-24	277	278	290
25-29	261	269	292
30-34	223	271	264
35-39	192	170	208
40-44	104	110	171
45-49	43	51	-
TFR	6.2	6.5	6.2*

* The rate is for women aged 15-44. There was no exposure for women aged 45-49 in the period 8-12 years before the survey.

From Table 3.1, it can be observed that there has been a decline in the level of fertility between the two most recent periods. However, the fact that fertility varies with age makes it important to look at the age pattern of fertility between the two periods. Figure 3.1 gives the age pattern of fertility for Tanzania for the periods 0-3, 4-7, 8-12 years prior to the survey.

Figure 3.1 shows that during the 0-3 year period prior to the survey, the level of fertility reached its maximum at age 20-24, compared with ages 20-34 and 25-29 in the periods 4-7 and 8-12 years prior to the survey, respectively. This suggests that women aged 25-29 and 30-34 may be starting to control their fertility.

Figure 3.1
Age-Specific Fertility Rates for Specific Periods Prior to the Survey



TDHS 1991/92

4 Fertility Differentials

Many studies have documented differentials in fertility between urban and rural dwellers and between women with different levels of education. Each of these factors is considered below.

4.1 URBAN-RURAL DIFFERENTIALS

About 75 percent of the respondents live in rural areas. Table 4.1 gives the urban-rural TFRs for the two four-year periods prior to the survey and shows that fertility in urban areas is lower than in rural areas.

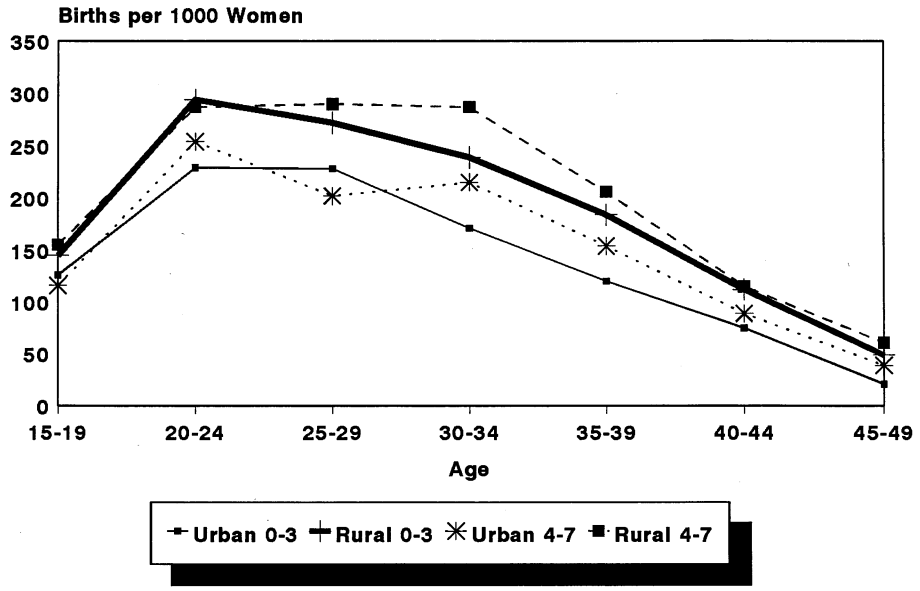
Table 4.1 Total fertility rates by residence, Tanzania 1991/92

Residence	0-3 years	4-7 years
Urban	4.85	5.34
Rural	6.48	7.01

Furthermore, there has been a decline between the periods 4-7 and 0-3 years prior to the survey. This decline occurred both in the rural and urban areas of the country (from TFR=7.0 to TFR=6.5 in rural areas; from TFR=5.3 to TFR=4.9 in urban areas). This is supported by Figure 4.1, which shows the age pattern of fertility for the rural and urban areas of Tanzania for the two periods.

In the figure below it can be observed that the decline is more pronounced in the age groups 25-29 and 30-34. This decline may be attributed to the fact that these women are more aware of family planning and some of them may actually be practising it. In addition, the programme encourages family planning for spacing and women in these age groups may have the greatest interest in spacing.

Figure 4.1
Age-Specific Fertility Rates by Residence for Specific Periods Prior to the Survey



TDHS 1991/92

4.2 EDUCATIONAL DIFFERENTIALS

Most previous studies in Tanzania and elsewhere show that fertility is inversely related to level of education. The formal educational system in Tanzania starts with seven years of primary education, followed by six years of secondary education (four years of ordinary level and two years of advanced level). At the tertiary level, the University of Dar es Salaam and the Sokoine University of Agriculture offer three- and four-year degree courses, post graduate diplomas, masters and doctorate degrees in a number of subjects. Various post secondary courses are also offered in a number of colleges. The nonformal education includes adult education classes. For the purpose of studying educational differentials in fertility, three educational groups were considered: those with no formal education, those with primary education and those with secondary or higher education. This grouping was necessitated by the fact that the number of respondents with education beyond secondary levels was not large enough to be able to draw reliable conclusions. Table 4.2 gives the levels of fertility in the periods 0-3 and 4-7 years prior to the survey for educational groups.

Table 4.2 shows that there are substantial differences in fertility levels between educational groups, particularly between women with secondary education and those who have only primary or no formal education. Fertility has declined among all educational groups. However, the decline in fertility for those with primary education or less is smaller than for women with secondary or higher education.

Table 4.2 Total fertility rates by woman's education, Tanzania 1991/92

Education	0-3 years	4-7 years	n
No education	6.35	6.82	3089
Primary	6.14	6.47	5605
Secondary/Higher	4.00	5.31	483

4.3 REGIONAL DIFFERENTIALS

Table 4.3 gives the level of fertility (in descending order for the period 0-3 years prior to the survey) in different regions in the country for the periods 0-3 and 4-7 years before the survey. For the purpose of analyzing fertility in these regions, areas in Pemba and Unguja were grouped to form two regions (this is due to the small sample size, which did not allow for the presentation of all five regions in the Islands separately).

In the eight years before the survey, fertility declined considerably in some regions, but in others there was either a small or nonexistent decline. Among the regions which showed a considerable decline are Pemba, Tanga, Lindi, Tabora, Coast, Mbeya, Dar es Salaam and Mtwara. A slight decrease in fertility is observed in Kigoma, Arusha, Iringa, Ruvuma, and Kilimanjaro. The rest of the regions showed no decline or even a slight increase in fertility between the two periods. The observed differences in the levels in fertility between the regions may partly be attributed to the socioeconomic differences that exist between different regions in the country. Figure 4.2 reveals the regional fertility differences. It is interesting to note that the regions with lower fertility 4-7 years before the survey were more likely to have declined in the recent past than high-fertility regions.

Table 4.3 Total fertility rates by region, Tanzania 1991/92

Region	0-3 years	4-7 years
Shinyanga	7.4	7.0
Rukwa	7.3	7.2
Pemba	7.2	8.4
Dodoma	7.0	6.6
Kigoma	6.9	7.0
Singida	6.7	6.6
Mwanza	6.6	6.6
Arusha	6.5	6.9
Mara	6.5	6.5
Kagera	6.4	6.2
Morogoro	6.4	6.0
Unguja	6.3	5.4
Tanga	6.2	6.9
Lindi	6.0	6.8
Iringa	6.0	6.3
Ruvuma	5.8	6.1
Tabora	5.7	6.3
Coast	5.5	6.1
Kilimanjaro	5.4	5.8
Mbeya	5.3	6.1
Dar es Salaam	4.1	5.1
Mtwara	3.9	4.6

4.4 PARITY PROGRESSION RATIOS:

Parity Progression Ratios (PPRs) are another useful indicator of fertility trends. They are the proportion of women at parity i who go on to have an $(i+1)^{th}$ birth. Compared with other methods of estimating fertility, this method may be better, since it does not rely very much on age, which in many cases is not correctly reported by women. This method is best when age reporting is particularly poor.

Figure 4.2
Total Fertility Rates by Region

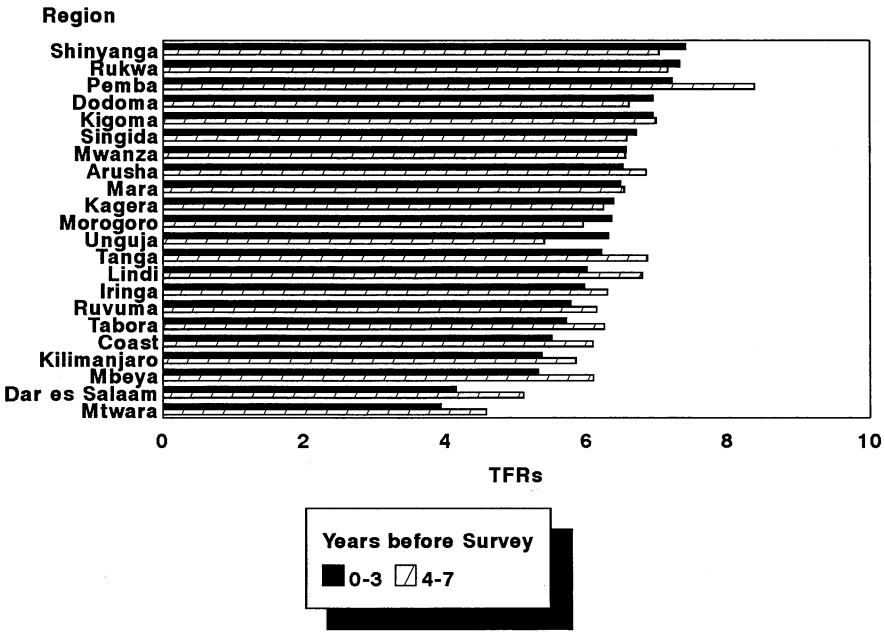


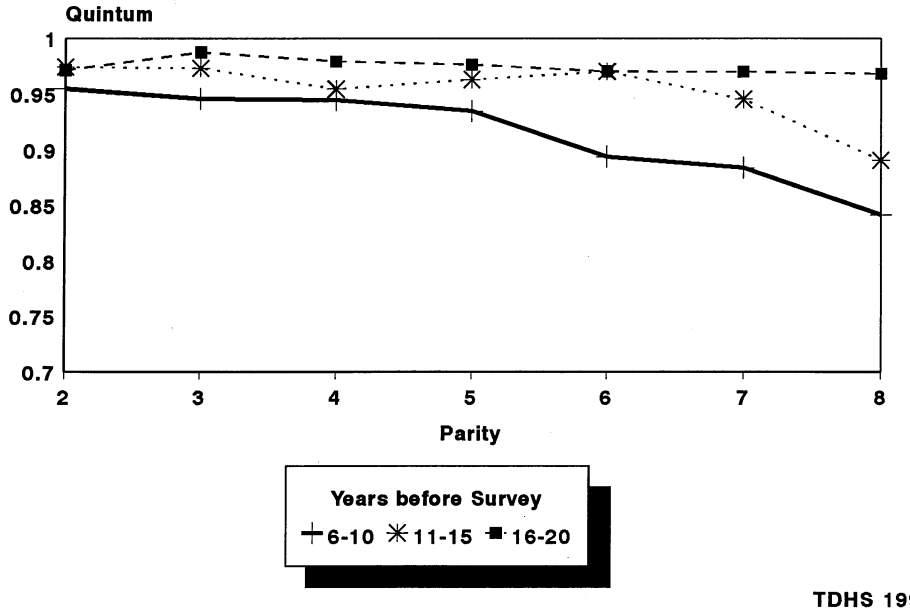
Figure 4.3 shows PPRs calculated for births at parity *i* which took place in three different periods prior to the survey (6-10 years, 11-15 years and 16-20 years). The PPRs provide further evidence that fertility has been declining over the last fifteen years in Tanzania.

The decline is most evident after parity 5. It seems that women, rather than first having many children and then deciding to limit further births, are spacing their births out over a longer period and reaching the natural end of their childbearing years at lower parities than in the past.

Figures 4.4 and 4.5 show the PPRs for urban and rural areas, respectively. These show the same pattern of declining fertility over time as for the nation as a whole. It is difficult to interpret the PPRs for women in urban areas at the time of the survey. Many of these women are migrants to the urban areas, particularly Dar es Salaam, and their fertility behaviour in the past is a mix of rural norms (though affected by the fact that these women had characteristics which led them to migrate), urban influences and upheavals associated with migration.

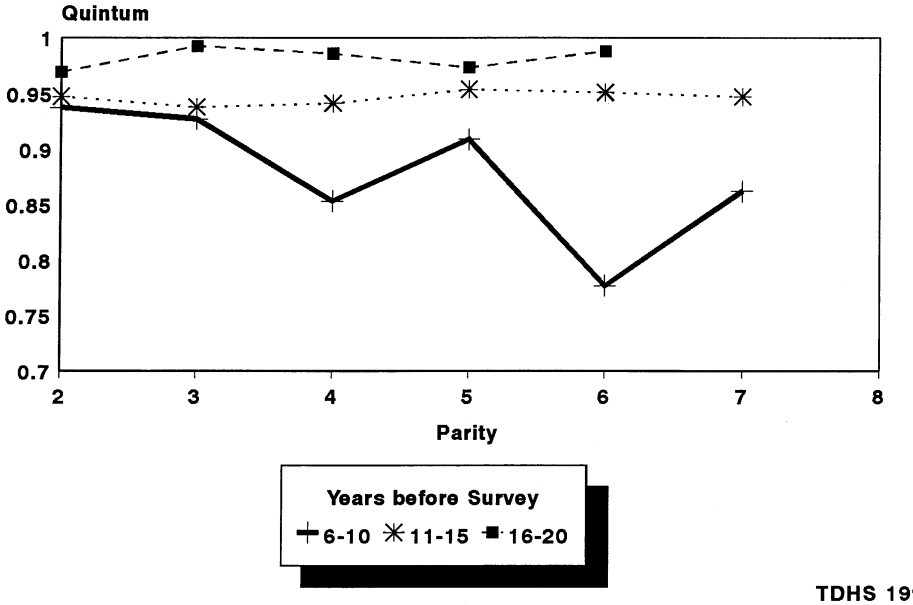
The PPRs for the rural areas show the beginning of a decline above parity 7 about 11-15 years ago and evidence of decline at parities 5 and 6 in the period 6-10 years ago.

Figure 4.3
Parity Progression Ratios for Specific Periods Prior to the Survey



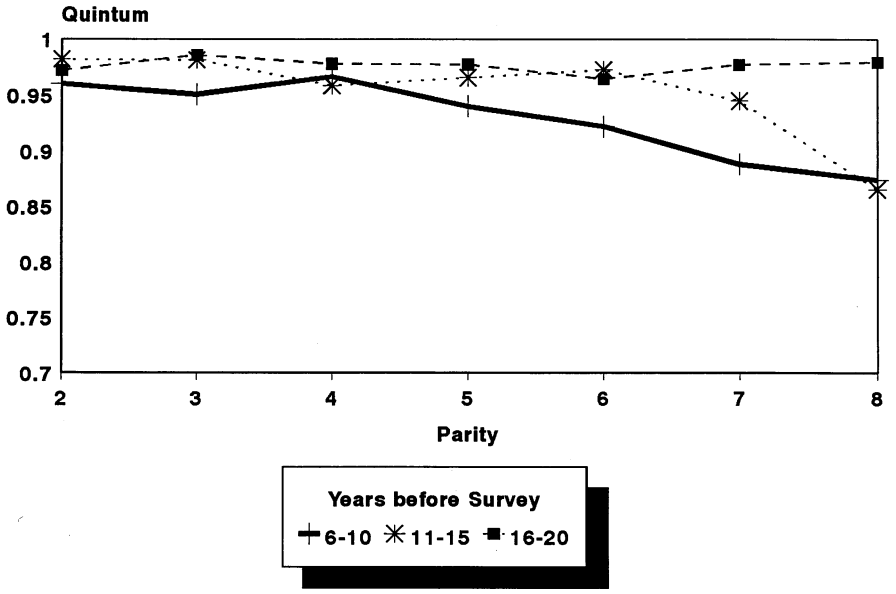
TDHS 1991/92

Figure 4.4
Parity Progression Ratios for Specific Periods Prior to the Survey Urban Tanzania



TDHS 1991/92

Figure 4.5
Parity Progression Ratios for Specific Periods Prior to the Survey Rural Tanzania



TDHS 1991/92

5 Proximate Determinants of Fertility

In many societies the socioeconomic factors which influence fertility act through a set of intermediate variables known as proximate determinants. These proximate determinants of fertility can be defined as the biological and behavioral factors that affect fertility directly. Davis and Blake (1956) grouped these factors into three broad groups, each with its own subgroups. These include: i) Factors affecting exposure to intercourse, ii) Factors affecting exposure to conception, and iii) Factors affecting gestation and successful parturition.

I Factors Affecting Exposure to Intercourse:

Included in this group are factors which govern the formation and dissolution of unions (i.e., *age of entry into sexual unions, permanent celibacy and the amount of reproductive period spent after or between unions*) and those factors which govern the exposure to intercourse within unions (i.e., *voluntary/involuntary abstinence and coital frequency*).

II Factors Affecting Exposure to Conception:

These include fecundity or infecundity as affected by involuntary causes, use or nonuse of contraception and fecundity or infecundity as affected by voluntary causes (i.e., sterilisation, medical treatment).

III Factors Affecting Gestation and Successful Parturition:

The factors included in this group are fetal mortality and spontaneous or induced abortion.

5.1 ESTIMATES OF BONGAARTS' MODEL

Bongaarts (1978) grouped Davis and Blake's variables into four major groups. These he termed as the Proximate Determinants of Fertility. The groups were as follows: i) Marriage, ii) Contraception, iii) Abortion, and iv) Postpartum infecundability. He developed a model for decomposing total fertility rates whereby:

$$TFR = TF \times C_i \times C_c \times C_a \times C_m$$

where TF is the total fecundity (approximated at 15.3)
C_i is the index of postpartum infecundability
C_c is the index of contraception
C_a is the index of abortion
C_m is the index of marriage

These indices vary from 0 to 1, depending on the extent to which fertility is reduced by a particular variable. When an index is equal to 1 it means that a particular variable has no effect on fertility reduction in that setting.

5.2 DIFFERENTIALS IN PROXIMATE DETERMINANTS

In the TDHS, information on age of the respondent, her marital status, her age at marriage, contraceptive knowledge and practice, duration of amenorrhea and postpartum abstinence, as well as other information were collected. Information on abortion was not collected in Tanzania where abortion is illegal except when it is performed on medical grounds. Experience has shown that abortions are severely under-reported under such conditions. The above information was used in estimating the levels of fertility in different social settings using Bongaarts' model. The results were as follows:

Table 5.1 Observed and implied differentials in TFRs using Bongaarts' model, Tanzania 1991/92

	Observed TFR	Implied TFR[1]	C_i	C_c	C_m	i^2
Tanzania	6.2	5.06	0.59	0.89	0.63	15.39
Region of residence						
Urban	4.85	4.37	0.63	0.84	0.54	13.20
Rural	6.48	5.31	0.58	0.92	0.65	15.91
Education						
No Education	6.36	6.20	0.57	0.96	0.74	16.49
Primary	6.14	4.87	0.60	0.87	0.61	15.05
Secondary/Higher	4.00	2.17	0.71	0.57	0.35	9.66

[1] Calculated using the Bongaarts Model
[2] The mean duration of insusceptibility

From Table 5.1 it can be observed that the implied TFRs (calculated using Bongaarts' model) are low compared with the observed TFRs. In calculating the index of marriage, ever married women were considered instead of currently married women, because when currently married were used to calculate C_m, the implied TFRs were very low.

Table 5.1 shows the relative effects of the proximate determinants on fertility levels in Tanzania. The values of C_m and C_i, the indices of marriage and breastfeeding, are lower than the index of contraception (C_c), indicating that they have a higher effect on reducing fertility compared with contraception. In Tanzania marriage is almost universal (according to the 1988 census) and breastfeeding is wide-spread. The higher value of C_m in rural as opposed to urban areas is an indicator of earlier marriage in the rural areas. In the rural areas the singulate mean age at marriage is 20, compared with age 22 in urban areas (see Table 5.2).

With regard to contraception, Table 5.1 shows that the fertility reduction from the use of contraception in Tanzania is small. This is evident from the high values of C_c. An exception is women with secondary education among whom use of contraception has a larger impact on fertility than the duration of postpartum infecundability. Section 6 further discusses this result.

The differences observed in the mean duration of insusceptibility, "i" (resulting from women being either amenorrheic or abstaining), are the result of the differences in breastfeeding and postpartum abstinence among women with different socioeconomic backgrounds. Tanzania's mean duration of insusceptibility of 15.4 months is slightly longer than neighbours Uganda, Zambia, Zimbabwe and Kenya (with mean durations of 13, 13, 12 and 11, respectively). The long mean duration of insusceptibility in Tanzania is due to prolonged breastfeeding.

Table 5.2 Singulate mean age at marriage/birth

	1978			1988		
	Total	Urban	Rural	Total	Urban	Rural
SMAM[1]	19.2	19.6	19.1	20.6	22.1	20.1
SMAB[2]	21.4	22.7	21.3	23.2	24.6	22.8

1 Singulate Mean Age at First Marriage
2 Singulate Mean Age at First Birth
Source: 1988 Population Census Initial Analysis.

6 Fertility Regulation and Reproductive Preferences

Family planning activities in Tanzania were started in 1959 by the Family Planning Association of Tanzania (UMATI) and were later incorporated into the Ministry of Health (MoH) in 1974. The Family Planning Unit (FPU) in the MoH is mandated by the Government to coordinate and oversee all family planning and related activities taking place in Tanzania. According to a paper presented to the Family Planning Participating Agencies' Meeting held in Morogoro, Tanzania, in February 1992 (Family Planning Unit, Ministry of Health), all regional and district hospitals, 50 percent of dispensaries, and all health centres have been given Maternal and Child Health (MCH) equipment. These include basic equipment for sterilisation, for screening some of the risk factors, and for IUD insertion. According to the 1991

Annual Report and Plans for 1992 for the MoH, there are 3,370 health facilities in Tanzania, out of which 3,151 have MCH facilities and 2,445 of them (about 72 percent) are equipped with family planning facilities. However, as of present, use of family planning is not very widely spread in Tanzania (the prevalence is about 10 percent). The reasons behind this can be attributed to, among other things, the fact that many Tanzanians consider children to be future assets, as well as the difficulty associated with obtaining the methods in some of the rural areas. In addition, family planning availability through the programme has only recently increased.

6.1 CONTRACEPTIVE PREVALENCE

Table 6.1 shows that the overall contraceptive prevalence in Tanzania is only about 10 percent. A comparison between the urban and rural areas reveals that prevalence is higher in urban areas (13 percent) than in rural areas (6 percent). These differences can be attributed, among other things, to the urban social setting, which is more conducive for family planning purposes, as well as the better availability of contraceptives. Moreover, most of the urban women have received at least some education, which may make them more receptive to family planning.

Table 6.1 Percent distribution of women currently using contraception by method, according to residence and education, Tanzania 1991/92

				Educational attainment		
Method	Total	Urban	Rural	No education	Primary	Secondary/ Higher
Number of women	882	542	341	139	628	115
All methods	9.6	12.8	6.3	4.5	11.2	23.8
Pill	2.9	6.2	1.8	0.8	3.6	8.0
IUD	0.4	0.9	0.2	0.0	0.4	2.5
Injection	0.2	0.4	0.2	0.3	0.2	0.1
Diaphragm/foam/ jelly	0.0	0.0	0.0	0.0	0.0	0.0
Condom	0.6	1.1	0.5	0.1	0.8	1.9
Female sterilisation	1.6	1.7	1.6	1.2	1.8	2.2
Male sterilisation	0.0	0.0	0.0	0.1	0.0	0.0
Rhythm	1.6	2.8	1.7	1.0	2.0	8.1
Withdrawal	2.0	0.9	1.4	0.6	1.7	0.8
Other traditional	0.5	0.6	0.5	0.4	0.6	0.3
Not currently using	90.4	85.5	92.1	95.5	88.8	76.2

Table 6.1 also shows that women with secondary and higher education have a higher prevalence of contraceptive use (about 24 percent) than their counterparts (11 percent for those with primary education and 5 percent for those with no education). The reasons behind these discrepancies may be that educated women are more informed on contraception than those with no education. The pill and rhythm are the most popular methods among those with primary and higher education.

Table 6.2 Percent distribution of women currently using contraception by method and age group, Tanzania 1991/92

	Age group						
Method	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Number of women using	78	191	177	154	146	82	55
All methods	3.6	10.4	11.3	13.1	14.7	11.2	7.9
Pill	0.6	3.7	5.1	5.4	3.8	0.8	0.0
IUD	0.0	0.2	0.3	0.5	1.4	0.5	0.4
Injection	0.0	0.1	0.1	0.2	0.6	1.0	0.5
Diaphragm/ foam/jelly	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Condom	0.4	1.1	0.2	1.4	0.5	0.3	0.1
Female sterilisation	0.0	0.3	0.4	1.3	5.5	5.4	4.1
Male sterilisation	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Rhythm	1.8	2.9	2.5	2.0	1.2	0.8	1.4
Withdrawal	0.6	1.4	2.0	1.8	1.3	1.7	0.4
Other traditional	0.2	0.7	0.7	0.6	0.6	0.5	0.5
Not currently using	96.4	89.6	88.7	86.9	85.3	88.9	92.0

Table 6.2 presents contraceptive prevalence for women by method and age. The most popular methods are the pill and female sterilisation. The pill is most popular among women between ages 20 and 34. Above age 35, sterilisation is the most used method. The popularity of the pill may be due to its easy availability in the Maternal and Child Health Care (MCH) clinics, as well as the fact that it has been available for a longer period compared with the other methods. As for female sterilisation, its popularity in the older ages may be due to the fact that these women have achieved their desired family sizes, and as such they are interested in a permanent method of family planning. It is important to note that use of family planning is most common among women aged 35-39, which is the same group of women for which fertility was noted to be decreasing the most.

Table 6.3 Contraceptive prevalence by method and marital status, Tanzania 1991/92

Method	Marital status			Total
	Never married	Married/living together	Formerly married	
Number of women	139	628	115	882
All methods	5.9	10.6	12.1	9.6
Pill	1.3	3.3	4.1	2.9
IUD	0.2	0.5	0.1	0.4
Injection	0.1	0.3	0.3	0.2
Diaphragm/foam/jelly	0.0	0.0	0.0	0.0
Condom	0.6	0.6	0.9	0.6
Female sterilisation	0.1	1.8	4.4	1.6
Male sterilisation	0.0	0.0	0.0	0.0
Rhythm	3.3	1.6	1.5	2.0
Withdrawal	0.2	1.9	0.0	1.3
Other traditional	0.1	0.6	0.7	0.5
Not currently using	94.1	89.4	87.9	90.4

Turning to marital status (Table 6.3), the most popular method for married women is the pill, followed by withdrawal and then female sterilisation. Only a small proportion of never married women (5.9 percent) reported using contraception. The majority who were using reported their current method was rhythm.

As for the formerly married, the most popular method is female sterilisation, followed by the pill. The high sterilisation prevalence for the formerly married women is not surprising because most of them are above age 35. Furthermore, women would not be ready to have children out of wedlock so they may prefer a more permanent method of family planning.

The number of children a woman has may influence her decision to have more children. Therefore it is necessary to look at contraceptive prevalence by the number of living children (see Table 6.4).

Table 6.4 Current contraceptive users by method and number of living children, Tanzania 1991/92

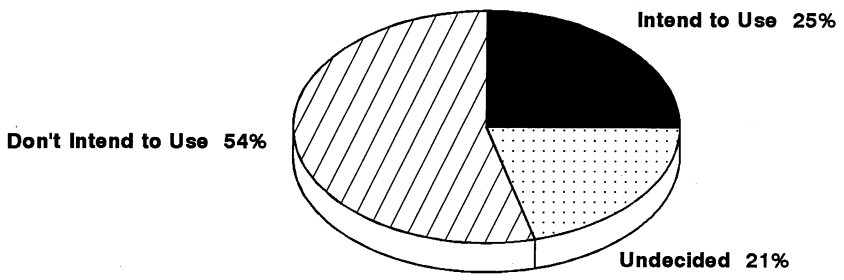
Method	Number of living children								
	0	1	2	3	4	5	6	7	8+
Number of women	75	149	145	104	84	85	69	72	99
All methods	3.2	10.9	12.8	11.5	11.5	12.4	12.0	15.5	10.2
Pill	0.2	4.4	5.5	3.1	4.2	5.2	4.8	2.5	0.6
IUD	0.1	0.0	0.4	1.2	0.6	0.4	0.4	0.7	0.4
Injection	0.0	0.1	0.1	0.0	0.1	0.4	0.6	0.7	1.0
Diaphragm/foam/ jelly	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Condom	0.4	0.8	1.4	0.7	0.3	0.3	1.1	1.0	0.0
Female sterilisation	0.1	1.1	0.4	2.2	1.4	2.5	1.1	5.0	5.2
Male sterilisation	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
Rhythm	2.3	2.9	1.8	2.0	1.5	1.4	1.4	3.1	0.9
Withdrawal	0.1	1.2	2.2	1.5	2.4	1.7	2.4	1.8	1.0
Other traditional	0.0	0.4	0.9	0.9	0.8	0.4	0.3	0.8	0.9
Not currently using	96.8	89.1	87.2	88.5	88.4	87.6	87.9	84.5	89.8

The proportion of women using contraceptives is relatively constant among women with at least one living child. With regard to female sterilisation, the prevalence is highest for women with seven or more children, implying that most women choose to be sterilised after attaining a completed family size of at least 7 children.

The preceding discussion has focused on use of contraception. However, it is important in Tanzania always to remember that prevalence is very low. This low contraceptive prevalence requires that one look at the intentions of the noncontraceptive users (shown in Figure 6.1).

The figure shows that only about 25 percent of the nonusers intend to use contraceptives in the future. About 54 percent have no intention of using contraceptives, while 21 percent of the nonusers are still undecided. When asked about the reasons for not using contraceptives, the majority of the nonusers said they still want more children. Only a small proportion reported opposition from partners or their religion as deciding factors against using contraception.

Figure 6.1
Intention to Use Contraception
Among Women Not Currently Using



TDHS 1991/92

7 Multivariate Analysis

A multivariate analysis of three dependent variables, described below, is used to assess the socioeconomic factors which most influence fertility. The dependent variables are 1) whether or not a woman had a birth in the three years before the survey, 2) whether she has ever used contraception, and 3) whether she was married before age twenty (for the subset of women currently above age 20). These variables are, respectively, one index of current fertility and two factors which influence fertility. Because the dependent variables are dichotomous, logistic regression is necessary to estimate the effects of the independent variables. The independent variables included in the models were region, urban or rural residence, level of education, occupation, age and parity. These factors are the most common variables that affect fertility through the proximate determinants.

7.1 GROUPING OF REGIONS

In the above analyses, Tanzania was divided into over 20 separate regions. Unfortunately, in some regions, because contraceptive prevalence is low, sample size is unacceptably low for multivariate analysis. Hence, it is necessary to form groups of regions for analytic purposes. Hierarchical cluster analysis on thirteen variables for the 21 regions (Zanzibar and Pemba are treated as one region) yielded five groups. Appendix 1 shows the variables and resulting groups.

The cluster analysis approach, with some supplementary data exploration, ensures a robust final grouping.

The regions which form Group(1) have a number of similar characteristics. First, the mean duration of breastfeeding for all regions in Group(1) is around 20 months, while the percentage of women marrying before age twenty is above 65 percent. In addition their mean age at last birth lies between 34 and 36 years. Moreover, Dodoma, Tabora and Kigoma are located on the main route used by the slave traders in the past and similar customs of the slave traders were adopted by the residents in those regions. The similarity with Zanzibar lies in the fact that the main slave market was located there.

The main economic activity in Mwanza, Shinyanga and Mara (three out of the four regions which form Group(2)) is livestock keeping. Most of the residents of Mwanza and Shinyanga belong to one tribe, the Wasukuma. The fact that Shinyanga, Mwanza and Mara border each other (Lake Zone), further increases the possibilities of them being similar. The similarity with Rukwa may stem from the fact that small scale mining is found in all the four regions.

In all regions which form Group(3) the similarities are mostly found in the proximate determinants of fertility and fertility. These include mean duration of breastfeeding which is higher than some of the other groups (between 20 and 22 months), a high percentage of women marrying below age twenty (all are above 65 percent) and their mean age at last birth lies between 35 and 37 years. In addition, Coast region borders Lindi and Morogoro regions. Morogoro, Ruvuma and Mbeya depend very much on agriculture, whereas Lindi and Coast depend on both agriculture and fishing.

Dar es Salaam and Mtwara (which form Group(4)) were grouped together because they both have very low fertility. The low fertility in Dar es Salaam is expected as most of it is urban. As for Mtwara, there are three factors which might have contributed to the low fertility in that region. One, the mean duration of abstinence is the highest in the country (around 21 months). Second, the percentage of women age 40 and above who had never had a birth is the highest in the country (around 10 percent). Finally, the fertility in the peak childbearing ages (20-34 years) is the lowest.

Regions that form Group(5) have the lowest teenage fertility in the country except for that of Dar es Salaam. In addition, the percentage of women aged 20 and above married in their teens is among the lowest in the country. The highest percentages of the ever-use of contraception was found in Kilimanjaro and Arusha regions which are also found in Group(5).

Table 7.1 presents the summary statistics for the independent variables used in the models predicting births in the last three years and the ever-use of contraceptives. Grouping of the occupation variable into agriculture and non-agriculture was done mainly because 92 percent of women in Tanzania work in the agricultural sector (1988 Census Initial Analysis). The unpaid family worker category includes all those who reported to be houseworkers, students and those who worked but did not receive any form of payment.

Table 7.1 Summary statistics for independent variables for predictive models of births in the last three years and ever-use of contraceptives

Variable	Proportion in category	n
Constant	1.00	
Region		
Group (1)	.19	1708
Group (2)	.25	2280
Group (3)	.21	1962
Group (4)	.09	846
Group (5)	.26	2350
Education		
No formal education	.35	3222
Primary	.60	5488
Secondary/Higher	.05	436
Occupation		
Unpaid family workers	.33	3028
Agricultural workers	.49	4488
Non-agricultural workers	.17	1587
Not employed	.01	43
Residence		
Urban	.20	1790
Rural	.80	7356
Parity		
0-2	.52	4775
3-5	.25	2313
6+	.23	20
Mean age of respondent	31.25	

7.2 BIRTH IN THE LAST 36 MONTHS

Table 7.2 presents the results of the regression of the probability of a birth in the last 36 months against the independent variables. For each independent variable, the table shows the estimated beta coefficient, the probability of outcome, and whether the independent variable was significantly different from the reference category at the 5% level. The probability of outcome column is designed to communicate the implications of being in a particular category of the independent variable. The other independent variables are held at their mean values, so that comparisons from category to category are possible.

Table 7.2 Regression coefficients and estimated probabilities of outcome for dependent variable: birth in the last 36 months

Variable	b	Probability of outcome	Significant?
Constant	-8.42		*
Region			
Group (1)	0	.49	
Group (2)	-.06	.48	
Group (3)	-.13	.46	
Group (4)	-.52	.36	*
Group (5)	-.07	.51	
Education			
No formal education	0	.45	
Primary	.15	.49	*
Secondary/Higher	-.49	.34	*
Occupation			
Unpaid family worker	0	.45	
Agricultural worker	.19	.50	*
Non-agricultural worker	.02	.46	
Not employed	-1.89	.11	*
Residence			
Urban	0	.46	
Rural	.18	.48	*
Parity			
0-2	0	.26	
3-5	1.32	.57	*
6+	2.68	.86	*
Age	.64		*
Age*Age	-.012		
Age (20)		.65	
Age (25)		.74	
Age (30)		.71	
Age (35)		.52	
Age (40)		.21	

Overall, it appears that the strongest effects are due to education and parity. Women with secondary and higher education have a much lower probability of birth than women with secondary and lower education (34 percent compared with about 47 percent). The probability of birth also increases with parity; this relationship is not surprising as high parity women will be more likely to have their births close together, and hence be more likely to have a birth in the 36 month window before the survey.

Women in Region Group (4) have a significantly lower probability of a recent birth than women in the other groups. This is likely due to the fact that Region Group (4) is largely composed of Dar es Salaam, so it may be picking up the urban effect. This also explains the small difference in probability of outcome

between urban and rural residents. There is little difference in birth probability by occupation type. The category "not employed" is difficult to interpret, because it is less than 1 percent of women.

7.3 EVER-USE OF CONTRACEPTION

The probability of ever-use of contraceptives, shown in Table 7.3, is very low for Region Groups (1) and (2), compared with the other region groups. This difference may be due to the UNICEF child survival programmes which are found in most of these regions. These programmes encourage, among other things, long durations of breastfeeding and child spacing, as well as distributing contraceptive information.

Table 7.3 Regression coefficients and estimated probabilities of outcome for dependent variable: ever-use of contraception

Variable	b	Probability of outcome	Significant?
Constant	-8.86		*
Region			
Group (1)	0	.08	
Group (2)	.23	.10	*
Group (3)	.70	.15	*
Group (4)	.73	.16	*
Group (5)	.93	.19	*
Education			
No formal education	0	.07	
Primary	1.14	.18	*
Secondary/Higher	1.63	.26	*
Occupation			
Unpaid family worker	0	.12	
Agricultural worker	.60	.12	
Non-agricultural worker	.65	.20	*
Not employed	.56	.19	
Residence			
Urban	0	.20	
Rural	-.67	.12	*
Parity			
0-2	0	.11	
3-5	.33	.14	*
6+	.54	.17	*
Age	.37		*
Age*Age	-.006		
Age (20)		.11	
Age (25)		.13	
Age (30)		.24	
Age (35)		.26	
Age (40)		.22	

The probability of ever-use rises markedly with increasing education; possibly the more educated have better contraceptive information and access. The non-agricultural workers have higher ever-use than

unpaid family workers: these include wage-sector workers for whom an unintended pregnancy would have relatively high opportunity costs because of lost wages. Lastly, urban dwellers are more likely to have ever used contraception than rural, probably because of easier access to contraceptive and other social services.

7.4 MARRIAGE BEFORE AGE 20

The independent variable of marriage before age 20 required that the model only be estimated on the subset of women who are currently above age 20. It is unknown whether unmarried women currently below age 20 will marry by that age, so including them would introduce a bias. Table 7.4 presents the distribution of the independent variables. Exploratory data analysis suggested that there is a synergistic interaction between region of residence and secondary education that should enter into the model. Consequently, Table 7.4 shows the distribution of respondents on this interaction. Unfortunately, there are few secondary-educated women in Region Groups (2) through (4), so interpretation of the coefficients is difficult.

Table 7.4 Summary statistics for the independent variables to estimate the probability of marriage before age 20

Variable	Percent in category	N
Education and Region		
No formal education	41.3	2862
Primary	54.6	3788
Secondary+ and region group (1)	1.7	119
Secondary+ and region group (2)	.3	21
Secondary+ and region group (3)	.4	25
Secondary+ and region group (4)	.5	38
Secondary+ and region group (5)	1.2	85
Occupation		
Unpaid family worker	28.3	1966
Agricultural worker	52.2	3620
Non-agricultural worker	19.2	1334
Not employed	.3	18
Residence		
Urban	18.8	1306
Rural	81.2	5632
Parity		
0-2	37.1	2572
3-5	33.3	2308
6+	29.7	2058

Irrespective of the region of residence the probability of a woman marrying before age 20 is high for women with no formal or only primary education (Table 7.5). Women with secondary education have a far lower probability of marrying, with the exception of Region Group (1), where their probability of marriage is comparable to lower educated women. This result may be due to the presence of Zanzibar in Region Group (1). Education in Zanzibar is for all from primary to form 3, and women are allowed to marry while still in school.

Table 7.5 Regression coefficients and estimated probabilities of outcome for dependent variable: marriage before age 20

Variable	b	Probability of outcome	Significant?
Constant	5.60		*
Education and Region			
No formal education	0	.80	
Primary	-.70	.66	*
Secondary+ and region group (1)	-.78	.64	*
Secondary+ and region group (2)	-2.31	.28	*
Secondary+ and region group (3)	-2.90	.18	*
Secondary+ and region group (4)	-1.89	.37	*
Secondary+ and region group (5)	-2.96	.17	*
Occupation			
Unpaid family worker	0	.71	
Agricultural worker	.12	.73	
Non-agricultural worker	-.18	.67	
Not employed	-.77	.53	
Residence			
Urban	0	.73	
Rural	-.12	.71	
Parity			
0-2	0	.45	
3-5	1.34	.76	*
6+	2.20	.88	*
Age	-.29		*
Age*Age	.004		
Age (20)		.86	
Age (25)		.77	
Age (30)		.68	
Age (35)		.62	
Age (40)		.59	

8 Conclusion

Fertility in Tanzania has shown a small decline in the recent past. The decline is a sign of a possible start of fertility transition from high fertility to low fertility. The observed decline in fertility may be the result of contraception, although the contraception prevalence in Tanzania is still only about 10.0 percent. Another factor which might have contributed to the decline is an increase in the age at marriage between 1978 and 1988.

Although contraceptive prevalence is low, it differs among different socioeconomic groups. Women living in urban areas have a higher contraceptive prevalence (about 13 percent) than those living in rural areas (about 6 percent). Furthermore, prevalence of contraceptive use increases with higher levels of education. As expected, the prevalence is higher for ever married women, as well as those of high parity. The most popular contraceptive method for the younger women (age group 15-34) is the pill, while for the older ones it is female sterilisation. Among nonusers of contraceptives, only 29 percent intend to use contraceptives in the future.

From the findings, there is a need to educate the public on contraceptive practices so as to accelerate the fertility decline. The need arises from the fact that most of the people are aware of at least one method of family planning but are not practising. The Family Planning Unit in the Ministry of Health and the Family Planning Association of Tanzania must take the initiative to convince people to use family planning. The immediate target groups should be women with no formal education, especially those in rural areas. The programme might be successful if emphasis is placed on limiting births for women aged 35 and over.

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Appendix 1 Grouping of regions based on fertility rates and proximate determinants

Region group	Region name	0-3 TFR			4-7 TFR			Mean months B/F	Mean months PPA	Ever used (%)	Married <20 (now 20+)	Ever married <20	No birth >40	Mean age at last birth
		15-19	20-34	35+	15-19	20-34	35+							
(1)	Dodoma	0.724	4.643	1.584	0.816	4.590	1.204	22.0	11.0	11.1	64.6	34.2	4.0	35.59
	Kigoma	0.626	4.710	1.607	0.687	4.980	1.323	20.9	6.0	8.8	73.9	24.2	2.6	34.62
	Tabora	0.742	3.885	1.090	0.767	4.116	1.370	22.1	10.8	19.4	68.2	23.6	7.9	34.74
	Zanzibar	0.733	4.241	1.603	0.844	4.520	1.406	20.5	3.8	10.6	78.5	33.5	1.0	34.43
(2)	Mara	0.950	3.914	1.627	0.964	3.996	1.575	17.5	7.0	15.4	57.2	37.9	5.2	36.13
	Mwanza	0.882	4.138	1.550	0.828	3.918	1.811	18.1	6.0	11.0	70.0	33.9	0.0	35.45
	Rukwa	0.907	4.300	2.118	0.800	4.528	1.830	22.7	11.0	8.1	71.0	32.8	0.0	37.98
	Shinyanga	0.819	4.433	2.160	0.799	4.225	2.009	19.9	5.7	16.5	76.3	30.2	2.5	38.18
(3)	Coast	0.826	3.230	1.454	0.915	3.511	1.665	22.2	14.7	33.1	72.8	33.3	6.6	36.15
	Lindi	1.113	3.093	1.797	0.904	3.915	1.972	21.8	18.5	23.6	81.6	42.6	1.5	36.79
	Mbeya	1.030	3.267	1.016	0.738	3.874	1.483	19.9	10.4	23.6	75.5	34.6	0.0	35.27
	Morogoro	0.921	3.665	1.776	0.812	3.873	1.269	21.9	12.4	24.9	68.5	45.0	1.6	36.22
	Ruvuma	0.798	3.620	1.362	0.829	4.159	1.154	22.2	20.2	16.2	67.0	29.8	2.9	35.14
(4)	Dar es Salaam	0.373	3.130	0.642	0.578	3.531	1.001	20.1	13.5	38.1	61.4	26.6	5.3	34.37
	Mtwara	0.703	2.408	0.822	0.738	2.715	1.123	21.4	20.7	12.8	76.7	31.3	9.8	33.92
(5)	Arusha	0.546	3.835	2.141	0.726	4.512	1.614	23.4	17.0	39.6	56.2	26.8	0.0	37.87
	Iringa	0.482	3.613	1.872	0.583	4.146	1.569	23.5	19.5	18.0	57.5	12.2	0.0	37.89
	Kagera	0.507	4.007	1.873	0.535	4.290	1.419	21.7	5.0	16.4	64.3	27.8	2.3	37.18
	Kilimanjaro	0.394	3.412	1.568	0.388	3.698	1.764	22.8	9.1	41.8	40.2	3.2	0.0	37.19
	Singida	0.594	4.363	1.759	0.580	4.278	1.719	22.3	11.0	22.7	61.1	15.1	5.8	37.05
	Tanga	0.499	3.750	1.966	0.821	4.444	1.597	21.0	7.5	27.4	60.4	21.9	1.7	36.13

Appendix 2 Coefficients of logistic regression of probability of a birth in the 36 months prior to the survey by background characteristics

Variable	b	s.e(b)	Significance	Odds ratio
Constant	-8.42	0.33		0.00
Region				
Group (1)[1]	0.00	0.00		0.96
Group (2)[2]	-0.06	0.08	0.50	0.90
Group (3)[3]	-0.13	0.09	0.14	0.84
Group (4)[4]	-0.52	0.10**	0.00	0.57
Group (5)[5]	-0.07	0.08	0.38	1.03
Education				
No formal education	0.00	0.00		0.83
Primary	0.15	0.06**	0.01	0.97
Secondary/Higher	-0.49	0.13**	0.00	0.51
Occupation				
Unpaid family workers	0.00	0.00		0.82
Agricultural workers	0.19	0.06**	0.00	0.98
Non-agricultural workers	0.02	0.07	0.78	0.82
Not employed	-1.89	0.58**	0.00	0.12
Residence				
Urban	0.00	0.00		0.77
Rural	0.18	0.06**	0.01	0.92
Parity				
0-2	0.00	0.00		0.35
3-5	1.32	0.08**	0.00	1.31
6+	2.68	0.12**	0.00	5.10

1 Region (1) represents Kigoma, Zanzibar, Dodoma and Tabora Regions.
2 Region (2) represents Rukwa, Shinyanga, Mwanza and Mara Regions.
3 Region (3) represents Coast, Lindi, Morogoro, Ruvuma and Mbeya Regions.
4 Region (4) represents Mtwara and Dar es Salaam Regions.
5 Region (5) represents Singida, Kagera, Tanga, Arusha, Iringa and Kilimanjaro Regions.
** They are significant.

Appendix 3 Coefficients of logistic regression of probability of ever-use of contraceptives by background characteristics

Variable	b	s.e(b)	Significance	Odds ratio
Constant	-8.86	0.39	0.00	
Region				
Group (1)[1]	0.00	0.00		0.09
Group (2)[2]	0.23	0.11**	0.39	0.11
Group (3)[3]	0.70	0.11**	0.00	0.18
Group (4)[4]	0.73	0.12**	0.00	0.18
Group (5)[5]	0.93	0.10**	0.00	0.23
Education				
No formal education	0.00	0.00		0.07
Primary	1.14	0.07**	0.00	0.22
Secondary/Higher	1.63	0.13**	0.00	0.36
Occupation				
Unpaid family workers	0.00	0.00		0.13
Agricultural workers	0.60	0.07	0.43	0.14
Non-agricultural workers	0.65	0.08**	0.00	0.25
Not employed	0.56	0.38	0.14	0.23
Residence				
Urban	0.00	0.00		0.26
Rural	-0.67	0.07**	0.00	0.13
Parity				
0-2	0.00	0.00		0.12
3-5	0.33	0.08**	0.00	0.17
6+	0.54	0.10**	0.00	0.21

1 Region (1) represents Kigoma, Zanzibar, Dodoma and Tabora Regions.
2 Region (2) represents Rukwa, Shinyanga, Mwanza and Mara Regions.
3 Region (3) represents Coast, Lindi, Morogoro, Ruvuma and Mbeya Regions.
4 Region (4) represents Mtwara and Dar es Salaam Regions.
5 Region (5) represents Singida, Kagera, Tanga, Arusha, Iringa and Kilimanjaro Regions.
** They are significant.

Appendix 4 Coefficients of logistic regression of probability of marriage before age 20 by background characteristics

Variable	b	s.e(b)	Significance	Odds ratio
Constant	5.60	0.52		
Education and Region				
No formal education	0.00	0.00		3.90
Primary	-0.70	0.07**	0.00	1.94
Secondary+ and region (1)[1]	-0.78	0.30**	0.01	1.78
Secondary+ and region (2)[2]	-2.31	0.40**	0.00	0.39
Secondary+ and region (3)[3]	-2.90	0.68**	0.00	0.22
Secondary+ and region (4)[4]	-1.89	0.41**	0.00	0.59
Secondary+ and region (5)[5]	-2.96	0.26**	0.00	0.20
Occupation				
Unpaid family workers	0.00	0.00		2.41
Agricultural workers	0.12	0.07	0.08	2.70
Non-agricultural workers	-0.18	0.08**	0.20	2.00
Not employed	-0.77	0.49	0.11	1.11
Residence				
Urban	0.00	0.00		2.72
Rural	-0.12	0.07	0.08	2.41
Parity				
0-2	0.00	0.00		0.82
3-5	1.33	0.07**	0.00	3.13
6+	2.20	0.10**	0.00	7.47

* For women aged 20 and above at the survey date.

1 Region (1) represents Kigoma, Zanzibar, Dodoma and Tabora Regions.

2 Region (2) represents Rukwa, Shinyanga, Mwanza and Mara Regions.

3 Region (3) represents Coast, Lindi, Morogoro, Ruvuma and Mbeya Regions.

4 Region (4) represents Mtwara and Dar es Salaam Regions.

5 Region (5) represents Singida, Kagera, Tanga, Arusha, Iringa and Kilimanjaro Regions.

** They are significant.

The Estimation of Potential Demand for Contraception and the Implication for Fertility in Uganda

Molly Kisanje
Family Planning Association of Uganda
Kampala, Uganda

Josephine K. Kalule
Ministry of Finance and Economic Planning
Kampala, Uganda

1 Introduction

Uganda, located in East Africa, is a landlocked country which shares borders with Kenya to the east, Tanzania and Rwanda to the south, Zaire to the west and Sudan to the north. The country lies astride the equator in the upper basin of the Nile at approximately 1,000 metres above sea level. Uganda has a total area of 241,038 square kilometres of which 18 percent is open water and swamps and 12 percent is forest reserves and game parks. Administratively, the country is divided into regions, districts, counties, sub-counties and parishes.

The country is heavily dependent on agriculture which contributes about 70 percent of the Gross Domestic Product (GDP) and more than 90 percent of the country's export earnings. In addition, the agricultural sector provides a livelihood for about 90 percent of the population. This sector is characterised by simple technology; the means of production is primarily hoe and panga. Consequently, the agricultural GDP per capita is low. The per capita income is also low because of the poor performance of the economy in the past. Current per capita income is only about US$ 300.

The main sources of population data in Uganda are the national population censuses. Although population counts started in 1911, the first systematic census which generated useable demographic data was held in 1948 and subsequent censuses were conducted in 1959, 1969, 1980 and 1991. The first household survey designed to collect data on demographic indicators as well as their determinants, the Uganda Demographic and Health Survey (UDHS), was conducted in 1988/89. Some of the demographic indices from the censuses and the UDHS are shown in Table 1.1.

From Table 1.1, it can be observed that the population of Uganda is growing very fast. According to the provisional results of the 1991 Population and Housing Census, the population of Uganda was 16.6 million, growing at a rate of 2.5 percent per annum. At this rate of growth, the population is expected to double within a period of 28 years. The majority of the population, 89 percent, live in rural areas. The country is already experiencing population pressure on the available land. Even though the average population density is only 84 persons per square kilometre, there are areas with densities of more than 250 persons per square kilometre.

Even though the annual growth rate appears to be declining, it is still among the highest in the world. The contribution of migration to this growth is almost negligible. The high growth can partly be explained by the persistently high fertility relative to declining levels of mortality, as shown in Table 1.1. A consequence of high growth rates is that a large proportion of the population of Uganda is very young--half the population is below age 15. This means that the population will continue to grow even when fertility rates begin to decline due to the large number of future parents already born.

Table 1.1 Demographic indicators, Uganda 1948-1991

Indicator	Census year				
	1948	1959	1969	1980	1991
Population (millions)	4.9	6.4	9.5	12.6	16.6
Density (pop./sq.km.)	25.2	33.2	48.4	64.1	84.0
Intercensal growth rate	-	2.5	3.2	2.8	2.5
Percent urban	-	4.8	7.8	8.7	11.4
Crude birth rate (per 1,000)	42	44	50	50	-
Crude death rate (per 1,000)	25	20	19	20	-
Total fertility rate	5.9	5.9	7.1	7.4	7.4*
Infant mortality rate (per 1,000)	200	160	120	115	101*
Sex ratio	100.0	100.8	101.8	98.2	96.4

Source: Statistics Department, Ministry of Planning and Economic Development, Entebbe.
Note: * Figures are from UDHS 1988/89. The 1991 data are from the 1991 Population and Housing Census provisional results.

The rapidly growing population is thwarting the government's efforts to improve the socioeconomic conditions of the country and the quality of life of the people. The government's goal is to balance the national resources and population growth in order to ensure sustainable development. This ambition prompted the government to develop a national population policy which would be used as a guide when dealing with the population and related problems.

2 The Uganda Demographic and Health Survey

2.1 OBJECTIVES

The UDHS, carried out between September 1988 and February 1989, was conducted at a time when there was a great need for demographic and family planning data to be used by programme planners and policy-makers. Due to the political instability experienced by the country in the 1970s and early 1980s, very limited research, if any, was done in the area of population and family planning during that period. Hence, there was little reliable and up-to-date information that could be used for planning and policy formulation purposes. The major objective of the UDHS was to generate data on fertility, family planning, and maternal and child health at the regional and national level needed for the formulation of the population policy, as well as for developing family planning and related programmes.

2.2 CHARACTERISTICS OF THE SAMPLE

The sample size for this survey was 4,730 women aged 15-49. The survey was conducted in the regions of West Nile, East, Central, West, South West and Kampala. Some parts of the Northern and North Eastern regions, containing an estimated 20 percent of the population, were excluded from the survey due

to security problems at the time of the sample selection. The UDHS used a stratified weighted probability sample of women aged 15-49 selected from 206 clusters.

Primary sampling units in rural areas were based on the smallest administrative units known as sub-parishes, which in the absence of a more reliable sampling frame, were selected with a probability proportion to the number of registered tax payers in each of the sub-parishes. In the urban areas, the sampling frame was based on a different type of administrative unit called Resistance Councils (RCs), which are similar to villages. In each of the selected primary sampling units, households were listed by name of the head of household. Individual households were selected for the interview from these lists. Altogether 4,857 women were identified as eligible for the individual interview; but 2.6 percent were not interviewed mainly because of absence and refusal. A total of 4,730 respondents were interviewed.

2.3 CHARACTERISTICS OF RESPONDENTS

The distributions of the surveyed women by urban-rural residence, education, region, and age are shown in Table 2.1. Of the 4,730 respondents, 88.5 percent are from rural areas and the remaining 11.5 percent from urban areas. Thirty-eight percent of the women have no education, 52 percent (plus those who had gone on to secondary or higher education) have attained some primary education and less than 10 percent have more than primary education. Comparison of educational status by rural and urban residence (not shown here) reveals marked differentials in educational attainment between urban and rural women. Approximately 10 percent of women in the urban areas have no education, nearly half of the women have a primary education and about 40 percent have secondary or higher education (the proportion with higher education is very small (2 percent)). While the proportion with no education in the rural areas is three times that of the urban women, the majority of rural women (52 percent) have attained at least some primary education.

Of equal interest is the comparison of the relationship between educational levels in the various regions. West Nile has the highest proportion of uneducated women (65 percent) and Kampala has the smallest (10 percent), which is attributable to its being a major urban area. In the Central region, over 70 percent have attended some primary education, whereas for other regions the proportions are between 54 and 62 percent. The different levels of education in these regions is indicative of the different levels of development among the regions of Uganda.

Table 2.1 Percent distribution of women by background characteristics, Uganda 1988/89

Background characteristic	Number of women	Percent distribution
Uganda	4730	100.0
Residence		
Urban	542	11.5
Rural	4188	88.5
Education		
No education	1787	37.8
Primary	2476	52.3
Secondary/Higher	466	9.9
Region		
West Nile	265	5.6
East	1304	27.6
Central	1177	24.9
West	273	5.8
South West	1415	29.9
Kampala	296	6.3
Age		
15-19	1157	24.5
20-24	985	20.8
25-29	859	18.2
30-34	620	11.3
35-39	459	9.7
40-44	345	7.3
45-49	304	6.4

With regard to marital status, Table 2.2 shows that the majority of women are currently married (67 percent) or have been in a marital union and were either widowed, separated, or divorced at the time of the survey (13 percent). Forty percent of women less than age 20 are married indicating an early entry in marriage in this society. Another indicator of early age at marriage is the large proportion (83 percent) of the 20-24 age group of women who have already married.

Table 2.2 Percent distribution of women by marital status, according to age, Uganda 1988/89

Age	Never married	Currently married	Separated, Divorced, Widowed	Total	Number
15-19	59.2	36.5	4.3	100.0	1157
20-24	17.0	72.1	11.0	100.0	985
25-29	4.8	80.1	13.1	100.0	959
30-34	2.5	81.6	15.9	100.0	620
35-39	1.0	79.0	19.9	100.0	459
40-44	1.0	73.1	26.0	100.0	345
45-49	0.9	73.2	25.9	100.0	304
Total	19.5	67.3	13.2	100.0	4730

Marriage is universal in Uganda: by their mid-thirties almost all women are either currently married or have ever been married. It is worthwhile to note the markedly high proportion of women aged 40-49 who are widowed, separated, or divorced. This could, in part, be a consequence of the political strife for almost twenty years prior to the survey which could have led to a number of men either dying or fleeing the country.

3 Quality of Data

An assessment of the quality of data obtained from surveys is important in determining the accuracy of the findings. The Demographic and Health Surveys are a valuable source of information on fertility. However, reliable estimates of fertility depend on accurately and completely reported information from women of childbearing age regarding the number and birth dates of children they have had. Problems with reported information can arise from misreporting of events by respondents, misrecording of information by interviewers, errors in identifying and interviewing eligible women as well as poor questionnaire design. For instance, the quality of data may be affected when some women are erroneously included or excluded from the eligible age range. This can come about as a result of respondents misreporting their ages and in some instances interviewers omitting some respondents, especially women whose exact ages are not known.

In the UDHS, a high proportion of women (74 percent) gave complete information on their dates of birth, that is, they reported both month and year of their birth. Twenty-five percent reported their age and year of birth only, and the month was imputed. The proportion of women who knew only their age, so that both year and month had to be imputed, was negligible. This is an indication that women in Uganda have

some knowledge about their date of birth, though the accuracy of their recollection cannot be validated. There was a tendency of heaping of reported ages on digits ending with 0, 5 and some even numbers such as 28, 38 and 48. The effect of this heaping can be minimised by grouping women into five-year age categories.

For nearly all (99.9 percent) of their births, respondents in the UDHS reported a complete birth date, i.e., a month and year. In spite of the completeness of reporting on the dates of births, there appears to be a problem of displacement in certain years. There was an excess of children reported in 1982 which may be explained by the interviewers transferring children born in 1983 out of that year and placing them in 1982. Interviewers may have been motivated to do this so as to avoid a number of questions on health which were only asked for children born in the period 1983-1989 and thus reduce their work. There is another deficit of births in 1981, perhaps due to rounding of birth dates and misreporting the birth dates of children born in 1981 as occurring in 1980. The conclusion from this section is that the principal shortcoming of the data is inaccuracy in the dating of births and displacement of births which can be adjusted for by grouping the data into four-year periods to minimise the effect of the displacement for the estimation of fertility (Arnold and Blanc, 1990).

4 Fertility

4.1 FERTILITY LEVELS AND TRENDS

Two commonly used measures of fertility are the age-period-specific fertility rates and total fertility rates (TFR). Age-period-specific fertility rates enable the analysis of fertility trends over a period of time. Fertility histories for Uganda have been looked at using this technique. The age-period-specific fertility rates for Uganda were estimated for the periods 0-3, 4-7, 8-11 and 12-15 years before the survey. The rates are presented in Figure 4.1 and Table 4.1.

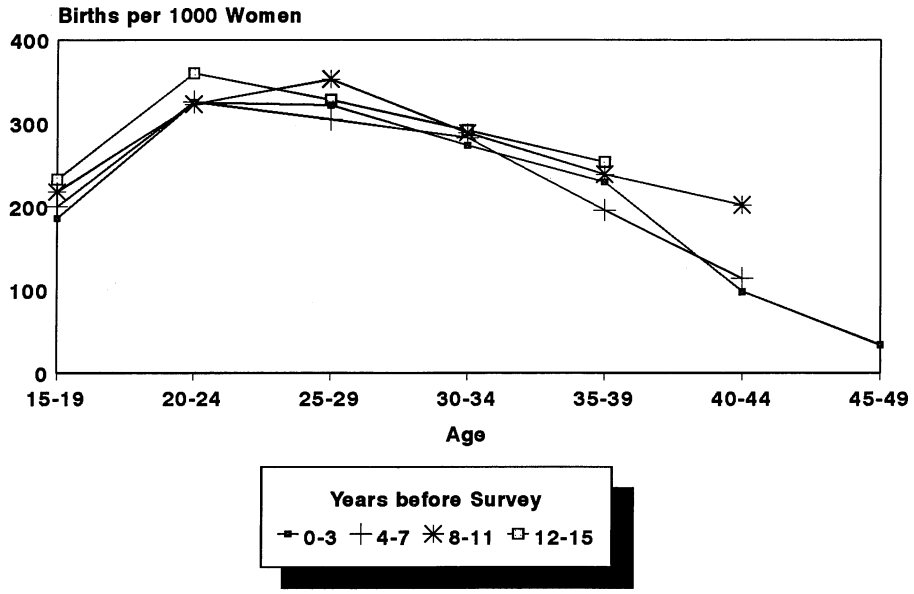
A comparison of the lines in Figure 4.1 indicates that fertility has changed little in the 16 years before the survey. There appears to be some decline in fertility in this period for women less than 20 and for women age 35 and older. An examination of the total fertility rates in Table 4.1 also indicates a small decline in fertility in the 16 years before the survey. The total number of births a woman could expect to have between the ages of 15 and 39 decreased from 7.3 to 6.9 in this period.

Table 4.1 Age-specific fertility rates and total fertility rates for women aged 15-39, 15-44, and 15-49 for the periods 0-3, 4-7, 8-11, and 12-15 years before the survey, Uganda 1988/89

	Period			
Age	0-3	4-7	8-11	12-15
15-19	186	200	218	233
20-24	325	326	323	360
25-29	322	305	353	328
30-34	274	283	289	292
35-39	230	196	239	254
40-44	098	114	202	NA
45-49	034	*	NA	NA
TFR 15-39	6.9	6.6	7.1	7.3
TFR 15-44	7.2	7.1	8.1	
TFR 15-49	7.3			

Note: * Fewer than 100 woman years of exposure
NA Truncated

Figure 4.1
Age-Specific Fertility Rates for Five-Year Periods Prior to the Survey



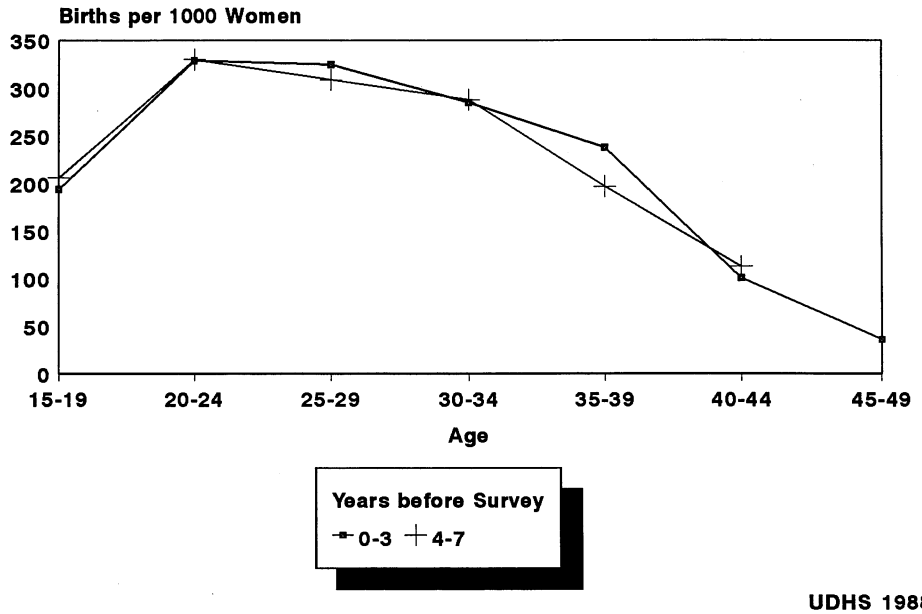
Fertility levels and trends for rural and urban areas have been examined for two periods prior to the survey (see Figures 4.2 and 4.3 and Table 4.2). This analysis shows two important results. First, fertility is significantly lower among urban than rural Ugandan women and second, fertility is declining among urban but not rural women, resulting in a growing difference in fertility rates in the two areas. In the period 4-7 years before the survey, the TFR for urban woman aged 15-44 was 6.3, while that of rural women was almost one child higher at 7.2. In the most recent period, urban fertility had decreased to 5.6 births per woman, while rural fertility was almost unchanged at 7.4 births.

4.2 PARITY PROGRESSION RATIOS

Another way of looking at trends in fertility is by parity progression ratios. These ratios are the proportions of women who move from one parity to the next within a period of five years (parity is the number of live births). The periods are referred to as quintums because they are based on five years of experience. Figure 4.4 shows the fertility pattern based on the parity progression ratios for four periods prior to the survey (i.e., 0-5, 6-10, 11-15 and 16-20 years before the survey).

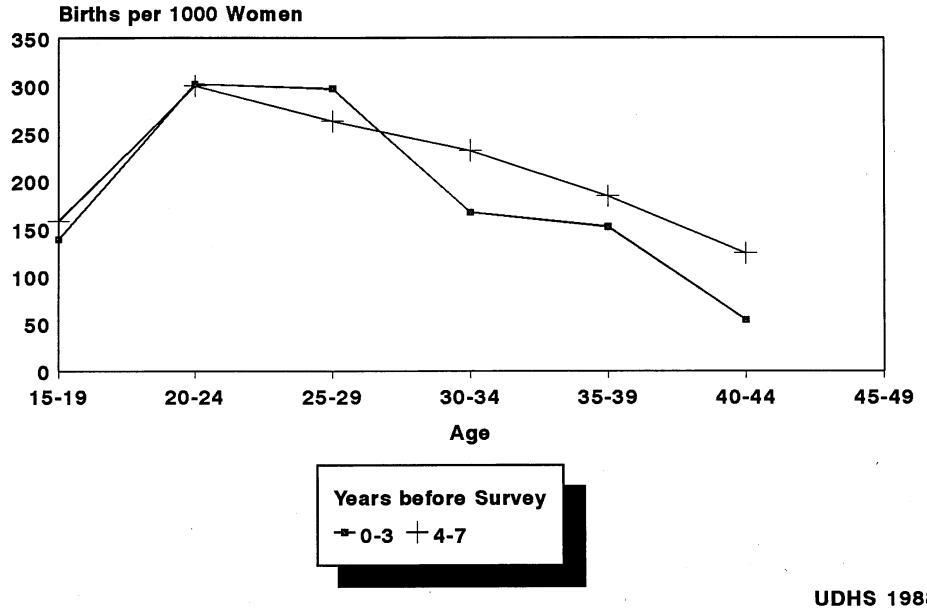
From this figure, it can be observed that the proportion of women opting for a next birth in the periods 6-10, 11-15, and 16-20 years before the survey was persistently high (well over 90 percent) for all parities. However, the pattern in the most recent period indicates that women are somewhat delaying having a second and a third birth. Furthermore, the proportions for subsequent parities are also a little lower than in the previous periods, and start to decline after the seventh birth.

Figure 4.2
Age-Specific Fertility Rates for Four-Year Periods Prior to the Survey
Rural Uganda



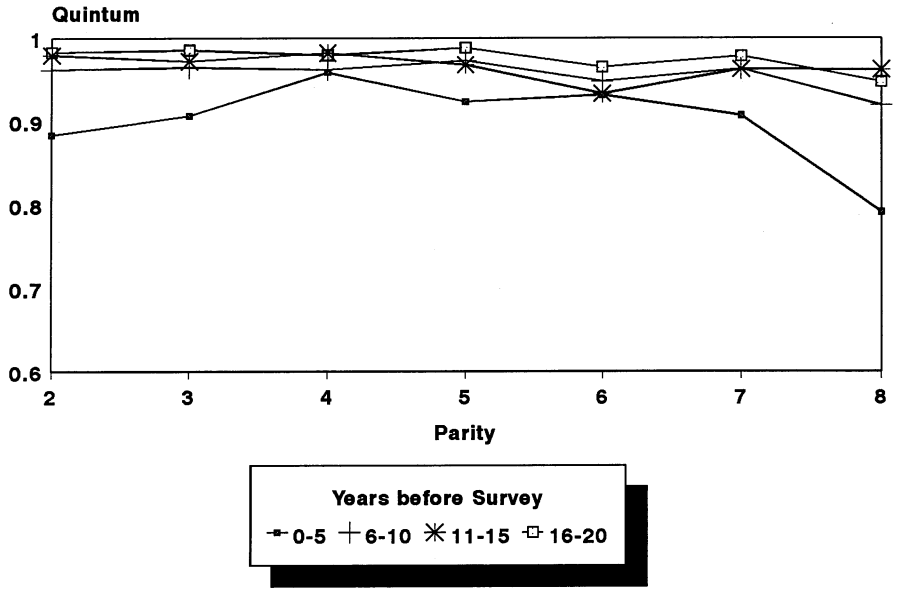
UDHS 1988/89

Figure 4.3
Age-Specific Fertility Rates for Four-Year Periods Prior to the Survey
Urban Uganda



UDHS 1988/89

Figure 4.4
Parity Progression Ratios for Specific Periods Prior to the Survey



UDHS 1988/89

4.3 THE PROXIMATE DETERMINANTS OF FERTILITY IN UGANDA

In an attempt to understand the fertility situation analyzed in the above sections, the Bongaarts model of proximate determinants of fertility is employed. This model quantifies the relative importance of marriage, contraception, abortion, postpartum infecundability and fertility as proximate determinants of fertility (Bongaarts and Potter, 1983). The model uses indices, which range between 0 and 1, to measure the fertility inhibiting effects of each of the above factors. The lower the index, the greater the fertility inhibiting effect of that determinant.

The model is expressed as follows:

$$TFR = C_m * C_c * C_i * C_a * TF$$

where TFR is the number of births a woman would have at the end of the reproductive years if she were to pass through all her childbearing years conforming to the age-specific fertility rates of a given year;

TF is the total fecundity. It refers to the biological maximum number of children a woman would have in her life or the total marital fertility rate in the absence of contraception, abortion, lactation and postpartum abstinence. TF values for most populations range from 13 to 17 births per woman, with an average of about 15.3 births;

C_m is the index of marriage;

C_c is the index of contraception;

C_i is the index of postpartum infecundability; and

C_a is the index of induced abortion.

Table 4.2 Urban and rural age-specific fertility rates and total fertility rates for women aged 15-44 and 15-49 for the periods 0-3 and 4-7 years before the survey, Uganda 1988/89

	Period	
Age	0-3	4-7
Urban		
15-19	139	158
20-24	302	300
25-29	297	263
30-34	167	232
35-39	151	183
40-44	54	124
45-49	*	*
TFR 15-44	5.6	6.3
Rural		
15-19	194	209
20-24	329	330
25-29	325	309
30-34	285	288
35-39	238	197
40-44	100	113
45-49	36	*
TFR 15-44	7.4	7.2
TFR 15-49	7.5	

Note: *Fewer than 100 woman years of exposure
NA Truncated

Only three of the indices are presented here; C_a is excluded from the analysis because it cannot be measured due to lack of data on induced abortion in Uganda. The values of the indices are given in Table 4.3.

Table 4.3 Proximate determinants and fertility, Uganda 1988/89

Characteristic	TFR observed	TFR implied	C_i	i	C_c	c	C_m	M
Total	7.3	7.4	.63	13.0	.96	2.5	.80	17.5
Residence								
Urban	5.6	6.5	.72	9.4	.83	12.2	.71	18.6
Rural	7.5	7.6	.63	13.4	.97	1.5	.81	17.2
Education								
No education	7.7	7.8	.60	14.9	.99	0.9	.86	16.7
Primary	7.1	7.2	.65	12.0	.95	3.2	.76	17.9
Secondary	5.8	5.5	.72	9.0	.80	18.6	.62	21.8
Region								
West Nile	7.2	6.4	.51	20.0	.99	0.0	.83	17.4
East	7.4	7.9	.63	13.5	.97	2.0	.84	16.5
Central	7.2	7.7	.67	11.0	.94	2.4	.84	17.1
West	8.0	7.5	.65	12.0	.94	3.4	.80	17.5
South West	7.6	6.8	.62	13.5	.97	0.9	.74	18.0
Kampala	5.9	5.7	.74	8.7	.75	17.9	.67	19.3

KEY: TFR Total Fertility Rate

C_m is an index of marriage. It is equal to 1 if all women of reproductive age are married and 0 if none is married.

C_c is the index of contraception. It is equal to 1 if no contraception is used and 0 if all couples use effective methods

C_i is the index of postpartum infecundability. It is equal to 1 in the absence of abstinence, lactation and postpartum infecundability and 0 if they are infinite.

i represents period of infecundability

c represents contraceptive prevalence rates for modern methods

M median age at marriage

The greatest contribution to reducing fertility from its biological maximum in Uganda comes from postpartum infecundability. The average duration of postpartum amenorrhea is 13 months and C_i = .63. The value of the marriage index is somewhat higher, C_m = .80. This is due to the low median age at marriage, 17.5, and the universality of marriage. It is further observed that the inhibiting effect of contraception (the contraceptive prevalence rate for modern methods in Uganda was only 2.5 percent in 1988) on fertility is almost negligible (C_c = .96). It can be concluded that the inhibiting effect of all these factors is small, hence the high fertility in the country.

Table 4.3 also shows the differentials of these indices by residence, educational status and region. There are marked differences in these indices by background characteristics. For example, while the average duration of postpartum infecundability in West Nile is 20 months and C_i = .51, in Kampala, the principal urban area, the average duration of postpartum infecundability is only 8.7 months and C_i = .74. On the other hand, among women with secondary or higher education and women who reside in Kampala, the median age at marriage is much higher and the index of marriage is considerably smaller than the national average (the median age at marriage was 21.8 and 19.3, and C_m = .62. and .67, respectively). Finally, use

of contraception in Kampala, where the prevalence rate for modern methods is 18 percent, has an effect on fertility which is as large as that of postpartum infecundability.

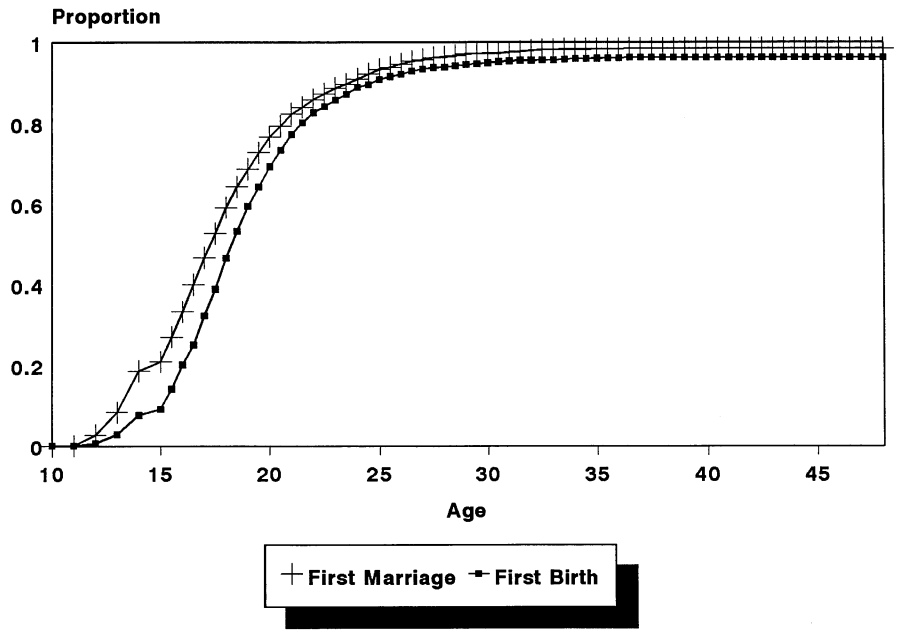
4.4 TRANSITION TO FIRST MARRIAGE AND BIRTH

In the preceding section, it was noted that a delayed age at marriage is a significant factor reducing fertility among some sub-groups. The age at which marriage occurs generally determines the beginning of the period of regular exposure to sexual intercourse and the risk of childbearing. Early entry into marital union means an early beginning of reproduction. The earlier one becomes a mother, the greater the likelihood of that individual having many children in her lifetime.

In Uganda, a significant proportion of women marry at an early age. Figure 4.5 shows the proportion of women who have married or have had their first birth at each age. Twenty percent of women have married by age 15 and nearly 80 percent by age 20. The figure also shows that women have their first birth at quite an early age. Almost 10 percent of women had their first birth before age 15 and three-quarters had a birth by age 20.

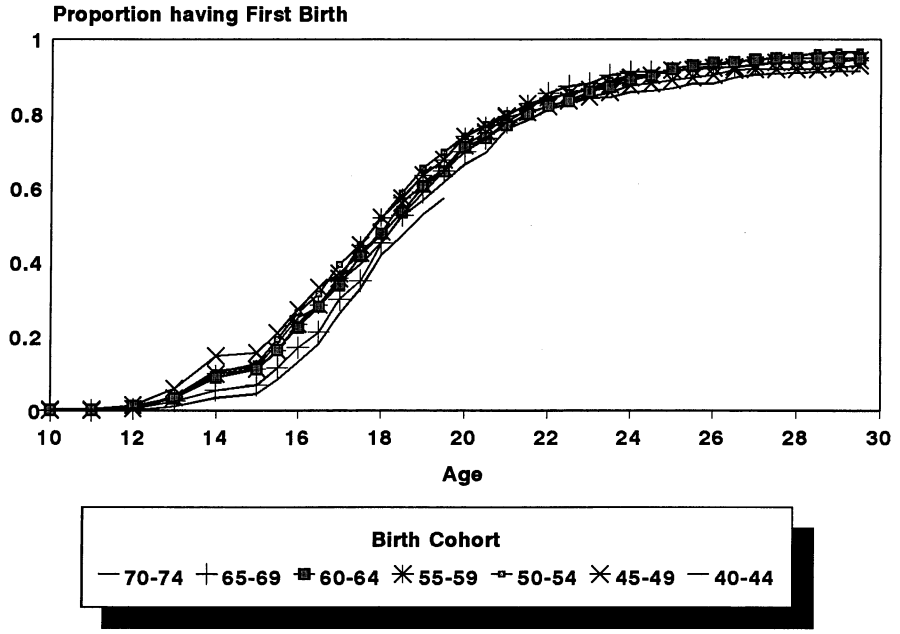
Figure 4.6 reveals that younger cohorts who began childbearing in the 10 years before the survey are more likely to delay having an early birth, e.g., before age 18, than women who began their childbearing more than 10 years ago. Moreover, an examination of the median age at transition to first marriage and first birth by cohort shows a rising age at both marriage and first birth, as well as a narrowing gap between the two transitions for the younger cohorts (Figure 4.7). Nonetheless, the median age to transition to both events is still low, i.e., below 19 years.

Figure 4.5
Transition to First Marriage and First Birth



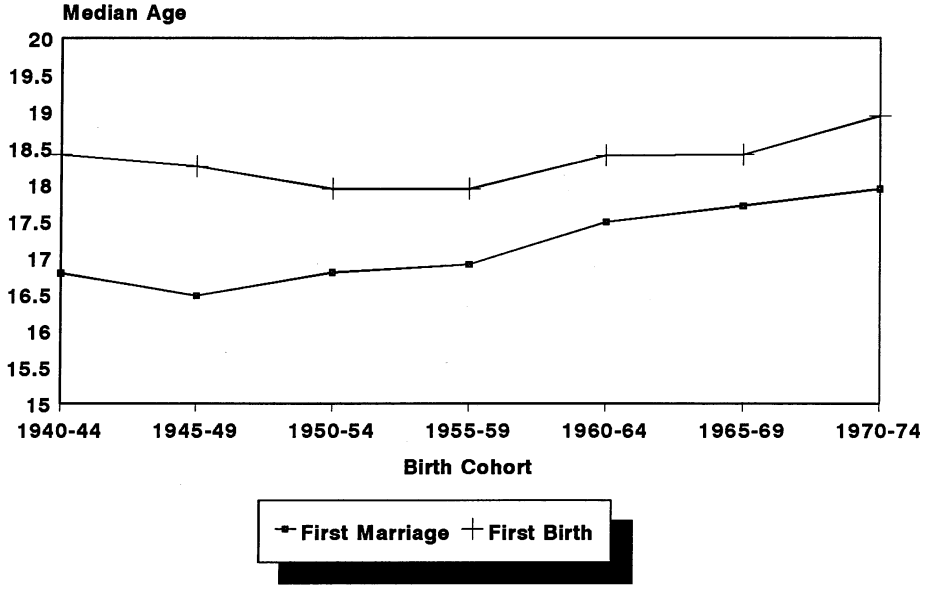
UDHS 1988/89

Figure 4.6
Transition to First Birth by Birth Cohort



UDHS 1988/89

Figure 4.7
Median Age at Transition to First Birth by Birth Cohort



UDHS 1988/89

5. Future Demand for Contraception

5.1 CONTRACEPTIVE USE AND UNMET NEED FOR CONTRACEPTION

In the previous section of this analysis, fertility levels and trends have been examined and the indication is that fertility is high and has been so for the last several years. These findings are not surprising for a society where the use of contraception is very low.

The contraceptive prevalence rate for Uganda is 5 percent for both modern and traditional methods and only 2.5 percent for modern. This explains the fact that the natural fertility is mainly reduced by marriage and postpartum infecundability. However, these two proximate determinants exert limited repression on fertility relative to the potential of contraception (Bongaarts, 1987). Moreover, the effect of postpartum infecundability is limited by a relatively short duration of breastfeeding as already noted. In Uganda where the median age at first birth is still low it can be expected that lifetime fertility will remain high unless a considerable increase in the use of contraception is realised. Realisation of this calls for a rational family planning programme that takes into account the special needs of the different groups of potential contraceptive acceptors.

The object of this section, therefore, is to provide information which will be used for the development of targets and achievable objectives when formulating the national population policy. The specific task is to determine the existing demand for family planning and on that basis make estimates of the appropriate contraceptive method mix that would be required to meet the current demand of contraception in Uganda.

A number of approaches have been used to determine the need and demand for family planning. These include reported ideal family size, reported intention to use contraception and the number of women who want to space or limit their births but are not using any contraception. The UDHS findings show that the desired number of children (6.4) is almost one less than that actually achieved (7.3) and there are considerable variations among women with different background characteristics, ranging from a maximum of 7.3 to a minimum of 4.5 (Kaijuka et al., 1989). Desired family size is conversely related to age, whereas the ideal number of children is 7.5 for women aged 40-44, it is only 5.9 for women aged 15-19 and 20-24. If young women perceive the benefits of smaller families, this implies a potential for an increased need for family planning services in the future, since young women constitute a large proportion of all women of reproductive age (over 50 percent of women of reproductive age are aged 30 or younger).

In order to demonstrate how the information on demand for family planning can be useful for programme formulation and implementation, yet another approach to estimating demand for family planning services has been taken here. We estimate the proportion of women with immediate demand for contraception as those who are currently using contraception plus those who reported that they intend to use a method of family planning within 12 months from the date of the interview. Table 5.1 shows the percent distribution of women currently using, women who intend to use immediately, women who intend to use later, and women who do not intend to use among all women of reproductive age (regardless of marital status), by selected background characteristics.

There are twice as many women who intend to use contraceptives in the 12 months after the survey than women currently using. The women in urban areas, who have higher contraceptive prevalence rates, are also the ones with higher proportions with intention to use. The same is observed for women with secondary education. Something worth noting is that among the regions, with the exception of Kampala, West has the highest proportion of women who intend to use. This region also has the highest TFR, suggesting that some women in this region would prefer to use family planning and perhaps have fewer births than women are currently having.

Table 5.1 Current use and intention to use by background characteristics, Uganda 1988/89

Background characteristic	Currently using	Intend to use in next 12 months	Intend to use later	Do not intend to use	Total	Number of women
Uganda	5.5	11.5	6.4	76.6	100.0	4730
Residence						
Urban	16.2	18.3	11.9	53.6	100.0	542
Rural	4.1	10.6	5.7	79.6	100.0	4188
Education						
No education	2.3	7.5	4.3	86.0	100.0	1787
Primary	5.6	12.7	6.6	75.1	100.0	2476
Secondary	17.5	20.3	13.3	48.9	100.0	467
Region						
West Nile	1.2	5.0	4.3	89.0	100.0	265
East	4.4	13.3	6.4	75.9	100.0	1304
Central	5.0	10.6	3.5	80.9	100.0	1177
West	8.4	13.9	7.2	79.0	100.0	273
South West	4.1	9.1	7.8	79.0	100.0	1415
Kampala	20.1	21.8	12.5	45.5	100.0	296
Age						
15-19	2.6	9.5	7.4	80.5	100.0	1157
20-24	5.4	11.5	9.8	73.5	100.0	985
25-29	5.7	14.6	7.0	72.7	100.0	859
30-34	6.7	13.3	5.9	74.1	100.0	620
35-39	7.9	15.8	4.4	71.9	100.0	459
40-44	8.6	9.8	0.9	80.8	100.0	345
45-49	7.1	2.2	0.0	90.8	100.0	304

In regard to the differential by age groups, women in the age groups 20-24, 25-29, 30-34 and 35-39 have a higher proportion of those intending to use than younger or older women. The low proportions for the young women could be due to the fact that they have just started having children, while among the older women it may due to the fact that many of these women have reached menopause or are subfecund. Assuming that the family planning needs were met, one would expect a decline in the TFR, given the fact that peak of reproduction occurs within this age range.

Drawing conclusions about demand for contraception on the basis of the proportion of women who say they want to use a method soon may be questioned with an argument that it is based on the women's preferences, disregarding the spouse's. Traditionally men are the decision makers in regard to family affairs in Ugandan society. However, given the changing socioeconomic conditions, women as well as their men are expected to have aspirations for improved wellbeing for themselves and their children. Moreover, the ongoing sensitisation in regard to the government's policy of promoting the status of women and encouraging them to contribute positively to national development hopefully has made men and women realise that women can become involved in productive activities only if they are able to control their reproductive behaviour.

The need for contraception among Ugandan women can also be measured by the proportion of women who are not currently using a method of family planning but expressed a desire to space and to limit births, 37 percent and 17 percent respectively, i.e., altogether 54 percent of married women not currently using a contraceptive method (Kaijuka et al., 1989). The women considered in this category are currently married women who were not using contraception but (1) reported wanting to postpone the next birth by at least two years from the time they were interviewed, or (2) reported wanting no more births.

Westoff and Ochoa (1991), in their comparative analysis of unmet need and demand for family planning, classify women according to the exposure to pregnancy, their interest in delaying or preventing the next birth and current use of contraception. Women with unmet need include those who want to space or limit their births but were not contracepting and pregnant and amenorrheic women who reported that the pregnancy occurred at a time when they had wanted to space or to limit their births. Demand for family planning is the sum of women currently contracepting and women with unmet need.

The Westoff and Ochoa classification was used to classify women in the UDHS according to the demand for contraception. Table 5.2 shows the distribution of women according to their unmet need or current use of contraception for spacing or limiting by background characteristics. When the women in the two categories of unmet need, i.e., need for spacing and need for limiting, are combined the result is more than four times the proportions of current users. This differential holds for all subgroups except women in urban areas, women with secondary education, women in the West and Kampala regions, and women aged 35-39.

The resulting contraceptive prevalence if all need for spacing and limiting births was met by contraceptive use would be equal to the proportion of women with unmet need plus the proportion currently using. In order to determine what the fertility would be if all need for contraceptive use was met, the new (hypothetical) prevalence rates were applied to the equation (United Nations, 1989):

TFR = 7.34 - 0.07u where u equals the contraceptive prevalence rate.

Meeting this need would have a marked effect on fertility. As can be seen in Table 5.3, the implied TFR is lower by one to three births than the observed. Overall, meeting all current need for spacing and limiting births implies that the total fertility rate would decline from 7.3 to 5.1. These findings suggest that Ugandan women are not necessarily in favour of uncontrolled childbearing and if individual preferences are translated into action, they offer prospects for rapid fertility decline.

Table 5.2 Percent distribution of currently married women by need for contraception or current use of contraception to space or limit births, according to selected background characteristics, Uganda 1988/89

Background characteristic	No need	Unmet need for spacing	Unmet need for limiting	Current use for spacing	Current use for limiting	Total
Uganda	67.9	19.9	7.3	2.1	2.8	100.0
Residence						
Urban	51.8	22.9	7.3	11.7	6.4	100.0
Rural	69.4	19.7	7.3	1.2	2.4	100.0
Education						
None	73.7	16.4	8.1	0.3	1.6	100.0
Primary	65.3	22.2	6.6	2.5	3.4	100.0
Secondary	47.0	29.2	6.4	11.5	5.9	100.0
Region						
West Nile	78.7	17.0	3.4	0.8	4.0	100.0
East	69.6	21.2	5.7	1.2	2.3	100.0
Central	64.7	23.6	7.0	1.8	2.9	100.0
West	65.7	20.0	7.5	1.7	5.1	100.0
South West	69.8	16.6	10.0	2.5	2.1	100.0
Kampala	46.9	20.2	8.3	16.4	8.2	100.0
Age						
15-19	69.8	27.2	1.3	1.7	0.0	100.0
20-24	72.3	23.5	1.4	2.8	0.0	100.0
25-29	67.7	24.1	4.0	3.2	1.0	100.0
30-35	68.6	18.3	7.2	2.7	3.2	100.0
40-44	61.0	16.7	14.2	0.8	7.4	100.0
40+	66.9	5.9	19.1	0.1	8.0	100.0
Parity						
0	89.5	7.1	2.6	0.9	0.0	100.0
1	76.2	20.4	0.7	2.4	0.3	100.0
2	74.6	20.3	1.3	3.0	0.8	100.0
3	70.0	23.1	2.5	3.0	1.4	100.0
4+	58.4	19.9	14.3	1.6	5.7	100.0

Table 5.3 Contraceptive prevalence and the implied TFR if all need for spacing or limiting births was met by contraceptive use and current TFR by selected background characteristics, Uganda 1988/89

Background characteristic	Contraceptive prevalence if all need was met	Implied TFR[1]	Current TFR
Uganda	32.1	5.1	7.3
Residence			
Urban	48.2	4.0	5.6
Rural	30.6	5.2	7.5
Education			
No education	26.3	5.5	7.7
Primary	34.7	4.9	7.1
Secondary	53.0	3.6	5.8
Region			
West Nile	21.3	5.8	7.2
East	30.4	5.2	7.4
Central	35.3	4.9	7.2
West	34.3	4.9	8.0
South West	30.2	5.2	7.6
Kampala	53.1	3.6	5.9

[1] Implied TFR = 7.34 - 0.07u where u equals the contraceptive prevalence rate if all need for spacing and limiting births was met by contraceptive use.

5.2 APPROPRIATE CONTRACEPTIVE METHOD MIX

In order to make recommendations regarding the potential demand for specific methods, a model for determining an appropriate contraceptive method mix (Choe and Bulatao, 1992) which can satisfy individual needs for fertility control was used. The model is based on the assumption that some contraceptive methods are more appropriate than others for particular sub-groups of women. These sub-groups are defined by the stages in women's reproductive cycles, health considerations and individual preferences. Women in the UDHS were grouped according to the following characteristics: age; fertility intentions, i.e., whether women want to space or limit their births; marital status, i.e., women in a marital union and those outside; whether breastfeeding or not (for women who had a birth in the six months before the survey); and whether a woman had a first birth.

Women who had not yet had a birth but wished to delay their first birth were classified as in need for contraception before their first birth. Women who had a birth in the last six months and were still breastfeeding were divided into those aged 35 and below and those aged 35 and over, and were categorized as in need for contraception for spacing. Women who stated that they wanted no more children were also divided into those aged 35 and below and those aged 35 and over and were considered in need of contraceptives for limiting. We did not have direct information on the future fertility intentions of women who were currently pregnant or amenorrheic. Thus we distributed them in accordance to the

fertility intentions of the nonpregnant, nonamenorrheic women in the same age group with an assumption that the fertility intentions of the two groups were similar.

Although analysis on reproduction behaviour and contraception is usually restricted to women in a marital union only, this model has included all women. While marriage plays a cardinal role in determining fertility in any society, the study takes into account the contraception needs of the nonmarried women, so that they can avoid having unwanted children.[1] Women who were not in a marital union were included because it was felt that they were having unwanted births, as already noted. Unmarried women who reported that they were sexually active in the four weeks before the survey or currently using contraception were considered as being in need of contraception for spacing, the remaining were considered not to have a need. Nonmarried women were also divided into those aged 35 and below and those older than age 35, as these two groups were thought to have different health considerations in choosing a contraceptive method.

The resulting classification of women is shown in Table 5.4. Overall 30 percent of women have a need for contraceptives because either they want to space or limit a birth. The largest category of need (15 percent) is comprised of women less than 35 years of age who wish to space their next birth; approximately 40 percent of these women are breastfeeding. The next single largest category (5 percent) is unmarried, sexually active women younger than 35, followed by women 35 or older who do not want any more births (4 percent).

Table 5.4 Percent distribution of women according to need for family planning and life stage, Uganda 1988/89

	Need for family planning										
			Between births			After last birth		Unmarried, Sexually active			
Age	No need	1st birth	BF	<35 years	>35 years	<35 years	>35 years	<35 years	>35 years	%	N
15-19	78.8	1.7	6.0	5.5	0.0	0.0	0.0	7.9	0.0	100	1152
20-24	70.8	0.7	7.1	13.6	0.0	0.7	0.0	7.0	0.0	100	981
25-29	67.2	0.6	7.7	15.8	0.0	3.8	0.0	4.8	0.0	100	856
30-34	66.7	2.0	6.4	14.5	0.0	5.4	0.0	5.1	0.0	100	611
35-39	63.0	0.1	7.4	0.0	9.5	0.0	15.1	0.2	4.8	100	458
40-44	62.3	0.5	4.7	0.0	6.1	0.0	18.9	0.0	7.5	100	344
45-49	77.0	0.7	0.7	0.0	1.5	0.0	15.5	0.0	4.6	100	302
Total	70.4	1.0	6.3	8.9	1.7	1.6	4.0	5.0	1.4	100	4704

In regard to the various contraceptive methods, the characteristics such as effectiveness, health implications, simplicity of use and reversibility were considered to determine an appropriate match

[1] Besides other socio-economic problems associated with single motherhood, child dumping is beginning to be a problem in Uganda. Although there is no empirical evidence on this at present, reports from the dailies give sufficient grounds to consider it a social problem.

between circumstances and method mix. The appropriate methods by stages of reproduction suggested by Choe and Bulatao (1992) have been used as a guide. The recommended appropriate contraceptive methods by stages of the reproductive life cycle are shown below:

Stage of life cycle	Method(s) of choice	Inappropriate method(s)
After marriage, before first birth	Condoms, Combined oral contraceptives (COCs), Injectables, Diaphragm/Foam/Jelly	Sterilization
During breastfeeding	IUDs, Progestin orals	COCs
Between births, after breastfeeding	COCs, Injectables, IUDs	Sterilization
After last portion, early period	IUDs, Implants	
After last birth, later period	Sterilization	COCs
Unmarried, sexually active, <35 years	Condoms, COCs, Injectables, Diaphragm/Foam/Jelly	Sterilization, IUDs
Unmarried, sexually active, >35 years	Condoms, Injectables, Diaphragm/Foam/Jelly	Sterilization, IUDs, COCs

Once a list of appropriate methods for each stage of the life cycle was determined, the probability of choice for each method within the set of appropriate methods, among women within each stage was derived using three different approaches as follows:

Estimate 1. The observed contraceptive method mix within each category. This is based on the observed mix of appropriate methods among women currently using, as well as the mix of appropriate methods preferred by women who intend to use a contraceptive method in the 12 months following the survey.

Estimate 2. A hypothetical method mix. This mix is based on informed opinion about the health considerations of the various categories of women, preferences among Ugandan women, method availability and method effectiveness.

Estimate 3. Actual prevailing method mix within each category observed for Kenya. Kenya was chosen because of similarities in culture, resource availability in family planning and family planning program goals established by the government.

Estimates of the method mix for each stage of the life cycle were made according to each of the above approaches. We estimated the method mix for all women by aggregating the estimates for the various stages.

The appropriate method mix for all women, as well as the difference between the appropriate and the current method mix, according to each of the three approaches, is presented in Table 5.5. As already noted the current contraceptive prevalence is only 5.5 percent and the method mix is marked by more use of traditional than modern methods. The other commonly used methods are pills, female sterilisation and injectables, in that order.

Table 5.5 Appropriate method mix, estimated by three approaches, and difference between current and appropriate method mix[1]

Method	Current method mix	Appropriate method mix			Difference between appropriate and current method mix		
		Estimate 1	Estimate 2	Estimate 3	Estimate 1	Estimate 2	Estimate 3
No method	94.5	70.4	70.4	70.4	-24.1	-24.1	-24.1
Pill	1.4	17.3	8.4	12.4	15.9	7.0	11.0
IUD	0.2	4.5	7.5	6.1	4.3	7.3	5.9
Injectable	0.4	4.4	6.9	7.7	4.0	6.5	6.3
Diaphragm/ Foam/Jelly	0.0	0.0	1.5	0.5	0.0	1.5	0.5
Condom	0.0	0.0	2.8	1.4	0.0	2.8	1.4
Female sterilisation	0.4	3.5	2.5	2.7	2.8	1.8	2.0
Traditional methods	2.9	0.0	0.0	0.0	-2.9	-2.9	-2.9

[1] See text for description of approaches to estimating appropriate method mix

The prevalence rate for all of the proposed appropriate methods mixes is 29.6 percent because they all meet all of the need for contraception as estimated in Table 5.4. Thus, nonuse of a method must be reduced by 24.1 percent. None of the appropriate methods mixes include traditional methods so they all also imply a reduction in traditional method use from 2.9 percent to 0.

The appropriate method mix based on the preference of current users and women who reported they intend to use in the next 12 months is dominated by the pill. The preference for pills may be explained by the fact that it is the most acceptable method among the young women who were also observed to be the major users. The preference of sterilisation by a relatively large number suggests that if this method was made widely available more women who have completed their families would adopt it. The high rate use of the injection is mainly attributable to its convenience to use, especially in cases where husbands are not agreeable to the use of contraceptives.

The principal difference between the first estimate and the second and third estimates of an appropriate method mix is the proportion of pill use. The second estimate is hypothetical and assumes women would use methods that are appropriate to their life cycle stage and fertility preference but which are hardly known in Uganda, e.g., the diaphragm, foams, and jellies. The departure between Estimate 1 and the estimated mix based on the distribution of methods observed in Kenya is generally small for methods other than the pill. The similarity between the two estimates may be explained in part by the limited informed choice of family planning methods in the case of both Uganda and Kenya.

6 Recommendations and Conclusions

On the basis of the findings, the following recommendations have been made. Although it has been found that there is an unmet need for family planning, there are still grey areas which need to be investigated.

- First and foremost, there is a need to investigate into reasons why there is a gap between current use and preference for spacing or limiting births. It is important to understand which characteristics are associated with women who need to adopt contraception, as this information should guide the programme.

- Second, as family planning programmes are developed, there should be a big component of operations research. It is necessary that programme implementation is accompanied by operations research in order to test the different approaches of service delivery, to diagnose specific local problems, and to evaluate and appraise specific components of the programme implementation. Research will also be needed in order to gather information on contraindication among Ugandan women and preferences related to the different methods. Such information would be important for improving the contraceptive method mix in the future.

- Third, since female sterilisation appears to be a preferred method, efforts should be made to have it widely available by ensuring that trained personnel and the necessary equipment are available in all major medical units.

- Four, although mass media plays a major role in dissemination of information on family planning, its effectiveness is very much limited if it is not accessible to the majority of the people. It is recommended that, such information should be distributed through primary groups and personal networks. This has found to be an effective channel of dissemination of such information (Freedman, 1987).

As a follow up to this report and its recommendations, the next step will be to carry out a cost analysis in order to find out the cost implications of the proposed appropriate method mix. In addition, cost analysis can be done for other approaches of service delivery in an attempt to find the most cost-effective approach through which the appropriate method mix can be offered. Additionally, there will be need for further study to find out how this approach can be incorporated into the existing primary health care system.

It is clear from this analysis that fertility in Uganda is high and has been at these high levels for a number of decades. The persistently high fertility has been found to be mainly a consequence of very limited use of contraception in this society. One major conclusion emerging from this analysis, however, is that despite the low contraceptive prevalence rates, there is a significant potential demand for contraception, which if satisfied, could result in some decline in fertility within a short period of time. This decline could be substantial if the appropriate contraceptive method mix approach to service delivery was adopted. A major point to bear in mind is that even though this society is generally pronatalist, individual fertility preferences are showing signs of moving towards a smaller family size norm and this could easily be imitated with availability of successful programmes. Satisfying the existing demand should also be looked at as one of the channels through which the attainment of improved status for the women in Uganda, which is one of the major policies of the government, could be achieved.

The challenge that these findings present is ensuring the availability of services. The provision of required services has two components: the satisfaction of individual needs whose satisfaction offers benefits both to the family and nation as well as the individual, and the attainment of beginning to move towards a

transition to low fertility. The degree of success of the programmes that meet people's needs would largely depend on the political will and support that may prevail. Nonetheless, the promulgation of an explicit population policy, which is in the offing, is actually a stage setting for the implementation of an effective family planning programme. With the population policy in place, it is envisioned that family planning will emerge as a major component of the overall development programme package.

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Fertility Patterns and their Determinants in Zambia: Findings from the Zambia Demographic and Health Survey[1]

Kumbutso Dzekedzeke
Central Statistics Office
Lusaka, Zambia

Nelson Nyangu
National Commission for Development Planning
Women in Development Dept.
Lusaka, Zambia

1 Country Profile

1.1 BACKGROUND

Zambia is a landlocked country situated in Central Africa south of the equator. It shares borders with eight countries: Malawi to the east, Zaire to the north, Tanzania to the northeast, Angola to the northwest, Mozambique to the southeast, Zimbabwe to the south, Botswana and Namibia to the southwest. Zambia covers an area of 752,614 square kilometres and has a tropical climate with three distinct seasons, a warm and wet season stretching from November to April, a cool-dry season from May to August and a hot-dry season covering September and October. The country's vegetation may broadly be classified as Savannah woodland which consists of various trees, tall grass, shrubs, herbs and other woodlands.

Administratively, Zambia is divided into nine provinces and 57 districts. The country has 73 ethnic groups and seven major tribal groupings: Bemba, Tonga, Lunda, Kaonde, Lozi, Luvale and Nyanja. The country's official language is English. Bemba and Nyanja are the common languages spoken in the two major urban areas, Copperbelt and Lusaka, respectively. The rest of the country uses languages specific to ethnic groups and/or localities.

Politically, Zambia has passed through three different systems of government since political independence from Britain in 1964. For the first eight years following independence (1964-1972) Zambia had a multiparty system of government. This was followed by a one party participatory democracy until 1990. In 1990, Zambia reverted back to a multiparty system through an act of parliament and in 1991 the second era multiparty system of government began.

Table 1.1 Population Trends in Zambia

Year	Population ('000)
1921*	980
1931*	1340
1946*	1680
1956*	2850
1963*	3410
1969	4090
1980	5660
1990	7820

* Source: Census of Africans 1963.
Census of 1969,1980 and 1990 (CSO Lusaka)

[1] The figures presented in this paper may differ very slightly from those that appear in the Zambia DHS final report. The differences are due to adjustments made in the design weights following an examination of the household listing and selection.

1.2 DEMOGRAPHIC PROFILE

Zambia's population has been increasing rapidly over the past three decades. The country has carried out four national censuses since 1963 (Table 1.1). The first census, conducted in 1963, enumerated a total population of 3.41 million. A second national census was carried out in 1969 and the total population at that time was 4.09 million. The 1980 Census of Population and Housing reported a total population of 5.66 million. The most recent national census was carried out in August 1990 and preliminary results indicate that Zambia's population is 7.82 million.

The Zambian population is extremely youthful (Table 1.2). Approximately half of the population is aged less than 15 years. Because the population is so young, the momentum for future population growth is high even if fertility levels decline in the immediate future.

Table 1.2 Percent distribution of the population by age, Zambia 1969, 1980 and 1990

Age group	1969		1980		1990	
	Male	Female	Male	Female	Male	Female
0-14	45	47	49	50	48	50
15-49	52	50	49	47	50	48
65+	3	3	2	3	2	2
Total	100	100	100	100	100	100
N('000)	2070	1990	2890	2770	3980	3840

Source: Census of 1969, 1980 & 1990 (CSO Lusaka).

Zambia is one of the most urbanised countries in Africa. The percent distribution of the population by area of residence and sex is shown in Table 1.3. Preliminary results of the 1990 Census show that, out of a total population of 7.82 million people, 3.3 million (42 percent) live in urban areas. This represents an increase from the previous census. The increase may largely be attributed to rural to urban migration and relatively high fertility levels in urban areas.

Table 1.3 Percent distribution of the population by residence and sex, Zambia 1980 and 1990

Residence	1980		1990	
	Male	Female	Male	Female
Rural	58	61	57	59
Urban	42	39	43	41
Total	100	100	100	100

Source: 1980, 1990 Censuses (CSO Lusaka).

Zambia's population has been urbanising at a very fast rate. Twenty percent of the total population lived in urban areas in 1963. This figure rose to 30 percent in 1969 and 40 percent in 1980. Most of this urbanised population live along the "line of rail" which stretches from Livingstone in Southern Zambia to Chililabombwe in the Copperbelt. Zambia's rural population is sparsely distributed. Unequal regional economic development and a limited and unequal distribution of arable land may have contributed to this pattern of settlement.

1.3 SOCIOECONOMIC SITUATION

Zambia's economy has depended almost exclusively on the mining industry. Until recently the main emphasis in Zambia's economy was on copper revenues. Several years after political independence in 1964, copper prices on the world market were high, local production was equally high and the economy was very buoyant. The government was able to embark on various programmes aimed at both redressing the socioeconomic imbalances created by the colonial political and economic legacy and accelerating improvements in the national economic base and in the quality of life of the people.

Emphasis was placed on the development of new infrastructure such as transportation, communication, and energy. In the social sector, substantial investment outlays were made to expand education at all levels. Most social services and investments in infrastructure were highly subsidised by the government. These programmes led to substantial and positive changes in the standard of living of the people, especially those in urban areas.

Education

Zambia's progress in the field of education has been tremendous. Zambia's education system is a three tier system. It begins with seven years of primary school, followed by a five-year secondary system. The secondary system is divided into two, grades 8-9 and grades 10 through 12. At grade 12 students write their ordinary level examination which allows them direct entry into tertiary education. Zambia's tertiary education is comprised of the universities, teacher training colleges and technical and vocational institutions.

During the 1970s enrolment in primary, secondary and technical education increased by 44, 75 and 46 percent, respectively. Enrolment in teacher training colleges rose by 105 percent and in the University of Zambia by 176 percent. In 1990, Zambia had 3,587 primary schools, 498 secondary schools, 14 teacher training colleges, 14 technical and vocational institutions and 2 universities.

Health

Zambia's health sector expanded at a very rapid rate just after independence. The target was to improve the provision of health services and narrow rural-urban differentials in access to health services (Ministry of Health, 1988). During the period from 1964 to 1980 there was improvement in the provision of health services which coincided with an economic upturn in the country. The health status of the people improved, mortality rates declined, and life expectancy at birth increased. However, the post-independence period of rapid social and economic progress was short-lived. The downturn in the global economy and the consequent worldwide recession that started in the 1970s hit the country hard. This contributed to a decline in the quality of health services.

1.4 ZAMBIA DEMOGRAPHIC AND HEALTH SURVEY (ZDHS)

The 1992 Zambia Demographic and Health Survey (ZDHS) is part of the worldwide DHS programme funded by the United States Agency for International Development (USAID) through Macro International Inc. of Columbia, Maryland (USA). The institutions that participated in the ZDHS are: the University of Zambia (Department of Social Development Studies), the Central Statistical Office, and the Ministry of Health.

The ZDHS was the first survey of its kind to be carried out in Zambia. Fieldwork for the ZDHS started in January 1992 and ended in May of the same year. The survey covered all parts of the country. Data processing started a month after the beginning of fieldwork and was completed in June 1992.

The major aim of the ZDHS is to provide information on fertility, family planning, infant and child mortality, and maternal and child health. Zambia is divided into 9 provinces and 57 districts. The sample was designed to provide estimates with acceptable levels of sampling error for certain key parameters, such as fertility and infant mortality, at the provincial level. The sample is self-weighting within urban areas. The rural segments of Luapula, North-Western, and Western provinces were oversampled. Thus, the sample is not self-weighting at the national level. The unweighted and weighted numbers of women by province are shown in Table 1.4. Due to a relatively small sample size in North-Western province, it has been combined with Western province for most analyses in this report. The percent distribution of women interviewed in each province is also shown in Table 1.4. The greatest number of women were interviewed in Copperbelt and Lusaka provinces. These provinces contain most of the urban population and are the most populous regions and the commercial, industrial, and administrative centres of Zambia.

Table 1.4 Number and percent distribution of women by province, Zambia 1992

Province	Number of women interviewed	Number of women weighted	Weighted percent
Central	565	610	8.6
Copperbelt	1606	1698	24.1
Eastern	658	717	10.2
Luapula	589	480	6.8
Lusaka	1137	1202	17.0
Northern	590	642	9.1
North-Western	387	198	2.8
Southern	947	1026	14.5
Western	581	486	6.9
Zambia	7060	7060	100.0

1.5 BACKGROUND CHARACTERISTICS OF RESPONDENTS

A description of the basic characteristics of the women interviewed in the sample provides the background for interpreting findings of the survey. The percent distribution of the women interviewed by age group is shown in Table 1.5. Two-thirds of the women interviewed were younger than age 30. The young age structure of women has implications for future fertility because even if fertility declines from its current high levels there is still a large number of young people just entering the childbearing years.

Education is one of the most important determinants of a woman's fertility behaviour. The majority of women in Zambia have attained the primary level of education. As seen in Table 1.5, about 60 percent of women interviewed had attained primary education and 22 percent had attained secondary education. Approximately half of the respondents lived in urban areas and half in rural areas.

The percent distribution of women with different levels of education by area of residence is shown in Table 1.6. Over 80 percent of women with secondary or higher education lived in urban areas, while four-fifths of women with no education lived in rural areas.

Figure 1.1 shows the percent distribution of women by marital status. The majority of the women interviewed were married, 25 percent had never married and 11 percent were not living with a man due to either divorce, widowhood, or separation.

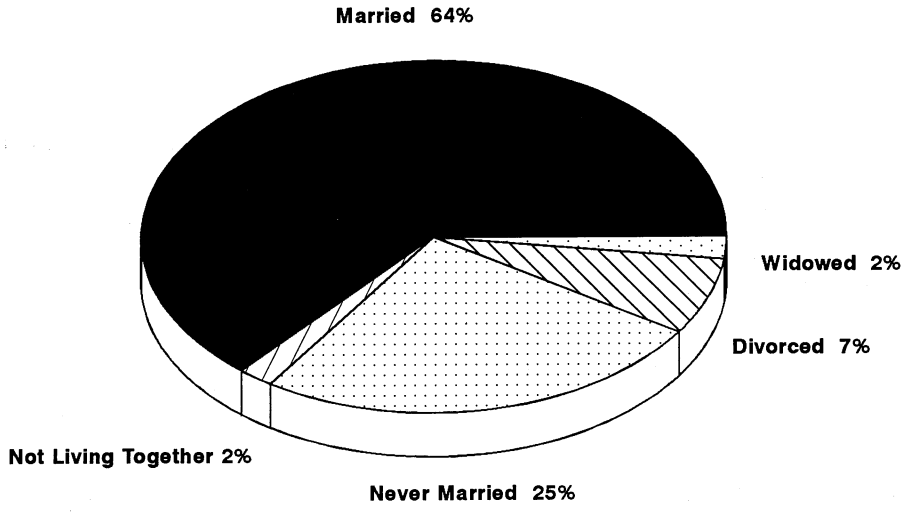
Table 1.5 Percent distribution of women by background characteristics, Zambia 1992

Background characteristic	Percent	Weighted number
Age		
15-19	28.0	1978
20-24	20.4	1439
25-29	16.7	1178
30-34	13.0	917
35-39	9.3	657
40-44	7.2	508
45-49	5.4	384
Education		
None	16.7	1178
Primary	59.9	4227
Secondary	21.7	1534
Higher	1.7	121
Residence		
Urban	50.1	3540
Rural	49.9	3520

Table 1.6 Percent distribution of women by level of education, according to residence, Zambia 1992

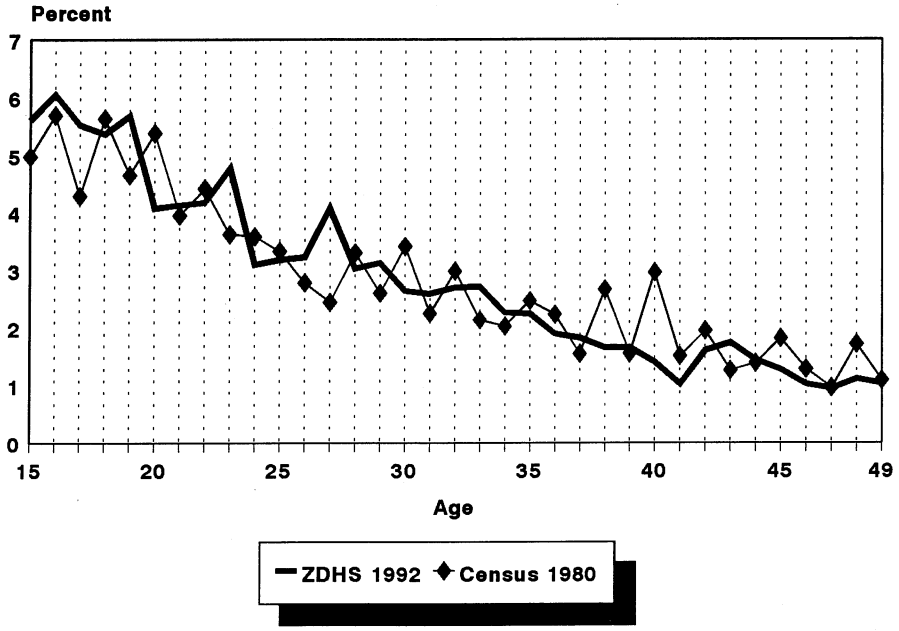
Level of education	Urban	Rural	Total	N
None	21.0	79.0	100	1178
Primary	46.5	53.5	100	4225
Secondary	80.5	19.5	100	1534
Higher	85.5	14.5	100	121

Figure 1.1
Percent Distribution of Women by Marital Status



ZDHS 1992

Figure 2.1
Single-Year Age Distribution of Women



ZDHS 1992 & CSO 1985

2 Quality of Data

In order to make accurate fertility estimates, reliable information on women's date of birth, the dates of birth of children, age at marriage, and the number of children ever born alive to the women are necessary. The quality of ZDHS data is reviewed in this section.

2.1 REPORTING OF AGE OF WOMEN

An accurately reported age distribution will typically have successive ages contributing a constantly declining proportion of the total population in the absence of age selective net migration. Typical age distributions in a society at a low level of development have high peaks and low troughs in the percentages of women reporting at some ages. This is because in societies where age is not well known there is a tendency to report ages ending in digits 0 and 5. The percentage of women reporting at each single year of age in the ZDHS is shown in Figure 2.1.

There are four peaks between the ages of 15 and 29 years. They are at ages 16, 19, 23, and 27 years. These peaks are not particularly high, however, and the reasons they occur are not clear. These are different from the peaks observed in the 1980 Census of Population and Housing for Zambia (See Figure 2.1). Figure 2.1 indicates that the quality of age reporting in the ZDHS is fairly good when compared to the 1980 Census of Population and Housing. The small trough in the proportion of women at age 15 may have occurred because women younger than 15 were not eligible to be interviewed. It is possible that some females age 15 were recorded as less than 15 years by the interviewers to reduce their workload.

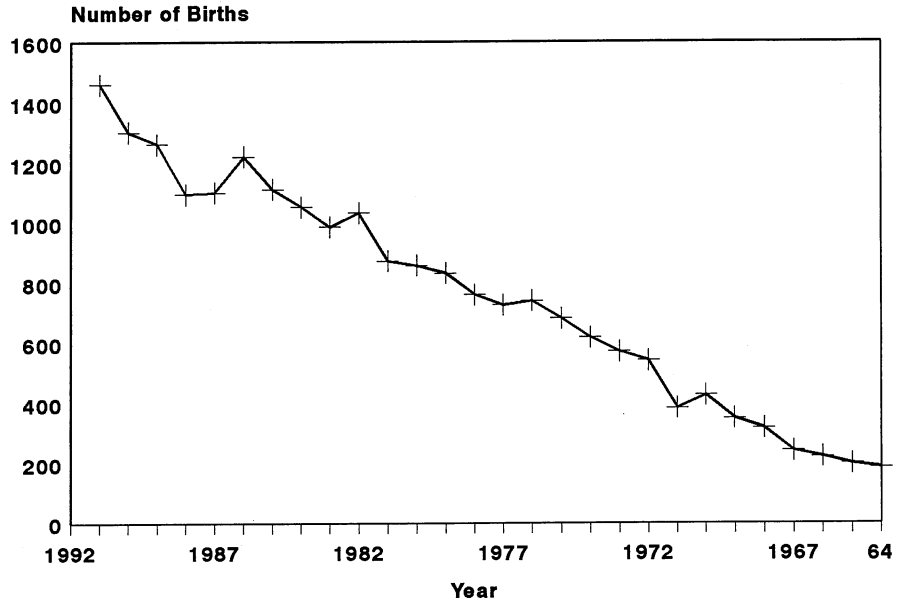
Examination of Figure 2.1 suggests that the quality of age reporting is poorer among women younger than 30 years than among older women. One would expect that the quality of age reporting would be poorer among the older women because older women have lived in a society where numeric age had little meaning. The younger women have lived in a society where knowledge of numeric age is much more important. They also are more likely to be educated. Although young women are more likely to know their age, they may also be more likely to misstate it in order not to give away their true age. The relatively better age reporting by the older women may be a result of the probing skills of the highly trained ZDHS interviewers.

Other analyses not shown here suggest that there is little difference in the quality of age reporting between urban and rural females. By level of education age reporting is poorest for females with primary education especially at ages less than 29 years. Age reporting is very good for females with higher education followed by women with secondary education.

2.2 REPORTING OF NUMBER OF BIRTHS

In a society which has been experiencing high fertility for some time the number of births will increase as the number of females in the reproductive age range increases. Thus, the number of births at a later period will be higher than at an earlier period. The number of births reported for each year by the females interviewed in the ZDHS is shown in Figure 2.2. There are many fewer births recorded for 1971, 1987 and 1988 than the years immediately following them. The deficit of births in 1971 is probably the result of women rounding off the ages of children born in 1971 to 1970. The deficit of births recorded for 1988 and 1987 accompanied by a peak in births in 1986 may be the result of interviewers pushing births from 1988 and 1987 to 1986; this would reduce the interviewers' workload since detailed information is collected in the ZDHS on births since January of the fifth calendar year prior to the survey (1987).

Figure 2.2
Number of Births by Calendar Year



ZDHS 1992

The displacement of births can distort retrospective analysis of the ZDHS birth history data. To overcome this defect, the Demographic and Health Surveys programme recommends analysis of fertility data for four-year periods instead of the usual five-year periods. The use of four-year rates should minimise the effects of displacement since, for most of the children, shifting their birth date will not cause them to be transferred across the boundary; i.e., most of the shifting should take place within the period 4-7 years prior to the survey (Arnold and Blanc, 1990).

2.3 COMPLETENESS OF REPORTING DATE OF BIRTH

Respondents were asked to report their month and year of birth and their current age, as well as the month and year of birth of all of their children and the current age of their living children. When they gave incomplete information on date of birth, the missing information was imputed. Partial information about the date of birth (such as the year of birth or the child's current age) was used to set constraints on the logical range of birth dates for imputation (Arnold, 1990). Other unreported information, such as the date of marriage, was similarly imputed by using the available information to set constraints on the logical range within which to impute a value.

Table 2.1 indicates the completeness of reporting of dates of birth for female respondents and their children. A higher proportion of complete dates were reported for women's date of birth than for children's dates of birth. In total, 88 percent of females reported a complete date for their own birth, while a complete date was reported for only 69 percent of their children. This differential is unusual in that typically women's dates of birth are not reported as well as those of their children for whom there is often a document, such as a birth registration certificate or vaccination card, to verify the birth date.

Table 2.1 Completeness of reporting of date of birth for women and children, Zambia 1992

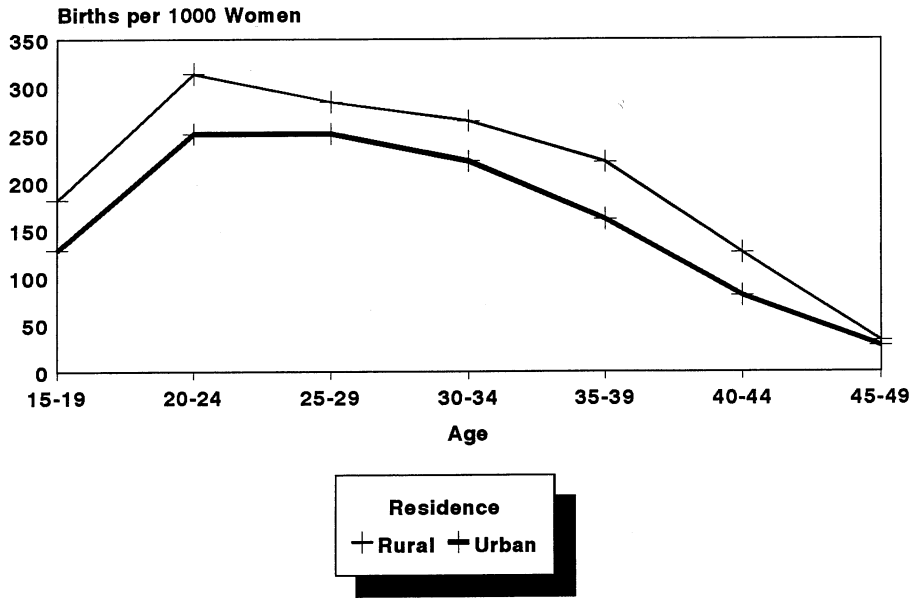
Information reported	Number	Percent
Women		
Month and year	6215	88.0
Month and age	1	0.0
Year and age	843	11.9
Total	7060	100.0
Children		
Month and year	22718	69.1
Month and age	1242	3.8
Year and age	2849	8.7
Year only	1577	4.8
Age only	1616	4.9
Month only	1333	4.1
None	1550	4.7
Total	32884	100.0

3 Fertility

Fertility rates presented in this paper are based on the birth history data collected in the Zambia DHS questionnaire. First, each woman was asked questions about the number of sons and daughters living with her, the number living elsewhere and the number who had died. Next, a complete birth history (live births) was collected, including the sex and date of birth of each child and its survival status. At the end of the birth history section of the questionnaire, there is a final check to ensure that the number of births in the birth history is equal to the reported number of children ever born.

Age-specific fertility rates (ASFRs) were calculated from the birth history by dividing the number of births to women in a specified age group during a specified time period by the number of women-years of exposure during the same period. Total fertility rates (TFRs) are calculated by summing the age-specific fertility rates for five-year age groups and multiplying by five. The total fertility rate represents the number of children an average woman would have between the ages of 15 and 49, if the woman experienced the age-specific rates observed during the period for which the rate is calculated. The total fertility rate is a synthetic cohort measure and thus does not represent the experience of any real age cohort.

Figure 3.1
Age-Specific Fertility Rates by Residence for the Four-Year Period Prior to the Survey



3.1 CURRENT FERTILITY

Age-specific fertility rates and total fertility rates for the period 0-3 years prior to the survey for the whole country, and for rural and urban areas are shown in Table 3.1. The highest ASFR is found among the 20-24 year age group. As shown in Figure 3.1, rural ASFRs 0-3 years prior to the survey peak in the 20-24 year age group, while in the urban areas the rates peak and are identical among women age 20-24 and 25-29.

Total fertility rates for women aged 15-49 years by background characteristics are shown in Table 3.2. There is a large difference in fertility by urban-rural residence; the TFR in urban areas is 5.6 children compared to 7.1 in rural areas, a difference of 1.5 children. By province, fertility rates range from 5.4 children per woman in Lusaka, a predominantly urban province, to 8.0 children per woman in Northern, a predominantly rural province. Higher rates are found in provinces which are predominantly rural, like Luapula, Northern, Southern, Eastern and Central. The low total fertility rate observed for North-Western and Western provinces, which are predominantly rural, is exceptional and may either be due to

Table 3.1 **Age-specific and total fertility rates by residence for the four years prior to the survey, Zambia 1992**

Age group	Urban	Rural	Total
15-19	128	181	154
20-24	251	314	281
25-29	251	284	267
30-34	222	264	242
35-39	161	221	191
40-44	81	126	110
45-49	28	33	31
TFR	5.61	7.12	6.38

Note: Rates are calculated for period 1-48 months prior to the interview. Rates for the age group 45-49 years are partially truncated.

high levels of natural infecundity or pathological sterility.

There are also significant differences in fertility between women with different levels of education. The largest difference is between women with no education, whose TFR is 7.2, and women with higher education, whose TFR is 4.1. It is likely that women with higher education spend more time in school and thus delay marriage and childbearing. As will be seen in a subsequent section, they are also more likely than other women to use effective contraceptive methods to space or limit their births.

Table 3.2 Total fertility rates by background characteristics, Zambia 1992

Background characteristic	Total fertility rates
Residence	
Urban	5.61
Rural	7.12
Province	
Central	6.79
Copperbelt	5.96
Eastern	6.79
Luapula	7.18
Lusaka	5.36
Northern	7.99
Southern	6.97
N/Western & Western	5.83
Education	
None	7.15
Primary	6.67
Secondary	4.96
Higher	4.05
Total	6.38

3.2 CHILDREN EVER BORN

The number of children ever born (CEB) to all women aged 15-49 years is another measure of fertility. In the Zambia DHS survey questionnaire the total number of children ever born was collected by a sequence of questions which were designed to maximise memory recall. In many surveys and censuses, information on CEB can be underestimated due to omission of births, especially among the oldest women in the sample or population. Table 3.3 shows the percent distribution of women by number of children ever born, according to age and background characteristics.

Table 3.3 Percent distribution of all women by number of children ever born, according to age, Zambia 1992

Age	Number of children ever born							Total	N
	0	1	2	3	4	5	6+		
15-19	72.8	22.6	4.0	0.6	-	-	-	100.0	1978
20-24	20.3	29.6	28.8	15.3	5.1	0.8	0.2	100.0	1439
25-29	8.2	11.3	16.3	23.5	20.0	12.8	8.1	100.0	1178
30-34	3.9	4.4	7.7	11.6	15.6	17.7	39.1	100.0	917
35-39	2.0	2.7	3.8	5.4	8.5	11.9	65.7	100.0	657
40-44	1.4	1.8	3.9	3.2	6.9	9.8	73.0	100.0	508
45-49	1.5	2.6	2.7	2.8	3.6	5.4	81.5	100.0	384
Total	26.8	15.3	11.5	9.6	7.9	6.7	22.3	100.0	7060

Among women aged 15-19, 27 percent have one or more children ever born. By age 20-24, 80 percent of women have had a child, 30 percent have had one child and 50 percent have had two or more children.

Among women aged 45-49, more than 80 percent have given birth to 6 or more children.

3.3 FERTILITY TRENDS

Age-specific fertility rates for four-year periods prior to the survey are shown in Table 3.4 and Figure 3.2. The rates suggest a consistent trend toward fertility decline in Zambia over the last fifteen years. The decline has occurred among all age groups, but is greatest among teenagers and women aged 40 and over. Among teenagers, the age-specific fertility rate has declined by 23 percent over the period from 12-15 to 0-3 years preceding the survey. Over the same period, age-specific fertility rates among women aged 40-44 have declined by 28 percent, while in the age groups 20-39, the declines range from 13 to 21 percent.

Table 3.4 **Age-specific and cumulative fertility rates for four-year periods preceding the survey, Zambia 1992**

Maternal age at birth	Years preceding the survey			
	0-3	4-7	8-11	12-15
15-19	154	163	187	199
20-24	281	290	307	322
25-29	267	293	310	313
30-34	242	256	284	290
35-39	191	224	[238]	[242]
40-44	110	[139]	[154]	[154]
45-49	[31]	[50]	-	-
Cumulative fertility 15-34	4.72	5.01	5.43	5.62

Age-specific fertility rates cumulated up to age 34 have dropped from 5.62 births per woman during the period 12-15 years prior to the survey to 4.72 during the four years prior the survey.

Figure 3.2
Age-Specific Fertility Rates for Four-Year Periods Prior to the Survey

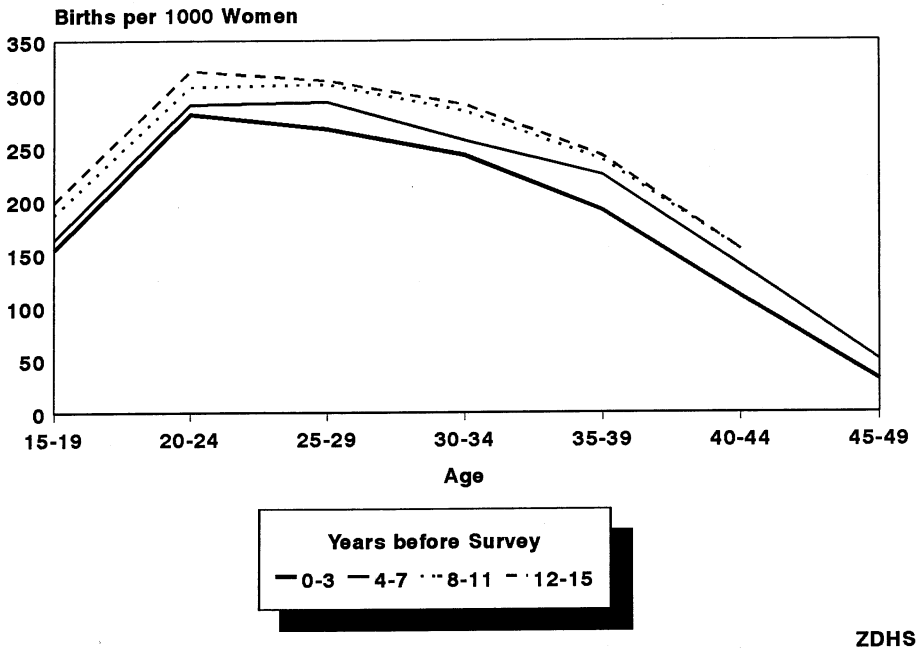
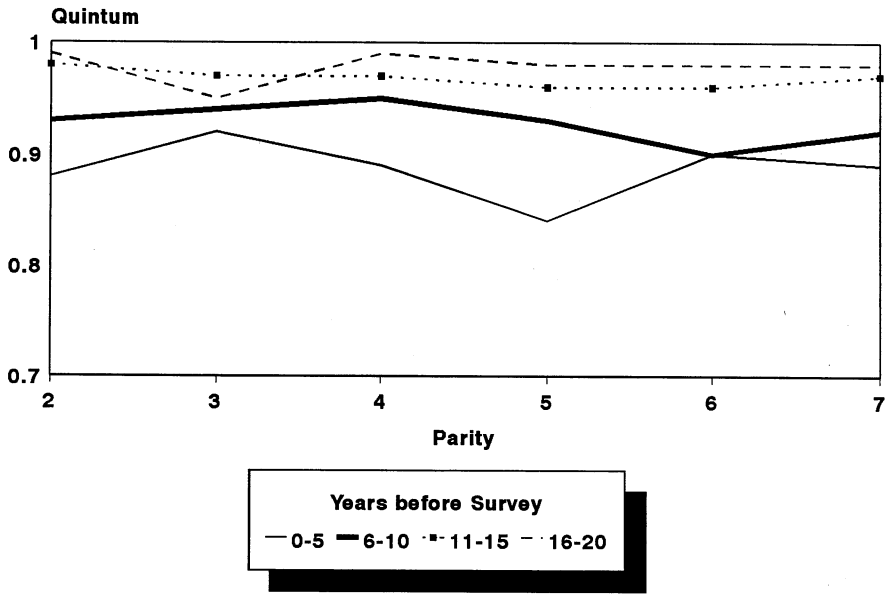


Figure 3.3
Proportion of Women having a Birth within Five Years of a Previous Birth



ZDHS 1992

3.4 PARITY PROGRESSION RATIOS

A parity progression ratio is the proportion of women at parity i who go on to parity i+1. Parity progression ratios are useful for detecting changes in fertility, particularly when birth dates are not well reported. The proportions of women at parity i who have another birth within five years (quintum) have been calculated from the ZDHS birth history data using life table techniques. The quintum is an approximation of the proportion of women who will eventually close the birth interval. Table 3.5 and Figure 3.3 show parity progression ratios for four time periods prior to the survey.

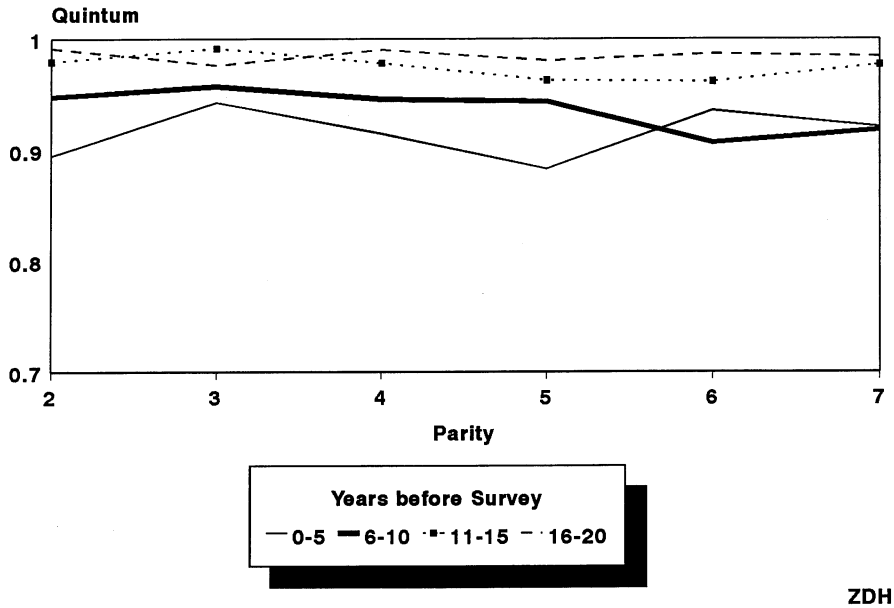
Table 3.5 Proportion of women at parity i who have a birth within five years of a previous birth (Quintum), Zambia 1992

Years prior to survey	Parity i+1					
	2	3	4	5	6	7
0-5	0.87	0.92	0.89	0.84	0.90	0.89
6-10	0.93	0.94	0.95	0.93	0.90	0.92
11-15	0.98	0.97	0.97	0.96	0.96	0.97
16-20	0.99	0.95	0.99	0.98	0.98	0.98

Figure 3.3 shows that fertility had been constantly high and stable in the 11-15 and 16-20 years before the survey. Some decline in the quintums is observed in the period 6-10 years before the survey, especially for transition to parity two and to parities five and higher. The estimates for the most recent period are substantially lower than previous estimates for most parities. The decline is most evident at parities four and five.

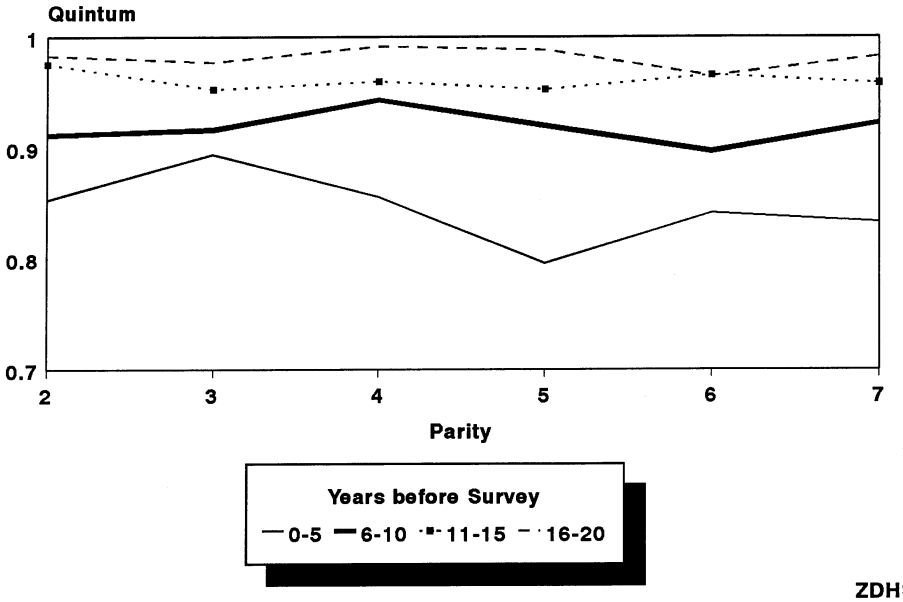
The proportion of women having a birth within five years of the previous birth calculated for urban and rural areas separately are shown in Figures 3.4 and 3.5. Both rural and urban areas show a decline in fertility in the most recent period, although the decline for urban areas is greater. In addition, it appears that the decline in urban areas began earlier than in rural areas.

Figure 3.4
Proportion of Women having a Birth within Five Years of a Previous Birth Rural Zambia



ZDHS 1992

Figure 3.5
Proportion of Women having a Birth within Five Years of a Previous Birth Urban Zambia



ZDHS 1992

4 Proximate Determinants of Fertility

To improve the understanding of the causes of fertility variation it is necessary to analyze the mechanisms through which socioeconomic variables influence fertility. Davis and Blake (1956) referred to these mechanisms as the intermediate fertility variables. Later, Bongaarts developed a model which quantifies the impact of the Davis-Blake variables on fertility (Bongaarts, 1978; Bongaarts and Potter, 1983). In the model, the following fertility rates are defined:

(i) The total fertility rate (TFR). This is the number of births a woman would have at the end of the reproductive period if she were to bear children at prevailing age-specific fertility rates while living through the entire reproductive period;

(ii) The total marital fertility rate (TMFR). This is the number of births a woman would have at the end of the reproductive years if she were to bear children at prevailing age-specific marital fertility rates and remain married during the entire reproductive period;

(iii) The total natural marital fertility rate (TN). This is equal to the total marital fertility rate in the absence of contraception and induced abortion;

(iv) The total fecundity rate (TF). This is the total natural fertility rate in the absence of lactational and postpartum abstinence. In other words, it is a biological maximum value.

The model rests on the fact that TF will always exceed TN, which in turn will always exceed the TMFR which will exceed the TFR. Thus, the following set of equations can be written:

$$TN = TF*C_i$$
$$TMFR = TN*C_c*C_a$$
$$TFR = TMFR*C_m$$

where C_i is an index of the length of postpartum infecundability, C_c is the index of contraception, C_a is an index of induced abortion and C_m is an index of the prevalence of marriage. All these indices take values between 0 and 1. The indices are equal to 1 if the fertility-inhibiting effect of the component to which they refer is nonexistent and equal to 0 if the fertility-inhibiting effect of this component is total. The summary of the above three equations is:

$$TFR = TF*C_i*C_c*C_a*C_m$$

The four indices therefore measure the way in which each of the following four components:

1. the amount of postpartum infecundability,
2. the use of contraception,
3. the use of induced abortion, and
4. the prevalence of marriage,

reduce fertility from its biological maximum. The relative values of the four indices tell us the relative importance of each of the components in reducing fertility. The Bongaarts model has been applied to examine the effect of contraception, marriage, and postpartum infecundity in generating observed fertility levels and differentials in Zambia based on the ZDHS data.

Table 4.1 shows the components of the Bongaarts model, the contraceptive prevalence rates, the mean insusceptibility periods and TFRs by background characteristics. The abortion index is not estimated because there is no information on the prevalence of abortion available from the Zambia DHS. It can be noted from Table 4.1 that the implied total fecundity rates (TF) for all categories of background characteristics are lower than that given by Bongaarts (15.3). This could imply that abortions contribute significantly to reducing total fecundity. Although abortions are illegal in Zambia, except on medical grounds, there is anecdotal evidence of a high number as indicated by the high number of illegal abortion complication cases recorded in the hospitals (Castle et al., 1990). In addition, in North-Western and Western provinces where, as mentioned earlier, women may have unusually high levels of sterility, the TF is unusually low at 11.4.

Table 4.1 Indices of Bongaarts' model and related measures, Zambia 1992

Background characteristic	Indices			Total fertility 4 years before survey	Implied fecundity	Mean insusceptibility period (months)	Contraceptive prevalence[1] (percent)
	C_i	C_c	C_m				
Zambia	0.63	0.88	0.91	6.4	12.6	13	12.6
Residence							
Urban	0.67	0.81	0.88	5.6	11.7	11	19.0
Rural	0.61	0.93	0.94	7.1	13.4	15	7.0
Education							
None	0.59	0.95	0.95	7.2	13.3	15	5.0
Primary	0.63	0.90	0.94	6.7	12.5	13	11.1
Secondary	0.68	0.73	0.84	5.0	12.0	11	25.7
Higher	0.79	0.51	0.93	4.1	10.9	7	57.3
Province							
Central	0.65	0.92	0.94	6.8	12.1	12	8.3
C/belt	0.66	0.83	0.89	6.0	12.3	12	16.5
Eastern	0.61	0.94	0.95	6.8	12.5	14	6.4
Luapula	0.62	0.93	0.94	7.2	13.3	14	6.5
Lusaka	0.65	0.78	0.88	5.4	12.1	13	22.6
Northern	0.60	0.85	0.94	8.0	16.7	15	16.3
Southern	0.64	0.92	0.94	7.0	12.6	13	7.5
N/Western & Western	0.60	0.93	0.91	5.8	11.4	15	7.3

[1] Does not include "other" methods

Another way of presenting the results from the model is to express the contribution of each index as a percentage of total fecundity (Adlakha et al., 1991). The results of this calculation are shown in Table 4.2. The table shows that there are differences according to background characteristics in the importance of the indices in reducing total fecundity from its maximum. For Zambia as a whole, postpartum infecundity accounts for 37 percent, followed by contraception at 7 percent and marriage at 5 percent. In rural Zambia, postpartum infecundability accounts for 39 percent of TF compared to urban Zambia where it accounts for only 33 percent. Contraception accounts for 4 percent of the TF in rural Zambia compared to 13 percent in urban Zambia and marriage accounts for 3 percent of TF in rural Zambia compared to 6 percent in urban Zambia. The differences in the indices between rural Zambia and urban Zambia imply that women breastfeed and abstain longer, contracept much less and get married earlier in rural Zambia than in urban Zambia.

Differences in current levels of fertility by level of education and province can also be examined using this approach. A significant difference between the women with low fertility and women with high fertility is the percent of TF accounted for by contraception. For example, contraception accounts for 18 and 39 percent of TF for women with secondary and higher education, respectively, while it accounts for 6 percent or less among those with no or primary education.

Table 4.2 Percent contribution of the proximate determinants to total fecundity, Zambia 1992

Background characteristic	TFR	Postpartum infecundability	Contraception	Marriage	Total
Zambia	51	37	7	5	100
Residence					
Urban	48	33	13	6	100
Rural	53	39	4	3	100
Education					
No education	54	41	3	3	100
Primary	53	37	6	3	100
Secondary	42	32	18	8	100
Higher	37	21	39	3	100
Province					
Central	56	35	5	4	100
Copperbelt	49	34	11	6	100
Eastern	54	39	4	3	100
Luapula	54	38	4	4	100
Lusaka	45	35	14	6	100
Northern	48	40	9	3	100
Southern	55	36	5	4	100
North-Western and Western	51	40	4	5	100

Note: Contribution of each proximate determinant has been computed based on indices in Table 4.1

5 Transition to First Marriage and First Birth

Marriage and childbearing in African societies are seen as important and obligatory stages in the transition from childhood to adulthood. The majority of women are married within a few years after attaining puberty and most births take place within marriage. As a result, the proportion of females ever married and their age at marriage have significant implications for fertility levels as they determine the percentage of females exposed to childbearing and the duration of that exposure. A comparative analysis of Demographic and Health Surveys and World Fertility Survey data shows that declines in fertility in many Asian and North African countries started because of delayed age at marriage, followed by an increase in the use of contraception, while age at marriage continued to increase (Adlakha et al., 1991).

The percentage of females ever married by five-year age groups in 1969, 1980 and 1992 are indicated in Table 5.1. There was a significant decline in the percentage of females ever married in the age groups 15-19 and 20-24 years between 1969 and 1980 but this decline did not continue between 1980 and 1992. This pattern may be related to the slowdown in urbanization of the female population between 1980 and 1990.

The increase in the median age at marriage across age cohorts is shown in Figure 5.1.[2] The figure shows that women in each birth cohort have been progressively marrying later. The importance of marriage for fertility is in its impact on increasing exposure to pregnancy. However, it can not necessarily be concluded that since women have been marrying later, they also have been having their births later. While there has been a rapid increase in the median age at marriage starting with the birth cohort 1962-1958 to the birth cohort 1977-1973, the median age at first childbirth has increased less rapidly across the same birth cohorts. As a result, the gap between the median age at first marriage and the median age at first childbirth has narrowed.

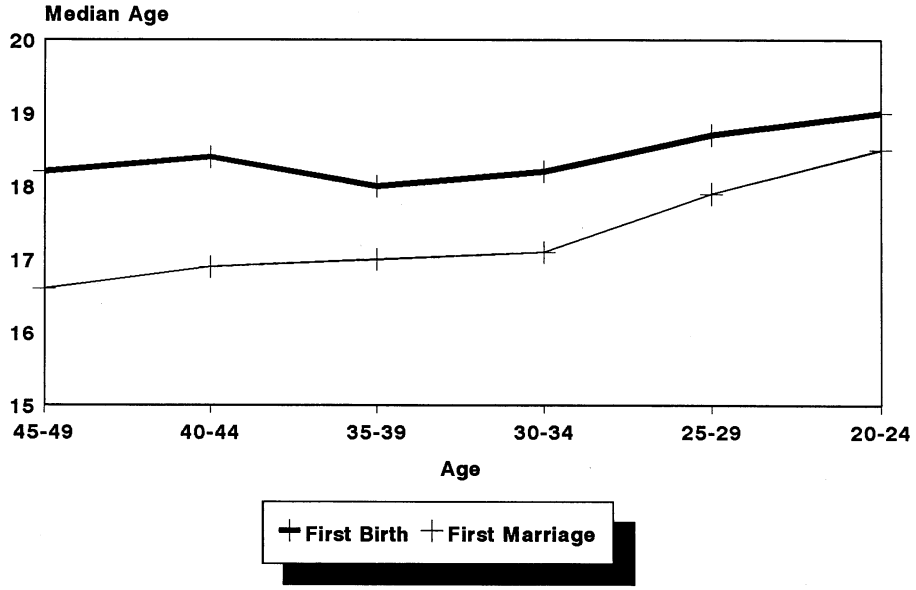
Table 5.1 Percentage of females ever married by age, Zambia 1969, 1980 and 1992

Age group	Proportion of females ever married		
	1969	1980	1992
15-19	42	32	30
20-24	91	80	79
25-29	96	92	94
30-34	98	96	98
35-39	98	97	99
40-44	98	97	100
45-49	98	97	100

Sources: 1969 and 1980 figures are from Census of Population and Housing 1980 Final Report Vol III. 1992 figures are from the Zambia DHS 1992.

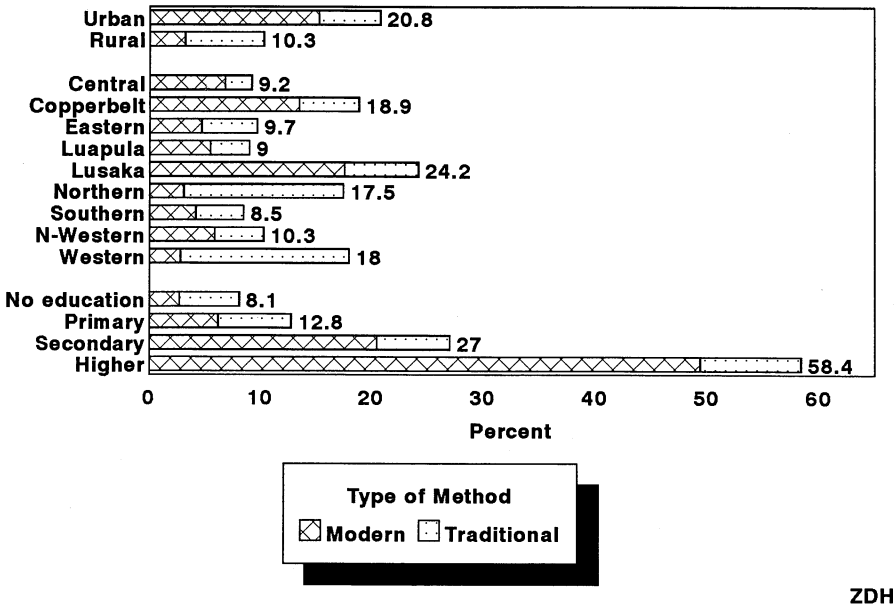
[2] The medians shown are based on life tables.

Figure 5.1
Median Age at First Marriage and First Birth by Age



ZDHS 1992

Figure 6.1
Percent of Married Women Using Contraception by Type of Method



ZDHS 1992

6 Fertility Regulation and Reproductive Preferences

6.1 CONTRACEPTIVE KNOWLEDGE AND USE

Knowledge of family planning methods and service providers are preconditions for the use of contraceptives. To determine women's knowledge of contraception, the ZDHS questionnaire first asked respondents to name any methods that a couple can use to delay or avoid pregnancy. For any methods the respondent did not spontaneously mention, the interviewer described the method and the respondent was asked if she recognised it. Descriptions for seven modern methods (pill, IUD, injections, vaginal methods, condom, female sterilisation and male sterilisation) and two traditional methods (natural family planning and withdrawal) were included.

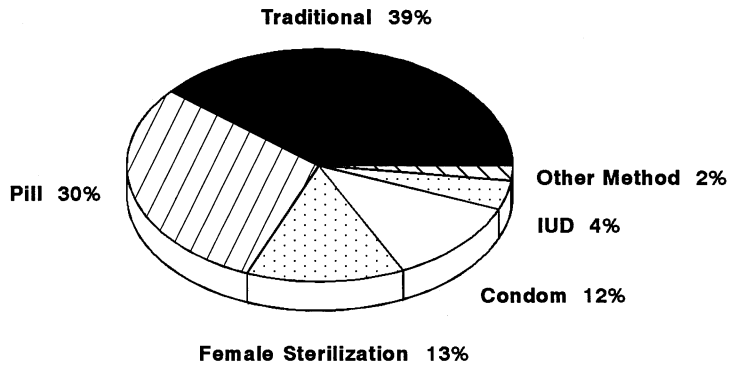
The level of awareness of family planning and particularly modern methods of family planning is relatively high in Zambia. Results from the Contraceptive Prevalence Survey (1988) showed that about 60 percent of all the women interviewed had heard of family planning; in the ZDHS, approximately 90 percent of the respondents had heard of at least one method.

The contraceptive prevalence rate (CPR) among married women in Zambia is about 15 percent. This rate is relatively low compared to countries like Zimbabwe (43 percent), Kenya (26 percent) and Botswana (30 percent). Figure 6.1 shows the percentage of married women using contraception by background characteristics. Approximately twice as many urban dwellers as rural dwellers use contraception. Contraceptive use increases dramatically with increasing levels of education, from 8 percent among women with no education to 58 percent among those with higher education. Among the regions, contraceptive prevalence is between 18 and 24 percent in Lusaka, Copperbelt, Western and Northern regions, while it is 9-10 percent in the remaining regions.

Figure 6.2 shows that about 60 percent of current users of contraception use modern methods. The pill is the most commonly used modern method, followed by female sterilisation and the condom. Family planning organisations, like the Planned Parenthood Association of Zambia (PPAZ) and Mindolo Ecumenical Foundation, are vigorously campaigning for increased use of the condom to prevent the spread of AIDS. Traditional methods are withdrawal, natural family planning (rhythm), herbs, strings and others. About 39 percent of current users use a traditional method.

As shown in Table 6.1, contraceptive use is most prevalent among women aged 35-39; 19 percent of these women use family planning. Contraceptive prevalence is lowest among women aged 15-19 (7 percent) and 45-49 (10 percent). Among women under age 40, the pill and withdrawal account for more than half of all contraceptive use. Among contraceptive users age 40-49, more than half are sterilised.

Figure 6.2
Percent Distribution of Contraceptive Users by Method



ZDHS 1992

Table 6.1 Percentage of currently married women using specific methods by age, Zambia 1992

Age group	Percent using						
	Pill	IUCD	Diaphragm	Condom	Sterilisation	Natural FP	Withdrawal
15-19	1.8	0.0	0.0	1.6	0.0	0.4	3.4
20-24	4.3	0.1	0.0	3.0	0.1	0.7	3.5
25-29	6.0	0.4	0.0	1.8	0.2	1.3	3.2
30-34	5.5	1.3	0.4	2.0	1.3	0.9	3.1
35-39	6.1	0.2	0.4	1.0	6.3	1.4	4.0
40-44	1.6	1.0	0.3	0.8	7.2	1.0	1.2
45-49	1.0	3.0	0.0	0.0	5.2	0.0	0.4
Total	4.3	0.4	0.1	1.8	2.1	0.9	3.0

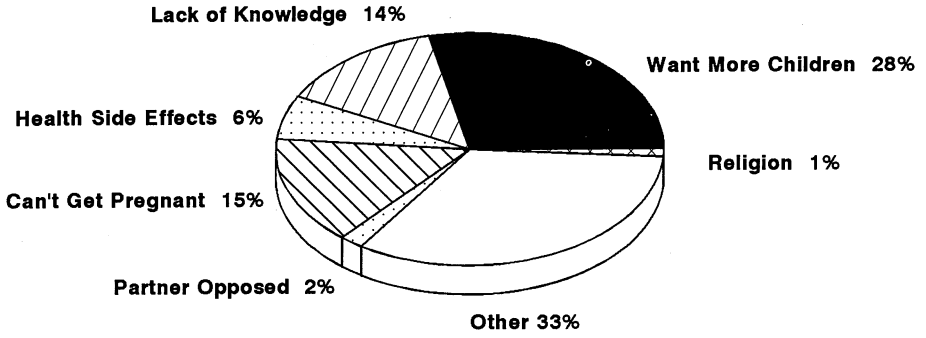
6.2 NONUSE OF CONTRACEPTION

Of all women interviewed in the Zambia DHS survey who were not using any method to delay or avoid pregnancy, 43 percent intended to use a method in future and 47 percent were not intending to use any method in the near future. Ten percent did not know their future intentions. The most preferred method of contraception among those who intend to use is the pill. This method is the preferred of almost 60 percent of all women who intend to use a method in the future. A reasonably high proportion of current nonusers intend to use a traditional method of contraception. The IUD and other modern contraceptive methods were the least preferred. Eleven percent of women were not sure which method to use though they intend to use a method in the future.

Of the women who did not intend to use a method of contraception, 28 percent said it was because they wanted more children, 14 percent did not intend to use due to a lack of knowledge, 15 percent said that they couldn't get pregnant and 2 percent did not intend to use due to their partners opposition (Figure 6.3).

These results have implications for policy in terms of unmet need for contraception, educational campaigns for partners about the advantages of contraceptive use and health problems of the women.

Figure 6.3
Percent Distribution of Non-Users of Contraception Who Do Not Intend to Use Contraception by Reason



ZDHS 1992

7 The Determinants of Fertility Differences in Zambia

In Section 3 it was shown that fertility has declined in all regions and among all subgroups in Zambia, although the pace of fertility decline has differed. What has determined the differences in the pace of fertility decline and the differences in fertility levels among regions and sub-groups? Age at marriage, education levels of women and husbands and region of residence generally affect the level of fertility at the macro level (van de Walle and Foster, 1990). However, the impact of these factors on fertility is variable. Cleland and Rodgríguez (1988) undertook a comparative analysis of the relationship between education (both male and female) and marital fertility in a cross-section of World Fertility Survey (WFS) countries using individual level data. Although they found substantial variation in the patterns observed in different regions of the world they found little variation among countries within any given region. Thus, although there was a clear negative relationship between education and fertility in Latin America, the relationship in Asia and Africa was less clear with the highest marital fertility often found among women with a few years of schooling. In the same study the effects of fertility determinants other than education were ambiguous.

The implication from these studies is that the impact of women's and men's levels of education, region of residence and age at marriage cannot be generalised across societies. The influence of these variables operates through societal and cultural factors which are difficult to quantify. The Caldwells have postulated the influence of a number of cultural factors on fertility, although many of their propositions have been questioned (van de Walle and Foster, 1990). In this section, we will examine whether age at marriage, education and region of residence have a significant impact on fertility differences in Zambia.

In order to determine which factors most influence fertility differences in Zambia, multiple and logistic regression models have been fitted. Two multiple regression models to predict the number of children ever born to women 15 to 49 years and women 35 years and above were fitted. We also fitted logistic regression models to predict the probability of using a contraceptive method, the probability of having a birth in the period 1990-1992 and the probability of marrying before 18 years of age. For reference, the regression coefficients and their standard errors are presented in Appendix A.

Based on the results of the models, we calculated predicted values of each of the dependent variables for categories of the independent variables. These predicted values are presented in Tables 7.1-7.3. The predicted values for each category of an independent variable are calculated net of each of the other variables in the equation; the other variables are assigned their mean value.

7.1 SELECTION OF VARIABLES

The dependent variable children ever born to women 15-49 years was selected to represent the average fertility of women by the middle of their reproductive years, while the dependent variable children ever born to women age 35 years and older was selected to represent the fertility of women who had completed or were close to completing childbearing. The probability of having a birth in the two years before the survey (1990-1992) has been selected as a measure of current fertility. The independent variables have been selected on the basis of differences in fertility between regions and sub-groups shown in Section 3, indications from the Bongaarts model in Section 5 that differences in age at marriage and differences in the level of use of contraception account for fertility differences between regions and sub-groups.

The probability of marrying before 18 years has been selected because the median age at marriage for all women in Zambia from the ZDHS data is 18 years. Before identifying policies to raise the median age at marriage, it is necessary to identify women who are most likely to marry before 18 years. The probability of using a contraceptive and the probability of marrying before 18 years for women of given characteristics were selected on the basis of indications in the Bongaarts model that marriage and use of contraceptives were

important in determining the level of fertility. The independent variables were selected because there are differences in the age at marriage and contraceptive use by region and background variables.

7.2 RESULTS FROM THE FERTILITY MODELS

In Table 7.1, it is shown that among women aged 15-49 and women aged 35-49, those using contraception have more children ever born than those not using contraception. This seemingly anomalous result is due to the fact that most women begin to use family planning after already having many births.

Women with primary education have the highest number of children ever born, followed by women with no education and women with secondary or higher education. The differences in fertility according to the husband's education follow the same pattern but are not statistically significant. Among women aged 15-49, the earlier they marry, the more children they have, net of other factors. Women whose husbands work in the non-agricultural sector are likely to have fewer children ever born than those whose husbands work in the agricultural sector.

Women with higher ideal numbers of children have many more children ever born than women with lower ideal numbers of children. The number of children ever born to women of North-Western and Western provinces is significantly lower than in other provinces.

The probability of having a birth in the two years before the survey (Table 7.2), a measure of current fertility, is significantly lower for women using contraception than for those not using. As age increases the probability of having a recent birth declines. Women with no education are more likely to have had a birth in the last two years than those with primary education and those with secondary or higher education. There are not significant differences in the probability of having a recent birth by husband's education or occupation, urban-rural residence, or ideal number of children.

7.3 RESULTS FROM THE MODEL ESTIMATING THE PROBABILITY OF MARRYING BEFORE 18 YEARS

The probability of marrying before age 18 decreases with increasing levels of women's and husband's education. An interesting finding is that the ideal number of children is not significant in influencing the probability of marrying before 18 years. However, women indicating higher ideal numbers of children are likely to have a high number of children ever born (Table 7.1). The implication is that women do not enter into marital unions to fulfil their desire for a certain number of children and that ideal numbers of children are conjured up within the marital union, most likely under the influence of kinship associations.

7.4 RESULTS FROM THE MODEL ESTIMATING THE PROBABILITY OF USING A CONTRACEPTIVE METHOD

The estimated probabilities of using a contraceptive method and not using a contraceptive method are shown in Table 7.3. The probability of using a contraceptive method is lower for women with higher ideal family sizes than for women with lower ideal family sizes. The probability of using a contraceptive method increases with age. Among the provinces, the probability of using a contraceptive method is highest for Northern and North-Western/Western provinces.

Table 7.1 Predicted number of children ever born, Zambia 1992

Characteristic	Predicted children ever born	
	All women 15-49 years	Women 35-49 years
Contraceptive use		
Using	3.94	5.22
Not Using	3.41	5.65
Residence		
Urban	3.49	5.25
Rural	3.48	5.32
Level of education		
None	3.41	5.27
Primary	3.55	5.36
Secondary/Higher	3.37	5.11
Education of husband		
None	3.43	5.26
Primary	3.51	5.30
Secondary/Higher	3.47	5.30
Age of woman		
17.5	0.41	2.91
22.5	2.14	3.71
27.5	3.50	4.36
32.5	4.50	4.51
37.5	5.14	4.85
42.5	5.42	5.20
47.5	5.34	5.43
Age at marriage		
15	3.82	5.47
17.5	3.41	5.33
22.5	2.62	4.82
Occupation of husband		
Non-agriculture	3.38	5.17
Agriculture	3.58	5.42
Ideal number of children		
0 to 4	3.26	5.11
5 and 6	3.48	5.19
7 and above	3.65	5.40
Province		
Central	3.41	5.12
Copperbelt	3.42	5.53
Eastern	3.56	5.22
Luapula	3.55	5.28
Lusaka	3.43	5.24
Northern	3.62	5.45
Southern	3.59	5.33
North-Western/Western	3.26	4.95

Table 7.2 **Estimated probabilities of marrying before 18 years and having a birth in the two years before the survey, Zambia 1992**

Characteristic	Probability of event	
	Marry before age 18	Have a birth within two years prior to survey
Contraceptive use		
Using		0.39
Not using		0.52
Children ever born		
0		0.01
1		0.04
2		0.11
3		0.29
4		0.56
5		0.80
6		0.93
7 and above		0.98
Residence		
Urban	0.76	0.39
Rural	0.72	0.43
Education		
None	0.78	0.48
Primary	0.79	0.40
Secondary/Higher	0.48	0.39
Education of husband		
None	0.78	0.40
Primary	0.76	0.43
Secondary/Higher	0.70	0.39
Age of woman		
17.5	0.76	0.98
22.5	0.73	0.88
27.5	0.71	0.57
32.5	0.71	0.20
37.5	0.72	0.05
42.5	0.74	0.01
47.5		0.01
Age at marriage		
15		0.99
17.5		0.44
22.5		0.67
Occupation of husband		
Non-agriculture	0.74	0.40
Agriculture	0.73	0.42
Ideal number of children		
0 to 4	0.70	0.43
5 and 6	0.75	0.41
7 and above	0.76	0.39
Province		
Central	0.72	0.46
Copperbelt	0.79	0.44
Eastern	0.72	0.36
Luapula	0.79	0.47
Lusaka	0.71	0.43
Northern	0.76	0.41
Southern	0.72	0.38
North-Western/Western	0.65	0.36

Table 7.3 Estimated probabilities of using or not using a contraceptive method, Zambia 1992

Characteristic	Probability of event	
	Using contraception	Not using contraception
Children ever born		
0	0.03	0.97
1	0.05	0.95
2	0.07	0.93
3	0.09	0.91
4	0.13	0.87
5	0.19	0.81
6	0.25	0.75
7 and above	0.34	0.66
Residence		
Urban	0.12	0.88
Rural	0.11	0.89
Education		
None	0.08	0.92
Primary	0.10	0.90
Secondary/Higher	0.21	0.79
Education of husband		
None	0.08	0.92
Primary	0.08	0.92
Secondary/Higher	0.11	0.89
Age of women		
17.5	0.14	0.86
22.5	0.11	0.89
27.5	0.09	0.91
32.5	0.07	0.93
37.5	0.06	0.94
42.5	0.05	0.95
47.5	0.05	0.95
Age at marriage		
15	0.12	0.88
17.5	0.08	0.92
22.5	0.10	0.90
Occupation of husband		
Non agriculture	0.12	0.88
Agriculture	0.11	0.89
Ideal number of children		
0 to 4	0.16	0.84
5 and 6	0.10	0.90
7 and above	0.09	0.91
Province		
Central	0.05	0.95
Copperbelt	0.09	0.91
Eastern	0.08	0.92
Luapula	0.06	0.94
Lusaka	0.11	0.89
Northern	0.12	0.88
Southern	0.06	0.94
North-Western/Western	0.12	0.88

8 Policy Implications of the Findings

The findings from these models have a number of policy implications. Details of population policies of Zambia can be found in the population policy document (Likwa, 1989). The findings from the models imply that strategies for the following policies should be implemented in the listed order of priority to sustain the fertility decline in Zambia.

(i) A strategy to promote the desire for small families should be high on the agenda. The models predicting the number of children ever born show that fertility intentions influence the number of children women will have and the likelihood of women demanding contraceptive methods in Zambia. Not much has been done to promote the "small is beautiful" norms of family size. This was the consensus of the InterAgency Technical Committee on Population which is responsible for implementing Zambia's population policy. High fertility intentions promoted through the African cultural context account for some of the failure of African countries family planning programmes in reducing fertility.

(ii) Messages discouraging large families should be targeted at primary school pupils as a special group. Currently, women whose highest level of education attainment is primary education are likely to have more children than women who have not attained any education or women whose highest level of education attained is secondary or higher.

(iii) Use of contraceptives should be encouraged among young women. It is too late to begin using contraceptives at older ages. Women using a contraceptive method at the time of the survey were less likely to have a birth in the two years before the survey. Thus, use of contraception lowers fertility but currently contraception is most likely to be used by older women who would already have had several children.

(iv) Female levels of education should be raised. In Zambia, high levels of female education have a greater impact on lowering fertility than high levels of male education. However, it should be noted that a female with primary education is likely to have more children ever born than a female without education. Thus, it appears that only education beyond the primary level has a negative impact on fertility.

(v) Although the government has succeeded in reducing the rate of urbanization (the female urban population only grew from 39 percent in 1980 to 41 percent in 1990) (CSO, 1991) it should be noted that urban dwellers are likely to have lower fertility as they marry later and are more likely to use a contraceptive method than rural women.

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Table A.1 Proportions and means of independent variables used in multivariate models

Independent variables	Ever married women age 15-49	Ever married women age 35+	Women age 18+
Not using contraception	0.86	0.84	
Urban	0.46	0.43	0.46
Education			
None	0.20	0.32	0.20
Secondary/Higher	0.19	0.15	0.20
Age	29.90	41.09	30.34
Age squared	968.67	1707.00	991.98
Education of husband			
None	0.10	0.16	0.10
Secondary/Higher	0.41	0.26	0.41
Non-agricultural occupation	0.45	0.51	0.55
Age at marriage	17.14	16.93	
Age at marriage squared	303.12	299.43	
Ideal number of children			
0-4	0.25	0.19	0.25
5-6	0.39	0.26	0.39
Province			
Central	0.09	0.09	0.09
Copperbelt	0.22	0.21	0.23
Eastern	0.12	0.11	0.11
Luapala	0.07	0.07	0.07
Lusaka	0.16	0.17	0.16
Northern	0.09	0.10	0.09
North-Western/Western	0.10	0.11	0.10
Children ever born	3.47		
Number of Cases	5279	1543	5108

Note: Values for omitted categories not shown.

Table A.2 **Coefficients of the multiple regression of children ever born to ever married women aged 15-49**

Independent variables	Coefficient	Standard error of the coefficient
Constant	-5.87	0.42
Not using	-0.52**	0.05
Urban	.01	0.05
Education		
None	-0.14**	0.05
Secondary/Higher	-0.17**	0.05
Education of husband		
None	-0.09	0.06
Secondary/higher	-0.04	0.04
Age	0.63**	0.01
Age squared	-0.007**	0.00
Age at marriage	-0.05	0.04
Age at marriage squared	-0.003**	0.00
Non agriculture	-0.20**	0.05
Ideal number of children		
0 to 4	-0.39**	0.05
5 and 6	-0.17**	0.04
Province		
Central	-0.18*	0.07
Copperbelt	-0.03	0.07
Eastern	-0.16*	0.07
Luapula	-0.03	0.07
Lusaka	-0.15*	0.07
Northern	0.03	0.07
North-Western/Western	-0.33**	0.07

r squared=0.66
* $p < .05$; ** $p < .01$

Table A.4 **Coefficients of the logistic regression of the probability of having a birth during the two years prior to the survey for ever married women aged 15-49**

Independent variables	Coefficient	Standard error of the coefficient
Constant	2.61**	0.95
Children ever born	1.16**	0.04
Using	-0.51**	0.10
Urban	-0.17	0.112
Woman's education		
None	0.34*	0.10
Secondary/Higher	0.03	0.10
Education of husband		
None	-0.13	0.12
Secondary/Higher	-0.14	0.09
Age	-0.47**	0.04
Age squared	0.002**	0.00
Age at marriage	0.40**	0.08
Age at marriage squared	-0.005*	0.02
Non agriculture	-0.06	0.09
Ideal number of children		
0 to 4	0.16	0.10
5 and 6	0.07	0.08
Province		
Central	0.34*	0.14
Copperbelt	0.26*	0.13
Eastern	-0.06	0.13
Luapula	0.37*	0.15
Lusaka	0.21	0.14
Northern	0.16	0.14
North-Western/Western	-0.09	0.14

* $p < 0.05$; ** $p < 0.01$

Table A.6 **Coefficients of the logistic regression of the probability of not using contraception for ever married women aged 15-49**

Independent variables	Coefficient	Standard error of the coefficient
Constant	3.14**	1.11
Children ever born	-0.39**	0.04
Urban	-0.09	0.13
Woman's education		
None	0.35*	0.14
Secondary/Higher	-0.84**	0.11
Education of husband		
No education	0.24	0.18
Secondary/Higher	-0.33**	0.11
Age	0.07	0.05
Age squared	-0.0005	0.0007
Age at marriage	-0.02	0.09
Age at marriage squared	-0.0003	0.002
Non agriculture	-0.14	0.12
Ideal number of children		
0 to 4	-0.65**	0.12
5 and 6	-0.13	0.11
Province		
Central	0.02	0.21
Copperbelt	-0.48**	0.17
Eastern	-0.41*	0.20
Luapula	0.05	0.23
Lusaka	-0.74**	0.17
Northern	-0.87**	0.19
North-Western/Western	-0.87**	0.19

* $p < 0.05$; ** $p < 0.01$

Table A.7 **Coefficients of the logistic regression of the probability of marrying before age 18 for women aged 18 and above**

Independent variables	Coefficient	Standard error of the coefficient
Constant	3.08**	0.50
Urban	0.18	0.10
Education		
No education	-0.05	0.10
Secondary/Higher	-1.39**	0.09
Education of husband		
No education	0.10	0.13
Secondary/Higher	-0.27**	0.09
Age	-0.10**	0.03
Age squared	0.001**	0.0005
Non agriculture	0.04	0.09
Ideal number of children		
0 to 4	-0.32**	0.09
5 and 6	-0.07	0.08
Province		
Central	0.07	0.14
Copperbelt	0.31*	0.13
Eastern	-0.005	0.13
Luapula	0.35*	0.16
Lusaka	-0.06	0.13
Northern	0.19	0.14
North-Western/Western	-0.37*	0.13

* $p < 0.05$; ** $p < 0.01$

Breastfeeding, Contraceptive Use, and Fertility in Zimbabwe: A Further Analysis of the Demographic and Health Survey

William B. Muhwava
University of Zimbabwe
Population Studies Programme
Harare, Zimbabwe

Ityai Muvandi
Evaluation and Research Unit
Zimbabwe National Family Planning Council
Harare, Zimbabwe

1 Country Profile

Zimbabwe lies north of the Tropic of Cancer and has a total land area of about 391 thousand square kilometres. The country is bordered by Mozambique on the east, South Africa on the south, Botswana on the west and Zambia on the north and northwest. Zimbabwe's population was 7.6 million in 1982. Currently, the population is estimated at 10.9 million (CSO, 1992). Zimbabwe has conducted three censuses, in 1961/62, 1969 and 1982. Population estimates indicate that the average annual increase in the population has been three percent or more since the 1930s (CSO, 1987 and 1989). Zimbabwe has a youthful population, with 48 percent of the national population under 15 years of age.

Zimbabwe has a dependency ratio of about 104 which means that each 100 Zimbabweans aged between 15 and 64 years support 104 other people outside that age range. The majority of Zimbabweans live in rural areas (69 percent), leaving the percentage of the urban population at 31 percent (CSO, 1992).

The total fertility rate (TFR) was estimated at 5.6, 6.5 and 5.7 in 1982, 1984 and 1988, respectively. These fluctuations could reflect a rise in births following independence and a subsequent fall. The infant mortality rate (IMR) was estimated to be 101 and 83 in 1969 and 1982, respectively. The improvement in infant and child survival between 1969 and 1982 contributed to the increase in life expectancy, from 50.8 to 57.4 years.

A dramatic increase in the use of contraception occurred in Zimbabwe during the 1980s. The contraceptive prevalence rate (CPR), estimated at 14 percent in 1980, rose to 39 percent in 1984, and continued to increase to 43 percent in 1988.

2 Objectives of the Paper

This paper is an outcome of The Anglophone Africa Regional Analysis Workshop of the Demographic and Health Surveys Program conducted in Harare from June 22 through August 7, 1992. A careful and timely analysis of fertility data is needed as there are signs that some African countries are on the verge of experiencing a dramatic decline in fertility. The objectives of this analysis were as follows:

(i) To document recent fertility trends in Zimbabwe on the basis of solid demographic analysis;
(ii) To make an analysis of trends and subnational fertility differentials using the data from the Zimbabwe Demographic and Health Survey (ZDHS);
(iii) To show the policy implications of fertility trends;
(iv) To analyze the proximate determinants of fertility in Zimbabwe;

(v) To assess the effect of socioeconomic variables on fertility; and
(vi) To examine the relationship between fertility and breastfeeding.

3 Sample Design

The sample for the ZDHS was a subsample of the Zimbabwe Revised Master Sample (ZRMS) for the Zimbabwe National Household Survey Capability Program of the Central Statistical Office. The approach of using the master sample allows for the possibility of linking data from different surveys.

The ZRMS was a two-stage area sample based on the August 1982 population census. The Primary Sampling Units (PSUs) were the Enumeration Areas (EAs) and the households were the Secondary Sampling Units (SSUs). The sample was stratified at the first stage, and in principle, self-weighted within each stratum. The strata divide the country into sectors which are mutually exclusive and exhaustive. The eight provinces were cross-tabulated against the following six strata: Communal Lands, Commercial Farming Areas, Urban and Semi-Urban Areas, Resettlement Areas, Small Scale Commercial Farming Areas, Forests, Parks and Statelands.

The last stratum, Parks and Statelands, was ignored because the population residing in this stratum was too small. Furthermore, of the overall 48 cells, 3 were empty; hence, 37 cells were used. The ZRMS contains 273 EAs. The subsample for the ZDHS was drawn from the ZRMS and contained 167 EAs. The household sample was self-weighting and nationally representative.

The major analytic objective of the ZDHS was to obtain data for estimating levels of fertility and mortality, as well as to provide information on the proximate determinants of fertility and basic indicators of maternal and child health. To achieve its objectives, the ZDHS interviewed all women aged 15-49 years in the selected households.

3.1 ORGANIZATION OF SURVEY OPERATIONS

Two questionnaires were used for the ZDHS: a household questionnaire and an individual woman's questionnaire. Both questionnaires were administered in Shona, Ndebele or English, with these major languages appearing on the same questionnaire. Information on the age and sex of all the usual members and visitors in the selected households was recorded on the household questionnaire and used to identify women eligible for the individual questionnaire. Eligibility for the individual interview was determined on a de facto basis: that is, a woman was eligible if she was between 15 and 49 years old and had spent the night prior to the interview in the household. The individual questionnaire was used to collect information on the following topics:

1. Background characteristics of the respondent
2. Reproductive behaviour and intentions
3. Knowledge and use of contraception
4. Breastfeeding, health and vaccination status of children
5. Marriage
6. Fertility preferences
7. Husband's background and woman's economic activity
8. Anthropometric measurements of children between 3 and 60 months

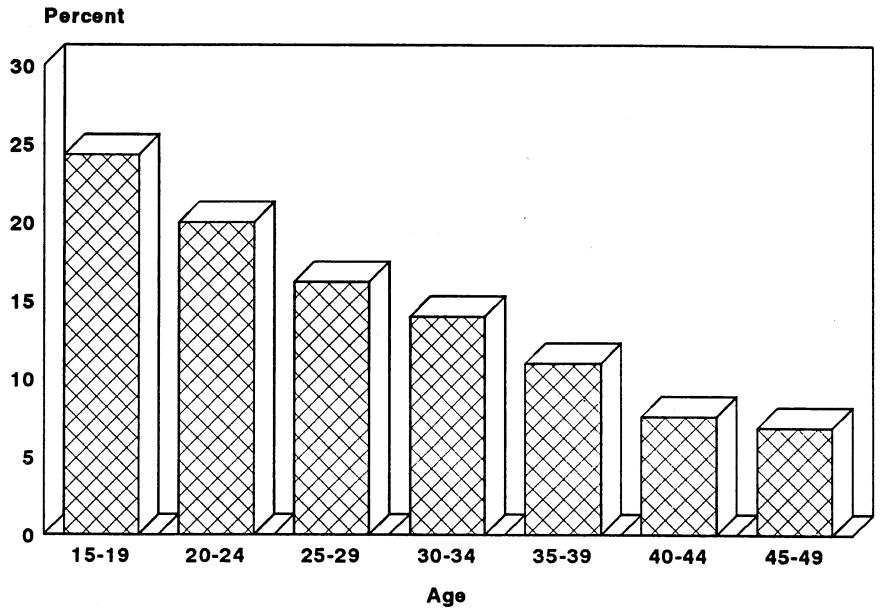
Fieldwork started on September 15, 1988 and was completed in February, 1989. Data entry and editing began one month after the fieldwork began and was completed within two weeks after the fieldwork ended.

4 Background Characteristics

Age Composition

A total of 4,201 women were interviewed in the ZDHS. The largest group of respondents (24 percent) are between the ages of 15 and 19 years (see Figure 4.1). About 75 percent of all respondents are under 35 years of age. When comparing the population age distribution of the ZDHS with the 1982 Population Census figures, it appears as if the 15-19 and the 45-49 year-olds are somewhat underrepresented in the ZDHS.

Figure 4.1
Grouped Age Distribution of Women



Place and Region of Residence

Table 4.1 shows that the ZDHS sample distribution was fairly comparable to the provincial population distribution (CSO, 1984). The majority of the respondents (67 percent) are residents of communal lands, while the remaining 34 percent are urban residents. These proportions are comparable to the 1982 Population Census distribution: rural (69 percent) and urban (31 percent).

Table 4.1 Percent distribution of respondents by province/city, Zimbabwe 1988

Province/city	Number of respondents	Percent
Manicaland	527	12.5(14.5)
Mashonaland Central	288	6.9(7.4)
Mashonaland East	543	12.9(19.7)
Mashonaland West	495	11.8(11.2)
Matabeleland North	189	4.5(12.6)
Matabeleland South	282	6.7 (6.8)
Midlands	656	15.6(14.3)
Masvingo	497	11.8(13.5)
Harare/Chitungwiza	345	8.2
Bulawayo	379	9.0
Total	4201	100.0

The 1982 Provincial Population Distributions are shown in parentheses.

Education

The distribution of respondents by educational achievement shows that only 14 percent of the respondents have no formal education, 56 percent have some primary education, and 31 percent have obtained at least a secondary level of education or higher (see Table 4.2). Because of the influence of educational attainment on demographic processes, it is imperative to look at its association with other background characteristics.

Table 4.2 indicates that women in the younger generations are attaining higher educational levels than women in the older age groups. For example, only 3 percent of women in the 15-19 age group have not received any formal education, compared with 28 percent of women in the 45-49 age group. Among those who attended school, educational achievement is also much greater for younger women than older women: 50 percent of the younger cohort attended secondary or post-secondary schools, compared with only 7 percent of the women in the oldest age group. There appears to be an especially sharp increase in the percentage of women attending secondary education in the recent past, probably due to the government's policy of free and universal education. One in two women under age 25 has some secondary education, compared with only one in five women in the 25-29 age group.

Differences in educational attainment by place of residence are striking. The proportion of rural women with no formal education is 17 percent, almost three times the urban proportion (6 percent). Moreover, among women who have received some formal education, those in urban areas are more likely to have attained secondary levels than those in rural areas. One in two women in urban areas has attained secondary education, compared with one in five women in rural areas.

Table 4.2 **Percent distribution of women 15-49 years by level of education, according to age, residence, province and religion, Zimbabwe 1988**

Background characteristic	No education	Primary	Secondary/ Higher	Number of women
Age				
15-19	2.5	47.7	49.8	1021
20-24	7.0	42.4	50.6	840
25-29	18.0	61.9	20.2	679
30-34	17.3	65.4	17.3	589
35-39	17.5	68.8	13.8	464
40-44	29.6	61.0	9.4	318
45-49	28.3	64.8	6.9	290
Residence				
Urban	6.4	42.6	51.0	1407
Rural	17.0	62.6	20.4	2794
Province				
Manicaland	14.2	64.3	21.4	527
Mashonaland Central	26.0	52.8	21.2	288
Mashonaland East	15.1	57.8	27.4	543
Mashonaland West	19.8	58.8	21.4	495
Matabeleland North	24.4	56.1	18.5	189
Matabeleland South	6.0	69.1	24.8	282
Midlands	11.9	52.0	36.1	656
Masvingo	12.5	62.4	25.2	497
Harare/Chitungwiza	3.8	43.2	53.0	345
Bulawayo	4.7	40.6	54.6	379
Religion *				
Christian	8.4	54.7	36.9	2818
Spiritual	13.3	64.3	22.4	848
Traditional	42.9	50.4	6.6	361
Other	33.6	50.4	15.9	113
No religion	35.7	37.5	26.8	56
Total	13.5	55.9	30.6	4201

* 5 cases of missing information on religion

There is also considerable variation in educational attainment by province. The proportion of women having no formal education ranges from less than 5 percent in Harare/Chitungwiza and Bulawayo to 20 percent or more in Mashonaland Central, Mashonaland West and Matabeleland North. Those achieving at least a secondary level of education are more likely to be found in the two major cities (Harare/Chitungwiza and Bulawayo) where more than half of the women have at least some secondary schooling.

Additionally, educational attainment varies by religious affiliation. Women belonging to Christian or Spiritual churches are more likely to have attended school than women adhering to Traditional religious beliefs.

Marital Status

The distribution of respondents by marital status is shown in Table 4.3. Currently married respondents constitute about 63 percent of the total, 27 percent have never married, 3 percent of the women are widowed and 8 percent are divorced.

Table 4.3 Percent distribution of respondents by marital status, Zimbabwe 1988

Marital status	Number of respondents	Percent
Never married	1 133	27.0
Married	2 643	62.9
Widowed	105	2.5
Divorced	320	7.6
Total	4 201	100.0

Family Size

About 27 percent of all the respondents living in rural areas have no living children (see Table 4.4), while the corresponding proportion in urban areas is 33 percent. Forty-four percent of the respondents in the rural areas have between one and four living children, while the corresponding proportion in urban areas is 51 percent. Finally, 28 percent of the rural dwellers have five or more children, while only 16 percent of urban dwellers have five or more children.

Of the 56 percent of the respondents with primary education, 88 percent have one or more living children (not shown here). Of the 30 percent of the respondents with secondary education, 83 percent have one or more living children. Almost all of the women with no education (99 percent) have one or more living children.

Women who belong to a Christian church have smaller families than women who are affiliated with Traditional or Spiritual religions (not shown here). The largest proportion of the respondents are Christians (67 percent), of whom 79 percent have at least one or more living children. Of the 9 percent of the respondents with Traditional religious beliefs, almost all (99 percent) have one or more living children. Of the 20 percent of respondents who indicate that their religion is Spiritual, over 90 percent have one or more living children.

Table 4.4 Percent distribution of women by number of living children according to type of residence, Zimbabwe 1988

Number of living children	Urban	Rural
Nil	33.2	27.3
1-4	51.2	44.4
5+	15.6	28.3
Total	100.0	100.0

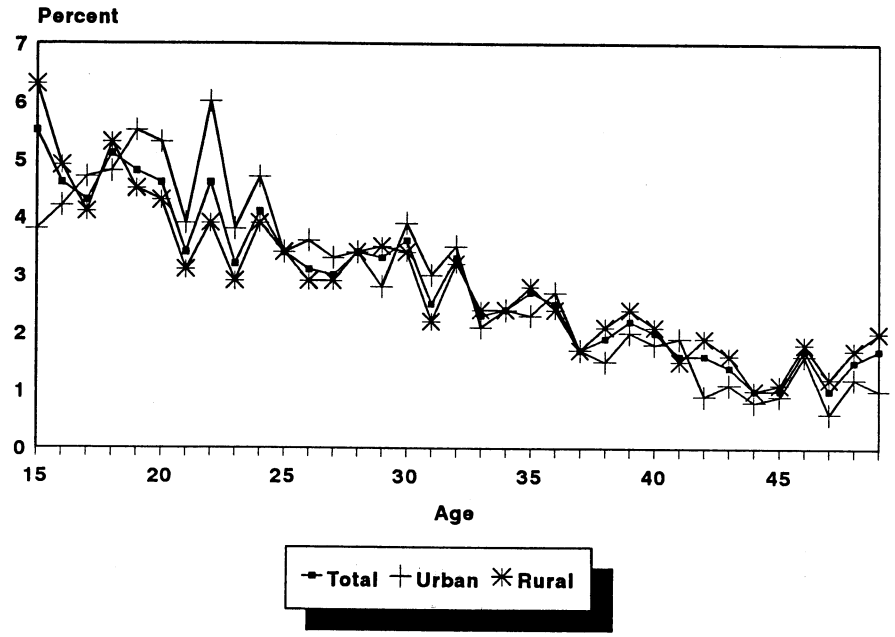
5 Evaluation of Data Quality

It is important to assess the quality of data as the more one knows about the quality of the data, the greater the confidence with which results can be taken. It should be pointed out that recognizing the problems does not necessarily diminish the utility of the data, but allows analysts and readers to make sensible conclusions, taking into account limitations of the data. Also, when policy makers have been assured of the quality of the data, they can confidently utilize the results.

5.1 AGE REPORTING

An examination of the single-year age distribution shows that the pattern of age reporting is similar for the total population and urban and rural areas (see Figure 5.1). Depressions are evident at ages 21, 23, 31, 33, 37 and 47. Heaps occur at ages 22, 26, 29, 32, 36, 39 and 46 years. This shows that preferences are for digits ending in 2, 6 and 9.

Figure 5.1
Single-Year Age Distribution by Residence



Age is one of the most important demographic variables in the sense that many estimates of demographic processes depend on accurate age reporting. Table 5.1 indicates that 90 percent of respondents completely reported their age and date of birth (month and year). About 8 percent did not know their month of birth, but reported their ages and year of birth. Only 2 percent did not know their age or date of birth.

As shown in Table 5.2, respondents were also able to provide a complete date of birth for nearly all of their children (99 percent). A month and/or year of birth was imputed for fewer than one percent of the births.

Table 5.1 Percent distribution of respondents by completeness of reporting of data and age at birth, Zimbabwe 1988

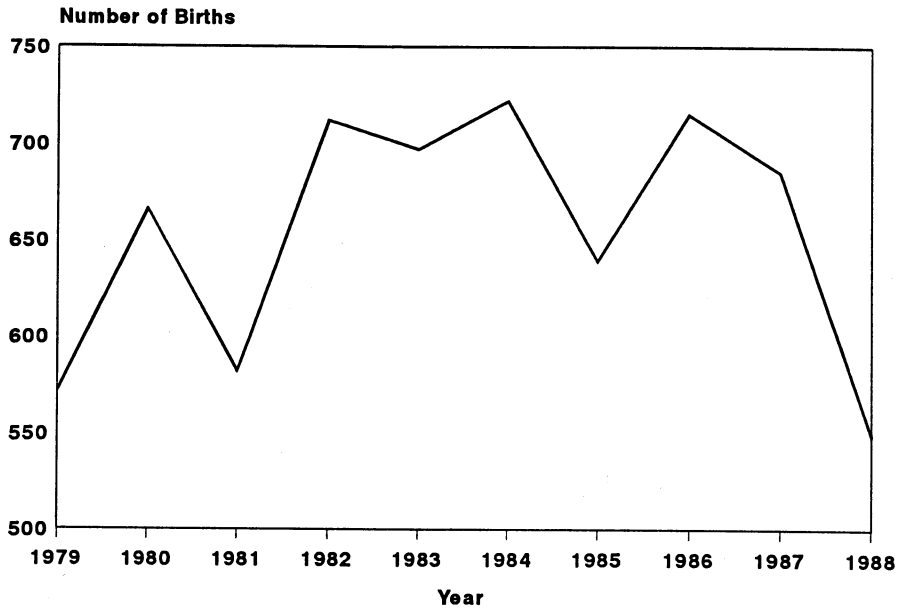
Completeness of information	Number of respondents	Percent
Month and year reported	3777	89.9
Year and age reported Month imputed	329	7.8
Age and year calculated Month imputed	25	2.3
Total	4201	100.0

Table 5.2 Percent distribution of births by completeness of information on month and year of birth and current age, Zimbabwe 1988

Completeness of information on births	Number of births	Percent
Month and year reported	12332	99.41
Year and age reported, Month imputed	18	0.15
Year reported, Month imputed, Age calculated	27	0.22
Age reported, Year calculated, Month imputed	6	0.05
No information reported, Date placed	21	0.17
Total	12404	100.00

Figure 5.2 shows an interesting pattern where the number of births increased in 1980, reflecting the effect of the post-war baby-boom. Two years later, in 1982, there was also an increase, reflecting the contribution of the same women having a subsequent birth. This pattern is echoed in years which are multiples of two. The births in 1988, the year of the survey, represent only part of the year; hence, they do not reflect the total number of births occurring in that year.

Figure 5.2
Number of Births by Calendar Year



6 Fertility Trends, Levels and Differentials

The importance of births as a component in the population balancing equation has been fully documented. Many developing countries have managed to reduce mortality significantly through massive expenditures on health and/or educational programmes. A reduction in deaths without a comparable reduction in births leads to a higher rate of natural increase. Thus, higher population growth rates are a common feature in most developing countries, including Zimbabwe. In light of the foregoing, it is important to document fertility trends, levels and differentials objectively in order to help identify salient areas in need of demographic interventions.

The fertility measures used in this paper are age-specific fertility rates (ASFRs) and total fertility rates (TFRs). Age-specific fertility rates are considered in recognition of the fact that fertility change may initially be restricted to particular age groups of women. The summation of ASFRs for single-year age groups gives the TFR. It should be noted that only period fertility rates are covered in this paper.

6.1 FERTILITY LEVELS AND TRENDS

In 1982, the total fertility rate for Zimbabwe was 5.6. The TFR increased to 6.5 in 1984 and then declined to 5.7 in 1988, to slightly above the 1982 level. The fluctuations in the TFR make it extremely difficult to make a conclusive statement about fertility decline in Zimbabwe. ASFRs and TFRs calculated

from different sources are presented in Table 6.1. The table indicates that Zimbabwe has been experiencing high and comparatively stable fertility levels, which have only started to decline very recently. Trends in age-specific fertility rates from the birth histories collected in the 1988 ZDHS are shown in Figure 6.1. The age-specific fertility rates indicate clear fertility declines across all age groups in the five-year period just prior to the survey.

Table 6.1 Age-specific fertility rates and total fertility rates, Zimbabwe 1969-1988

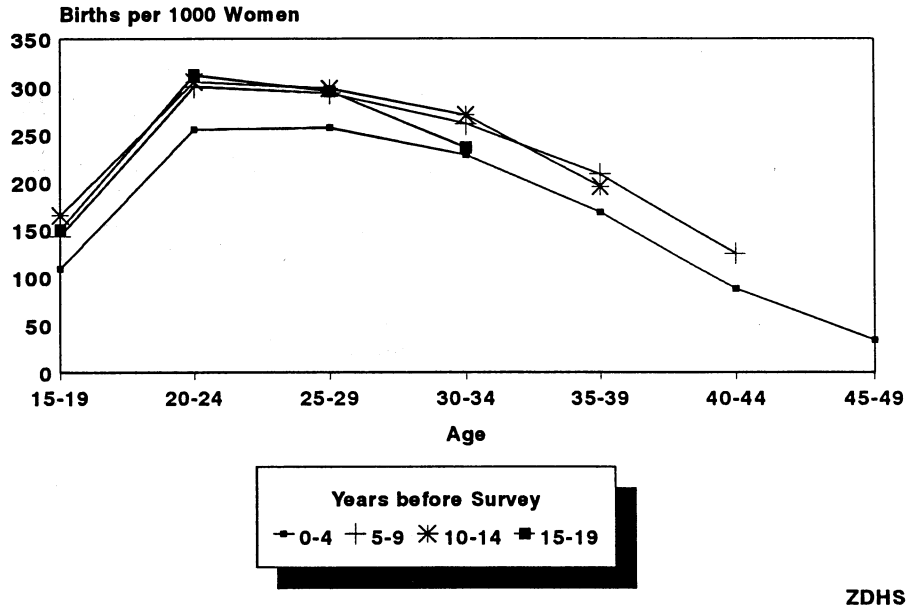
Age	Census 1969	Census 1982	ZRHS 1984	ZDHS 1982-84	ICDS 1987	ZDHS 1985-88
15-19	79	91	131	129	69	103
20-24	272	258	289	299	213	247
25-29	304	253	299	307	240	247
30-34	257	225	307	273	214	219
35-39	218	165	273	214	168	160
40-44	145	93	214	111	84	86
45-49	73	38	168	--	41	36
TFR, 15-44	6.4	5.4	6.5	6.7	4.9	5.3
TFR, 15-49	6.7	5.6	6.5	6.7	5.1	5.5

6.2 FERTILITY DIFFERENTIALS

Fertility differentials are clearly observable in Zimbabwe both geographically and among social categories. Figure 6.2 shows the difference in fertility among the provinces for the five-year period before the survey. For example, Matabeleland South Province has a TFR of 7.5, compared with a TFR of 5 for Mashonaland East Province. The two urban areas--Harare/Chitungwiza and Bulawayo--have the lowest TFRs (4.3 and 4.0, respectively).

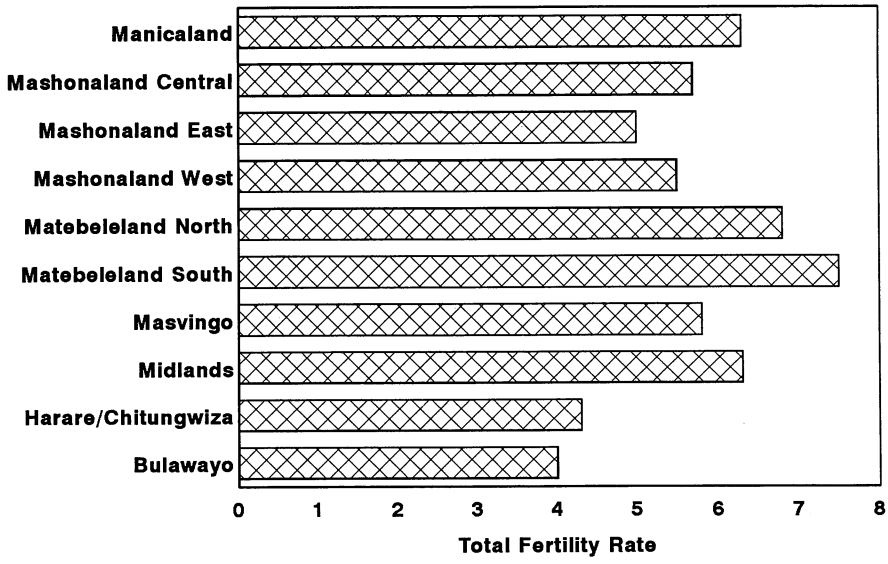
The pattern observed in the different provinces confirms the expected rural-urban fertility differentials. Table 6.2 shows that rural women, as expected, have higher fertility (TFR=6.4), compared with urban women (TFR=4.2) for the five-year period before the survey. Of particular interest is that fertility for urban women reached a peak at a later age (25-29 years), while the fertility for rural women peaked in the younger age group (20-24 years).

Figure 6.1
Age-Specific Fertility Rates for Five-Year Periods Prior to the Survey



ZDHS 1988

Figure 6.2
Total Fertility Rates by Province for the Five-Year Period Prior to the Survey



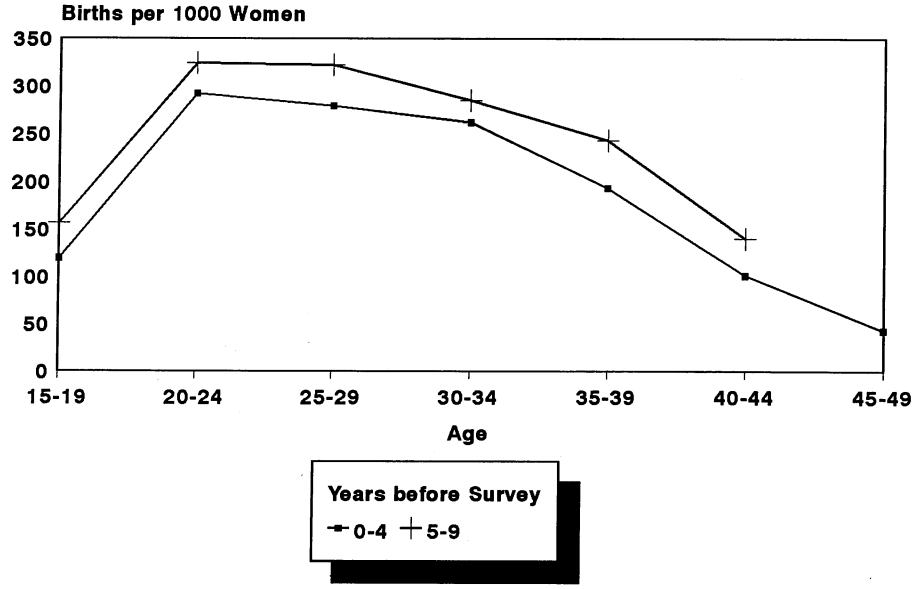
ZDHS 1988

Table 6.2 Total fertility rates and age-specific fertility rates for the five-year period preceding the survey by selected background characteristics, Zimbabwe 1988

	Education			Area of residence	
Age	No education	Primary	Secondary/ Higher	Rural	Urban
TFR	7.3	6.0	3.8	6.4	4.2
15-19	213	158	68	119	92
20-24	299	291	183	292	195
25-29	286	258	229	279	217
30-34	297	227	153	262	159
35-39	181	171	128	193	110
40-44	118	86	9	101	54
45-49	74	17	--	43	6

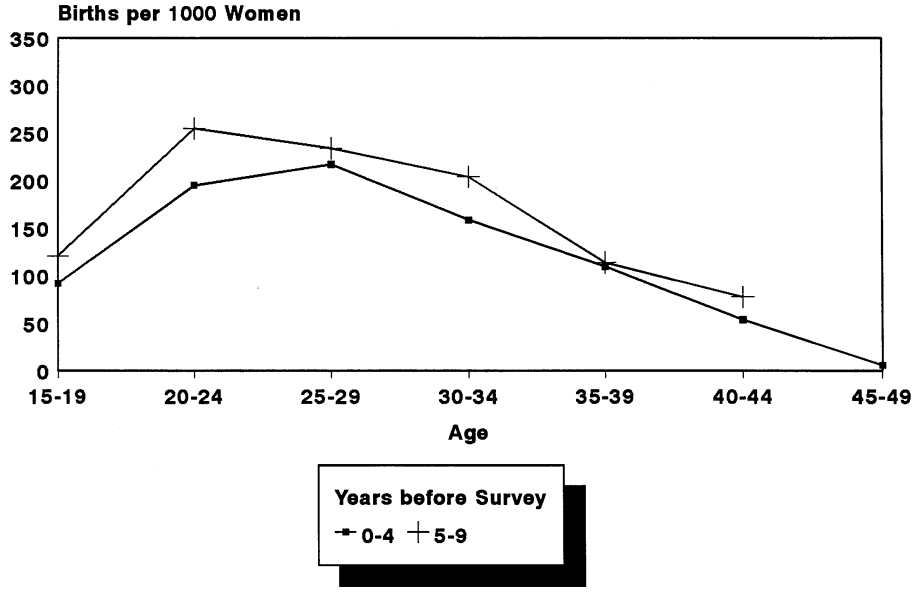
Trends in age-specific fertility rates for rural and urban areas are presented in Figures 6.3 and 6.4. Focusing on the rural areas, it is clear that fertility declined between the two five-year periods preceding the 1988 ZDHS. Overall, the rural TFR declined by one child from 7.4 to 6.4, that is a decline of 13 percent in five years. Of interest is that fertility decline was almost uniform across all age groups.

Figure 6.3
Age-Specific Fertility Rates for Five-Year Periods Prior to the Survey
Rural Zimbabwe



ZDHS 1988

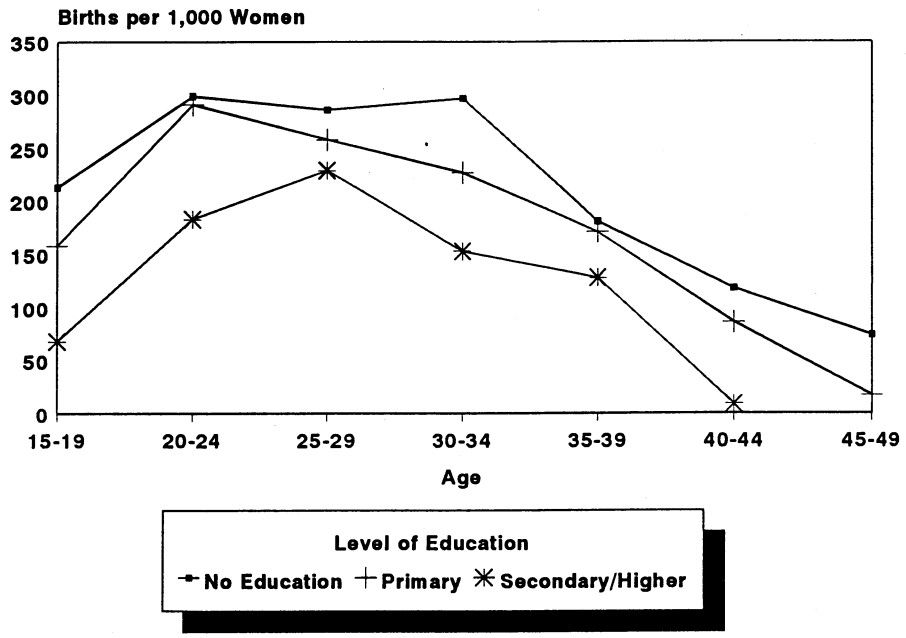
Figure 6.4
Age-Specific Fertility Rates for Five-Year Periods Prior to the Survey
Urban Zimbabwe



In urban areas, the magnitude of the fertility decline was comparable to that in the rural areas though the age pattern differed. The greatest decline was experienced in the 20-24 year age group, while in the age groups 35-39 and 40-44, fertility levels remained almost the same during these two periods. Overall, the TFR declined from 5.0 in the period 5-9 years before the survey to 4.2 in the period 0-4 years before the survey, that is a 16.5 percent decline.

Fertility differentials are also found among different educational categories during the five years before the survey. During this period, fertility as measured by TFR, was 3.8, 6 and 7.3 for women with secondary and higher education, primary education and those with no formal education, respectively. As Figure 6.5 indicates, fertility reached a peak in age group 20-24 for women with primary and no education, while for women with secondary or higher levels of education fertility reached a peak at a later age group, 25-29 years. These data suggest that prolonged education delays childbearing and hence reduces the period at which these women are at risk of getting pregnant. The median age at first birth was 21.2 years for women with secondary and higher education, compared with 19.4 years for women with primary education and 18.9 years for women with no education.

Figure 6.5
Age-Specific Fertility Rates by Level of Education



ZDHS 1988

7 Parity progression ratios

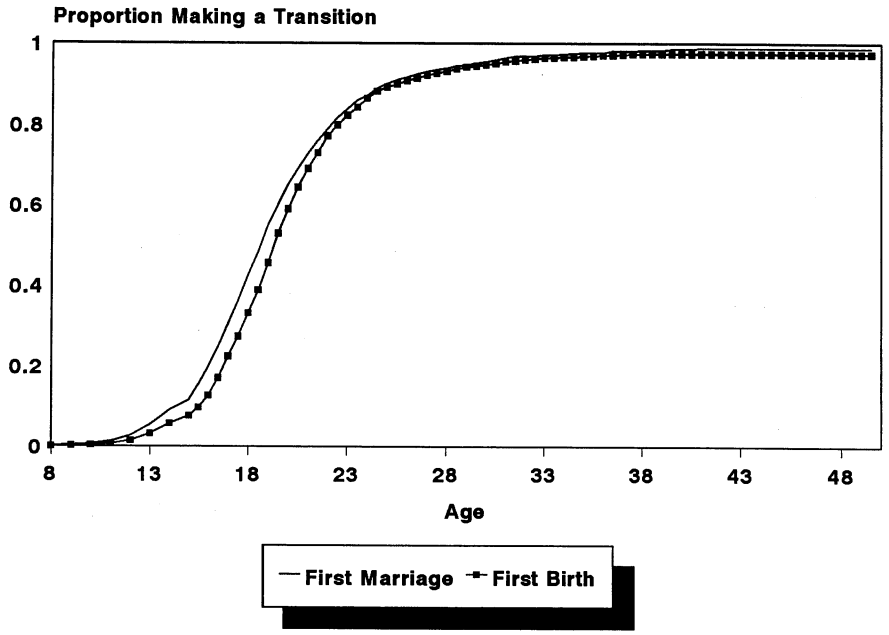
Parity progression ratios measure the family building process as women move successively from one stage to the next, that is, from first marriage to first birth, from first birth to the second birth and so on. Analysis is focused on the proportion of women who move from one stage to the next and the length of time it takes to move from one stage to the next, among women who move to the next stage. These ratios are calculated by taking the women of a certain parity and finding the proportion of these who move on to have another child. The two components of the family building process are related to the concepts of the quantity or quantum of fertility and the timing or tempo of fertility. The analysis of the two components using cross-sectional data is affected by selectivity and censoring, since some of the women interviewed will not have a complete maternity history. Censored data can be analyzed using life-table techniques, so that estimates of the quantities can be made by constructing birth interval life-tables for each birth order (with marriage defined as birth order zero). Selectivity refers to the fact that the transition from birth order i to i+1 can only be studied for women who have achieved at least birth order i at the time of the survey. Selectivity biases are handled by introducing proper controls in the analysis by constructing separate life tables for subgroups of women.

7.1 TRANSITION TO FIRST BIRTH AND FIRST MARRIAGE

Marriage and childbearing start early in Zimbabwe. Some women (around 10 percent) are married and become mothers before the age of 15. Figure 7.1 indicates that women start to marry earlier than they start childbearing. At age 18, around 50 percent of women are married, whereas less than 40 percent have

become mothers. However, as age increases, the proportions ever married and who are mothers become very close.

Figure 7.1
Transition to First Marriage and First Birth



ZDHS 1988

7.2 TRANSITION TO SECOND AND HIGHER ORDER BIRTHS

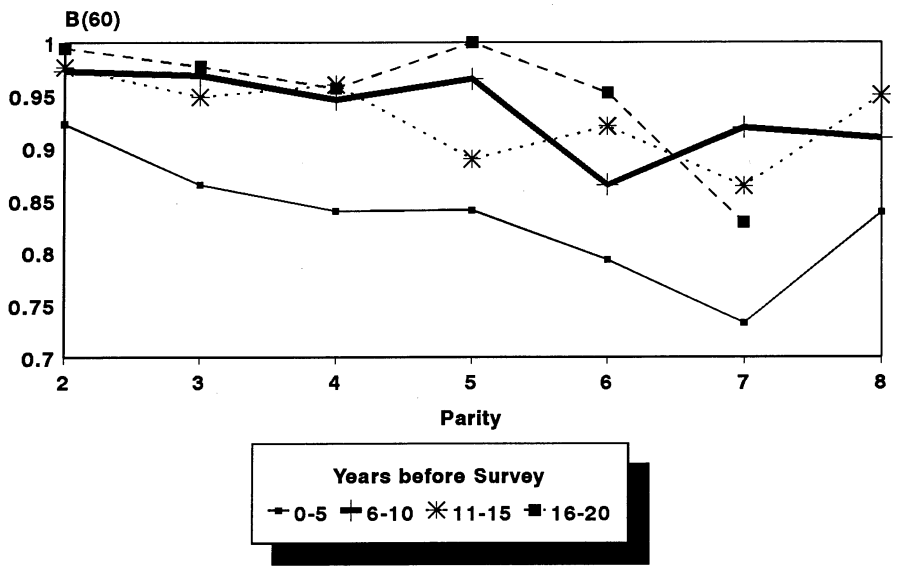
For the purpose of measuring changes in fertility behaviour, we are interested in the proportion having a subsequent birth, which we call the parity progression ratio. In life table analysis, the parity progression ratio at time x (also called the birth function) is 1-l(x) and denoted by B(x) (Rodríguez and Hobcraft, 1980). Each birth interval life table is summarised in terms of the birth function B(x)--the cumulative proportion of women having a subsequent birth by x months since the previous birth (or marriage). We have selected B(60) as our summary measure, that is, the proportion of women having a birth within 60 months (5 years) of the previous birth (or date of first marriage).

As noted in the previous section, fertility has been fairly constant for the period ten to twenty years before the ZDHS, however, substantial fertility declines were recorded in the six years prior to the ZDHS. Figure 7.2 shows the parity progression ratios (B(60)) for four periods before the survey for women who married at ages 18-19, or approximately the median age of marriage. The decline in fertility in the six years before the survey is reflected in the decreases in the parity progression ratios for all birth order transitions. The decline is more pronounced from transitions to parity five through eight.

The greatest declines are observed for the transitions to parities five and above, which may be indicative of a decline in family size in the recent past. These data seem to suggest that the majority of Zimbabwean women with fewer than five children may be contracepting for spacing purposes. Beyond parity four, there are indications of limiting behaviours. The decline in the proportion of women who move from

fourth birth to fifth may be due to the information and education given to women that imply that having more than four children may not be ideal. Also, with working women, four maternity leaves are granted with pay; beyond that, no pay is given.

Figure 7.2
Parity Progression Ratios for Women who First Married at Ages 18 and 19



B(60) A birth within 60 months of a previous birth

ZDHS 1988

8 Proximate Determinants of Fertility

Behaviours that have direct impact on the reproductive process of women are called proximate causes of fertility (Bongaarts, 1978; Bongaarts and Potter, 1983). Bongaarts has proposed that the principal proximate determinants are marriage, breastfeeding, contraceptive use and abortion. The myriad of social, economic and cultural factors which influence fertility act through one or more of the proximate determinants.

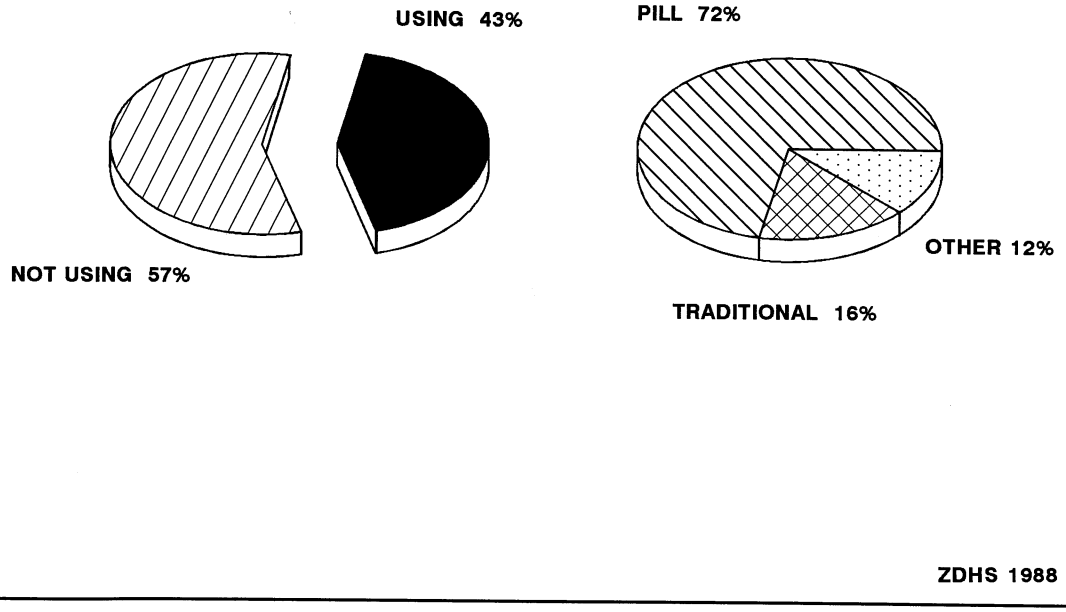
8.1 CONTRACEPTIVE USE

Contraceptive use is of particular interest in Zimbabwe because a strong family planning programme has been providing family planning services since 1953. The services are provided by government facilities, the Zimbabwe National Family Planning Council (ZNFPC) and the private sector. Through its network of clinics and the community-based distribution (CBD) system, the ZNFPC is the major provider of family planning services in Zimbabwe. ZNFPC clinics provide a full range of contraceptive methods, including the pill, IUD, injection and barrier methods. Voluntary surgical contraception is also provided at the major ZNFPC clinics in Harare and Bulawayo.

The CBD system serves as the principal outreach mechanism for family planning service delivery in Zimbabwe. The CBDs are recruited from within the community and are trained to educate and motivate the population to use family planning, to supply clients with pills and condoms in their homes and to refer women wanting to use other methods to clinics. The current workforce of 700 distributors covers approximately 76 percent of the rural population in Zimbabwe (CSO and IRD, 1989).

As shown in Table 8.1, 36 percent of currently married women are using modern contraceptive methods, while 7 percent are using traditional methods. The pill is the most commonly used contraceptive method among currently married women in Zimbabwe, with 31 percent using. Among all current users, 72 percent use the pill, 12 percent use other modern contraceptive methods and 16 percent use traditional methods (see Figure 8.1).

Figure 8.1
Current Use of Contraception



Contraceptive Use Differentials

The urban-rural differential in contraceptive use is fairly large; 52 percent of the currently married women in urban areas are using contraception, compared with 40 percent in rural areas. Among urban women, the contraceptive prevalence rate is greater for those living in Harare than in Bulawayo. The rate is considerably lower in Matebeleland North, Matebeleland South and Manicaland. Among urban women, 9 percent are using a modern method other than the pill, compared with 3 percent in the rural areas, while the prevalence of use of traditional methods is greater among rural (9 percent) than urban women (3 percent).

Table 8.1 Percent distribution of currently married women by current contraceptive method, according to residence and province/city, Zimbabwe 1988

Residence and province/city	Using any method	Pill	Other modern	Tradi-tional	Not using	Total	Number
Total	43	31	5	7	57	100	2643
Residence							
Urban	52	40	9	3	48	100	779
Rural	40	27	3	9	60	100	1864
Province/city							
Manicaland	32	22	3	7	68	100	352
Mashonaland Central	48	36	5	7	52	100	217
Mashonaland East	48	38	5	5	52	100	341
Mashonaland West	48	38	5	5	52	100	336
Matabeleland North	27	17	1	9	73	100	128
Matabeleland South	28	17	4	7	72	100	156
Midlands	45	30	5	10	55	100	398
Masvingo	48	31	4	13	52	100	312
Harare/Chitungwiza	52	41	8	3	48	100	204
Bulawayo	44	30	11	3	56	100	199

About one-third of all currently married women with no education are not using any contraceptive method (not shown here). In the same educational category, two-thirds of the currently married contraceptors are relying on the pill. Among currently married women of reproductive age with primary education, about 42 percent are contracepting. Of those contracepting, 72 percent are relying on the pill. The majority of other users in these two educational categories rely on traditional methods. For currently married women with secondary or higher education, 56 percent are contracepting. Among this group, 73 percent use the pill, 8 percent chose female sterilization and 7 percent use the IUD. Smaller proportions are using (in order of frequency of use) traditional methods, condom, male sterilization, and injectables.

8.2 AGE AT FIRST MARRIAGE

The age at which a woman marries marks the beginning of regular exposure to the risk of childbearing. An increase in the average age at first marriage in a population is associated with the transition to lower fertility, as the length of time the woman spends exposed to the risk of childbearing is reduced and consequently, the number of children she will bear over her reproductive span declines.

In the ZDHS, information on age at first marriage was collected by asking each ever married woman for the date (month and year) when she began living with her first husband. In the case of those who can not remember the exact date, they were asked how old they were when they first married. The completeness of the information supplied could be summarized as follows: 77 percent reported both the month and the year, 18 percent knew the year only and 5 percent reported how old they were when they

first married. However, these data are affected by the interpretation of marriage as some women may report when the marriage was officially registered as opposed to when the woman actually entered in into a union. The ZDHS results indicate that women marry at relatively early ages as measured by the median age at marriage shown below in Table 8.2.

Although the age at first marriage appears to be increasing in Zimbabwe, the ZDHS results show that many Zimbabwean women still marry at an early age. More than 52 percent of respondents reported that they married for the first time before their twentieth birthday, with 9 percent saying they married before they were fifteen years old. Among women who married after age twenty, most married before their twenty-fifth birthday. Only 3 percent were twenty-five years and above when they married for the first time. There is some indication that the age at first marriage has been increasing. The median age for women 20-24 years (19.7 years) is nearly one year higher than the median age of women in the 25-29 age group (18.8 years). The somewhat erratic variation in the median age among older cohorts is probably due to greater misreporting in these groups.

Table 8.2 Percent distribution of women by current marital status, according to age, Zimbabwe 1988

	Age at first marriage							
Age	Never married	Under 15	15-17	18-19	20-21	22-24	25 and above	*Median age
15-19	80.2	3.7	12.1	3.9	0.0	0.0	0.0	---
20-24	28.5	6.7	26.4	20.0	13.7	4.8	0.0	19.7
25-29	6.8	9.7	29.9	26.1	12.8	12.4	2.4	18.8
30-34	2.5	12.7	29.2	27.8	12.7	9.7	5.3	18.5
35-39	1.5	9.5	28.2	24.4	16.2	11.2	9.1	19.0
40-44	0.9	20.1	29.2	19.2	13.5	9.7	7.2	18.1
45-49	1.4	13.1	31.4	18.6	14.5	11.7	9.3	18.6
Total	27.0	9.1	24.7	18.5	10.4	7.1	3.3	---

* Median age is defined as the age by which 50 percent of the women have married.

Another way of looking at age at first marriage is to examine the percent single at each given age and the singulate mean age at marriage. Marriage is almost universal as only 3 percent remain single at ages 30-34. Early marriage is common as almost 71 percent of the women aged 20-24 had entered first marriage. The singulate age at marriage is 20.7 years.

Table 8.3 indicates the variations in the median age at first marriage across age cohorts for women in subgroups. The median age at first marriage for women 25-49 is slightly higher in urban areas (19.2 years) than in rural areas (18.4 years). There is an upward trend in the age at first marriage among women under 35 years in both rural and urban areas. As expected, a woman's educational level is strongly associated with her age at first marriage. The median age at first marriage for those with secondary education and higher is 20.8 years, compared with 18.5 years for those with primary education and only 17.5 years for women who never attended school. The inverse relation between age at first marriage and a woman's educational attainment is observed in all cohorts.

Table 8.3 Median age at first marriage by current age, according to selected background characteristics, Zimbabwe 1988

Background characteristic	Current age						
	20-24	25-29	30-34	35-39	40-44	45-49	25-49
Residence							
Urban	---	19.4	19.1	19.3	18.6	20.3	19.2
Rural	19.3	18.5	18.2	18.9	17.8	18.2	18.4
Education							
No education	16.7	17.2	17.3	18.9	16.7	17.8	17.5
Primary	17.9	18.5	18.5	18.8	18.1	18.3	18.5
Secondary/Higher	--	21.3	20.3	20.3	20.3	22.5	20.8
Total	19.7	18.8	18.5	19.0	18.1	18.6	18.6

8.3 POSTPARTUM AMENORRHEA

Postpartum amenorrhea is the duration of the anovulatory interval after a birth and is estimated from the delay in the return to menstruation. The period of amenorrhea following a birth is related to the duration and nature of breastfeeding. Generally, the longer a mother breastfeeds her child and the longer she waits before introducing supplements, the longer will be the period of amenorrhea.

In the ZDHS, data were collected on the length of breastfeeding and the duration after a woman's birth in the past 36 months when her menses returned. The results are presented in Table 8.4.

Table 8.4 indicates that menstruation had not returned for more than 70 percent of mothers who were 6-7 months postpartum and about half the mothers 12-13 months postpartum were still amenorrheic. However, there was a rapid decline in the proportion amenorrheic after that point. Only 20 percent of the mothers 18-19 months postpartum were still amenorrheic and almost all mothers whose babies were two years old or more had resumed menstruation.

8.4 PROXIMATE DETERMINANTS MODEL

The model was first proposed by Davis and Blake in 1956. Starting from the premise that reproduction involves three necessary steps of intercourse, conception and completion of gestation, Davis and Blake proposed the following set of intermediate fertility variables:

A. Exposure factors

- Age at entry into sexual unions
- Extent of permanent celibacy
- Amount of reproductive period spend after or between unions

B. Deliberate marital fertility factors

- Use or nonuse of contraception
- Use or nonuse of induced abortion

C. Natural marital fertility factors

- Length of period of nonsusceptibility to conception after birth
- Frequency of intercourse
- Extent of involuntary sterility
- Extent of spontaneous intrauterine mortality
- Duration of viability of ova and sperm.

The model was later revisited by John Bongaarts (1982). The Bongaarts model is a useful way of quantifying the relative importance of proximate determinants of fertility. The model is a multiplicative one in which each component is expressed as an index. According to the model, the actual levels of fertility (TFR) can be written as:

$$TFR = C_m \times C_c \times C_a \times C_i \times TF$$

Where C_m is the index of marriage
C_c is the index of contraception
C_a is the index of abortion
C_i is the index of postpartum infecundability
TF is the potential fertility where there are no inhibiting factors.

Table 8.4 Percent of births in the 36 months before the survey by whether the mother is still breastfeeding or amenorrheic according to duration since birth, Zimbabwe 1988

Months since birth	Still breast-feeding	Still amenor-rhoeic	Number of births
Less than 2	95.0	88.7	80
2-3	94.9	78.8	118
4-5	91.8	70.9	110
6-7	92.2	73.5	102
8-9	89.4	61.5	104
10-11	89.8	50.9	108
12-13	87.6	49.6	113
14-15	81.7	43.5	131
16-17	73.4	30.3	109
18-19	52.1	18.8	96
20-21	33.3	13.1	99
22-23	16.1	2.7	112
24-25	11.4	0.8	132
26-27	6.5	0.0	138
28-29	3.9	0.8	128
30-31	2.8	0.0	106
32-33	1.7	0.0	119
34-35	0.0	0.0	97
Total	49.7	30.9	2 002

Application of the Bongaarts proximate determinants model was made to the ZDHS data. In the analysis for the ZDHS survey, the component of abortion (C_a) is not considered because data to compute it were not available. Thus the model is reduced to three components (C_i, C_c and C_m). Theoretically, each index can range from 0 to 1, but such extreme values are generally not found. The difference of each index from 1, can be interpreted as a proportionate reduction attributable to a particular component of the model. The results for the ZDHS are shown in Table 8.5.

Table 8.5 The total fertility rate (TFR), index of marriage (C_m), index of contraception (C_c) and index of infecundity (C_i) by level of education and area of residence, Zimbabwe 1988

Education and residence	Observed TFR	Implied TFR	C_i	C_c	C_m
Total	5.70	3.4	0.67	0.58	0.58
Education					
No education	7.34	5.4	0.64	0.68	0.82
Primary	6.04	3.6	0.68	0.59	0.58
Secondary/ Higher	3.85	2.1	0.64	0.44	0.50
Residence					
Rural	6.55	3.9	0.66	0.60	0.64
Urban	4.16	2.1	0.69	0.47	0.43

The national figures show that postpartum insusceptibility (C_i) contributes to a 33 percent reduction from the TF. Marriage also contributes 42 percent reduction from the Total Natural Fertility Rate (TNFR) and contraception accounts for 42 percent reduction from the Total Marital Fertility (TMFR).

Another way of presenting the model is to consider the Total Fecundity Rate (TF) by including the TFR as one component along with the other three components--contraception (C_c), marriage (C_m) and postpartum insusceptibility (C_i)--and expressing the contribution of each component as a percentage of Total Fecundity. Table 8.6 shows the proportion of total fecundity that can be accounted for by the various components including TFR. Table 8.6 indicates that the highest contribution to TF was the postpartum infecundability component (34 percent). Marriage and contraception have the same effect of 16 percent each.

Table 8.6 The proportion of total fecundity accounted for by TFR and proximate determinants, Zimbabwe 1988

TFR	Marriage C_m	Contraception C_c	Postpartum insusceptibility C_i	Total
34%	16%	16%	34%	100%

It should be noted that the implied TFR in all cases is lower than the observed TFR. This may be due to the fact that the model TF of 15.3 is lower than that found in Zimbabwe. An alternative explanation for the discrepancy between the predicted and observed TFR is that there is a substantial overlap between postpartum infecundability and contraceptive use, and the model is overestimating their combined effect on fertility. The interrelationship between breastfeeding and contraceptive use is addressed in the latter sections of this report.

Educational Differentials

As seen from Table 8.5, the inhibiting effect of age at first marriage is highest for those with secondary and higher levels of education (0.5), compared with those with primary education (0.42) and no education (0.18). Contraceptive use shows the highest effect on those with secondary and higher education (0.56), compared to those with primary education (0.41) and no education (0.32). The effect of postpartum insusceptibility is nearly the same for all educational categories, which indicates that the duration of menorrhea is nearly the same across all educational categories.

Urban-Rural Differentials

As one would expect, given the later age at marriage and greater use of contraception among urban women, the inhibiting effects of marriage and contraception are higher in urban areas than in rural areas. The postpartum insusceptibility inhibiting effect is slightly higher in rural areas than in urban areas due to somewhat longer periods of breastfeeding (20 versus 17 months).

9 The Interrelationships Between Breastfeeding and Contraceptive Use

The relationship between contraceptive prevalence and fertility in Zimbabwe presents some puzzles. Using data from 96 countries, the relationship between the TFR and contraceptive prevalence rate (CPR) has been estimated using a regression equation (United Nations, 1989) as follows:

$$TFR = 7.34 - 0.07CPR.$$

This regression equation implies a TFR of 4.34 for Zimbabwe given its contraceptive prevalence of 43 percent. The discrepancy between the observed TFR of 5.7 and this expected TFR has been the source of some debate among demographers. If the Zimbabwe family planning programme is to lead to a sustained reduction in fertility it will be important for the use of contraception to be effective and sustained. Population analysts argue that contraception is initiated soon after birth and hence there are long durations of contraception and breastfeeding overlap (Phiri, 1990; Adamchak and Mbizvo, 1990). They argue that this leads to contraceptive waste because breastfeeding delays considerably the return of menstrual cycles and thus ovulation and fecundity.

The Bongaarts model of proximate determinants of fertility computes the effect of contraception after discounting the effect of postpartum infecundability. As already discussed, the index of contraception in the ZDHS was 0.58, which implies a relatively high effect of contraceptive use on fertility. However, if there is substantial overlap between contraceptive use and breastfeeding, the effect of contraception is overestimated.

Our task in this part of the paper is to use the data from the ZDHS to:

(a) Assess the correlates of contraceptive use and breastfeeding;
(b) Assess the factors that predict the time after birth at which contraception is initiated; and
(c) Assess the factors affecting contraceptive use for less than 18 months or for 18 months and above.

9.1 METHODOLOGY

Data for this analysis require information on duration of contraceptive use. Detailed contraceptive histories were only available for the open birth interval and so this paper cannot look at the effect of contraceptive use on birth interval length. Instead, an attempt is made to model the components of birth interval length up to the interview date. These can be divided into the durations of time to starting to use contraception,

to weaning and to stopping contraceptive use and the duration of the overlap between contraceptive use and breastfeeding.

The analysis uses a variety of multivariate methods to assess the socioeconomic and demographic characteristics which most influence the three components of the duration of use: the correlates of contraceptive use and breastfeeding, the time to starting to use contraception and whether the women had used contraception for a relatively long or short length of time.

9.2 FINDINGS

Current Contraceptive Use by Breastfeeding Status

As a first exploratory step in finding the interrelationships between contraceptive use and breastfeeding, Table 9.1 was constructed for the whole sample. It indicates that about 44 percent of breastfeeding women were using modern contraception at the same time. When both modern contraception and other contraceptive methods are considered, the proportion breastfeeding and contracepting at the time of the survey increases to 55 percent. There is, therefore, a clear indication of substantial overlap of contraceptive use and breastfeeding.

Table 9.1 Percent distribution of all women by current contraceptive use according to breastfeeding status, Zimbabwe 1988

	Breastfeeding status		
Contraceptive use	Not breastfeeding	Breastfeeding	Total
Not using	75 (2402)	45 (447)	68 (2849)
Using modern	22 (702)	44 (441)	27 (1143)
Using other	3 (99)	11 (110)	5 (209)
Total	100 (3203)	100 (998)	100 (4201)

Numbers in parentheses are the number of cases in each cell.

Next we identify the socioeconomic and demographic characteristics of women in each of these states controlling for the length of time since birth. We used a variable which combined breastfeeding status and current contraceptive use as the dependent variable with four categories:

- Currently contracepting and breastfeeding;
- Used contraception in the open birth interval and stopped;
- Currently using and no breastfeeding; and
- Not used in the open birth interval.

We used multinomial logistic regression to estimate the odds of being in each category of the dependent variable relative to the reference category for selected socioeconomic and demographic characteristics. In our analysis, the reference category was currently using contraception and not breastfeeding. The regression coefficients and the standard errors for the model are contained in Appendix A. The estimated probabilities of each outcome (or category of the dependent variable) for each of the predictor variables are contained in Table 9.2.

Table 9.2 Classification table for contraceptive use and breastfeeding in the last open birth interval among parous women, controlling for other variables, Zimbabwe 1988

Variable	Currently using and breastfeeding	Used in the open birth interval	Not used in the open birth interval	Currently using and not breastfeeding
Residence				
Urban	0.18	0.06	0.48	0.29
Rural	0.20	0.05	0.54	0.22
Education				
No education	0.18	0.04	0.61	0.16
Primary	0.19	0.05	0.54	0.22
Secondary/Higher	0.19	0.07	0.39	0.36
Preferred birth interval				
Less than 2 years	0.06	0.24	0.50	0.19
25-36 months	0.13	0.21	0.48	0.18
37-48 months	0.15	0.13	0.50	0.22
49-60 months	0.26	0.03	0.53	0.18
More than 5 years	0.25	0.02	0.42	0.31
Want no more	0.20	0.03	0.55	0.23
Children ever born				
2	0.20	0.05	0.52	0.23
5	0.19	0.05	0.52	0.24
7	0.18	0.04	0.52	0.25
8	0.18	0.04	0.52	0.26
Period since last birth				
3 months	0.64	0.01	0.30	0.06
12 months	0.42	0.02	0.44	0.12
24 months	0.17	0.06	0.52	0.25
36 months	0.05	0.12	0.45	0.38
45 months	0.02	0.18	0.35	0.45
Mean	0.19	0.05	0.52	0.23

The first column in Table 9.2 shows the probabilities of women currently using a method while breastfeeding by selected characteristics. It is interesting to note that there are virtually no differences between socioeconomic groups. The main determinant of whether a woman uses contraception while she is breastfeeding (controlling for duration since last birth) among the variables considered in Table 9.2 is her preferred birth interval; the longer the preferred birth interval, the more likely a woman is to overlap her contraceptive use and breastfeeding. Women may adopt this behaviour as insurance against a subsequent pregnancy occurring too soon after the last birth.

However, while there are no socioeconomic differentials in using contraception during breastfeeding, there are significant differences among socioeconomic groups in the likelihood that a woman will continue to use contraception after she has weaned her child. Educated and urban women are more likely to use contraceptives after weaning, compared with uneducated and rural women. The results in Table 9.2 suggest that long durations of protection against the risk of pregnancy are more likely to occur among urban and educated women than among their rural and less educated counterparts. As there are few socioeconomic differentials in duration of breastfeeding, one would expect those women who are using contraception after stopping breastfeeding to be protected for a longer time than their counterparts who stopped contraception while still breastfeeding.

Table 9.3 Summary statistics for variables used in the regression model among women who used contraception in the open birth interval, Zimbabwe 1988

Variable	Mean/proportion of sample in category	Standard deviation	Sample size
Constant	1.00	0.00	---
Dependent variables			
Start	6.46	8.22	1216
Duration	15.23	12.51	1216
Overlap	9.00	7.31	1216
Independent variables			
Age	26.54	6.56	1216
Parity			
1-2	0.37	--	450
2-3	0.30	--	364
5+	0.33	--	402
Residence			
Urban	0.35	--	425
Rural	0.65	--	791
Breastfeeding			
Yes	0.86	--	1046
No	0.62	--	754
Occupation			
Working	0.38	--	462
Not working	0.62	--	754
Education			
No education	0.13	--	158
Primary	0.61	--	742
Secondary/Higher	0.26	--	316
Marital duration			
0-9 years	0.04	--	49
10 years and above	0.50	--	608
Not currently married	0.46	--	559

Definition of Dependent Variables:
Start - Duration (in months) since last birth of initiation of contraceptive use
Duration - Duration of contraceptive use
Overlap - Duration of time simultaneously contracepting and breastfeeding

Time to Starting to Use Contraception

Next, we turn to a subsample of data containing only women who had used a contraceptive method in the open birth interval. This analysis uses a number of socioeconomic and demographic characteristics as predictors of the time to starting to use contraception. As all the sample had ever used contraception, there were no censoring problems and a regression approach was used. Table 9.3 presents summary statistics for the dependent and independent variables considered in the following analysis. The results of the analysis are presented in Table 9.4.

After some experimentation it was found that three variables were important predictors:

- Parity;
- Educational level; and
- Whether the women initiated contraception while still breastfeeding

Table 9.4 presents estimates of the average durations of time to starting contraception for women with different socioeconomic characteristics after controlling for each of the other variables in the model. The regression coefficients and their standard errors are shown in Appendix B.

Table 9.4 Estimated duration since last birth of initiation of contraceptive use for selected socioeconomic characteristics, based on multiple regression model, Zimbabwe 1988

Socioeconomic characteristic	Mean
Overall mean	6.54
Education	
None	8.34
Primary	6.50
Secondary/Higher	5.73
Residence	
Urban	6.60
Rural	6.51
Number of children ever born	
1-2	5.64
3-4	3.14
5 and above	10.64
Breastfeeding status when started contraception	
Breastfeeding	3.95
Not breastfeeding	22.47
Age	
18	7.14
25	6.65
35	5.95

On average, women begin using contraception six months after a birth. However, this average masks the large difference between women who begin using contraception while they are still breastfeeding (86 percent of women who used contraception in the open birth interval) and those who postpone starting to use a method until after they wean their child. Women who overlap their contraceptive use and breastfeeding, on average, begin to use contraception four months after the birth. Women with some primary or secondary education and women with three or four births are likely to adopt a contraceptive method even closer to the time of the birth.

Duration of Contraceptive Use

To investigate duration of contraceptive use it was assumed that women have a target birth interval of between 24 and 36 months and that they contracept in order to meet this spacing requirement. Thus, those with this target would contracept for up to 18 months and other women would contracept longer. Logistic regression was used to investigate the characteristics of women who use contraception for under 18 months on one hand and for over 18 months on the other hand. To overcome censoring problems the analysis was restricted to those who started to contracept at least 18 months before the survey. A large number of socioeconomic and demographic characteristics were used as predictors and exploratory analysis revealed that duration of use is dependent on the following variables:

- Time after birth when contraception is initiated;
- Education of respondent; and
- Marital duration of the women.

The results of the analysis are presented in Table 9.5. Table 9.5 gives the estimated probabilities of using contraception for over 18 months for the four predictors. Each of these estimated probabilities controls for the effects of the other predictors.

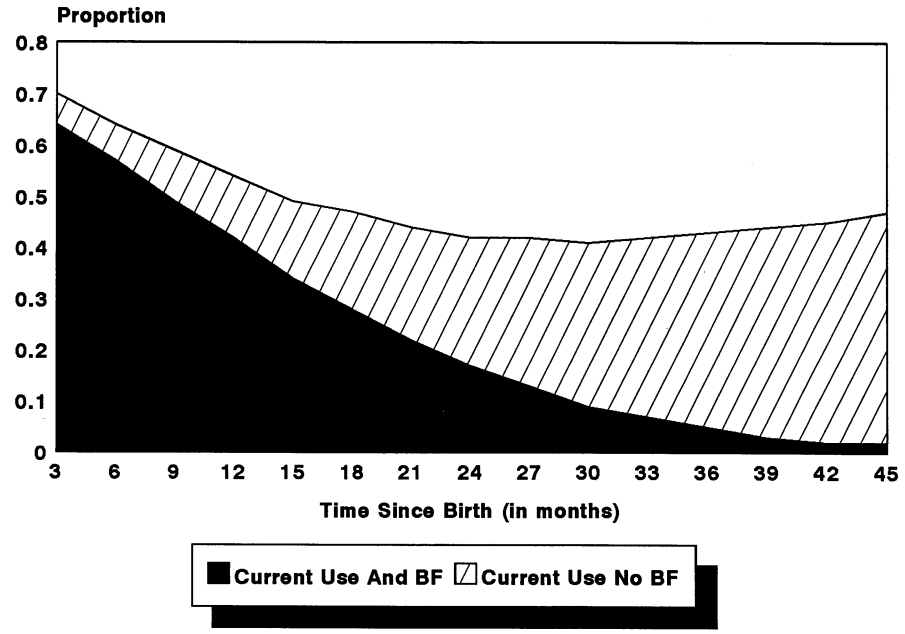
Table 9.5 Estimated proportion using contraception for less than 18 months and for more than 18 months for selected socioeconomic characteristics, based on multiple regression model, Zimbabwe 1988

Variable	Contraceptive use for less than 18 months	Contraceptive use for 18 months and above
Duration since start		
1 month	0.35	0.65
4 months	0.37	0.63
8 months	0.41	0.59
12 months	0.45	0.55
Education		
No education	0.53	0.47
Primary	0.38	0.62
Secondary/Higher	0.36	0.64
Marital duration		
0-9 years	0.52	0.48
10 years and above	0.30	0.70
Mean	0.39	0.61

The data indicate that women who start contraception soon after birth are more likely to use contraception for more than 18 months as compared to those who start some months after birth. This implies long durations of contraceptive use and breastfeeding overlap (see Figure 9.1). If there is a slight delay in contraceptive use after birth for say six months, there will be greater contraceptive protection to users. Women in the first 6 months after a birth of a child who breastfeed are less likely to be fecund than women who don't breastfeed. The delayed period of starting contraception after birth is likely to have greater demographic impact.

Table 9.5 shows that women with no education are less likely to use contraception for longer periods than women with primary or higher levels of education. This has important implication for information, education and communication (IE&C) strategy development. Recently married women (0-9 years) are also less likely to use contraception for long periods when compared to those married for ten years or more. This implies contraceptive use for spacing purposes and relatively short birth intervals for these women.

Figure 9.1
Overlap of Contraceptive Use and Breastfeeding



ZDHS 1988

10 Summary and Conclusions

The ZDHS birth history data have been used to examine fertility levels and trends in Zimbabwe, and the interrelationships between breastfeeding and fertility. Fertility has been consistently high in the past but recently there is evidence of a substantial decline, particularly when the TFR fell by 19 percent in the eight years prior to survey.

Results of the analysis show that 43 percent of currently married women were using some form of contraception at the time of the survey. Modern contraception was used by 36 percent of the women, while 7 percent of the women were using traditional methods of contraception. It is important to point out that the pill is the most dominant modern method accounting for 72 percent of all current contraceptive users. As expected, there are contraceptive use differentials by area of residence with women in the urban areas being more likely to use contraception than those in rural areas. Furthermore, women in urban areas are more likely to use modern contraception than those in rural areas. As expected, women with primary education and higher are more likely to use contraception than women with no education.

Those with continuing high fertility are women in the rural areas and those with no education, while the decline has been concentrated in urban areas and among those with primary education and higher. The changes in reproductive behaviour, as measured by the parity progression ratios, observed between the mid-70s and mid-80s are quite remarkable, both in terms of magnitude and speed. The parity progression

ratios show significant declines in the proportion of women with four children moving on to have a fifth birth within five years of their fourth birth. There is evidence that the first groups to adopt limiting behaviour are women living in urban areas and those who have completed secondary education and beyond. When the transition starts, it appears to be only a matter of time before it spreads to other strata of the population, in a self-sustaining process of diffusion. Much remains to be studied about this process: the importance of mass media, the social and geographic criteria and the types of barriers that can delay or stall this process. It is interesting that there is also notable fertility decline among primary school educated women. This suggests that there has already been some diffusion.

With regards to the analysis of age at first marriage, it is evident that early marriages are still prevalent in Zimbabwe although changes towards late marriage are taking place. The data also indicate that according to the Bongaarts model the inhibiting effects of marriage and contraception are more important than postpartum infecundability. A decomposition of the TFR into change due to marital status and marital fertility indicated that changes in marriage are responsible for some reduction in recent fertility. Perhaps the most important finding to emerge from the analysis is that the fertility increasing effects of the short breastfeeding interval among the urban and highly educated women are counterbalanced by the greater fertility reducing effects of nuptiality and contraception.

With respect to contraceptive use and breastfeeding, the results show that there is substantial overlap. The longer the desired birth interval, the earlier women are likely to start using contraception. Urban and educated women are more likely than other women to continue using after they have weaned their child.

10.1 PROSPECTS FOR FUTURE ANALYSIS

This analysis of the determinants of fertility in Zimbabwe using the ZDHS data provides new insights into the prospects for further fertility decline and the design of a comprehensive population policy. The possibility that the severe economic problems of Zimbabwe might be promoting or impeding fertility decline prompts the need for an evaluation of the micro-economic determinants of fertility and a careful examination of social class differences in fertility, attitudes towards contraception and desire for future births.

Further analysis should focus on the following questions which may prove useful in evaluating policy and targeting resources:

- What are the social and cultural sources and determinants of the fertility decline in Zimbabwe?

- What are the effects of education on fertility, desired family size, contraceptive use and what are the channels through which these effects operate?

- What are the likely effects of increases in the availability and costs of schooling, health care and family planning services on contraceptive use and fertility?

10.2 POLICY IMPLICATIONS

From the foregoing analysis, a few salient areas of potential policy relevance can be identified. It has been observed that although fertility has started to decline in the five years prior to the ZDHS, these declines are much more pronounced in the urban areas. Data show that the total fertility rate is 6.4 in the rural areas and 4.2 in the urban areas, a difference of two children. In view of the limited resources and economic difficulties, we feel that a greater demographic impact would be realized if the population control efforts in terms of IE&C are directed to the rural areas.

Although the Zimbabwe family planning programme has achieved a remarkable contraceptive prevalence relative to other countries on the African subcontinent, it should be pointed out that the programme is pill dominated. There is, therefore, a need to broaden the contraceptive method mix in order to match all clients to the most suitable contraceptive methods. A broader choice of contraceptives has been observed to lead to prolonged contraceptive use.

Generally, contraception is initiated soon after birth. This means that there are long durations of contraception and breastfeeding overlap. However, breastfeeding alone would delay considerably the return of the menstrual cycles and thus ovulation and fecundity. It has also been found that 70 percent of mothers who were 6-7 months postpartum were still amenorrheic. If this period of postpartum amenorrhea is linked with the timing of contraceptive initiation after birth, then the Zimbabwe family planning programme will use contraceptives much more effectively and its demographic impact will be potentially greater.

Women with no education are less likely to use contraception for longer periods than those with primary or higher levels of education. The ZNFPC would benefit by particularly targeting these women in its IE&C programmes. However, it would be much more effective to ensure that once demand for contraceptive use has been created in these "neglected" subgroups, a broader range of contraceptive methods should also be available to meet both the spacing and the limiting goals of these people.

There are indications from the data that contraception in Zimbabwe is largely used for spacing purposes. At the currently high fertility levels, the population growth rate will remain one of the highest on the subcontinent. For the national family planning programme to have a marked demographic impact, the emphasis of the programme should shift, though cautiously from spacing to the adopting of a small family norm.

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Appendix A

Coefficients and Descriptive Statistics for Variables Used in the Multinomial Logistic Equation

A. Contraceptive use and breastfeeding

Variable	Coefficient	Standard error	T-Ratio	Mean	Standard deviation
Constant	3.01	0.28	10.68	1.00	0.00
Period since birth	-0.14	0.01	-17.95*	22.31	15.18
Preferred birth interval					
<2 years	-0.79	0.46	-1.69	0.04	0.21
25-36 months	0.09	0.32	0.27	0.12	0.32
49-60 months	0.79	0.30	2.63*	0.13	0.34
>61 months	0.19	0.26	0.71	0.20	0.40
No more	0.24	0.25	0.88	0.34	0.47
Place of residence	-0.41	0.19	-2.20*	0.27	0.45
Parity	-0.05	0.04	-1.20	4.19	2.66
No education	0.24	0.23	1.03	0.17	0.38
Secondary	-0.49	0.21	-2.34*	0.21	0.41

* Indicates that the variables are statistically significant

B. Used contraception in the open birth interval

Variable	Coefficient	Standard error	T-Ratio	Mean	Standard deviation
Constant	-0.93	0.38	-2.45*	1.00	0.00
Period since birth	0.03	0.01	3.64*	22.31	15.18
Preferred birth interval					
<2 years	0.78	0.50	1.56	0.04	0.21
25-36 months	0.68	0.35	1.93*	0.12	0.32
49-60 months	-1.09	0.36	-3.00*	0.13	0.34
>61 months	-2.40	0.39	-6.12*	0.20	0.40
No more	-1.45	0.33	-4.40*	0.34	0.47
Urban	0.00	0.24	0.00	0.27	0.45
Parity	-0.07	0.05	-1.35	4.19	2.66
No education	0.25	0.30	0.83	0.17	0.38
Secondary	-0.09	0.27	-0.35	0.21	0.41

* Indicates that the variables are statistically significant

C. Not used contraception in the open birth interval

Variable	Coefficient	Standard error	T-Ratio	Mean	Standard deviation
Constant	2.16	0.24	8.81*	1.00	0.00
Period since birth	-0.05	0.01	-9.44*	22.31	15.18
Preferred birth interval					
<2 years	0.13	0.40	0.32	0.04	0.21
25-36 months	0.15	0.29	0.52	0.12	0.32
49-60 months	0.28	0.26	1.11	0.13	0.34
>61 months	-0.50	0.22	-2.28*	0.20	0.40
No more	0.06	0.23	0.25	0.34	0.47
Residence	-0.41	0.15	-2.67*	0.27	0.45
Parity	-0.03	0.03	-1.00	4.19	2.66
No education	0.42	0.19	2.19*	0.17	0.38
Secondary	-0.81	0.18	-4.39*	0.21	0.41

* Indicates that the variables are statistically significant

Appendix B

Regression coefficients and descriptive statistics of variables used in the ordinary least squares regression equation

Variable	Coefficient	Standard error	T-Ratio	Mean	Standard deviation
Constant	22.18	1.58	14.06	1.00	0.00
Age	-0.07	0.45	-1.56	26.54	6.56
Parity 1-2	-2.25	0.73	-3.08	0.37	0.48
Parity 5+	-1.12	0.56	-2.01	0.30	0.46
Urban	0.14	0.40	0.40	0.34	0.47
Breastfeeding	-14.87	0.52	-28.59	0.86	0.35
No education	1.85	0.56	3.34	0.13	0.34
Secondary	-0.82	0.48	-1.72	0.26	0.43