Sudan

Sudan Demographic and Health Survey 1989/1990

Department of Statistics
Ministry of Economic and National Planning

DHS
Demographic and Health Surveys
Institute for Resource Development/Macro International, Inc.

REPUBLIC OF THE SUDAN

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Department of Statistics
Ministry of Economic and National Planning
Khartoum, Sudan

Institute for Resource Development/Macro International, Inc.
Columbia, Maryland USA

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This report presents the findings of the Sudan Demographic and Health Survey (SDHS). The survey was a collaborative effort between the Department of Statistics, Ministry of Economic and National Planning, the Republic of the Sudan, and the Institute for Resource Development/Macro International, Inc. (IRD). The survey is part of the worldwide Demographic and Health Surveys programme, which is designed to collect data on fertility, family planning, and maternal and child health. Funding for the survey was provided by the government of the Republic of Sudan, United States Agency for International Development (Contract No. DPE-3023-C-00-4083-00), and UNICEF. Additional information about the SDHS can be obtained from the Population Census Office, Department of Statistics, Ministry of Economic and National Planning, P.O. Box 700, Khartoum, Sudan. Additional information about the DHS programme can be obtained by writing to: DHS Programme, IRD/Macro International, Inc., 8850 Stanford Boulevard, Suite 4000, Columbia, MD 21045, USA (Telephone: 301- 290-2800; Telex: 87775; Fax: 301-290-2999).

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FOREWORD

The Sudan Demographic and Health Survey (SDHS) was conducted as part of worldwide Demographic and Health Surveys programme (DHS) of the Institute for Resource Development (IRD)/Macro International, Inc. Sudan is one of fifteen African countries that participated in the first phase of the programme. The survey is a welcome addition to demographic and health data in the country. It provides detailed information on various demographic components such as marriage, fertility, family planning, and on the socioeconomic factors associated with these variables. Knowledge of these components of population dynamics is considered an integral part of effective development planning in Sudan.

The survey was conducted in two phases in 1989 and 1990 by the Department of Statistics. It was limited to northern Sudan due to civil unrest in the South. The survey was conducted with financial support from USAID and UNICEF and technical assistance from IRD.

The successful implementation of the SDHS would not have been possible without the active and dedicated efforts of a large number of people. In particular, I would like to thank Mr. Abdel Wahab Modawi, the project director, Mr. Ibrahim Abbas Saif Elnasr, deputy project director, Mr. Elnaiem S. Abbas, sampling coordinator, Mr. Mohamed A. Yousif, field coordinator, Mr. Abdeen Frahat, assistant field coordinator, and Mr. Ahmed Suliman and Mr. Salah A. Rahman, data processing coordinators. My thanks also go to the directors and staff of the regional statistical offices. Special thanks to Ms. Suzan Wesley of the Ministry of Health for her valuable participation in training field staff and also to the interviewers, who carried out the fieldwork under difficult conditions, and all the other people who took part in the survey, in particular the drivers, editors, coders, and data entry personnel. Thanks are also due to the regional governors and their staff in the regional departments who helped very much in making life easier for the interviewers and other field staff.

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I also wish to record my special thanks to Mr. Sushil Kumar, the monitor for the Sudan Demographic and Health Survey for his efforts throughout the various stages of the survey, especially for travelling with the field staff to the different parts of the country and for his contributions to this report.

Last but not least, I gratefully acknowledge the help of those people who made this report available in such a short period of time as the first study based on survey data to be used by planners and policymakers.

Dr. Omer A. El Tay
Director General
Department of Statistics
Khartoum

SUMMARY

The Sudan Demographic and Health Survey (SDHS) was conducted in two phases between November 15, 1989 and May 21, 1990 by the Department of Statistics of the Ministry of Economic and National Planning. The survey collected information on fertility levels, marriage patterns, reproductive intentions, knowledge and use of contraception, maternal and child health, maternal mortality, and female circumcision. The survey findings provide the National Population Committee and the Ministry of Health with valuable information for use in evaluating population policy and planning public health programmes.

A total of 5860 ever-married women age 15-49 were interviewed in six regions in northern Sudan; three regions in southern Sudan could not be included in the survey because of civil unrest in that part of the country. The SDHS provides data on fertility and mortality comparable to the 1978-79 Sudan Fertility Survey (SFS) and complements the information collected in the 1983 census.

Fertility levels and trends

Fertility has declined sharply in Sudan, from an average of six children per women in the Sudan Fertility Survey (TFR 6.0) to five children in the Sudan DHS survey (TFR 5.0). Women living in urban areas have lower fertility (TFR 4.1) than those in rural areas (5.6), and fertility is lower in the Khartoum and Northern regions than in other regions. The difference in fertility by education is particularly striking; at current rates, women who have attained secondary school education will have an average of 3.3 children compared with 5.9 children for women with no education, a difference of almost three children.

Although fertility in Sudan is low compared with most sub-Saharan countries, the desire for children is strong. One in three currently married women wants to have another child within two years and the same proportion want another child in two or more years; only one in four married women wants to stop childbearing. The proportion of women who want no more children increases with family size and age. The average ideal family size, 5.9 children, exceeds the total fertility rate (5.0) by approximately one child. Older women are more likely to want large families than younger women, and women just beginning their families say they want to have about five children.

Marriage

Almost all Sudanese women marry during their lifetime. At the time of the survey, 55 percent of women 15-49 were currently married and 5 percent were widowed or divorced. Nearly one in five currently married women lives in a polygynous union (i.e., is married to a man who has more than one wife). The prevalence of polygyny is about the same in the SDHS as it was in the Sudan Fertility Survey.

Marriage occurs at a fairly young age, although there is a trend toward later marriage among younger women (especially those with junior secondary or higher level of schooling). The proportion of women 15-49 who have never married is 12 percentage points higher in the SDHS than in the Sudan Fertility Survey.

There has been a substantial increase in the average age at first marriage in Sudan. Among

SDHS. Since age at first marriage is closely associated with fertility, it is likely that fertility will decrease in the future.

With marriages occurring later, women are having their first birth at a later age. While one in three women age 45-49 had her first birth before age 18, only one in six women age 20-24 began childbearing prior to age 18. The women most likely to postpone marriage and childbearing are those who live in urban areas or in the Khartoum and Northern regions, and women with post-primary education.

Breastfeeding and postpartum abstinence

Breastfeeding and postpartum abstinence provide substantial protection from pregnancy after the birth of a child. In addition to the health benefits to the child, breastfeeding prolongs the length of postpartum amenorrhoea. In Sudan, almost all women breastfeed their children; 93 percent of children are still being breastfed 10-11 months after birth, and 41 percent continue breastfeeding for 20-21 months. Postpartum abstinence is traditional in Sudan and in the first two months following the birth of a child 90 percent of women were abstaining; this decreases to 32 percent after two months, and to 5 percent after one year. The survey results indicate that the combined effects of breastfeeding and postpartum abstinence protect women from pregnancy for an average of 15 months after the birth of a child.

Knowledge and use of contraception

Most currently married women (71 percent) know at least one method of family planning, and 59 percent know a source for a method. The pill (70 percent) is the most widely known method, followed by injection, female sterilisation, and the IUD. Only 39 percent of women knew a traditional method of family planning.

Despite widespread knowledge of family planning, only about one-fourth of ever-married women have ever used a contraceptive method, and among currently married women, only 9 percent were using a method at the time of the survey (6 percent modern methods and 3 percent traditional methods). The level of contraceptive use while still low, has increased from less than 5 percent reported in the Sudan Fertility Survey.

Use of family planning varies by age, residence, and level of education. Current use is less than 4 percent among women 15-19, increases to 10 percent for women 30-44, then decreases to 6 percent for women 45-49. Seventeen percent of urban women practice family planning compared with only 4 percent of rural women; and women with senior secondary education are more likely to practice family planning (26 percent) than women with no education (3 percent).

There is widespread approval of family planning in Sudan. Almost two-thirds of currently married women who know a family planning method approve of the use of contraception. Husbands generally share their wives's views on family planning. Three-fourths of married women who were not using a contraceptive method at the time of the survey said they did not intend to use a method in the future.

Communication between husbands and wives is important for successful family planning. Less than half of currently married women who know a contraceptive method said they had talked about

family planning with their husbands in the year before the survey; one in four women discussed it once or twice; and one in five discussed it more than twice. Younger women and older women were less likely to discuss family planning than those age 20 to 39.

Mortality among children

The neonatal mortality rate in Sudan remained virtually unchanged in the decade between the SDHS and the SFS (44 deaths per 1000 births), but under-five mortality decreased by 14 percent (from 143 deaths per 1000 births to 123 per thousand). Under-five mortality is 19 percent lower in urban areas (117 per 1000 births) than in rural areas (144 per 1000 births).

The level of mother's education and the length of the preceding birth interval play important roles in child survival. Children of mothers with no education experience nearly twice the level of under-five mortality as children whose mother had attained senior secondary or higher education. Mortality among children under five is 2.7 times higher among children born after an interval of less than 24 months than among children born after interval of 48 months or more.

Maternal mortality

The maternal mortality rate (maternal deaths per 1000 women years of exposure) has remained nearly constant over the twenty years preceding the survey, while the maternal mortality ratio (number of maternal deaths per 100,000 births), has increased (despite declining fertility). Using the direct method of estimation, the maternal mortality ratio is 352 maternal deaths per 100,000 births for the period 1976-82, and 552 per 100,000 births for the period 1983-89. The indirect estimate for the maternal mortality ratio is 537. The latter estimate is an average of women's experience over an extended period before the survey centred on 1977.

Maternal health care

The health care mothers receive during pregnancy and delivery is important to the survival and well-being of both children and mothers. The SDHS results indicate that most women in Sudan made at least one antenatal visit to a doctor or trained health worker/midwife. Eighty-seven percent of births benefitted from professional antenatal care in urban areas compared with 62 percent in rural areas. Although the proportion of pregnant mothers seen by trained health workers/midwives are similar in urban and rural areas, doctors provided antenatal care for 42 percent and 19 percent of births in urban and rural areas, respectively.

Neonatal tetanus, a major cause of infant deaths in developing countries, can be prevented if mothers receive tetanus toxoid vaccinations. One-third of Sudanese mothers received two doses of tetanus toxoid during their pregnancy, while an additional one-tenth received one dose. The proportion of births whose mothers received two doses of tetanus toxoid is substantially higher in urban areas than in rural.

For births occurring in the five years preceding the survey, 18 percent of urban mothers were attended by doctors, 68 percent by trained health workers/midwives, and 11 percent by traditional birth attendants; for rural mothers these percentages were 4 percent, 56 percent, and 34 percent, respectively, indicating that rural women still depend on the traditional attendants more than doctors for assistance at delivery.

Sudan's Expanded Programme of Immunisation (EPI) recommends that all children receive immunisations in the first year of life against common childhood diseases. In the SDHS mothers of 46 percent of children age 12-23 months were able to show interviewers the health card documenting their child's immunisations. For 33 percent of children the health card was not available but their mothers reported that they had received at least one immunisation.

The SDHS results indicate that immunisation coverage for children 12-23 months is moderate: 76 percent of children had been immunised against BCG, 60 percent had received three doses of DPT, 61 percent had received three doses of polio, 61 percent were vaccinated against measles, and 52 percent had had all primary immunisations. Immunisation coverage is higher for urban children than for rural children; it is higher in the Khartoum and Northern regions than in other regions; and it increases sharply with the mother's level of education.

Diarrhoea, a common illness among infants and young children, can cause severe dehydration and if left untreated, can lead to death. The SDHS results show that 30 percent of children under five had had diarrhoea in the two weeks preceding the survey, and 18 percent in the 24 hours preceding the survey. Prevalence was highest among children between the ages of 6 and 23 months.

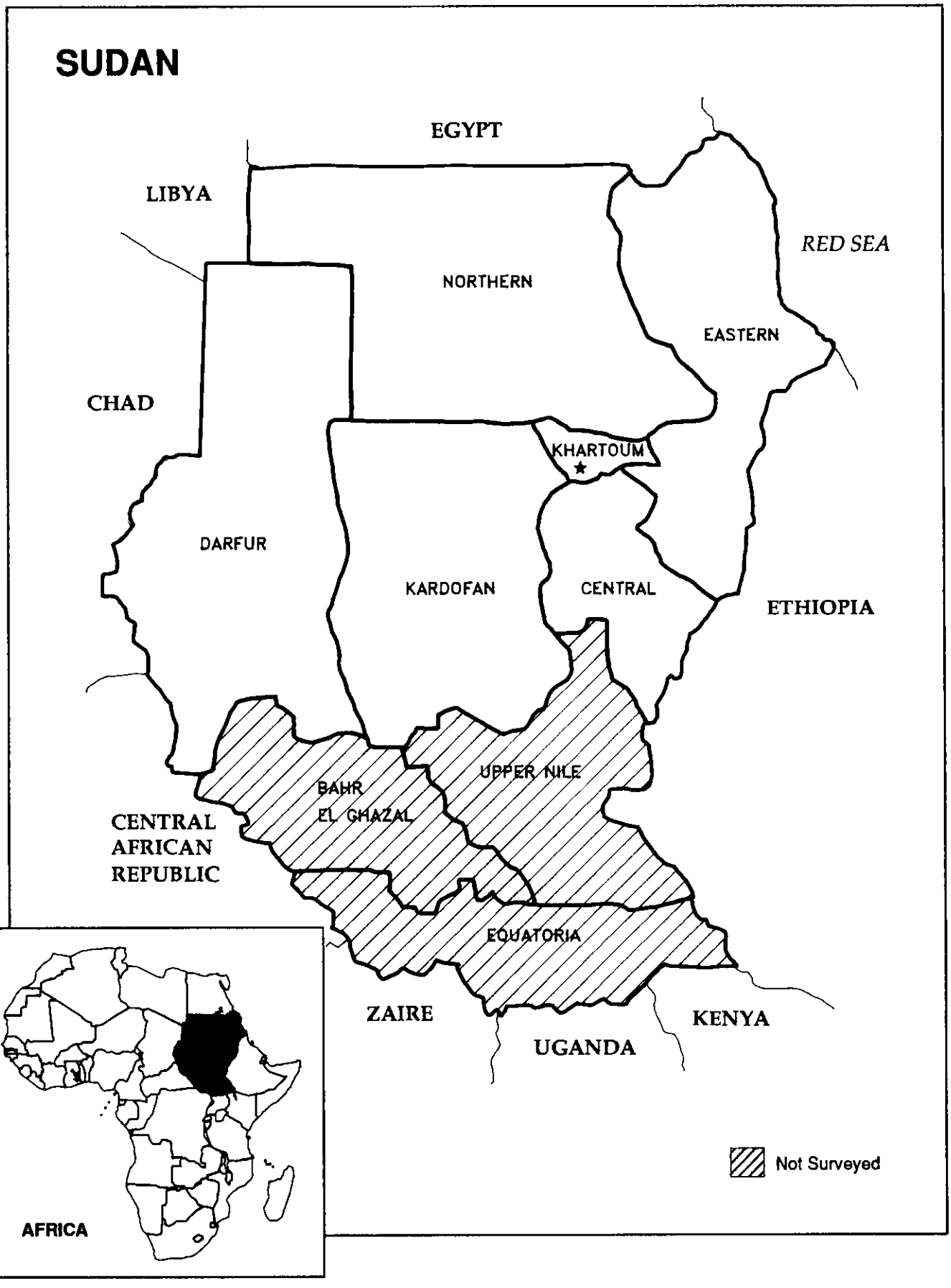
Dehydration caused by diarrhoea can be treated effectively and inexpensively using oral rehydration therapy (ORT). In Sudan 29 percent of children with diarrhoea were treated with a solution prepared from ORS packets (salts), and 8 percent with a homemade salt and sugar solution. About half of the children with diarrhoea were taken to a medical facility; however, 30 percent neither visited a health facility nor received any treatment.

Coughing together with difficult breathing is symptom of lower respiratory tract infection particularly pneumonia. Of all children under five, 48 percent had had a cough and 19 percent had had both a cough and difficult breathing during the two weeks before the survey. About 50 percent of the children suffering from cough were taken for treatment to a government health facility, 11 percent went to private doctors or hospitals and 4 percent consulted pharmacies. Children having cough in urban areas were more likely to be taken to private doctors (25 percent) than children in rural areas (3 percent).

Female circumcision

The SDHS collected data on the prevalence of female circumcision and the attitudes of women and men toward the practice. Eighty-nine percent of ever-married women in Sudan have been circumcised, representing a slight drop from 96 percent reported by the SFS. The majority of women received Pharaonic circumcision (82 percent); 15 percent received Sunna, and 3 percent had an intermediate type of circumcision.

More than three-quarters of ever-married women support continuation of the practice of female circumcision. Support for circumcising their own daughters is even stronger than for circumcision in general. Among those wanting to retain the practice, Sunna circumcision (the least severe type) is preferred by 48 percent of the ever-married women; 46 percent prefer Pharaonic circumcision and 5 percent prefer the intermediate type. Those who oppose continuation of female circumcision said they believe the best way to abolish the practice is through education campaigns and the enforcement of laws against female circumcision.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BAHR
EL GHAZAL
UPPER NILE
CENTRAL
AFRICAN
REPUBLIC
EQUATORIA
ZAIRE
KENYA
UGANDA
Not Surveyed
AFRICA

CHAPTER 1

BACKGROUND

1.1 GEOGRAPHY, HISTORY, ECONOMY

Sudan is the largest country in Africa and covers an area of about 2.5 million square kilometres or nearly one-tenth of the total area of Africa. It is located in the northeastern part of the continent and extends from about latitude 3 degrees to 23 degrees north and from longitude 22 degrees to 39 degrees east. It is 2100 kilometres from north to south and about 1800 kilometres from east to west. Sudan shares borders with eight countries: Egypt and Libya to the north; the Central African Republic, Chad, and Zaire to the west; Kenya and Uganda to the south; and Ethiopia to the east. The Red Sea forms part of the eastern border.

The country is located in the tropics and features Saharan conditions in the North and equatorial conditions in the South. With minor variations, northern Sudan is dry and characterised by high temperatures and little rainfall; southern Sudan is humid with milder temperatures and heavy rains. The soil composition varies, depending on the rainfall, being generally fertile in the Central region and in parts of the Eastern region. Due to the variation in climatic conditions, Sudan has rain forest vegetation in the South and savanna woodland, semi-desert, and desert vegetation in the North.

The population of Sudan is characterised by two distinct cultural traditions, one in the North and one in the South; regional divisions reflect this ethnic division. Northern Sudan consists of six regions: Khartoum, the national capital, Northern region (Northern and Nile provinces), Eastern region (Kassala and Red Sea provinces), Central region (Blue Nile, White Nile and Gezeira provinces), Kordofan (North Kordofan and South Kordofan provinces), and Darfur (North Darfur and South Darfur provinces). The majority of people in northern Sudan are Muslims, although there are some Christians and practitioners of traditional religion. Arabic is commonly spoken in the North in addition to local languages. Southern Sudan, consisting of three regions: Equatoria (Eastern Equatoria and Western Equatoria provinces), Upper Nile (Upper Nile and Jonglei provinces), and Bahr El Ghazal (Bahar El Ghazal and El Buheyrat provinces). The majority of people in southern Sudan practice traditional religion and speak local African languages. In general, they are more closely linked to population groups further south than to those in northern Sudan.

Sudan became independent in 1956 after a long period of British rule. Just prior to independence, a British-type of democratic system was hurriedly put in place. People were unfamiliar with the new system, and the country soon experienced political instability and economic deterioration. A mutiny broke out in the southern provinces and later turned into civil war. Although the war ended by 1972, it started up again in late 1980s. During this period of civil strife the country experienced widespread unrest with resulting destruction of the social infrastructure and disruption of the economy. Although the entire country has suffered the effects of the civil war, the greatest impact has been in the South. For this reason, the DHS survey did not include the southern regions.

1.2 POPULATION

The first census, which was undertaken in 1955-56, reported a population of 10.3 million. The 1973 census reported 14.1 million, and the 1983 census 20.6 million. In a period of 27 years the

population had doubled in size, with a fourfold increase in the urban areas (Table 1.1). A recent projection done by the Census Office estimated the population of Sudan in 1989 to be 24.5 million (Population Census Office, 1991).

Population size and growth rate

Table 1.1 Population size and growth rate by residence pattern, Sudan Census, 1956, 1973, and 1983

Residence pattern	Population			Growth Rate (%)		
	1956	1973	1983	1956-1973	1973-1983	1956-1983
Urban	903,973	2,605,896	4,219,826	6.3	5.0	5.9
Rural	8,002,712	9,877,984	14,109,541	1.2	3.7	2.1
Nomadic	1,405,951	1,629,710	2,264,830	0.9	3.4	1.8
Total	10,262,536	14,113,590	20,594,197	1.9	3.9	2.7

The intercensal growth rate was 1.9 percent per annum for 1956-1973, 3.9 percent per annum for 1973-1983 and 2.7 percent per annum for 1956-1983. Because of coverage problems in the South during the 1973 census, the growth rate based on the 1956-1983 census data is probably the most plausible.

Fertility

The age-specific and total fertility rates for the census data were estimated using the United Nations MORTPAK package (FERTPF Programme). The results are presented in Table 1.2 together with estimates obtained from the Sudan Fertility Survey 1978-79. The table shows rates for the 12 months preceding the census or survey and gives both reported and adjusted fertility rates. The adjusted fertility rates show a consistent pattern of decline. Fertility rates based on data collected in the Sudan Demographic and Health Survey are discussed in Chapter 3.

Mortality

Indirect estimates of life expectancy at birth obtained from 1973 census data were 46 years for males, 50 years for females and 48 years for both sexes. By 1983, these levels had risen to about 53 years for males, 55 years for females and 54 years for both sexes, indicating a decline in mortality. The trend does not appear to have continued during the period 1983 to 1988. On the contrary, the level of mortality may have risen due to the civil war in the South and the drought in most parts of the country.

Age-specific fertility rates and total fertility rates

Table 1.2 Reported and adjusted age-specific fertility rates and total fertility rates (TFR), from selected sources, Sudan 1973-1983

	Age-specific fertility rate					
	1973 census		Sudan Fertility Survey 1978-79		1983 census	
Age	Reported	Adjusted[1]	Reported	Adjusted[1]	Reported	Adjusted[1]
15-19	0.109	0.142	0.090	0.100	0.067	0.113
20-24	0.259	0.337	0.275	0.304	0.187	0.279
25-29	0.273	0.355	0.325	0.360	0.236	0.355
30-34	0.213	0.277	0.272	0.301	0.209	0.289
35-39	0.150	0.195	0.155	0.172	0.161	0.216
40-44	0.055	0.072	0.110	0.122	0.062	0.080
45-49	0.028	0.036	0.018	0.020	0.041	0.050
TFR	5.4	7.1	6.2	6.9	4.8	6.8

Note: Regions in the South are excluded.

[1]Based on P/F ratios for age groups 20-24, 25-29, and 30-34.

Source: Population Census Office, 1991

1.3 POPULATION AND FAMILY PLANNING POLICIES AND PROGRAMMES

Family planning activities in Sudan started in 1965 with the establishment of the Sudan Family Planning Association (SFPA), an affiliate of the International Planned Parenthood Federation (IPPF). In the beginning, family planning services were limited primarily to urban centres, despite the fact that about 80 percent of the population is rural. With increased acceptance of family planning on the part of Islamic leaders and with the introduction of primary health care, the Government has integrated family planning into the overall maternal and child health programme as a mean of reducing maternal morbidity and mortality. The main aim of the SFPA is to encourage women to space births so that they and their children increase their chances for survival. Another goal of the family planning programme is to reduce the high rate of natural population increase and to improve the health of mothers and their children under the age of five years.

1.4 HEALTH PRIORITIES AND PROGRAMMES

Health services in Sudan are provided by the Ministry of Health and by local (regional) governmental and nongovernmental organisations. The Ministry of Health is responsible for developing health policies and for providing health care in government hospitals and health centres. The regional governments are in charge of health care delivery at the district level (within provinces) and coordinating the services of nongovernmental organisations.

The goals and objectives of the Ministry of Health are:

- reduction of infant mortality to 50 deaths per 1000 live births by the year 2000,
- reduction of child (under five years) mortality to 70 deaths per 1000 live births by the year 2000,
- reduction of maternal mortality by one-third of the level in 1990 by the year 2000,
- reduction of severe malnutrition among children under five years by the year 1995,
- elimination of iodine deficiency by 1995,
- reduction of vitamin A deficiency by 50 percent by 1995,
- reduction of child mortality due to acute respiratory infection by 25 percent of the 1990 level by 1995, and
- reduction of mortality due to diarrhoeal disease in children under five by 40 percent of the preprogramme level by 1995.

1.5 EDUCATION SYSTEM

The education system in Sudan consists of four levels: primary, junior secondary, senior secondary, and higher institute and university. Primary school covers the first six years of education, while junior and senior secondary each cover three years.[1] In the following chapters secondary education refers to post-primary education or junior secondary and higher. In addition to formal education, there are schools called *Khalwas*, where children of all ages are accepted. The curriculum in these centres is mainly religious with the objective of teaching children to memorize the Koran. The government has a goal of achieving universal basic education for all Sudanese children by the year 2000.

1.6 OBJECTIVES OF THE SURVEY

The primary objective of the SDHS was to provide data on fertility, nuptiality, family planning, fertility preferences, childhood mortality, indicators of maternal health care, and utilization of child health services. Additional information was collected on educational level, literacy, source of household water, and other housing conditions.

The SDHS is intended to serve as a source of demographic data for comparison with the 1983 census and the Sudan Fertility Survey (SFS) 1978-79, and to provide population and health data for policymakers and researchers. The objectives of the survey are to:

[1] Before the educational system was reorganized in the early 1970s, primary, intermediate, and secondary schooling were for four years each.

- assess the overall demographic situation in Sudan,
- assist in the evaluation of population and health programmes,
- assist the Department of Statistics in strengthening and improving its technical skills for conducting demographic and health surveys,
- enable the National Population Committee (NPC) to develop a population policy for the country, and
- measure changes in fertility and contraceptive prevalence, and study the factors which affect these changes, and
- examine the basic indicators of maternal and child health in Sudan.

1.7 ORGANISATION OF THE SURVEY

The SDHS was carried out by the Census Office of the Department of Statistics, Ministry of Finance and Economic Planning, with financial support from the United States Agency for International Development (USAID). The Institute for Resource Development (IRD), a Macro Systems Company, provided technical assistance for the survey through the Demographic and Health Surveys Programme. UNICEF also provided financial support to complete the survey.

Sample Design

The SDHS was conducted in the northern regions of Sudan, covering 12 provinces. The three regions in the South (6 provinces) were not included in the survey due to civil unrest and security problems. The SDHS covered approximately 80 percent of the total population of the country. The sample was designed to obtain 5000 completed interviews with eligible women, i.e. ever-married women 15-49 years of age who slept in the selected household the night before the interview. It was a multistage, stratified, self-weighting probability sample, representing the settled but excluding the nomad population in urban and rural areas of the 12 northern provinces. The 1983 census formed the sampling frame. In addition, a special sample design was followed in the major cities to ensure the inclusion of recently settled areas in and around these cities. The sample design is described in more detail in Appendix A. The estimates of sampling errors are given in Appendix B.

Questionnaires

Two questionnaires in Arabic were used for the SDHS: the Household Questionnaire and the Individual Questionnaire. Both were adapted from the DHS Model "B" Questionnaire, designed for use in countries with low contraceptive prevalence. The questionnaires were finalised after a pretest was carried out in June and July 1989.

The Household Questionnaire was used to list information including name, age, sex, and residence status for all usual members of the household and any visitors. For those ten years and older, information on marital status and level and grade of education was also recorded. The major purpose of the Household Questionnaire was to identify those women who were eligible for the Individual Questionnaire.

The Individual Questionnaire was used to collect data from ever-married women 15-49 years who were present in a sampled household the night prior to the household interview. The questionnaire collected information on the following topics:

Respondent's background
Reproductive history and female circumcision
Knowledge and use of family planning
Maternal and child health, and breastfeeding
Marriage
Fertility preferences
Husband's background
Maternal mortality

Pretest

In order to check the content and translation of the questionnaires, a pretest was conducted. Twelve female employees from the statistics section of the Ministry of Health were selected to participate as interviewers in the pretest. All interviewers had at least secondary education and some had interviewing experience.

A two-week training course for the pretest interviewers was conducted in June 1989. Staff from the Ministry of Health, IRD/Macro, and the Census Office conducted the training. On completion of the training, interviews were conducted from June 25 to July 4, 1989 in both urban (El Zihaour and Al Hilla El Gadieda) and rural (Id Babikir) areas. A total of 162 individual questionnaires were completed, 82 in urban, and 80 in rural areas. The average time required to complete the individual questionnaire was 48 minutes in urban areas and 43 minutes in rural areas. After the pretest, modifications were made in the questionnaires and manuals. An English translation of the final version of the household and individual questionnaires is included in Appendix C.

Fieldwork and Training

The training of the field staff for the main survey began on October 16 and lasted until November 14, 1989. Sixty-two women were recruited to undergo the training; most of them were university graduates and not affiliated with the government. The special training programme for six supervisors started one week later and was conducted simultaneously. The interviewers' training included five hours of classroom sessions per day, as well as a few days of field practice. In addition to those involved in conducting the pretest training, the staff from the National Population Committee also participated in training field staff.

The training programme included:

- general lectures related to fertility, family planning and public health,
- specific sessions on how to fill out the questionnaires,
- role playing and mock interviews,
- four days of field practice in areas not covered in the survey, and
- periodic tests.

Trainees who failed to show interest, did not attend on a regular basis, did not agree to work in all provinces or failed the first three tests were disqualified. At the beginning of the third week of training, 14 of the best trainees were selected to be the field editors. They were thoroughly trained to undertake their responsibilities.

At the end of the training, 48 of the 62 trainees were selected to work as interviewers and editors during the main survey fieldwork. An additional three were asked to stand by as back-up.

The fieldwork was carried out in two phases: from November 15, 1989 to January 31, 1990 and from March 19 to May 21, 1990. Phase I of the fieldwork involved interviewing in Khartoum and in the Central and Eastern regions and was carried out by seven teams. Each team consisted of a supervisor, two field editors and five interviewers. The field editors also worked as interviewers when time permitted. Phase II of the fieldwork in Kordofan and Darfur regions was initially planned to start February 10, 1990 but was delayed until mid-March because of problems obtaining survey vehicles. Since one solution was to reduce the number of teams, the survey director selected 27 of the 45 interviewers to complete the fieldwork: (a) one team (seven interviewers, a supervisor and a fieldwork coordinator from the Central office) was assigned to complete the remaining rural clusters in Khartoum and to cover the entire Northern region, and (b) four teams (20 interviewers/editors and four supervisors) worked in two groups in Kordofan and Darfur regions.

Data Entry, Editing and Tabulation

The central office of the SDHS in Khartoum was responsible for collecting the completed questionnaires from supervisors as soon as a sufficient number of clusters was completed in a province. The field coordinator from the central office, or staff from the regional census offices, hand-carried the batches of questionnaires to Khartoum for data entry and editing. At the central office, the questionnaires were coded and reviewed for consistency and completeness by office editors who also carried out the data entry. To provide feedback for the field teams, the office editors were instructed to report any problems detected while editing the questionnaires. These reports were reviewed by the senior staff and, when warranted, team supervisors were contacted in order to inform them of the steps to be taken to avoid these problems in the future.

The data entry and editing phase began soon after the start of the fieldwork. The data from the questionnaires were entered and edited on microcomputers using the Integrated System for Survey Analysis (ISSA), a package developed especially for the Demographic and Health Survey programme. Eight data entry personnel used three IBM-compatible microcomputers to process the SDHS survey. The data entry and editing were completed one month after the end of the fieldwork. All data processing, including preliminary tabulations, was completed by July 1990.

Coverage of the Survey

In the Sudan Demographic and Health Survey, 7,280 households were selected for the sample; 6,945 of these were identified (Table 1.3). Household interviews were completed in 6,891 identified households, which represents a response rate of 99 percent. A total of 6,131 eligible women were identified and 5,860 were successfully interviewed. The response rate at the individual level was 96 percent.

Sample results

Table 1.3 Sample Results, Sudan DHS 1989-90

Result	Number	Percent
Households selected	7280	100.0
Completed	6891	94.7
Household present, but no competent respondent	34	0.5
Household absent	113	1.6
Refused	3	0.0
Dwelling vacant	187	2.6
Dwelling destroyed	1	0.0
Dwelling not found	17	0.2
Other	34	0.5
Households identified	6945	100.0
Interviewed	6891	99.2
Not interviewed	54	0.8
Eligible women identified	6131	100.0
Completed	5860	95.6
Not at home	169	2.8
Refused	15	0.2
Partly completed	5	0.1
Other	82	1.3

CHAPTER 2

BACKGROUND CHARACTERISTICS OF HOUSEHOLDS AND RESPONDENTS

Throughout this report, nuptiality, fertility, contraceptive behaviour, mortality and health of children, etc. are viewed in terms of the different subgroups of the population. One purpose of this chapter is to profile these subgroups and to describe the environment in which women and children live. The general characteristics of the population are presented, including: the age-sex structure, literacy and education, household arrangements (headship, size) and housing facilities (such as water supply, sanitation, and electricity). The distinction between urban and rural settings is an important indicator of household differences.

The second purpose of the chapter is to provide a summary of the respondents' characteristics. This is intended to highlight important features of the women included in the SDHS. For the full sample, percent distributions are shown for various demographic and socioeconomic characteristics, such as age, marital status, residence, and education level.

2.1 HOUSEHOLD POPULATION BY AGE

In many developing countries data on age are affected by errors such as misstatement and preference for or avoidance of certain digits. In order to improve age reporting in cases where age is not given, interviewers were instructed to estimate ages using a specially designed historical calendar, with reference to other members of the household whose ages might be reasonably guessed, or based on physiological or sociological factors.

Table 2.1 shows the percent distribution of the household population by five-year age groups, according to urban-rural residence and sex. The table indicates that the age distribution of the household population in the SDHS is similar to that of the 1983 census population and the population surveyed by the Sudan Fertility Survey 1978-79. Proportionally, in the SDHS there are more people age 15-49 and fewer children and older people in urban areas; this is due to the migration of young adults from rural areas to the cities.

Figure 2.1 shows the population distribution of the three data sources—the SFS, the 1983 census, and the SDHS—by broad age categories. It is apparent that the proportion of the population under age 15 has declined, while the proportion age 15-64 has increased. This pattern is characteristic of populations that are experiencing declining fertility.

2.2 EDUCATIONAL LEVEL AND MARRIAGE

In the SDHS, for all household members ten years and older, questions were asked to determine what level of education they had completed and whether they had ever been married. Table 2.2 shows the percent distribution of the population age 10 and over by level of education and the percentage ever married according to sex, age, residence, and region.

The table shows that 33 percent of men in the SDHS household sample have never attended school, 25 percent attended but did not complete primary school, 10 percent completed primary school,

Distribution of the household population by age

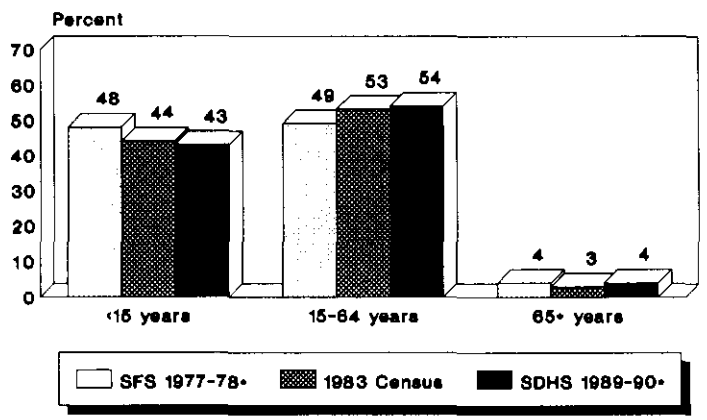
Table 2.1 Percent distribution of the household population by five-year age groups according to urban-rural residence and sex, Sudan DHS 1989-90, and percent distribution of population according to the 1983 census and the Sudan Fertility Survey (SFS) 1978-79

	SDHS 1989-90										
	Urban			Rural			Total				
Age group	Male	Female	Total	Male	Female	Total	Male	Female	Total	1983 Census	SFS 1978-79
0-4	12.2	12.3	12.3	16.3	15.2	15.7	14.6	14.1	14.3	13.9	16.0
5-9	12.2	13.1	12.6	16.8	16.1	16.5	14.9	14.9	14.9	16.4	17.4
10-14	12.1	12.5	12.3	14.5	14.0	14.3	13.5	13.4	13.5	13.7	14.3
15-19	12.0	12.6	12.3	10.3	11.4	10.9	11.0	11.9	11.5	11.4	10.4
20-24	12.5	11.5	12.0	6.8	8.7	7.8	9.2	9.8	9.5	7.8	6.7
25-29	9.3	9.7	9.5	6.0	8.3	7.2	7.4	8.8	8.1	7.8	7.2
30-34	6.1	5.7	5.9	4.7	4.8	4.8	5.3	5.2	5.2	5.6	4.8
35-59	6.0	5.3	5.7	4.5	5.4	5.0	5.1	5.3	5.2	6.2	5.9
40-44	3.9	3.4	3.7	3.8	3.0	3.4	3.9	3.1	3.5	4.3	3.7
45-49	3.5	2.7	3.1	3.6	2.4	3.0	3.6	2.5	3.1	3.7	3.4
50-54	2.2	3.3	2.7	2.8	2.6	2.7	2.5	2.9	2.7	2.8	2.7
55-59	2.1	2.8	2.4	2.2	3.0	2.6	2.1	2.9	2.5	1.6	2.1
60-64	1.9	1.9	1.9	2.6	1.9	2.2	2.3	1.9	2.1	1.7	1.8
65-69	1.5	1.0	1.2	1.8	1.0	1.4	1.6	1.0	1.3	1.0	1.2
70-74	1.0	1.0	1.0	1.6	1.0	1.3	1.4	1.0	1.2	0.9	1.2
75-79	0.5	0.4	0.5	0.7	0.4	0.5	0.6	0.4	0.5	1.0	1.3
80 +	0.9	0.6	0.8	1.0	0.7	0.9	0.9	0.7	0.8	0.2	0.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of persons	9170	8485	17655	12616	13298	25914	21786	21783	43569	a	63211

Note: Figures are based on the de facto population, i.e., persons who slept in the household the night before the interview.

[a]The total population (excluding nomadic groups) was 18,329,327.

Figure 2.1
Distribution of the Population by Age
SFS, 1983 Census and SDHS



* Limited to six regions in Northern Sudan

Sudan DHS 1989-90

Distribution of the household population by education and marriage

Table 2.2 Percent distribution of household population by level of education, and the percentage ever married according to sex, age, residence and region, Sudan DHS 1989-90

Characteristic	Level of education: No education	Primary incomplete	Primary complete	Junior secondary	Senior secondary+	Total percent	Percentage ever married	Number of persons
				MALES				
Age								
10-14	13.4	62.0	14.0	9.9	0.7	100.0	0.7	2919
15-19	14.3	16.1	14.7	34.4	20.5	100.0	1.7	2391
20-24	13.4	13.3	14.0	17.0	42.4	100.0	9.7	1999
25-29	21.0	14.5	12.5	16.6	35.4	100.0	37.7	1608
30-34	32.8	14.8	10.3	12.2	29.9	100.0	68.3	1140
35-39	38.5	21.8	7.9	10.7	21.0	100.0	85.8	1117
40-44	49.2	23.5	4.0	9.5	13.9	100.0	94.4	835
45-49	55.6	22.1	3.1	7.5	11.8	100.0	96.3	774
50-54	69.7	16.7	2.4	4.8	6.4	100.0	97.2	545
55-59	68.5	18.6	1.7	3.2	8.0	100.0	97.8	463
60-64	82.7	10.9	1.0	2.6	2.8	100.0	98.0	503
65 or more	87.7	7.2	1.2	1.5	2.4	100.0	98.8	990
Residence								
Urban	20.3	21.2	10.3	17.7	30.6	100.0	38.1	6893
Rural	42.5	27.6	9.9	11.5	8.5	100.0	47.2	8391
Region								
Khartoum	17.8	18.5	10.3	17.8	35.7	100.0	38.4	4010
Northern	22.3	27.0	10.9	20.5	19.3	100.0	40.7	940
Eastern	48.0	22.2	9.2	9.5	11.2	100.0	47.3	1632
Central	30.8	28.1	10.8	15.8	14.5	100.0	41.5	4386
Kordofan	38.8	31.3	10.3	10.4	9.3	100.0	46.3	2032
Darfur	49.1	24.0	8.5	9.5	8.8	100.0	49.4	2284
Total	32.5	24.7	10.1	14.3	18.4	100.0	43.1	15284
				FEMALES				
Age								
10-14	22.1	55.8	12.0	9.8	0.4	100.0	1.5	2911
15-19	23.5	18.1	14.6	27.2	16.6	100.0	15.8	2580
20-24	29.1	15.5	12.3	12.3	30.8	100.0	46.7	2136
25-29	42.6	17.0	9.8	8.3	22.3	100.0	73.7	1923
30-34	53.1	21.6	6.8	6.0	12.4	100.0	88.2	1126
35-39	66.2	23.5	2.4	3.2	4.7	100.0	95.0	1161
40-44	75.9	17.3	0.6	2.9	3.4	100.0	97.4	684
45-49	86.3	10.3	0.5	1.8	1.1	100.0	98.7	554
50-54	91.2	6.4	0.3	1.1	1.0	100.0	98.9	627
55-59	94.7	4.1	0.0	0.6	0.6	100.0	99.1	640
60-64	96.3	3.2	0.0	0.2	0.2	100.0	99.0	410
65 or more	98.2	0.9	0.1	0.4	0.3	100.0	97.8	672
Residence								
Urban	33.3	21.9	8.9	14.1	21.8	100.0	51.5	6319
Rural	56.9	23.5	8.0	7.3	4.2	100.0	57.5	9105
Region								
Khartoum	27.8	21.3	9.6	15.3	26.1	100.0	52.1	3479
Northern	34.8	28.0	10.7	14.4	12.2	100.0	54.4	1066
Eastern	64.1	17.7	6.3	6.3	5.7	100.0	63.8	1488
Central	45.0	26.7	8.7	10.2	9.3	100.0	53.0	4400
Kordofan	54.3	25.0	8.0	7.3	5.3	100.0	53.2	2497
Darfur	66.5	16.9	6.7	5.9	3.9	100.0	59.6	2494
Total	47.2	22.8	8.4	10.1	11.4	100.0	55.1	15424

Note: Figures are based on the de facto population, i.e., persons who slept in the household the night before the interview; 84 males and 43 females were excluded because of missing information on education.

14 percent have a junior secondary education and 18 percent attained senior secondary school or higher. The substantial improvement in educational attainment over time can be seen in the fact that younger men have attained higher levels than older men. The proportion of men with no education increases with age and the proportion with secondary school decreases with age. As expected, urban men tend to be more highly educated than their rural counterparts. The regions show considerable variation in education: in Khartoum more than 50 percent of the men have attained post-primary education; this decreases to 40 percent in the Northern region, 30 percent in the Central region, and 20 percent in the Eastern, Kordofan, and Darfur regions.

Women in Sudan are less educated than men. About 47 percent of women age ten and over in the SDHS household sample have never attended school, 23 percent have not completed primary school, 8 percent have completed primary education, 10 percent have a junior secondary education, and about the same proportion (11 percent) attended secondary school or higher. As with men, there has been a steady improvement in women's educational attainment over time. Women have advanced in education at all levels, but the gains are most marked at the higher levels. For example, among women age 60 and over, only three in 1,000 women got as far as secondary level. Among women who were age 20-24 at the time of the survey, however, nearly one-third had attained the secondary level of schooling. Women who reside in urban areas have considerably more education than those living in rural areas. Fifty-seven percent of rural women have never attended school compared with 33 percent of urban women, and the proportion who have post-primary education is three times as high in urban areas as in rural. Educational attainment for women is the highest in Khartoum where four in ten women have post-primary education. Women in the Darfur region have the least education.

Table 2.2 shows that marriage is almost universal among Sudanese men and women. By the time they reach their late 40s, all but 4 percent of men and 1 percent of women have married. However, women marry much earlier in life than men. For example, while almost half of women aged 20-24 have married, only 10 percent of men in this age group have married. The proportion of both men and women who have ever married is lower in urban areas than in rural and lower in Khartoum than in other regions.

2.3 HOUSEHOLD COMPOSITION

Table 2.3 presents information on household composition according to urban-rural residence for the de jure population (i.e., usual residents). Eighty-seven percent of the households in Sudan are headed by men, while 13 percent have female heads. There is a slight difference between urban and rural areas in the proportion of households headed by men and women. Large households are common in Sudan. The average number of household members is 6.6 for the country as a whole, with urban households larger than rural households (7.5 and 6.2, respectively). One-third of urban households are composed of nine or more members, compared with one-fifth of rural households.

Type of household and household size

Table 2.3 Percent distribution of households (HH) by sex of head of household and household size according to urban-rural residence, Sudan DHS 1989-90

Household head/size	Residence		
	Urban	Rural	Total
Household head			
Male	86.7	87.9	87.4
Female	13.3	12.1	12.6
Number of household members			
1	1.9	2.8	2.5
2	4.4	7.4	6.3
3	6.6	10.8	9.3
4	8.2	12.2	10.8
5	11.2	12.7	12.2
6	10.9	12.5	11.9
7	11.7	11.3	11.4
8	10.4	9.7	10.0
9+	34.7	20.6	25.6
Total percent	100.0	100.0	100.0
Mean HH size	7.5	6.2	6.6
Number of HH	2451	4440	6891

Note: Figures are based on the de jure (usual resident) household population.

2.4 HOUSING CHARACTERISTICS

It should be noted that the data on housing characteristics were collected in the individual questionnaire and not in the household questionnaire. Thus, a selected household is represented as many times as the number of eligible woman interviewed in the household. The households with no individual interviews are therefore not included in this analysis.

Table 2.4 shows the percent distribution of respondents by housing characteristics according to urban-rural residence. Overall, one-third of respondents live in households that have electricity, though this varies widely by residence; two-thirds of urban women live in households with electricity, compared with 13 percent of rural women. As for the source of drinking water, 40 percent of respondents live in households with water piped into the residence, while 15 percent use an outside water pipe, another 20 percent use public wells, 9 percent depend on rivers and other surface water, and 8 percent buy water from vendors. The table also indicates that 57 percent of respondents live in households equipped with pit latrines, while 35 percent have no facility. Six percent have flush toilets and 1 percent use buckets. Urban residents are much more likely to have piped water and toilet facilities than rural residents.

Housing characteristics

Table 2.4 Percent distribution of respondents by housing characteristics according to urban-rural residence, Sudan DHS 1989-90

Housing characteristic	Residence		
	Urban	Rural	Total
Percent with electricity	66.1	13.2	32.8
Source of water			
Piped into residence	75.9	18.7	40.0
Piped outside	6.1	20.3	15.0
Public well	4.6	28.6	19.7
River/surface water	2.8	12.8	9.1
Vendor	9.5	7.7	8.4
Rainwater	0.0	1.9	1.2
Other	1.0	10.0	6.7
Total percent	100.0	100.0	100.0
Sanitation facility			
Pit latrine	70.7	48.7	56.9
Flush	16.1	0.3	6.2
Bucket	1.7	0.7	1.0
Other	0.4	0.5	0.4
No facility	11.1	49.8	35.4
Total percent	100.0	100.0	100.0
Flooring material			
Earth/sand	66.6	96.4	85.3
Ceramic	19.8	1.5	8.3
Cement	6.8	1.3	3.3
Brick	6.6	0.8	2.9
Other	0.2	0.0	0.1
Total percent	100.0	100.0	100.0
Wall material			
Straw	11.5	55.5	39.1
Mud	35.6	32.4	33.6
Brick	46.0	10.1	23.5
Cement/concrete	5.2	0.2	2.0
Wood	1.1	0.9	0.9
Other	0.6	0.9	0.8
Total percent	100.0	100.0	100.0
Number of respondents	2181	3679	5860

As far as construction materials of homes are concerned, 85 percent of respondents have earth or sand floors in their houses, while 8 percent have ceramic floors, 3 percent have cement, and the same proportion have brick floors. In urban areas, ceramic, cement and brick flooring is more common, though a majority (two-thirds) of women live in houses with earthen flooring. In contrast, almost all rural respondents (96 percent) have earth/sand flooring. Houses with straw walls are most common, followed

by those with mud or brick walls. Around one-third of respondents in urban and rural areas live in homes with mud walls, while almost half of urban respondents (46 percent) and one in ten rural respondents (or one-quarter for the whole country) have brick walls.

2.5 PRESENCE OF DURABLE GOODS IN THE HOUSEHOLD

Table 2.5 shows the percentage of respondents who live in households with specific durable consumer goods by residence. Overall, 56 percent of women live in households that have a radio, 25 percent have a television and 20 percent have a refrigerator. Regarding ownership of a means of transportation, only 15 percent of women live in households with a bicycle, 11 percent with a car, and only 1 percent with a motorcycle. The question on tractor ownership was asked only of rural respondents, 2 percent of whom live in households that have a tractor.

Durable goods in the household

Table 2.5 Percentage of ever-married women in households with specific durable consumer goods by urban-rural residence, Sudan DHS 1989-90

Durable consumer good	Residence		
	Urban	Rural	Total
Radio	76.2	43.4	55.6
Television	51.8	9.9	25.5
Refrigerator	44.4	6.0	20.3
Bicycle	25.2	9.4	15.3
Motorcycle	2.2	0.4	1.1
Car	21.0	5.2	11.1
Tractor	a	1.7	a
Number of women	2181	3679	5860

[a]Question not asked in urban areas.

Ownership of durable consumer goods varies greatly by residence. As expected, the proportion of women who live in households where the specific items are present is much lower in rural areas than in urban areas. This urban-rural difference is particularly strong for televisions and refrigerators, and reflects the fact that urban respondents are five times as likely to have electricity as rural respondents.

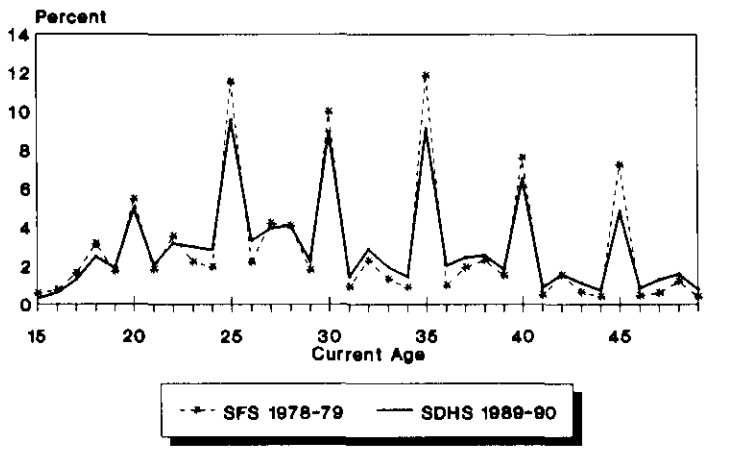
2.6 BACKGROUND CHARACTERISTICS OF WOMEN

Age

The low level individual awareness of exact age in Sudan increases the probability of age misreporting. In some cases, age was not known at all and the interviewers had to estimate it by various means.

Figure 2.2 compares the age distributions of female respondents in the SFS and the SDHS as reported by the respondents. Both distributions show appreciable heaping at ages ending in zero and five and corresponding troughs at ages ending in one and nine. Less pronounced heaping is found at ages ending in even numbers such as two and eight. The very sharp peaks and troughs in the SFS are reduced somewhat in the SDHS, suggesting that progress has been made in the quality of age reporting. However, this improvement may be due to the higher educational level of respondents as well as improved data collection procedures.

Figure 2.2
Percent Distribution of Ever-married Women by Current Age, SFS and SDHS



Sudan DHS 1989-90

Table 2.6 shows the percent distribution of respondents by age group and other background characteristics. As expected, the distribution of ever-married and currently married women increases from age 15-19 to age 25-29, then declines as age increases. The distribution of ever-married and currently married women is similar for all background characteristics.

Place of Residence

A little more than one-third (37 percent) of the women in the sample reside in urban areas with the remainder (63 percent) living in rural areas. About half of the respondents live in two regions: 27 percent in the Central region and 21 percent in Khartoum; the region with the smallest proportion of respondents is the Northern region (7 percent). The other regions in order of size are Darfur (18 percent), Kordofan (15 percent) and the Eastern region (11 percent). Almost all the women interviewed in the survey are Muslim (98 percent); only 2 percent are Christian.

Level of Education

As can be seen in Table 2.6, the majority of women in Sudan have received no formal education. Among ever-married women, six in ten (58 percent) have never been to school, and only 15 percent have received education beyond primary school. More than six in ten ever-married women cannot read and only one in four can read easily.

Background characteristics of respondents

Table 2.6 Percent distribution of ever-married women and currently married women by selected background characteristics, Sudan DHS 1989-90

Background characteristic	Ever-married women		Currently married women	
	Percent	Number of women	Percent	Number of women
Age				
15-19	6.5	380	6.8	367
20-24	16.0	938	16.7	900
25-29	23.1	1355	23.6	1276
30-34	16.6	970	16.8	906
35-39	17.9	1047	17.7	955
40-44	10.8	630	10.1	543
45-49	9.2	540	8.4	453
Residence				
Urban	37.2	2181	36.6	1979
Rural	62.8	3679	63.4	3421
Region				
Khartoum	21.3	1249	21.0	1136
Northern	6.7	394	6.8	365
Eastern	11.4	667	11.4	616
Central	27.3	1599	27.4	1480
Kordofan	15.5	908	15.3	828
Darfur	17.8	1043	18.1	975
Education				
No education	58.4	3425	58.0	3130
Primary incomplete	19.5	1142	19.6	1061
Primary complete	6.8	401	6.9	374
Junior secondary	7.3	427	7.5	405
Senior secondary+	7.9	465	8.0	430
Literacy				
Reads easily	25.8	1509	25.8	1395
Reads with difficulty	12.6	737	12.8	693
Cannot read	61.6	3607	61.2	3305
Missing	0.1	7	0.1	7
Religion				
Muslim	98.0	5745	98.0	5293
Christian	1.9	111	1.9	103
Other	0.1	4	0.1	4
Total	100.0	5860	100.0	5400

Table 2.7 examines variations in educational attainment of ever-married women by age, residence, and region. Education is inversely related to age; that is, older women are generally less educated than younger women. For example, whereas about two-fifths of women age 20-24 have no education, more than four-fifths of the women age 45-49 have no schooling.

Women's level of education

Table 2.7 Percent distribution of ever-married women by age, urban-rural residence, and region, according to level of education, Sudan DHS 1989-90

Background characteristic	No education	Primary incomplete	Primary complete	Junior secondary	Senior secondary+	Total percent	Number of women
Age							
15-19	43.4	22.1	16.3	15.5	2.6	100.0	380
20-24	41.8	18.7	12.5	14.8	12.3	100.0	938
25-29	50.4	18.1	10.1	8.5	12.9	100.0	1355
30-34	56.9	21.2	5.6	6.1	10.2	100.0	970
35-39	66.0	24.5	2.3	3.2	4.0	100.0	1047
40-44	75.6	18.3	0.8	2.4	3.0	100.0	630
45-49	86.3	11.3	0.4	1.1	0.9	100.0	540
Residence							
Urban	39.5	23.9	8.1	11.5	17.0	100.0	2181
Rural	69.7	16.9	6.1	4.8	2.6	100.0	3679
Region							
Khartoum	32.2	24.9	8.4	12.6	21.9	100.0	1249
Northern	41.1	29.7	10.7	10.4	8.1	100.0	394
Eastern	71.4	14.1	5.2	4.5	4.8	100.0	667
Central	56.0	24.1	7.4	7.1	5.4	100.0	1599
Kordofan	72.9	14.6	5.5	4.5	2.4	100.0	908
Darfur	79.4	9.8	4.8	4.3	1.7	100.0	1043
Total	58.4	19.5	6.8	7.3	7.9	100.0	5860

Women who reside in urban areas have a higher level of education than those living in rural areas. The proportion of ever-married women who have no education is much higher in rural areas (70 percent) than in urban areas (40 percent). Conversely, the percentage who have senior secondary or higher education is more than six times higher in urban areas than in rural areas. Regarding differentials by region, educational attainment is higher in Khartoum than in any other region, with 13 percent having junior secondary schooling and 22 percent having attained senior secondary or higher education. The Northern region shows the next highest level of educational achievement (10 percent of women have attained junior secondary education and 8 percent senior secondary or higher). The proportion of women who have attended senior secondary or higher education in the other four regions ranges from 2 to 5 percent. Women in the Darfur region appear to be the most educationally disadvantaged.

Migration

The SDHS questionnaire provides information on the migration of respondents and the reasons for migration. Respondents were asked how long they had been living continuously in the place where they were interviewed. Those who had not always lived in that place were asked in which province they had lived just before moving to their current residence. Of the 5860 respondents interviewed, 2104 (36 percent) had moved either within the same province (intra-regional migration) or from one province to another (inter-provincial migration). It should be noted that migration refers to the most recent move to the current place of residence, and therefore does not necessarily reflect migration since birth or since the beginning of civil unrest. The results summarized in Table 2.8 indicate that most migration in northern Sudan was internal, that is, intra-provincial (53 percent) or inter-provincial (40 percent). Only a small

proportion of the migrants came from southern Sudan or from outside Sudan, mostly from neighbouring countries.

Overall, about half of the migrants moved because of marriage, one-third moved for reasons related to employment, and one in ten moved in order to own or live in a better home. Reasons for migration varied by type of migration, although marriage and employment were important in all types of migration. Almost half the immigration from other countries and more than one-quarter of out-migration from the South was due to security problems. The other major reasons for out-migration from the South were employment (36 percent) and marriage (30 percent); among immigrants from other countries, marriage (26 percent) was more often cited as a reason for migrating than employment (20 percent). About three percent of migrants in northern Sudan mentioned drought/desertification as the reason for moving.

Type of migration and reasons for migration

Table 2.8 Among ever-married women who have migrated, the percent distribution by type and reason for migration according to type of migration, Sudan DHS 1989-90

Type of migration/ reason for migration	Within North		South to North	From other countries	All migrants
	Intra-province	Inter-province			
Type of migration	53.0	40.5	3.2	3.3	100.0
Reason for migration					
Marriage	51.7	45.4	29.9	25.7	47.6
Employment	25.7	40.1	35.8	20.0	31.7
Living in own/ better home	12.6	5.4	6.0	1.4	9.1
Drought/desertification	3.8	2.2	0.0	0.0	2.9
Security	2.7	1.1	28.4	47.1	4.3
Famine	0.2	0.4	0.0	0.0	0.2
Other/missing	3.5	5.4	0.0	5.7	4.2
Total percent	100.0	100.0	100.0	100.0	100.0
Number of women	1115	852	67	70	2104

Note: A migrant is defined as a person who has not always lived in the village, town, or city in which she currently resides.

Exposure to Radio

Table 2.9 shows the percentage of ever-married women who are exposed to radio at least once a week, according to selected background characteristics. Slightly more than two-thirds of women in the sample listen to radio once a week, with only minor differences by age. Women 20-24 years old were most likely to listen to the radio (72 percent); those 45-49 years were least likely (64 percent).

Exposure to radio

Table 2.9 Percentage of ever-married women who listen to radio at least once a week by background characteristics, Sudan DHS 1989-90

Background characteristic	Listens to radio	Number of women
Age		
15-19	67.9	380
20-24	72.1	938
25-29	67.9	1355
30-34	67.7	970
35-39	67.5	1047
40-44	65.2	630
45-49	64.4	540
Residence		
Urban	84.2	2181
Rural	58.2	3679
Region		
Khartoum	86.9	1249
Northern	83.5	394
Eastern	61.5	667
Central	71.2	1599
Kordofan	61.1	908
Darfur	44.0	1043
Education		
No education	53.5	3425
Primary incomplete	84.1	1142
Primary complete	86.5	401
Junior secondary	91.1	427
Senior secondary+	96.1	465
Total	67.9	5860

The SDHS data indicate a positive relationship between education and exposure to radio. Ninety-six percent of women with senior secondary school or higher education listen to radio once a week compared with 54 percent of women who have never been to school.

As expected, exposure to radio is related to residence; 84 percent of urban women listen to radio regularly compared with 58 percent of rural women. There are also substantial regional differences: approximately 90 percent of women who live in Khartoum listen to radio once a week compared with less than half of those in Darfur region.

2.7 CHARACTERISTICS OF HUSBANDS

The SDHS questionnaire included questions about the characteristics of husbands of respondents. For women who were no longer married (divorced or widowed), the questions referred to their most recent husband. Table 2.10 shows the percent distribution of ever-married women by husbands' background characteristics. About half of the respondents' husbands have no education, 19 percent have

Background characteristics of husbands of respondents

Table 2.10 Percent distribution of ever-married women by husband's background characteristics, Sudan DHS 1989-90

Husband's background characteristic	Percent of ever-married women	Number of women
Education		
No education	47.5	2782
Primary incomplete	19.2	1125
Primary complete	6.5	381
Junior secondary	9.6	563
Senior secondary+	15.6	914
Don't know, Missing	1.6	95
Literacy		
Reads easily	55.6	3260
Reads with difficulty	12.1	710
Cannot read	32.1	1881
Missing	0.2	9
Occupation		
Professional, technical, or managerial	8.6	504
Clerical	6.3	372
Sales	15.7	919
Agriculture: self-employed	24.4	1432
Agriculture: employee	8.6	503
Household domestic	0.1	7
Services	16.8	982
Skilled manual	12.3	719
Unskilled manual	6.1	357
Currently not working	0.5	28
Missing	0.6	37
Couple's literacy		
Both literate	35.4	2073
Husband literate, not wife	32.3	1894
Wife literate, not husband	2.9	172
Both illiterate	29.1	1705
Information incomplete	0.3	16
Total	100.0	5860

not completed primary, 7 percent have completed primary, 10 percent have junior secondary schooling and 16 percent have senior secondary or higher education. More than two-thirds of the husbands can read, although 12 percent read with difficulty.

The level of education and literacy for husbands has improved since the Sudan Fertility Survey. According to the SFS, only 36 percent of husbands had attended school and 52 percent could read. It is interesting that both surveys reported a higher proportion of husbands who could read than the proportion who attended school (about 15 percent higher) which suggests that some husbands acquired literacy

outside the formal educational system, probably in Khalwas, the religious schools. Regarding the joint literacy of spouses, couples are about equally divided into three groups: both the husband and the wife are literate (35 percent); the husband is literate and the wife is not (32 percent); and both the husband and the wife are illiterate (29 percent). Only 3 percent of couples are in the fourth possible category, that is, the wife is literate and the husband is not. Generally, husbands have more education than their wives and are more likely to be literate (see Table 2.6).

The distribution of husbands by occupation reflects the fact that Sudan is mainly a country of subsistence farmers. Table 2.10 shows that self-employed agriculture is the most common single enterprise (24 percent), followed by service workers (17 percent), sales workers (16 percent) and skilled manual workers (12 percent). Nine percent of husbands were in the professional, technical and managerial category and the same proportion were in the agricultural employee category. Less than one percent of women reported that their husbands were unemployed.

CHAPTER 3

FERTILITY

This chapter examines a number of issues related to fertility and childbearing, including fertility levels and trends, and the age at which women initiate childbearing. In the SDHS, a series of questions about live births was asked to obtain data on fertility. The wording and the sequence of the questions were designed so as to reduce errors commonly found in such surveys. First, the respondents were asked to report their total number of live births, the number of surviving children, and the number living at home and elsewhere. Second, a full birth history was collected from each woman, including the name, sex and date (year and month or season) of each live birth, age at death for children who died, and for living children, whether or not they were residing with their mother. As an indicator of future fertility, all currently married women were also asked if they were pregnant.

It has been observed that the estimation of fertility levels from birth histories can be affected by underreporting of the number of children ever born, while errors of recall in reporting children's dates of birth can distort trends in fertility over time. Evidence from previous censuses and similar surveys in Sudan shows that female children are always underreported as compared with male children. The underreporting is due mainly to the omission of female children who died in infancy and those who married and left the parental home. Finally, some women with no surviving children are enumerated as childless. However, misreporting and misdating are less likely to be serious for time periods close to the date of the survey, which are the main focus of the analysis of the levels, trends, and differentials in fertility presented in this chapter.

Despite efforts to eliminate the problems of misreporting of date of birth, there is evidence from the SDHS that births occurring five or six years prior to the survey were shifted to seven years prior to the survey, presumably to avoid asking an extensive series of questions in the health section for those children. In order to obtain data for all children under age five, questions related to health status were asked for all respondents' children born since January 1, 1984. SDHS data on births indicate that 25 percent more births were reported as occurring in 1983 than in 1984. Displacement of this type has occurred in many of the DHS surveys (Arnold, 1990). For the purpose of this report data on trends in fertility that involve the year 1983 or 1984 should be regarded with caution. However, this problem most likely does not affect the rates for the five-year period prior to the survey.

Finally, although the SDHS collected birth histories only from ever-married women, it is possible to calculate measures relating to all women regardless of marital status by assuming that women who were reported as having never married had no children. While some births undoubtedly occur outside of marital unions, most observers agree that the level of nonmarital fertility is likely to be quite low in northern Sudan.

3.1 LEVELS AND DIFFERENTIALS IN FERTILITY

Table 3.1 presents the total fertility rate (TFR) and the mean number of children ever born (CEB) according to background characteristics of women. The TFR, which is an indicator of current fertility, is defined as the number of children a woman would give birth to by the end of her reproductive life if current age-specific rates were to stay constant. The first two columns of the table show the total fertility rates for two calendar year periods, 1987-90 and 1984-86 respectively, while the third column presents

Total fertility rates

Table 3.1 Total fertility rates for women 15-49 for calendar year periods and the five years preceding the survey, and the mean number of children ever born to women 40-49, by background characteristics, Sudan DHS 1989-1990

Background characteristic	Total fertility rates			Mean number of children ever born to women age 40-49
	1987-1990[a]	1984-1986	0-4 years before survey	
Residence				
Urban	3.9	4.4	4.1	6.8
Rural	5.2	6.4	5.6	7.6
Region				
Khartoum	3.6	4.2	3.9	6.4
Northern	4.3	4.4	4.3	6.5
Eastern	5.0	6.0	5.5	7.5
Central	4.6	6.2	5.0	7.9
Kordofan	4.9	6.5	5.5	7.8
Darfur	5.7	5.9	5.9	7.0
Education				
No education	5.5	6.5	5.9	7.4
Primary	4.7	5.3	4.9	6.9
Secondary+	3.3	3.1	3.3	4.8
Total	4.6	5.6	5.0	7.3

Note: Figures are calculated for all women (ever-married and never-married) 15-49 using information on women's age and marital status from the household questionnaire and on the number of births from the woman's questionnaire. The procedure assumes no births occur to never-married women.

[a]Includes exposure in 1990 up to the time of the interview.

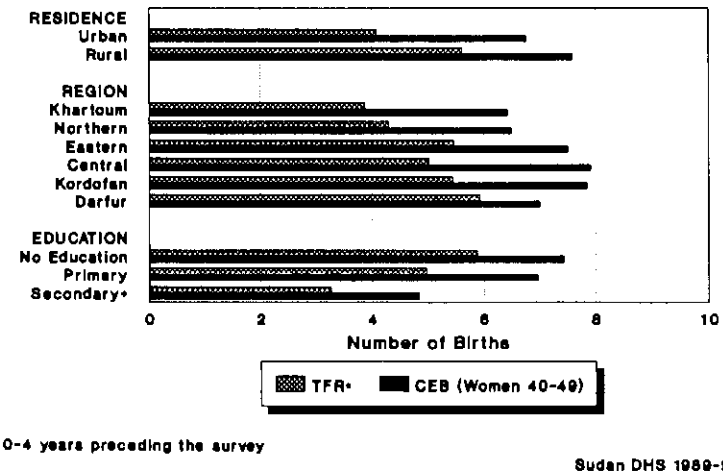
the total fertility rates for the five-year period before the survey. The last column of the table presents the mean number of children ever born to women 40-49 years old. The average number of children ever born is an indicator of cumulative fertility and reflects past fertility performance for these older women who are nearing the end of their reproductive lives. If no change in fertility has taken place, the two fertility measures (TFR and CEB) for women aged 40-49 would either be equal or very close to each other.

Comparison of the TFR in the five years preceding the survey with the completed family size for older women (the last column in Table 3.1) suggests that fertility has been declining in the Sudan. The mean number of children ever born to women 40-49 is 7.3 while the TFR for the five years before the survey is 5.0 children per woman.

The evidence of fertility decline can also be seen by comparing total fertility rates for the two calendar periods. The TFR of 4.6 per woman for the period 1987-1990 is 18 percent lower than the rate of 5.6 for the period 1984-1986.

Regarding fertility differentials, Table 3.1 shows that rural fertility is higher than urban fertility for all time periods, although the differential has narrowed in the most recent period. Based on births in the five years preceding the survey, rural women have on average 1.5 more births than women in urban areas (Figure 3.1). Women in the Khartoum and Northern regions have the lowest fertility. This is true whether the indicator is TFR or the mean number of children ever born to women 40-49 years. For the five years preceding the survey, the TFR in the Khartoum region was 3.9 compared with 5.9 in the Darfur region. Similarly, the mean number of children ever born is 6.4 and 6.5 for the Khartoum and Northern regions respectively, compared with 7.8 and 7.9 for the Kordofan and Central regions respectively. The decline in fertility is evident in all the regions. The sharpest decline is reported in the Kordofan and Central regions.

Figure 3.1
Total Fertility Rate (TFR) and Mean Number of Children Ever Born (CEB)



* 0-4 years preceding the survey

Sudan DHS 1989-90

The largest fertility differentials are associated with educational background. The TFR in the five years preceding the survey was 5.9 for women with no education and 3.3 for those with junior secondary education and higher, a difference of 2.6 births. Similar differences are also observed when completed fertility is considered. Generally, differences are less significant between women with no education and those with primary education, than between women with primary education and those with junior secondary and higher education. Previous studies based on censuses and national surveys have shown that female education, specifically secondary and higher education, is negatively correlated with fertility. Women with higher education tend to delay marriage and have fewer children (see chapters 5 and 6).

3.2 FERTILITY TRENDS

The fertility indicators in Table 3.1 suggest a substantial decline in fertility in recent years. Data from the birth histories collected in the SDHS make it possible to analyze fertility trends over a long period of time.

Table 3.2 shows age-specific fertility rates for successive five-year periods preceding the survey. Note that fertility rates are truncated due to the fact that the SDHS covered only women who were under 50 years of age at the time of the survey. Partially truncated rates are shown in brackets. Information in this table should be treated with caution due to the possible omission of or incorrect dating of events, especially by older women, for the more distant time periods.

Age-specific fertility rates for five-year periods

Table 3.2 Age-specific fertility rates (per thousand women) for five-year periods preceding the survey, by age of mother at the time of the birth, Sudan DHS 1989-1990

	Number of years preceding survey						
Age at birth	0-4	5-9	10-14	15-19	20-24	25-29	30-34
15-19	69	112	134	188	218	203	[156]
20-24	183	246	303	329	314	[347]	
25-29	240	310	339	326	[409]		
30-34	236	277	296	[327]			
35-39	157	199	[237]				
40-44	82	[97]					
45-49	[25]						
Total fertility rate							
15-34	3.6	4.7	5.4	[5.9]			

Note: Figures in square brackets are partially truncated rates.

Table 3.2 indicates that fertility has been declining gradually during the 20 to 25 years preceding the survey. The decline is most pronounced in the ten-year period preceding the survey, particularly for women 15-34. For example, women would have had an average of 5.9 children by the age of 35 during the period 15-19 years preceding the survey, the rate was 5.4 for the period 10-14 years preceding the survey, and 4.7 for the period 5-9 years preceding the survey. The decline accelerated between the periods 5-9 and 0-4 years prior to the survey, when fertility dropped from 4.7 to 3.6 children, a decrease of 23 percent.

Another approach in considering fertility trends is to compare the SDHS rates with those obtained from the Sudan Fertility Survey (SFS) conducted in 1978-79 (Sudan, 1982). Table 3.3 presents the age-specific and total fertility rates for both surveys. Note that the SFS and SDHS rates are both based on information derived from complete birth histories and refer to the five years preceding the surveys.

Comparison of data from the two surveys further supports a major decline in fertility during the last ten years. The TFR has declined by one birth in the inter-survey period, dropping from 6.0 children per woman in the SFS to 5.0 children in the SDHS. Figure 3.2 also shows that for every age group except women 35-39, the age-specific fertility rates from the SDHS are lower than those from the SFS. The fertility decline is most evident among women 15-24.

Comparison of age-specific fertility rates, SFS and SDHS

Table 3.3 Age-specific fertility rates (per thousand women) and total fertility rate for women 15-49, Sudan Fertility Survey (SFS) 1978-79 and Sudan DHS 1989-90

Age	SFS 1978-79[a]	SDHS 1989-90
15-19	114	69
20-24	264	183
25-29	283	240
30-34	251	236
35-39	149	157
40-44	108	82
45-49	35	25
Total fertility rate	6.02	4.96

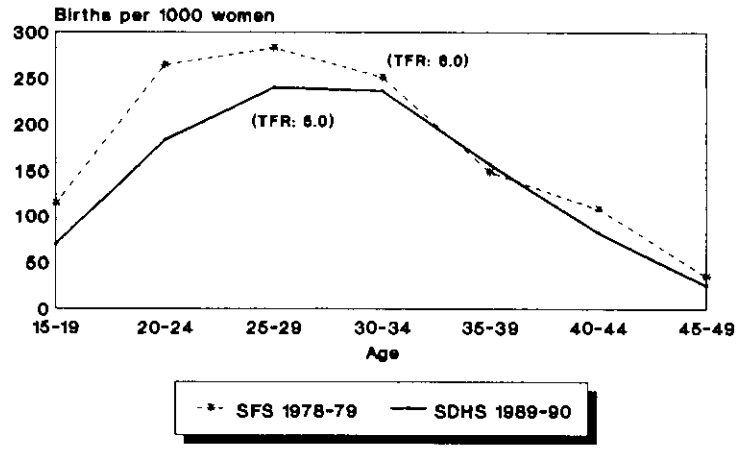
Note: Figures are calculated for all women (ever-married and never married) 15-49 using information on women's age and marital status from the household questionnaire and on the number of births from the woman's questionnaire. The procedure assumes no births occurred for never-married women. Rates refer to the five years preceding the survey.

[a]Sudan (1982) Ministry of National Planning, Department of Statistics, The Sudan Fertility Survey 1979, Principal Report, Vol. I, Table 5.18

The rapid decline in the TFR in Sudan is due to many factors, but can be attributed mainly to major changes in the marriage patterns: increasing age at first marriage, a sharp drop in the proportion ever married among women 20-29, and a slight increase in polygyny since the SFS, especially among women over 40 (see chapter 5). Among all of the countries in Africa that conducted DHS surveys, the rise in the median age at first marriage between women age 35-39 and 25-29 was sharpest in Sudan. The age at first birth has also increased substantially since the SFS (see section 3.5 below). Although contraceptive use has almost doubled in the last ten years (see chapter 4), use of modern contraceptive methods among married women is still low; therefore, changes in contraceptive use have not had much impact on fertility. It cannot be ruled out that fertility control among couples may be more prevalent than reported in the SDHS, but there is no evidence to support this argument. Other factors which may have had an impact on the fertility decline in Sudan are: an increase in urbanization, a rapid increase in male and female education, and the temporary migration of husbands to work in Saudi Arabia and the Gulf states.

Despite remittances from labour migrants, Sudan has experienced severe economic conditions for more than five years (partly due to drought). It is known that economic factors can affect fertility desires and behaviour, thus, it is possible that economic conditions have contributed to the fertility decline. Further investigation is needed to clearly delineate the causes of fertility decline in Sudan.

Figure 3.2
Age-Specific Fertility Rates
SFS and SDHS



Sudan DHS 1989-90

3.3 CURRENT PREGNANCY

Another measure of current fertility is the proportion of women who are pregnant. This represents, in a sense, the most current level of fertility since it actually anticipates fertility during the next few months. However, this measure of current fertility should be treated with caution because it is an underestimate. Some women in the early stages of pregnancy may be unaware or uncertain that they are pregnant; others may deliberately avoid mentioning their status due to local customs and tradition. Table 3.4 shows the percentage of all women and currently married women reporting a current pregnancy by age. Overall, 16 percent of currently married women and 9 percent of all women reported being pregnant. There was no change in the proportion pregnant among married women between the SFS and the SDHS; however, the proportion pregnant among all women has declined slightly (from 10 to 9 percent).

Currently pregnant women

Table 3.4 Percentage of all women and currently married women 15-49 who reported a current pregnancy by age, Sudan Fertility Survey (SFS) 1978-79 and Sudan DHS 1989-90

	All women[1]		Currently married women	
Age	SFS 1978-79[2]	SDHS 1989-90	SFS 1978-79[2]	SDHS 1989-90
15-19	5.1	3.8	25.1	24.5
20-24	11.1	10.0	18.5	22.4
25-29	11.2	14.0	18.1	20.3
30-34	15.9	12.1	18.0	14.9
35-39	14.4	11.4	16.5	13.0
40-44	6.7	5.8	8.0	7.0
45-49	1.8	2.6	2.3	3.1
Total	10.4	9.0	16.3	16.0

[1]Assumes no pregnancies among never-married women.
[2]Sudan (1982) Ministry of National Planning, Department of Statistics, The Sudan Fertility Survey, 1979, Principal Report, Vol. I, Table 5.15

3.4 CHILDREN EVER BORN

Information on the number of children ever born is presented in Table 3.5 for all women and for currently married women. (Note: For all women, it is assumed that never-married women had no births.) These data, which reflect the cumulation of births over time, show that on average, all women have had 2.7 children, while currently married women have had 4.5. The difference in fertility between the two groups is mainly due to the large proportion of never-married women in the younger age groups. The mean number of children ever born increases with age, reflecting the natural family building process. For example, among all women, the average number of live births for the age group 25-29 was 2.2, while women 35-39 reported an average of 6.0 live births. At the end of their reproductive life at age 45-49, the mean number of children ever born for all women was 7.5.

The results show that early childbearing is relatively rare since fewer than 10 percent of teenagers (15-19) have had a child, compared to 37 percent of women 20-24. The proportion of women who have never given birth can be taken as a measure of primary sterility. Only 2 percent of currently married women 45-49 have never given birth. This is down from 8 percent reported in the SFS 1978-79. The difference in the proportion of childless women between the two surveys may be explained by a possible reduction in primary sterility because of improved health conditions.

Children ever born

Table 3.5 Percent distribution of all women and currently married women 15-49 by number of children ever born (CEB), according to age, Sudan DHS 1989-1990

Age	Number of children ever born											Total percent	Mean number CEB	Number of women
	None	1	2	3	4	5	6	7	8	9	10+			
							ALL WOMEN							
15-19	91.3	6.1	2.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.1	2386
20-24	62.9	14.0	11.2	6.7	3.8	1.1	0.2	0.0	0.0	0.0	0.0	100.0	0.8	2049
25-29	34.2	11.6	12.4	13.9	11.5	9.2	4.2	2.2	0.7	0.1	0.1	100.0	2.2	1878
30-34	17.1	6.2	7.6	10.5	12.8	12.9	11.9	10.3	5.4	3.0	2.3	100.0	4.1	1117
35-39	7.9	3.3	4.0	6.8	8.6	11.5	11.0	11.8	13.5	9.5	12.3	100.0	6.0	1106
40-44	7.0	2.6	3.2	4.6	6.3	6.6	8.3	11.1	11.4	12.8	26.0	100.0	7.0	650
45-49	4.4	2.4	2.6	4.0	3.8	7.3	9.9	9.0	12.6	15.0	29.1	100.0	7.5	547
Total	45.8	8.1	6.9	6.7	6.1	5.7	4.6	4.2	3.8	3.2	5.0	100.0	2.7	9732
							CURRENTLY MARRIED WOMEN							
15-19	45.0	38.4	13.6	2.7	0.0	0.3	0.0	0.0	0.0	0.0	0.0	100.0	0.8	367
20-24	19.1	30.1	23.9	15.3	8.4	2.3	0.6	0.0	0.1	0.1	0.0	100.0	1.7	900
25-29	8.1	14.6	17.2	19.4	16.8	13.2	6.2	3.2	1.1	0.2	0.1	100.0	3.1	1276
30-34	3.9	6.5	8.3	11.4	14.8	15.2	14.5	12.5	6.5	3.8	2.8	100.0	4.8	906
35-39	1.7	3.1	3.5	6.4	8.7	12.6	11.8	13.0	14.9	10.6	13.8	100.0	6.5	955
40-44	3.3	2.2	2.4	4.1	5.5	6.6	7.9	11.8	12.0	14.2	30.0	100.0	7.6	543
45-49	2.0	1.5	2.2	3.3	3.3	7.3	9.7	8.2	13.7	15.7	33.1	100.0	8.0	453
Total	9.6	13.1	11.4	11.1	10.2	9.6	7.7	7.0	6.4	5.3	8.7	100.0	4.5	5400

Table 3.6 presents the mean number of children ever born to ever-married women by age at first marriage and duration of marriage. Since use of contraception is limited and premarital conception is negligible, the number of children a woman bears depends largely on the age at which she marries and the duration of her marriage. Therefore, women who marry at a young age will give birth to more children than women who marry later because they are exposed to the risk of pregnancy for a longer time. The data show that, overall, women married before age 15 have more children (an average of 5.8) than women married between age 20 and 21 (3.2 children). However, the pattern is not present when controlling for duration since first marriage. For marriage durations less than 15 years, age at marriage has no effect on the number of children ever born, except for women married at age 25 or over. Among women with longer marriage durations, marrying at a later age has only a small negative effect on fertility.

3.5 AGE AT FIRST BIRTH

The age at which women start childbearing is an important demographic and health indicator and in most countries is closely associated with age at first marriage. The data on age at first birth are affected by reporting errors, such as misreporting the woman's age, underreporting of first births, and misreporting the first child's date of birth. Such errors are usually more pronounced among older women.

Children ever born by age at first marriage

Table 3.6 Mean number of children ever born to ever-married women, by age at first marriage and years since first marriage, Sudan DHS 1989-1990

Years since first marriage	Age at first marriage						
	<15	15-17	18-19	20-21	22-24	25+	Total
0-4	0.9	0.9	0.8	0.9	1.0	0.8	0.9
5-9	2.5	2.7	2.7	2.5	2.5	2.5	2.6
10-14	4.2	4.6	4.4	4.4	4.5	3.0	4.3
15-19	5.7	6.0	5.7	5.7	5.3	4.1	5.7
20-24	6.9	7.3	7.5	5.7	5.1	5.7	7.0
25-29	8.0	7.7	7.6	6.7	8.7	NA	7.8
30+	8.4	8.1	10.2	NA	NA	NA	8.3
Total	5.8	4.6	3.8	3.2	2.6	2.0	4.4

NA = Not applicable; by definition these women would be age 50 or over.

Table 3.7 shows the percent distribution of women by age at first birth according to their current age. The median age at first birth is presented for all cohorts in which at least 50 percent of the women had a first birth (i.e., age groups 25-29 and above). Overall, one-third of women had their first child before age 20, and slightly less than one-quarter had their first birth before reaching age 18. These proportions measure the magnitude of teenage pregnancy, which is a major concern of health professionals. Women are at greater risk of dying from the complications of pregnancy and delivery below the age of 20 and above the age of 34. Also, early childbearing usually results in women having larger families, which can have a negative effect on socioeconomic status and the participation of women in the labour force. However, there is evidence of a trend toward delayed childbearing in Sudan. For example, while more than half of the women 45-49 (53 percent) had given birth before reaching age 20, only one-quarter of those 20-24 (26 percent) had done so.

Overall, the median age at first birth is 20.5 years. The trend across age cohorts suggests a substantial increase from the oldest to the youngest cohorts. Indeed, the median age at first birth rose from 18.9 years for women age 40-44 to 22.8 years for those age 25-29.

Table 3.8 shows the median age at first birth among women age 25-49 years by current age and background characteristics. Urban women begin childbearing much later (21.5 years) than rural women (20 years). With respect to regional differences, the Northern (22.8 years) and Khartoum (21.3 years) regions have the highest median age at first birth, and the Eastern region (19.6 years) has the lowest. In the three other regions, the median age at first birth is slightly below the overall median. Differences in median age at first birth are particularly large with respect to educational level. Women with no education have the lowest median age at first birth (19.2 years); women with primary and secondary education have the highest (20.4 and 28.2 years, respectively). The association is most evident for women age 25 to 39.

Age at first birth

Table 3.7 Percent distribution of women 15-49 by age at first birth, according to current age, Sudan DHS 1989-1990

Current age	Women with no births	Age at first birth						Total percent	Number of women	Median age at first birth[a]
		<15	15-17	18-19	20-21	22-24	25+			
15-19	91.3	1.5	5.5	1.7	0.0	0.0	0.0	100.0	2386	b
20-24	62.9	4.8	12.2	9.2	7.4	3.6	0.0	100.0	2049	b
25-29	34.2	6.9	16.6	12.8	10.3	13.3	6.0	100.0	1878	22.8
30-34	17.1	10.3	23.8	10.7	12.7	13.9	11.5	100.0	1117	20.8
35-39	7.9	13.4	24.3	15.9	13.5	13.0	12.0	100.0	1106	19.5
40-44	7.0	14.2	28.8	17.5	10.5	11.5	10.5	100.0	650	18.9
45-49	4.4	12.6	22.1	18.1	14.1	11.9	16.8	100.0	547	19.8
Total	45.8	7.1	15.8	10.0	8.0	7.8	5.5	100.0	9732	20.5[c]

[a]Defined as the exact age by which 50 percent of women have had a birth.
[b]Omitted for age-groups 15-19 and 20-24 because less than 50 percent of the women in these age groups have had a birth.
[c]Based on data for women 25-49 years.

Median age at first birth by background characteristics

Table 3.8 Median age at first birth among women 25-49, by current age and background characteristics, Sudan DHS 1989-1990

Background characteristics	Current age					
	25-29	30-34	35-39	40-44	45-49	Total
Residence						
Urban	25.6	21.8	20.1	18.6	19.1	21.5
Rural	21.2	19.9	19.2	19.1	20.1	20.0
Region						
Khartoum	25.4	21.7	20.0	18.6	19.1	21.3
Northern	24.9	23.1	21.2	20.8	20.1	22.8
Eastern	20.8	18.9	17.8	17.2	19.8	19.6
Central	22.9	20.3	19.2	18.2	18.7	20.1
Kordofan	23.0	20.9	18.6	18.7	19.8	20.4
Darfur	20.3	20.3	20.2	19.6	20.8	20.3
Education						
No education	19.6	19.0	19.0	18.8	19.7	19.2
Primary	21.3	20.5	19.7	18.8	20.1	20.4
Secondary+	a	27.0	24.2	21.8	(19.9)	28.2
Total	22.8	20.8	19.5	18.9	19.8	20.5

Note: Median is defined as the exact age by which 50 percent of the women have had a birth. Numbers in parentheses are based on fewer than 20 cases cases.

[a]Less than 50 percent of the women have had a birth.

CHAPTER 4

FERTILITY REGULATION

Information on contraceptive use is of particular interest to policymakers, programme managers, and researchers in population and family planning. This chapter describes women's knowledge of family planning methods and sources where they can be obtained, women's perceptions of problems with particular methods, and use or contraception. Differentials in knowledge and use are also discussed.

4.1 KNOWLEDGE OF FAMILY PLANNING METHODS AND SOURCES

Familiarity with contraceptive methods and sources for methods are among the prerequisites for the adoption of fertility regulation. The Sudan Demographic and Health Survey (SDHS) provides information on the level of knowledge of family planning methods and providers of family planning services. Data on knowledge of contraceptive methods were collected by asking a series of questions in the individual questionnaire. The respondent was asked to name the methods or ways a couple could use to avoid or postpone pregnancy. The interviewer then read a brief description of specific methods, omitting those that the respondent had already mentioned, and asked whether the respondent had ever heard of the method. The questionnaire included seven specific modern methods: the pill, IUD, injection, vaginal methods (jelly, diaphragm or foam), condom, female sterilisation and male sterilisation. Two traditional methods, rhythm or periodic abstinence and withdrawal, were included. Any other methods mentioned by respondents, such as herbs or breastfeeding, were also recorded. To determine knowledge of sources of contraceptive methods, for each modern method the respondent recognized, she was asked where she would go to obtain the method if she wanted to use it. Women who reported knowing about rhythm were asked, "Where would you go to obtain advice on periodic abstinence?"

Table 4.1 indicates that 71 percent of currently married women[1] have heard of at least one family planning method. The most widely known method is the pill; almost all women who knew of a method had heard about the pill. Less than half of the women knew about any of the other methods. About 45 percent had heard of female sterilisation and injection, and 39 percent know about the IUD. Knowledge of other modern methods was low: condom (18 percent), vaginal methods (8 percent) and male sterilisation (5 percent). Four in ten women knew a traditional method, mainly periodic abstinence (36 percent), while less than one in five (19 percent) reported knowledge of withdrawal.

In the last ten years, contraceptive knowledge has increased substantially. Since the Sudan Fertility Survey 1978-79, the level of knowledge (of at least one method of family planning) has risen from 51 percent to 71 percent among currently married women. The proportion of women who have heard of the pill has increased from less than 50 percent in the late seventies to 70 percent in 1990. Knowledge of other methods also increased substantially: the proportion knowing about injection, vaginal methods, and male and female sterilisation doubled, and awareness of the condom, IUD, periodic abstinence, and withdrawal tripled.

[1] The results for ever-married and currently married women are almost identical.

Knowledge of contraceptive methods

Table 4.1 Percentage of currently married women who know a specific contraceptive method, Sudan Fertility Survey 1978-79 and Sudan DHS 1989-90, and the percentage who know a source for specific methods, Sudan DHS 1989-90

Method of contraception	Know method: SFS[1] 1978-79	Know method: SDHS 1989-90	Know source
Any method	50.8	71.4	60.5
Any modern method	49.8	70.8	59.2
Pill	47.9	69.9	54.5
IUD	13.9	39.0	33.0
Injection	25.0	45.6	36.0
Vaginal methods	3.0	7.8	5.9
Condom	6.0	17.8	13.4
Female sterilisation	23.8	44.1	40.1
Male sterilisation	2.7	5.1	4.2
Any traditional method	14.4	38.7	34.5
Periodic abstinence	9.5	36.0	34.5
Withdrawal	5.1	19.3	NA
Other methods	1.8	4.1	NA
Number of women	2859	5400	5400

[1]United Nations (1987). Department of International Economic and Social Affairs. Population Division. Fertility Behaviour in the Context of Development, Table 80

The results presented in Table 4.1 also show that 60 percent of married women know where to go to get a modern method of contraception. In the SFS only 23 percent of currently married women reported knowing a source of family planning. (SFS respondents were not asked to name a source for vaginal methods or male sterilisation.)

Knowledge of sources for specific methods shows substantial improvements between the SFS and the SDHS. For example, the overwhelming majority of women in the SDHS who had heard of female sterilisation also knew where to go to get the operation (44 percent knew the method and 40 percent knew a source). For other modern methods, around three-quarters of the women who knew a particular method also knew where to obtain it. Almost everyone who recognized periodic abstinence (36 percent) mentioned someone or some place where they could seek information about the method (35 percent). In contrast, the SFS results indicated that less than half of those who knew about the pill, and only 28-30 percent of those aware of female sterilisation, injection, the IUD or the condom could name a source for the method (not shown in the table).

The percentage of married women who knew at least one modern contraceptive method and a source is presented in Table 4.2 by background characteristics. There were only small differences in knowledge of modern methods by age: 67 percent of the youngest women knew a modern method, 75 percent of those 20-24, and 65 percent of women 45-49.

Knowledge of modern contraceptive methods

Table 4.2 Percentage of currently married women who know at least one modern method and the percentage who know a source for a modern method, by background characteristics, Sudan DHS 1989-90

Background characteristic	Know modern method	Know source	Number of women
Age			
15-19	67.3	54.5	367
20-24	75.0	64.6	900
25-29	72.5	61.5	1276
30-34	72.7	58.8	906
35-39	69.1	57.8	955
40-44	67.2	55.2	543
45-49	64.9	53.9	453
Residence			
Urban	91.3	83.4	1979
Rural	59.0	45.1	3421
Region			
Khartoum	96.3	91.6	1136
Northern	97.8	88.5	365
Eastern	60.2	46.9	616
Central	80.2	69.9	1480
Kordofan	62.7	41.2	828
Darfur	30.5	17.0	975
Education			
No education	54.2	38.8	3130
Primary incomplete	90.8	82.1	1061
Primary complete	91.7	84.8	374
Junior secondary	97.0	91.6	405
Senior secondary+	99.5	97.9	430
Total	70.8	59.2	5400

There was greater variability in the level of contraceptive knowledge by residence and region. Nine in ten urban women knew at least one modern family planning method, compared with six in ten rural women. Knowledge of a modern method was almost universal in the Khartoum (96 percent) and Northern regions (98 percent), high in the Central region (80 percent), below the national average in the Eastern and Kordofan regions (60 and 63 percent, respectively), and lowest in the Darfur region (31 percent). Differentials in knowledge by education were also striking. Among women with no schooling, only 54 percent knew a modern method, compared with over 90 percent of women with primary education, and almost all women with higher education. In fact, the differences in knowledge by

education may account, in large part, for the differences in knowledge by residence and region, since the more educated women tend to live in urban areas, especially Khartoum.

Differentials in knowledge of service providers follow the patterns noted above for knowledge of modern methods. Between 54 and 65 percent of married women knew a source for a modern contraceptive method. Urban women were more likely to know a source (83 percent) than rural women (45 percent). The Khartoum (92 percent) and Northern regions (89 percent) had the highest proportion of women knowing at least one family planning source, and the Darfur region (17 percent), the lowest. It should be noted that knowledge of service providers depends to a large extent on the existence of service points and access to them in an area. Therefore, the small proportion of women in Darfur who knew a source for contraception may be partly due to the paucity of sources and the difficulty in reaching those sources.

4.2 KNOWLEDGE OF FERTILE PERIOD

A basic understanding of the ovulatory cycle and an awareness of the fertile period is important for practising certain family planning methods, especially periodic abstinence or "the safe period." Periodic abstinence, as noted above, is one of the better-known methods in Sudan, with more than one-third of ever-married women having heard of it. To obtain data on knowledge of the safe period, all respondents were asked when in the monthly cycle women have the greatest chance of becoming pregnant.

Table 4.3 presents the distribution of all ever-married women and women who have ever used periodic abstinence by their knowledge of the fertile period. The most common response, given by 43 percent of all ever-married women, was "don't know." Only 29 percent of ever-married women correctly identified the middle of the cycle as the time a woman is most likely to get pregnant and one in four believes that the most fertile time in the ovulatory cycle occurs just after the period ends.

Knowledge of the fertile period is much more accurate among ever-users of periodic abstinence. Almost three of every four ever-users correctly identified the fertile period as falling in the middle of the ovulatory cycle, while only 3 percent of ever-users reported that they did not know

Knowledge of the fertile period

Table 4.3 Percent distribution of ever-married women and women who have ever used periodic abstinence by knowledge of the fertile period during the ovulatory cycle, Sudan DHS 1989-90

Fertile period	Ever-married women	Ever-users of periodic abstinence
Correct knowledge of fertile period		
Middle of the cycle	29.2	72.1
Doubtful knowledge		
After period ends	24.5	22.3
Before period begins	2.0	1.9
Erroneous knowledge		
During period	0.4	0.3
At any time	0.6	0.1
Other	0.2	0.1
Don't know	43.1	3.1
Total percent	100.0	100.0
Number of women	5860	678

when the fertile period occurs. As the response, "after the period ends" is not very specific, some women who answered, "a few days after the period ends" or something similar, may actually have accurate knowledge; therefore in Table 4.3, this category is shown as "doubtful knowledge." About one percent of ever-married women and ever-users had completely erroneous knowledge of the fertile period and gave responses such as "during her period" or "at any time."

4.3 KNOWLEDGE OF SOURCES FOR SPECIFIC CONTRACEPTIVE METHODS

Table 4.4 presents the percent distribution of women who knew specific contraceptive methods by the service provider mentioned as a source for each method. For the pill, IUD and injection, the proportion of women mentioning private and public sources was about equal. Public sources were cited more frequently than private for female and male sterilisation. The majority of women who knew about vaginal methods and the condom mentioned providers in the private sector.

Knowledge of source of supply for specific methods

Table 4.4 Percent distribution of women knowing a contraceptive method by supply source they say they would use, according to specific methods, Sudan DHS 1989-90

Supply source	Pill	IUD	Injec-tion	Vagi-nal methods	Con-dom	Female sterili-sation	Male sterili-sation	Periodic absti-nence[1]
Public	37.8	42.8	39.6	20.7	10.1	63.2	48.7	7.0
Government hospital	15.7	30.3	22.6	4.6	3.0	61.2	46.7	1.6
Government health centre	14.4	6.6	9.9	5.7	2.2	0.7	1.3	1.2
Dispensary	1.3	0.3	0.7	0.2	0.3	0.3	0.0	0.1
Mobile clinic	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2
Other health facility	0.5	0.1	0.4	0.2	0.3	0.1	0.0	0.2
Family planning clinic	5.9	5.5	6.0	10.0	4.3	0.7	0.7	3.7
Private	40.1	41.7	39.4	54.3	65.9	27.6	35.3	80.9
Private doctor	12.6	38.5	28.4	12.4	5.0	25.9	31.7	16.5
Private hospital	0.2	1.0	1.2	0.2	0.4	1.1	1.7	0.2
Pharmacy	26.6	2.0	9.5	40.4	59.5	0.3	0.7	0.1
Friends/relatives	0.6	0.0	0.1	0.7	0.7	0.2	1.3	61.2
Other	0.1	0.1	0.1	0.7	0.3	0.1	0.0	2.9
Unspecified medical facilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0
Unclassified	22.1	15.6	21.0	25.0	24.1	9.2	16.0	4.0
Don't know	21.9	15.4	20.4	24.6	23.3	8.3	15.3	3.5
Missing	0.2	0.1	0.6	0.4	0.8	1.0	0.7	0.5
Total percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of women	4103	2301	2674	460	1022	2592	300	2100

[1]Refers to the place women say they could go to obtain advice on periodic abstinence.

Pharmacies were perceived as a major source for supply methods, namely, condoms (60 percent), vaginal methods (40 percent), and the pill (27 percent), while government hospitals and private doctors were the main service providers for clinical methods. Government hospitals were cited as major sources for female sterilisation (61 percent), and male sterilisation (47 percent) and were mentioned by a substantial proportion of women for the IUD (30 percent) and injection (23 percent). Private doctors are cited more frequently for the IUD (39 percent) and injection (28 percent) but are less popular than government hospitals for male and female sterilisation (32 percent and 26 percent, respectively). Private doctors were also mentioned as a source for information about periodic abstinence by 17 percent of women. Family planning clinics have less importance as service providers; only a small proportion of women mentioned family planning clinics as sources for supply methods (4 to 10 percent). Relatives and friends (61 percent) were the primary source for information about periodic abstinence.

It should be noted that for each method a substantial minority of women did not report any source. One in seven women mentioned no service provider for the IUD and male sterilisation; one in five did not know where to obtain the pill or injection; and almost one in four did not know where condoms and vaginal methods could be obtained.

4.4 PROBLEMS PERCEIVED WITH CONTRACEPTIVE METHODS

In order to understand the problems women associate with the use of family planning methods, respondents in the SDHS were asked to report the main problem, if any, with using each method that they had heard of. Table 4.5 shows the distribution of women who knew specific methods, by the main problem they perceived in using each method. From one-half to two-thirds of women who were asked the question reported either "don't know" or "none" (no problem).

Problems perceived in using specific methods

Table 4.5 Percent distribution of ever-married women who know a specific contraceptive method by the main problem perceived in using the method, Sudan DHS 1989-90

Main problem perceived	Pill	IUD	Injec-tion	Vagi-nal methods	Con-dom	Female sterili-sation	Male sterili-sation	Periodic absti-nence	With-drawal
None	16.6	14.6	18.9	22.0	22.1	35.6	18.0	50.4	28.7
Not effective	1.0	9.6	2.5	10.7	12.6	2.4	1.7	24.3	6.2
Husband disapproves	1.3	0.7	1.1	2.6	14.5	2.6	8.7	6.1	33.4
Others disapprove	0.1	0.1	0.0	0.0	0.1	0.0	0.3	0.2	0.1
Health concerns	46.6	40.4	30.6	10.0	3.8	7.9	4.3	0.4	1.2
Inaccessibility/ lack of availability	0.5	0.1	0.8	0.9	0.3	0.0	0.0	0.0	0.0
High cost	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Inconvenient to use	0.1	3.0	0.5	6.7	6.2	0.3	1.0	1.4	6.9
Permanent method	0.1	0.2	1.0	0.0	0.3	18.6	19.0	0.9	0.0
Religion	0.6	0.2	0.5	0.2	0.6	2.6	5.7	0.4	0.7
Other	0.2	0.1	0.1	0.0	0.2	0.1	1.0	0.0	0.4
Don't know	32.7	30.6	43.2	46.3	38.4	28.6	39.0	15.1	20.4
Missing	0.2	0.2	0.7	0.7	1.0	1.2	1.3	0.7	1.9
Total percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of women	4103	2301	2674	460	1022	2592	300	2100	1121

Focusing on specific responses, health concerns were the most frequently cited problem regarding the pill (47 percent), IUD (40 percent) and injection (31 percent). Irreversibility was the major problem (19 percent) reported in using female and male sterilisation. Other responses regarding sterilisation included health concerns for female sterilisation (8 percent), and husband's disapproval (9 percent) and religion (6 percent) for male sterilisation. Husband's disapproval was the most commonly mentioned problem with the condom (15 percent) and withdrawal (33 percent). "Not effective" was reported as a problem for the condom (13 percent) and the IUD (10 percent) and was the most frequently mentioned problem with vaginal methods (11 percent) and periodic abstinence (24 percent). Around 6 percent mentioned husband's disapproval as the major problem with periodic abstinence, and the same proportion reported inconvenience as the major problem with the condom, withdrawal, and vaginal methods.

In summary, the findings in Table 4.5 suggest that the high proportion of women who reported health concerns for the pill, IUD, and injection underscores the need to provide information and assurance to current and potential users of these methods. Male methods, especially the condom and withdrawal, but also male sterilisation and periodic abstinence, were less acceptable to women because their husbands disapproved of them.

4.5 EVER USE OF CONTRACEPTION

In the SDHS, all respondents were asked if they had ever used the methods they reported knowledge of. As shown in Table 4.6, almost one-fourth (24 percent) of ever-married women have used a method to regulate their fertility at some point in their lives. Eighteen percent have used a modern method and 14 percent have used a traditional method; thus, the majority of ever-users have had experience with a modern method and some have used two or more methods. Currently married women have about the same level of ever-use (25 percent) as ever-married women. Ever use of contraception among currently married women is almost twice as high in the SDHS as in the SFS (13 percent).

The age differentials for ever-use show that among currently married women, the lowest rate of ever-use (9 percent) occurred among the youngest women, those age 15-19; the highest rate (31 percent) was found among women age 30-34. Except for age group 30-34, about 25 percent of currently married women between 20 and 44 years have tried some method for controlling fertility. Twenty-three percent of the women in their late forties have had some experience with family planning (the overwhelming majority of them with modern methods).

Two methods, the pill (17 percent) and periodic abstinence (12 percent), are used most commonly; less than 5 percent of women have ever used any other method—withdrawal (4 percent), condom, IUD, and "other" methods (2 percent), and 1 percent injection or sterilisation.

Ever use of contraception

Table 4.6 Percentage of ever-married women and currently married women who have ever used a contraceptive method, by specific method according to age, Sudan DHS 1989-90

Age	Any method	Any modern method	Modern method						Traditional method				Number of women
			Pill	IUD	Injection	Vaginal methods	Condom	Female sterilisation	Any trad'l method	Periodic abstinence	Withdrawal	Other	
EVER-MARRIED WOMEN													
15-19	8.9	5.3	4.7	0.3	0.0	0.0	0.5	0.0	6.6	4.7	1.8	0.6	380
20-24	24.1	14.1	13.2	0.5	0.7	0.2	2.0	0.0	16.1	13.1	4.5	1.1	938
25-29	25.7	18.5	17.0	1.4	1.1	0.2	1.3	0.1	15.0	12.1	4.2	1.9	1355
30-34	30.1	23.3	21.4	2.7	1.4	0.5	3.0	1.2	18.6	15.2	6.1	2.8	970
35-39	25.3	20.2	19.6	2.2	0.8	0.4	2.3	0.7	13.5	11.1	3.0	2.4	1047
40-44	24.6	19.4	17.6	1.7	1.4	0.5	1.7	2.4	12.7	11.1	1.9	2.1	630
45-49	20.6	18.3	16.3	1.3	1.7	0.4	1.9	2.2	9.8	7.4	2.4	1.3	540
Total	24.4	18.1	16.8	1.6	1.1	0.3	1.9	0.8	14.2	11.6	3.8	1.8	5860
CURRENTLY MARRIED WOMEN													
15-19	9.0	5.4	4.9	0.3	0.0	0.0	0.5	0.0	6.5	4.6	1.9	0.6	367
20-24	24.3	14.2	13.4	0.6	0.8	0.2	2.0	0.0	16.3	13.2	4.6	1.0	900
25-29	26.2	18.7	17.4	1.4	1.0	0.2	1.4	0.1	15.4	12.4	4.3	2.0	1276
30-34	31.1	24.0	22.2	2.5	1.5	0.6	3.1	1.3	19.5	15.9	6.5	3.0	906
35-39	26.3	20.9	20.2	2.3	0.7	0.4	2.4	0.7	14.2	11.7	3.1	2.5	955
40-44	26.0	20.3	18.4	2.0	1.5	0.6	1.7	2.6	13.8	12.0	2.0	2.5	543
45-49	22.5	20.3	17.9	1.5	1.8	0.4	2.0	2.4	10.4	8.2	2.4	1.3	453
Total	25.2	18.6	17.3	1.6	1.1	0.4	2.0	0.8	14.9	12.1	4.0	1.9	5400

4.6 CURRENT USE OF CONTRACEPTION

Only currently married women were asked if they were using any contraceptive method at the time of the survey. The contraceptive prevalence rate reported by the SDHS is 9 percent, which, though low in comparison with many developing countries,[2] is almost double the level reported in the SFS (5 percent) (Table 4.7). The pill, the most widely known method, is also the most widely used (4 percent), accounting for more than 40 percent of contraceptive use in Sudan. The remaining modern method users are equally divided between those relying on the IUD and female sterilisation. Periodic abstinence is the most frequently used traditional method and the second most frequently used method overall (2 percent). Less than 1 percent of married women rely on breastfeeding or traditional methods such as "seeds" and herbs.

Table 4.7 shows the percent distribution of currently married women by contraceptive method currently used according to selected background characteristics. The pattern of differentials by age is similar to the pattern for ever-use of contraception, with women in their thirties and early forties having the highest levels of contraceptive use. Extremely large differences are observed in contraceptive prevalence for urban and rural areas; 17 percent of urban women were using a contraceptive method at the time of the survey compared with 4 percent of rural women (see Figure 4.1). Urban women are also more likely than rural women to use modern methods, especially the IUD.

Figure 4.1 highlights the differentials in contraceptive prevalence by region. Khartoum has the highest level of contraceptive prevalence, with 22 percent of married women using a method, followed by the Northern (12 percent) and Central regions (8 percent). Less than 5 percent of women use contraception in the Eastern (4 percent), Kordofan (3 percent) and Darfur (1 percent) regions.

Pronounced differences in current use exist by level of education. The proportion of married women using contraception increases dramatically from 3 percent among women with no schooling to 12 percent among those with primary education, and then rises to 19 and 26 percent for women with junior secondary and senior secondary or higher education, respectively. Contraceptive use also increases with the number of living children (Table 4.7); current use is negligible (1 percent) among women who have yet to start childbearing and increases to 7 percent among women with one child. The prevalence rate is about 10 percent for women with two or more children.

Figure 4.2 compares contraceptive prevalence by age and number of living children for the SFS and the SDHS. Since the SFS, contraceptive use has increased substantially in the age group 20-24 (from 4 to 8 percent) and even more dramatically among women age 30 and over (almost two-and-a-half times the previous prevalence rate), but has remained unchanged for age groups 15-19 and 25-29. Except among childless women, contraceptive use has increased since the SFS among women regardless of number of children. Among women with two children, current use increased from 4 percent in the SFS to 10 percent in the SDHS; increases in the proportion using family planning were less pronounced for other family sizes.

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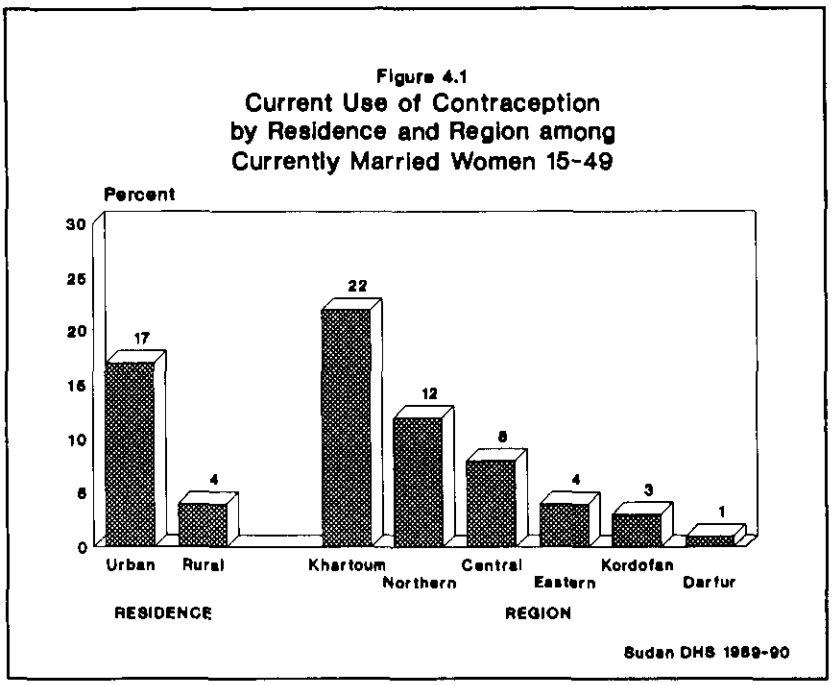
[2] For African countries where DHS surveys have been conducted, prevalence rates are higher than Sudan in: Tunisia (50 percent), Zimbabwe (43 percent), Egypt (38 percent), Morocco (36 percent), Botswana (33 percent), Kenya (27 percent), Ghana (13 percent) and Togo (12 percent). Six countries—Burundi, Liberia, Mali, Nigeria, Senegal, and Uganda—have contraceptive prevalence rates lower than Sudan (3-7 percent).

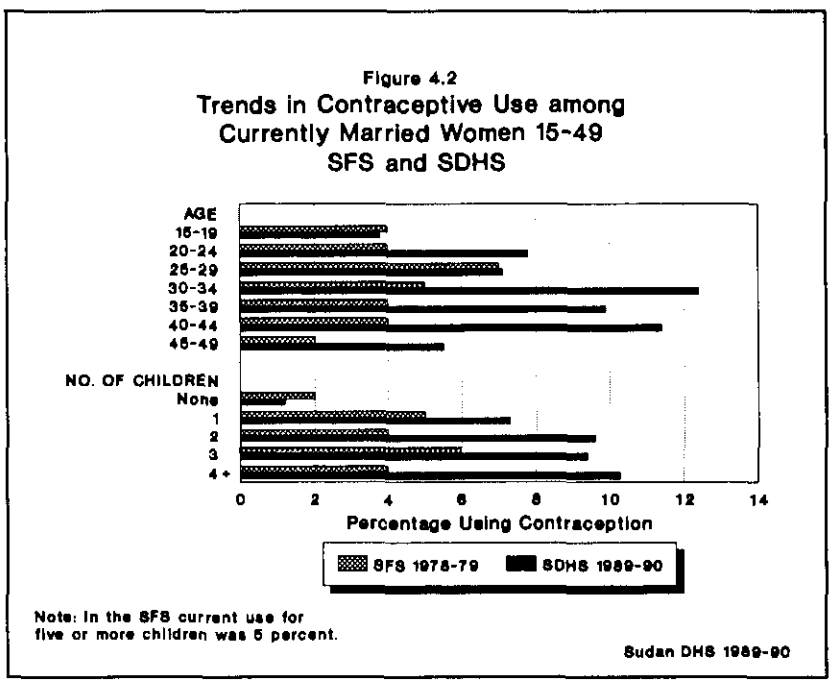
Current use of contraception

Table 4.7 Percent distribution of currently married women by contraceptive method currently used, according to background characteristics, Sudan DHS 1989-90; and percent distribution of currently married women by contraceptive method currently being used, SFS 1978-79

Background characteristic	Any method	Any modern method	Contraceptive method: Pill	IUD	Injection	Condom	Female sterilisation	Any trad'l method	Periodic abstinence	Withdrawal	Other	Not currently using	Total percent	Number of women
Age														
15-19	3.8	2.2	1.9	0.3	0.0	0.0	0.0	1.6	1.4	0.0	0.3	96.2	100.0	367
20-24	7.8	4.2	3.9	0.2	0.1	0.0	0.0	3.6	2.9	0.4	0.2	92.2	100.0	900
25-29	7.1	5.0	4.4	0.4	0.1	0.1	0.1	2.0	1.2	0.2	0.7	92.9	100.0	1276
30-34	12.4	7.9	5.3	1.0	0.0	0.3	1.3	4.4	2.8	0.4	1.2	87.6	100.0	906
35-39	9.9	5.7	3.7	1.3	0.0	0.0	0.7	4.3	2.8	0.4	1.0	90.1	100.0	955
40-44	11.4	7.7	3.5	1.1	0.2	0.4	2.6	3.7	3.3	0.0	0.4	88.6	100.0	543
45-49	5.5	4.4	1.8	0.2	0.0	0.0	2.4	1.1	0.7	0.4	0.0	94.5	100.0	453
Residence														
Urban	17.0	11.3	7.6	1.6	0.1	0.3	1.6	5.7	4.2	0.8	0.7	83.0	100.0	1979
Rural	3.9	2.2	1.7	0.1	0.0	0.0	0.4	1.7	1.0	0.0	0.6	96.1	100.0	3421
Region														
Khartoum	22.1	15.8	10.9	2.4	0.2	0.4	1.9	6.3	4.7	1.0	0.6	77.9	100.0	1136
Northern	12.1	8.2	6.6	0.0	0.0	0.3	1.4	3.8	3.0	0.0	0.8	87.9	100.0	365
Eastern	4.4	2.1	1.6	0.2	0.0	0.0	0.3	2.3	1.6	0.0	0.6	95.6	100.0	616
Central	7.6	4.1	2.6	0.5	0.1	0.0	0.9	3.4	2.2	0.2	1.1	92.4	100.0	1480
Kordofan	3.0	1.4	1.1	0.1	0.0	0.0	0.2	1.6	0.7	0.2	0.6	97.0	100.0	828
Darfur	0.9	0.2	0.2	0.0	0.0	0.0	0.0	0.7	0.7	0.0	0.0	99.1	100.0	975
Education														
No education	3.2	1.9	1.0	0.2	0.0	0.1	0.6	1.3	0.6	0.0	0.7	96.8	100.0	3130
Primary incomplete	12.7	8.0	5.4	0.9	0.2	0.0	1.5	4.7	3.2	0.6	1.0	87.3	100.0	1061
Primary complete	11.5	7.8	7.2	0.3	0.0	0.3	0.0	3.7	3.2	0.0	0.6	88.5	100.0	374
Junior secondary	19.3	13.1	10.4	1.2	0.0	0.0	1.5	6.2	4.9	0.7	0.5	80.7	100.0	405
Senior secondary+	26.0	16.5	11.9	3.0	0.0	0.7	0.9	9.5	8.1	1.4	0.0	74.0	100.0	430
Number of living children														
None	1.2	0.2	0.2	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	98.8	100.0	576
1	7.3	3.9	3.9	0.0	0.0	0.0	0.0	3.4	2.9	0.4	0.1	92.7	100.0	819
2	9.6	6.9	5.4	1.1	0.0	0.0	0.4	2.7	1.7	0.7	0.2	90.4	100.0	708
3	9.4	6.3	4.1	0.9	0.3	0.5	0.5	3.1	2.0	0.3	0.8	90.6	100.0	651
4 or more	10.3	6.6	4.2	0.8	0.0	0.1	1.5	3.7	2.4	0.2	1.0	89.7	100.0	2646
Total SDHS	8.7	5.5	3.9	0.7	0.1	0.1	0.8	3.1	2.2	0.3	0.6	91.3	100.0	5400
Total SFS[1]	4.6	3.9	3.1	0.1	0.2	0.1	0.3	0.7	0.4	0.1	0.0	95.4	100.0	2859

[1]United Nations (1987). Department of International Economic and Social Affairs. Population Division. Fertility Behaviour in the Context of Development, Table 81





4.7 NUMBER OF CHILDREN AT FIRST USE

Table 4.8 shows the percent distribution of ever-married women by the number of living children they had at the time they first used contraception. It is interesting to note that half of the women (12 percent) started using contraception before their second child. This tendency to start contraception early, probably for the purpose of spacing births, is more noticeable among younger women, i.e., women below 30 years of age. For example, 20 percent of women aged 20-24 started using before they had two children, compared with only 4 percent of those age 45-49.

Number of children at first use of contraception

Table 4.8 Percent distribution of ever-married women by number of living children at the time of first use of contraception, according to current age, Sudan DHS 1989-90

Age	Never used	No. of living children at time of first use: None	1	2	3	4+	Missing	Total percent	Number of women
15-19	91.1	3.4	5.0	0.5	0.0	0.0	0.0	100.0	380
20-24	75.9	4.5	15.0	3.6	0.6	0.0	0.3	100.0	938
25-29	74.3	3.4	12.6	6.1	1.6	1.8	0.1	100.0	1355
30-34	69.9	1.3	10.7	7.0	5.4	5.6	0.1	100.0	970
35-39	74.7	0.9	5.9	5.1	4.6	8.5	0.4	100.0	1047
40-44	75.4	1.1	5.1	3.3	3.8	11.0	0.3	100.0	630
45-49	79.4	0.2	3.9	1.7	1.7	12.8	0.4	100.0	540
Total	75.6	2.2	9.4	4.6	2.7	5.2	0.2	100.0	5860

4.8 SOURCE OF CURRENT CONTRACEPTIVE METHOD

The identification of sources of contraceptive methods for current users is important in order to evaluate the role played by various providers of family planning services and supplies in the public and private sectors. Women who were using a method were asked where they obtained the method, or in the case of users of periodic abstinence, where they obtained advice the last time. The responses are summarized in Table 4.9.

The public sector (including nongovernmental organizations) provides methods to six of ten users of modern methods (46 percent government sources, and 12 percent family planning clinics), while the private sector serves four in ten users. In the private sector, pharmacies (22 percent) and private doctors/clinics (13 percent) are the major sources of contraceptive methods (see Figure 4.3).

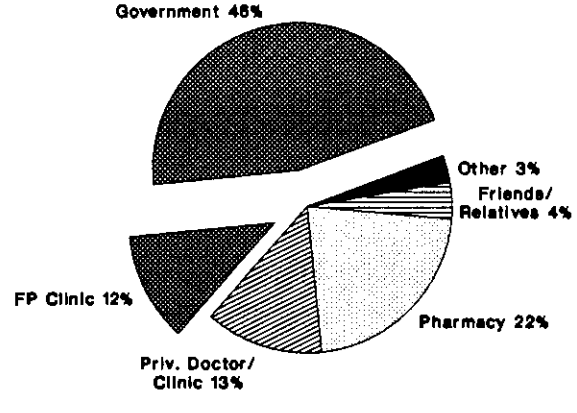
As for sources of specific methods, government health centres (31 percent) and pharmacies (29 percent) are the major sources for pill users; family planning clinics (14 percent), government hospitals (11 percent), private doctors (4 percent) and, friends and relatives (5 percent) are the other sources. Eighty percent of the women who chose female sterilisation, used government hospitals and 11 percent used private doctors. The majority of IUD insertions (53 percent) were done by private doctors; the rest were performed at government hospitals (14 percent), family planning clinics (11 percent), government health centres (8 percent), and private hospitals (8 percent). The majority of women who relied on periodic abstinence consulted friends and relatives (54 percent), although one in five reported private doctors as the source of information and advice on the rhythm method.

Sources of contraceptive services

Table 4.9 Percent distribution of current users of modern methods by most recent source of supply according to specific method, and percent distribution of users of periodic abstinence by most recent source of information, Sudan DHS 1989-90

Source of supply or information	Supply methods[1]		Clinic methods			Total modern methods[1]	Periodic abstinence
	Pill	Total	IUD	Female sterilisation	Total		
Public	59.1	57.6	36.1	80.0	60.5	58.4	5.0
Government hospital	10.6	10.6	13.9	80.0	50.6	21.5	1.7
Govt health centre	31.3	30.0	8.3	0.0	3.7	22.8	0.8
Dispensary	1.9	1.8	0.0	0.0	0.0	1.3	0.0
Mobile clinic	0.5	0.5	0.0	0.0	0.0	0.3	0.0
Other health facility	0.5	0.5	2.8	0.0	1.2	0.7	0.8
Family planning clinic	14.4	14.3	11.1	0.0	4.9	11.7	1.7
Private	40.4	41.9	63.9	17.8	38.3	40.9	95.0
Private doctor	3.8	3.7	52.8	11.1	29.6	10.7	19.3
Private hospital	0.5	0.9	8.3	2.2	4.9	2.0	0.0
Pharmacy	29.3	30.9	0.0	0.0	0.0	22.5	0.0
Friends/relatives	5.3	5.1	0.0	0.0	0.0	3.7	53.8
Other	1.4	1.4	2.8	4.4	3.7	2.0	21.8
Unclassified	0.5	0.5	0.0	2.2	1.2	0.7	0.0
Don't know	0.5	0.5	0.0	0.0	0.0	0.3	0.0
Missing	0.0	0.0	0.0	2.2	1.2	0.3	0.0
Total percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Figure 4.3
Source of Contraceptive Methods for Current Users of Modern Methods



Sudan DHS 1989-90

4.9 DISSATISFACTION WITH CURRENT PROVIDERS OF CONTRACEPTION

Twenty percent of the currently married women using contraception reported some dissatisfaction with their most recent source of contraception (see Table 4.10). The highest proportion of dissatisfied respondents were pharmacy clients (30 percent). Eighteen percent of those using government health facilities and 13 percent of those attended by private doctors or at private hospitals were also dissatisfied with the services they received. Overall, the main complaint was unavailability of the desired method at the source (9 percent), though this complaint was more common among pharmacy clients (18 percent). Distance to the source was the second most frequently mentioned cause of dissatisfaction (6 percent): 8 percent of pharmacy clients, 6 percent of government health facilities users, and 3 percent of those receiving services at private hospitals or from private doctors. Among those who received services from private doctors or hospitals, the major dissatisfaction was cost; 5 percent of the women said these services were expensive. Only 2 percent of users mentioned waiting too long as a reason for dissatisfaction with the service.

Dissatisfaction with source of contraceptive services

Table 4.10 Percent distribution of current users of contraception by type of dissatisfaction with the source of contraceptive services, according to type of source last visited, Sudan DHS 1989-90

Source of contraceptive services	Dissatisfaction with the source of contraceptive services									
	None	Too far	Wait too long	Not comfortable with staff	Expensive	Desired method not available	Other	Unsure/ missing	Total percent	Number of users
Govt. health facility	82.1	6.4	2.3	1.2	1.2	6.4	0.0	0.6	100.0	173
Pharmacy	70.1	7.5	3.0	0.0	1.5	17.9	0.0	0.0	100.0	67
Private doctor/ hospital	87.2	2.6	0.0	0.0	5.1	2.6	2.6	0.0	100.0	39
Total[1]	79.7	5.9	2.1	0.7	1.7	9.0	0.3	0.6	100.0	290

[1]Includes 11 women who said that they obtained their method from friends or relatives but excludes women who did not specify the source.

4.10 ATTITUDE TOWARD NEXT PREGNANCY AND REASON FOR NONUSE OF CONTRACEPTION

Table 4.11 presents the percent distribution of sexually active, nonpregnant women who were not using a contraceptive method by their attitude toward becoming pregnant in the next few weeks. Overall, one-third of these nonusers were exposed to the risk of unwanted pregnancy, that is, they said that they would be unhappy if they got pregnant in the next few weeks. Examining the attitude of these women by number of living children, the proportion at risk of an unwanted pregnancy increases with increasing family size. For example, 29 percent of mothers with one child said they would be unhappy if they became pregnant in the next few weeks, compared with 40 percent of women with four or more children. It is notable that among those with four or more children, 44 said they would be happy to become

pregnant again, while 16 percent said that it would not matter. This finding suggests that the majority of women with large families either want more children or are fatalistic about the size of their family.

Attitude toward becoming pregnant among nonusers

Table 4.11 Percent distribution of nonpregnant women who are sexually active and who are not using any contraceptive method by attitude toward becoming pregnant in the next few weeks, according to number of living children, Sudan DHS 1989-90

Number of living children	Attitude toward becoming pregnant in next few weeks: Happy	Unhappy	Would not matter	Missing	Total percent	Number of women
None	93.6	3.2	2.4	0.7	100.0	409
1	64.7	29.3	5.4	0.6	100.0	467
2	58.4	33.4	7.1	1.2	100.0	425
3	54.7	34.6	10.2	0.5	100.0	413
4 or more	43.5	40.0	15.8	0.7	100.0	1856
Total	55.1	33.0	11.2	0.7	100.0	3570

Women who reported that they would be unhappy if they became pregnant soon were asked why they were not using any method of family planning. The percent distribution of younger women (under 30) and older women (30 years and over) by the reason given for nonuse are shown in Table 4.12. A substantial proportion of these women (39 percent) did not feel themselves at risk of pregnancy because they were breastfeeding (24 percent), menopausal (7 percent) or were sexually active infrequently (8 percent). Another 36 percent cited reasons for nonuse that are important for family planning services: lack of knowledge (21 percent), health concerns (12 percent), inaccessibility of methods (3 percent) and high cost (1 percent). Four percent gave religion as the main reason for nonuse, 2 percent disapprove of family planning, and 6 percent report that their husband disapproved of family planning. Finally, about 7 percent of the women cited reasons that implied there was little they can do to control their fertility (fatalistic). The main difference in reasons for nonuse among younger and older women was that a higher proportion of younger women reported postpartum/breastfeeding (35 percent) and husband disapproval (7 percent). Also, older women were more likely to mention menopause and lack of knowledge as reasons for nonuse.

Reasons for nonuse of contraception

Table 4.12 Percent distribution of nonpregnant women who are sexually active, not using any contraceptive method, and who would be unhappy if they became pregnant, by main reason for nonuse, according to age, Sudan DHS 1989-90

Main reason for not using contraception	Age 15-29	Age 30-49	Total
Postpartum/breastfeeding	34.5	16.4	24.0
Menopausal/subfecund	0.0	12.9	7.5
Infrequent sex	7.7	7.8	7.7
Lack of knowledge	17.8	22.7	20.6
Health concerns	8.1	15.1	12.1
Inaccessibility/ lack of availability	3.8	1.8	2.6
High cost	0.4	0.6	0.5
Religion	3.4	4.2	3.9
Husband disapproves	7.3	4.5	5.7
Oppose family planning	3.0	1.6	2.2
Fatalistic	6.7	7.0	6.9
Don't know	3.8	3.1	3.4
Inconvenient to use	1.2	1.0	1.1
Others disapprove	0.4	0.1	0.3
Other	0.6	0.7	0.7
Missing	1.2	0.4	0.8
Total percent	100.0	100.0	100.0

4.11 INTENTION TO USE CONTRACEPTION IN THE FUTURE

Women who were not using any contraceptive method at the time of interview were asked if they thought they would use a family planning method in the future. Those who responded in the affirmative were also asked what method they would prefer to use and whether they would use that method in the next 12 months.

Table 4.13 shows the distribution of currently married women who were not using contraception, by intention to use in the future, according to the number of living children (including a current pregnancy). Three-fourths of the women (77 percent) said they did not intend to use any contraceptive method. Eighteen percent said they intended to use a method—13 percent in the next 12 months, and 4 percent after 12 months (1 percent unspecified); 5 percent were unsure about future use. Differentials by number of living children were minimal, although those with no children were least likely to express an intention of using within the next 12 months.

Method preferences among those who intend to use in the future are shown in Table 4.14. The pill is by far the most popular choice (61 percent), followed by periodic abstinence as a distant second (15 percent). Injection, although used by hardly any current users, is the preferred method of 8 percent of those who intend to use. Male methods—condom, withdrawal, and male sterilisation—were selected by almost none of those who intend to use. Method preferences were almost identical for women who intend to use contraception in the next 12 months and those who intend to use a method after 12 months.

Intention to use contraception in the future

Table 4.13 Percent distribution of currently married women who are not using any contraceptive method, by intention to use in the future, according to number of living children, Sudan DHS 1989-90

Intention to use in future	Number of children[1] None	1	2	3	4+	Total
Intend to use						
In next 12 months	4.6	13.6	16.4	15.0	13.0	13.1
After 12 months	12.7	5.7	4.9	3.2	2.0	4.0
Unsure when	2.2	1.6	1.8	1.6	0.9	1.3
Unsure about use	6.5	6.7	6.4	4.2	3.4	4.7
Do not intend to use	73.8	72.1	70.4	75.9	80.7	76.8
Missing	0.2	0.3	0.1	0.0	0.0	0.1
Total percent	100.0	100.0	100.0	100.0	100.0	100.0
Number of women	416	750	672	618	2476	4932

[1]Includes current pregnancy.

Preferred method for future use

Table 4.14 Percent distribution of currently married women who are not using a contraceptive method but who intend to use in the future, by preferred method, Sudan DHS 1989-90

Preferred method	Intend to use: In next 12 months	After 12 months	Total
Pill	60.8	61.3	60.9
IUD	6.5	5.0	6.2
Injections	7.3	8.0	7.5
Condom	0.5	0.5	0.5
Female sterilisation	2.5	3.5	2.7
Periodic Abstinence	14.6	14.1	14.5
Withdrawal	0.9	1.0	0.9
Other	0.9	0.5	0.8
Don't know	6.0	6.0	6.0
Total percent	100.0	100.0	100.0
Number of women	645	199	844

4.12 APPROVAL AND ACCEPTABILITY OF FAMILY PLANNING

In the SDHS all respondents were asked whether they approved or disapproved of couples using a method to avoid or delay pregnancy. Currently married women were also asked if they thought their husbands approved or disapproved of family planning in general. Table 4.15 presents information on the attitudes of currently married women toward family planning and their perceptions of the attitudes of their husbands toward family planning. Sixty-four percent of the women said they approved of family planning. When asked about their husband's attitude toward family planning, only 37 percent of married women reported that their husbands approved; 44 percent said their husbands disapproved, and 19 percent did not know. Examining the attitudes of couples, it was found that 35 percent of couples jointly approved of family planning, 25 percent jointly disapproved; and in 19 percent of couples the wife supported family planning while the husband opposed it.

Attitudes of husbands and wives toward family planning

Table 4.15 Percent distribution of currently married women who know a contraceptive method by the husband's attitude toward family planning (according to the wife) and the wife's attitude toward the use of family planning, Sudan DHS 1989-90

Wife's attitude toward family planning	Husband's attitude toward family planning				
	Disapproves	Approves	Don't know	All wives[1]	Number of women
Disapproves	25.4	2.0	8.8	36.2	1395
Approves	18.7	35.3	9.6	63.6	2454
All husbands[2]	44.1	37.3	18.5	100.0	3856
Number of women	1701	1440	713	3856	3856

[1]Includes seven cases with missing information.
[2]Includes two cases with missing information.

The differentials in wives' and husbands' attitudes toward family planning are presented in Table 4.16 by selected background characteristics. Differences in wives' and husbands' approval of family planning by age of wife were minimal except that those in the youngest and oldest age groups were somewhat less likely to approve than those in the middle age groups. Not surprisingly, the attitude toward family planning was more favourable among women residing in urban areas (72 percent) than in rural areas (57 percent); similarly, more urban wives (46 percent) than rural wives (29 percent) thought that their husbands approved of family planning. The urban-rural differential was slightly larger for husbands than for their wives. Differentials by education were strong; approval of family planning increased dramatically from less than 50 percent among women with no schooling to over 70 percent among those with primary education and then rose to 89 percent for those having at least a secondary education. Husbands and wives had a similar pattern of family planning approval according to the wife's

education: 24 percent of husbands with uneducated wives approved of family planning compared with 65 percent of wives with at least secondary education. The urban-rural and educational differences were reflected in the regional differentials. Approval of family planning among married women in the Khartoum region (77 percent) and the Northern region (60 percent) was slightly higher than in the Central region (63 percent). On the other hand, the Central region showed a higher level of approval than the Kordofan (54 percent), Eastern (52 percent) or Darfur (45 percent) regions. Husbands' attitudes followed the same pattern as their wives by region. More than half of the husbands in Khartoum approved, compared with less than one-fifth of those in the Darfur region.

Approval of family planning by wives and their husbands

Table 4.16 Among currently married women who know a contraceptive method, the percentage who approve of family planning and the percentage who say their husbands approve of family planning by background characteristics of women, Sudan DHS 1989-90

Background characteristics	Approve of family planning		Number of women
	Women	Husbands	
Age			
15-19	53.6	31.2	250
20-24	66.8	37.9	680
25-29	66.7	41.2	934
30-34	64.7	39.1	662
35-39	65.0	34.7	666
40-44	59.8	37.8	368
45-49	54.7	30.4	296
Residence			
Urban	71.6	46.3	1812
Rural	56.6	29.4	2044
Region			
Khartoum	77.0	54.0	1098
Northern	68.6	46.8	357
Eastern	51.5	29.3	379
Central	62.6	32.9	1195
Kordofan	54.3	22.7	529
Darfur	44.6	18.8	298
Education			
No education	48.0	23.5	1722
Primary incomplete	70.8	40.9	968
Primary complete	73.2	44.0	343
Junior secondary	79.2	53.3	394
Senior secondary+	88.6	65.0	429
Total	63.6	37.3	3856

A good indication of the acceptability of family planning is the extent to which couples discuss the subject with each other. Currently married women were asked how often they had talked about family planning with their husbands in the year preceding the survey. As shown in Table 4.17, less than half of the married women have discussed family planning with their husbands in the preceding year; 27 percent discussed it once or twice and 20 percent discussed it three or more times. The differentials by wife's age in the proportion of couples who discussed family planning were similar to those observed in approval of family planning. Younger and older women were less likely to discuss family planning with their husbands than women 20 to 39 years old.

Frequency of discussion of family planning by couples

Table 4.17 Percent distribution of currently married women who know a contraceptive method by the number of times family planning was discussed with husband in the year preceding the survey, according to current age, Sudan DHS 1989-90

Age	Number of times discussed family planning: Never	Once or twice	Three or more	Missing	Total percent	Number of women
15-19	60.0	26.8	13.2	0.0	100.0	250
20-24	47.4	31.9	20.7	0.0	100.0	680
25-29	47.5	30.5	21.8	0.1	100.0	934
30-34	50.0	24.6	25.2	0.2	100.0	662
35-39	55.3	24.9	19.8	0.0	100.0	666
40-44	61.7	21.5	16.8	0.0	100.0	368
45-49	65.2	21.6	12.5	0.7	100.0	296
Total	52.8	27.0	20.1	0.1	100.0	3856

Another indicator of family planning approval is attitudes towards mass media providing information on family planning. All respondents were asked if it was acceptable to them for family planning information to be provided on radio or television. The results presented in Table 4.18 indicated that almost 75 percent of ever-married women considered it acceptable for mass media to provide family planning information. This was true for women of all ages except those age 45-49 who were less likely (67 percent) to approve of the use of radio and television to provide information on family planning. The attitudes of ever-married and currently married women were similar regarding dissemination of family planning information on the radio (not shown in the table). It is interesting to note that among currently married women, approval of the use of mass media to disseminate family planning information (over 70 percent) was higher than approval of the use of family planning (64 percent, see Table 4.16). Differentials by urban-rural residence, by education, and by region in approval of the use of mass media for disseminating family planning information follow the pattern described above for differentials in approval of family planning among currently married women.

Approval of the use of mass media for disseminating family planning information

Table 4.18 Percentage of ever-married women who approve of providing family planning information on radio or television, by age according to selected background characteristics, Sudan DHS 1989-90

Background characteristic	Age of woman							
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	Total
Residence								
Urban	83.3	86.2	87.5	86.5	86.8	82.6	77.7	85.2
Rural	67.6	72.7	66.0	64.2	67.1	64.8	59.7	66.5
Region								
Khartoum	86.5	93.1	92.7	92.5	91.9	90.8	86.6	91.4
Northern	(90.9)	92.6	83.5	97.0	98.8	94.0	77.8	91.1
Eastern	58.5	64.5	60.2	50.5	59.6	52.3	47.5	57.7
Central	71.4	76.9	81.7	75.9	79.3	74.3	70.2	77.0
Kordofan	75.9	79.1	75.2	71.1	71.6	72.0	66.7	73.2
Darfur	60.9	57.0	46.9	51.4	48.8	47.6	43.5	50.0
Education								
No education	58.2	61.2	57.1	58.3	66.0	64.9	63.3	61.5
Primary incomplete	75.0	82.9	84.5	89.8	87.5	93.9	88.5	86.3
Primary complete	79.0	88.0	89.8	90.7	95.8	(100.0)	(100.0)	88.3
Junior secondary	91.5	92.8	93.9	96.6	97.1	(100.0)	(100.0)	94.1
Senior secondary+	(100.0)	94.8	98.9	98.0	100.0	(94.7)	(100.0)	97.6
Total	71.6	77.4	73.9	73.2	74.3	72.2	67.0	73.4

Note: Numbers in parentheses are based on fewer than 20 cases.

CHAPTER 5

NUPTIALITY AND EXPOSURE TO THE RISK OF PREGNANCY

5.1 CURRENT MARITAL STATUS

Marriage, divorce, and widowhood are demographic events that influence exposure to pregnancy and thereby affect fertility. The marital composition of a population directly affects the population dynamics. Marriage and fertility are closely linked in northern Sudan because childbearing takes place within the context of marriage. Since marriage is the primary indicator of exposure to the risk of pregnancy, the study of marriage patterns is essential to the understanding of fertility in Sudan

Table 5.1 presents the distribution of all women according to marital status and age. The table shows that at the time of the survey, 40 percent of the women 15-49 years of age had never been married, while 55 percent were currently married, 2 percent were widowed, and the remaining 3 percent were divorced.

Marital status of women 15-49

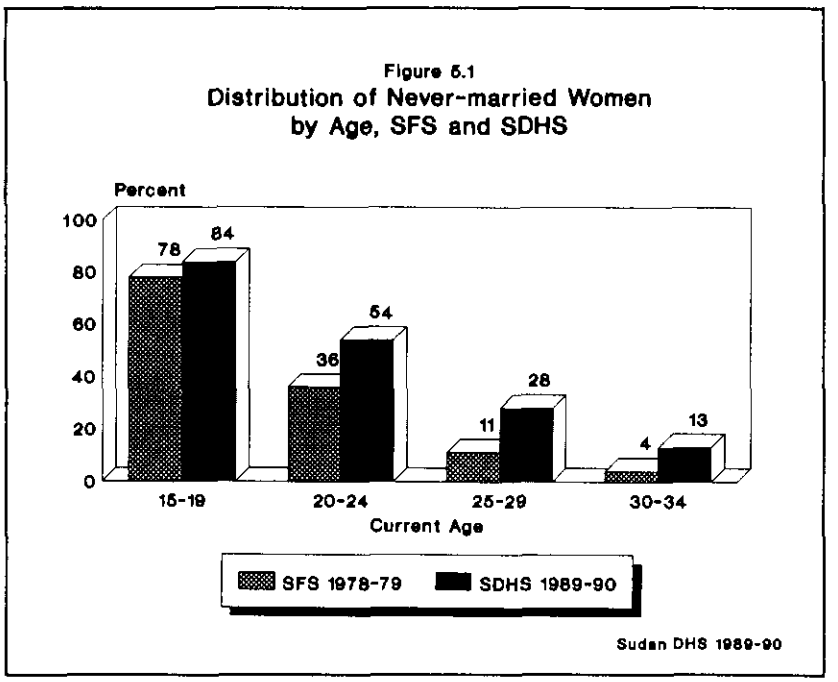
Table 5.1 Percent distribution of all women by current marital status, according to age, Sudan DHS 1989-90, and the percentage of never-married women by age, Sudan Fertility Survey (SFS) 1978-79

	Marital status						
Age	Never married	Currently married	Widowed	Divorced	Total percent	Number of women	Percentage of never-married women SFS 1978-79[a]
15-19	84.1	15.4	0.0	0.5	100.0	2386	78.2
20-24	54.2	43.9	0.2	1.7	100.0	2048	36.4
25-29	27.8	68.0	0.5	3.7	100.0	1878	11.0
30-34	13.2	81.1	1.3	4.5	100.0	1117	4.3
35-39	5.4	86.3	3.6	4.7	100.0	1106	2.0
40-44	3.0	83.6	9.1	4.3	100.0	650	1.5
45-49	1.3	82.8	12.1	3.8	100.0	547	0.8
Total	39.8	55.5	2.0	2.7	100.0	9732	28.1

[a]Sudan (1982) Ministry of National Planning, Department of Statistics, *The Sudan Fertility Survey 1979*, Principal Report, Vol. II, calculated from Table B2 (figures are from the household questionnaire).

Nearly all women in the Sudan marry during their reproductive years. By age 45-49 only one percent of women have never entered into a marital union. The proportion currently married ranges from 15 percent among women 15-19 to 86 percent among those age 35-39, then declines slightly to 83 percent among women 45-49. The proportion widowed increases with age, reaching 12 percent for women age 45-49. Except for the youngest age groups the proportion divorced is 4 to 5 percent. Among ever-married women, 92 percent were currently married, 3 percent widowed, and 5 percent divorced.

Figure 5.1 shows the proportion of never-married women by age group for the Sudan Fertility Survey (SFS) and the SDHS. Overall, the proportion never married increased 12 percentage points between the two surveys (from 28 to 40 percent). As expected, the proportion of never-married women decreases with increasing current age in both surveys. In the SDHS, 84 percent of women age 15-19 were never married, declining to 54 percent among women 20-24 and 28 percent among those 25-29. The corresponding proportions were lower for the same age groups in the SFS, indicating increasing age at first marriage. Compared with the SFS, the proportion of women still single at the time of the SDHS increased slightly among the youngest group (from 78 to 84 percent) and substantially among those in their twenties (from 36 to 54 percent for women 20-24, from 11 to 28 percent for women 25-29).



5.2 POLYGYNY

In order to collect information on the practice of polygyny in the Sudan, all currently married women were asked whether their husbands had other wives. Table 5.2 shows the percentage of currently married women in polygynous unions by age and selected background characteristics. At the time of the survey, one in five currently married women was living in a polygynous union and had at least one co-wife. Four percent of married women had two or more co-wives (not shown in the table).

Younger women were less likely to be in a polygynous unions than older women. The proportion of currently married women who reported that their husbands had other wives increased from 11 percent among women in age group 15-19 to 26 percent among women aged 40-49 years. The prevalence of polygynous unions reported in the SDHS (20 percent) was slightly higher than in the SFS (17 percent), which suggests that the practice of polygyny has not declined over the past decade. The difference between the two surveys may be due to sampling design, variations in data collection, or possibly to factors related to the long periods of civil strife and economic hardship.

Polygyny

Table 5.2 Percentage of currently married women in a polygynous union, by age and selected background characteristics, Sudan DHS 1989-90; and percentage of currently married women in a polygynous union, by age, SFS 1978-79

Background characteristic	Current age							Total
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	
Residence								
Urban	9.7	13.9	12.2	16.1	16.9	22.5	23.4	16.0
Rural	12.0	13.0	20.6	28.3	28.5	28.6	27.7	22.6
Region								
Khartoum	4.2	11.4	9.9	16.2	13.5	17.1	24.2	13.5
Northern	0.0	1.9	3.6	11.7	15.4	8.7	19.4	9.3
Eastern	12.7	13.1	9.9	16.5	21.0	30.2	40.0	16.7
Central	8.3	9.2	11.3	18.1	19.7	20.9	20.8	15.0
Kordofan	9.6	19.4	28.2	29.9	25.0	31.0	23.3	25.1
Darfur	27.4	24.0	36.1	42.9	45.4	48.4	34.1	37.9
Education								
No education	13.7	20.2	24.5	31.2	29.1	28.3	27.5	26.4
Primary incomplete	13.6	10.6	14.7	19.7	16.0	18.4	16.4	15.6
Primary complete	11.5	5.6	12.4	8.3	18.2	(20.0)	(0.0)	10.2
Junior secondary	3.6	6.7	6.4	10.5	21.9	(6.7)	(25.0)	8.4
Senior secondary+	(0.0)	9.9	5.6	3.2	0.0	(26.7)	(25.0)	6.5
Total SDHS	11.4	13.3	17.6	23.4	24.3	26.2	26.0	20.2
Total SFS[a]	--->11.1<----		---->16.6<---		-------->21.2[b]<--------			16.8[b]

Note: Figures in parentheses are based on fewer than 20 cases.

[a]Sudan (1982) Ministry of National Planning, Department of Statistics, *The Sudan Fertility Survey 1979*, Principal Report, Vol. I, Table 4.12.
[b]Includes women age 50.

The formation of polygynous unions is influenced by residence pattern. In urban areas 16 percent of currently married women had one or more co-wives, compared with 23 percent in rural areas. The distribution of women by five-year age group, also showed a higher proportions of polygynous unions among rural women than among urban, with the exception of women 20-24.

The regional distribution of women in a polygynous union showed that the highest proportion of polygynous women was in Darfur (38 percent) and the lowest was in the Northern region (9 percent). The Khartoum and Central regions were also low (about 15 percent). These regional variations hold true for all age groups except women 35-39.

There is an inverse relationship between polygyny and education. Polygyny was most prevalent among women with no education (26 percent) and declined to less than 7 percent among women with secondary education. This negative relationship generally holds true for all age groups.

5.3 AGE AT FIRST MARRIAGE

Age at first marriage is an important indicator of exposure to the risk of conception and childbirth, especially in a society in which almost all births occur within marital unions. Table 5.3 gives the percent distribution of women by age at first marriage and the median age at first marriage according to age at the time of the survey. As can be seen from the table, the proportion of women who married before age 15 has declined from one in three women, for those age 35 years or older, to only one in twenty women age 15-19. In addition, more than three-fourths of women currently 40 years and over married before age 20, i.e., more than twice the proportion of those age 20-24 who married by the same age.

Age at first marriage

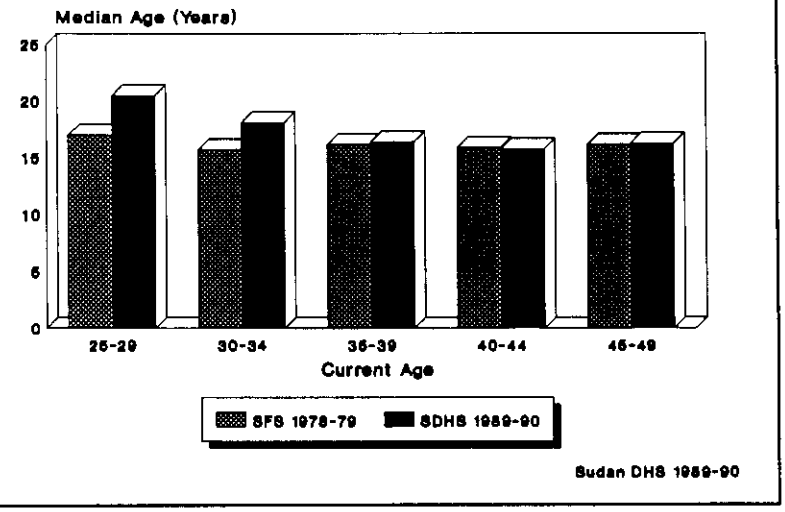
Table 5.3 Percent distribution of all women by age at first marriage and median age at first marriage, by current age, Sudan DHS 1989-90, and median age at first marriage by age, SFS 1978-79

Current age	Never-married[a]	Age at first marriage						Total percent	Number of women	Median age at first marriage[b]	
		<15	15-17	18-19	20-21	22-24	25+			SDHS	SFS
15-19	84.1	4.9	9.0	2.1	0.0	0.0	0.0	100.0	2386	c	c
20-24	54.2	11.5	15.4	9.7	6.5	2.7	0.0	100.0	2048	c	18.6
25-29	27.8	16.3	20.1	10.9	9.8	11.0	4.2	100.0	1878	20.5	17.0
30-34	13.2	26.0	23.6	10.1	10.3	8.4	8.4	100.0	1117	18.1	15.7
35-39	5.4	33.4	27.9	11.7	7.8	6.3	7.6	100.0	1106	16.4	16.2
40-44	3.0	36.9	31.4	9.5	6.8	5.7	6.6	100.0	650	15.8	15.9
45-49	1.3	34.0	30.7	11.9	9.0	7.1	6.0	100.0	547	16.3	16.2
Total	39.8	17.9	19.0	8.4	6.3	5.1	3.4	100.0	9732	c	c

[a]Women who were reported as never-married in the household questionnaire.
[b]Median age at marriage is defined as the exact age by which 50 percent of the women in the age category have experienced marriage.
[c]The median age at marriage for women 15-19 and for women 20-24 in the SDHS have been omitted, since the majority of these women have not yet married; the median for all women is not shown for the same reason.

Table 5.3 also shows that the median age at first marriage has increased substantially: it was about 16 years for women age 35 and over but increased to 18 years for those 30-34 years and to almost 21 years for women 25-29 years of age. The anomaly of a higher median age at marriage for women age 45-49 than for those 40-44 may be due to the inability of many older women, who are also the least educated, to recall their age at marriage, or to the fact that in Africa older women have a tendency to overstate their age at first marriage. Comparable information from the SFS also indicate that age at first marriage is increasing. Figure 5.2 and Table 5.3 show that the median age at marriage was virtually the same in both surveys for women 35 and over, but that it increased by more than two years for women 30-34, and by three and one-half years for women 25-29 years old.

Figure 5.2
Median Age at First Marriage
SFS and SDHS



Differentials in the median age at first marriage according to selected background characteristics of women are examined in Table 5.4. Only women age 25-49 were included in this table because the majority of younger women were unmarried. The table shows that the median age at marriage for urban women (19 years) is two years greater than for rural women (17 years). Although the median age at marriage is the same for urban and rural women in the two older cohorts, the gap between urban and rural women increases substantially for the younger cohorts. It is noteworthy that the median age at marriage for women 25-29 (20.5 years) is higher in Sudan than in any other African country except Tunisia (22.8 years), according to data from the DHS surveys. Comparing the median age at first marriage for women 35-39 and 25-29 in the African countries where DHS surveys have been carried out, it was found that Sudan has experienced the most rapid change in marriage patterns.[1] The increase in the median age at marriage from the older to the younger cohort was 4.1 years (5.7 years in urban areas and 3.0 years in rural areas).

Pronounced regional differentials in age at marriage exist in Sudan. Women in the Khartoum and Northern regions, where the median age at first marriage is 19 and 20 years respectively, marry later than women in other regions. In the Central, Kordofan and Darfur regions, the median age at marriage is about 17 years, while women in the Eastern region marry even earlier, at about 16 years of age.

The median age at marriage is closely related to the level of education. Women with a senior secondary education have the highest median age at marriage, 26 years compared with 16 years for women with no education, an astonishing difference of ten years. As can be seen in Table 5.4, for each age group the median age at marriage increases with the level of education. Thus, the table reflects a strong positive relationship between age at marriage and education. In fact, women with at least senior

[1] Tunisia is the only other country in Africa where the median age at first marriage for age 25-29 (22.8 years) is substantially higher than the median age at first marriage for women 35-39 years (20.6 years).

secondary education have the highest median age at first marriage (26 years) of any African country for which DHS survey data are available.[2]

Differentials in the median age at first marriage

Table 5.4 Median age at first marriage among women 25-49 years old, by current age and selected background characteristics, Sudan DHS 1989-90

Background characteristic	Current age 25-29	30-34	35-39	40-44	45-49	Total
Residence						
Urban	23.2	20.0	17.5	15.8	16.3	19.1
Rural	19.0	16.8	16.0	15.8	16.3	17.1
Region						
Khartoum	23.0	19.9	17.4	16.1	16.5	19.1
Northern	23.5	19.8	17.8	18.5	17.5	19.9
Eastern	18.5	16.0	15.2	15.3	15.0	16.4
Central	20.5	17.0	16.2	15.5	15.4	17.5
Kordofan	20.6	18.6	15.8	15.5	16.5	17.4
Darfur	18.2	17.2	16.7	16.5	16.9	17.2
Education						
No education	17.3	16.1	15.8	15.6	16.0	16.2
Primary incomplete	19.0	17.9	17.1	16.4	17.3	17.7
Primary complete	20.2	19.8	21.9	a	a	20.1
Junior secondary	26.7	20.9	20.3	a	a	22.9
Senior secondary+	27.3	27.0	24.1	a	a	26.4
Total	20.5	18.1	16.4	15.8	16.3	17.8

[a]Fewer than 20 cases.

5.4 BREASTFEEDING, POSTPARTUM AMENORRHOEA, AND ABSTINENCE

In addition to marriage patterns, there are several other factors that affect exposure to the risk of pregnancy, such as breastfeeding, amenorrhoea, and postpartum sexual abstinence. The duration of amenorrhoea (the period following a birth before the return of the menstrual cycle) is directly related to breastfeeding; that is, the longer (and more frequently) a woman breastfeeds, the longer she is likely to remain amenorrhoeic.

Table 5.5 presents the percentages of births in the last three years whose mothers are still breastfeeding, amenorrhoeic, and abstaining by the number of months since birth. It is clear from the table that breastfeeding is a common practice among Sudanese women. Over 90 percent of births were

[2] Burundi, Nigeria (Ondo State), Senegal, Sudan, Togo, and Zimbabwe in sub-Saharan Africa; and Egypt, Morocco, and Tunisia in North Africa.

still being breastfed 10-11 months after delivery and 40 percent of babies were still breastfed at 20-21 months. After that, breastfeeding diminishes rapidly and only 16 percent of children were still being breastfed 24-25 months after birth,.

Breastfeeding and exposure to the risk of pregnancy

Table 5.5 Percentage of births whose mothers are still breastfeeding, postpartum amenorrhoeic, abstaining, and insusceptible, by number of months since birth, Sudan DHS 1989-90

Months since birth	Breast-feeding	Amenor-rhoeic	Abstaining	Insus-ceptible[1]	Number of births
Less than 2	92.9	95.2	89.6	96.7	269
2-3	93.1	80.7	32.1	84.3	274
4-5	93.1	77.5	15.6	79.8	218
6-7	90.1	68.5	10.8	69.8	222
8-9	91.6	66.4	10.2	70.4	226
10-11	93.1	65.5	6.9	68.4	174
12-13	79.3	47.8	5.2	50.0	270
14-15	67.1	33.3	4.1	35.2	219
16-17	61.5	32.5	2.0	33.0	200
18-19	51.0	25.8	6.2	28.4	194
20-21	41.2	22.2	8.2	27.3	194
22-23	38.4	23.8	5.5	27.4	164
24-25	16.1	6.9	1.5	8.0	261
26-27	9.2	4.4	3.9	8.3	206
28-29	9.4	5.2	3.1	7.8	192
30-31	5.8	3.7	1.6	5.3	189
32-33	10.4	6.4	2.8	9.2	249
34-35	8.5	4.3	0.4	4.7	235
Total	54.1	38.7	13.0	41.1	3956

Note: Includes births 0-35 months preceding the survey.

More than 80 percent of Sudanese women were amenorrhoeic for at least two months after birth; 66 percent of women were still amenorrhoeic 10-11 months after giving birth. The duration of amenorrhoea follows a pattern similar to that for duration of breastfeeding; however, the proportion of women who were amenorrhoeic decreased faster than the proportion of women who were still breastfeeding, reaching 7 percent 24-25 months after birth, compared with 16 percent among breastfeeding women.

In Sudan, as in other Islamic societies, women observe a period of sexual abstinence following childbirth. Traditionally, the period of postpartum abstinence lasts forty days; a celebration is held to mark the end of the period. Table 5.5 shows that the proportion of women still abstaining declines sharply in the months following childbirth, from 90 percent less than two months following the birth to 32 percent two to three months after the birth, and 5 percent one year after the birth. This is a much sharper decline than for women still breastfeeding or still postpartum amenorrhoeic.

The proportion of women who are insusceptible to pregnancy due to either amenorrhoea or the practice of postpartum abstinence is given in Table 5.5. The results show that one year after giving birth, 50 percent of the women are still insusceptible.

Table 5.6 presents the mean number of months[3] of breastfeeding, postpartum amenorrhoea, postpartum abstinence and insusceptibility by selected background characteristics of the mother. As can be seen from the table, the average duration of breastfeeding is slightly more than 19 months; the average for amenorrhoea is 14 months, and for postpartum abstinence 5 months. The mean duration of insusceptibility is 15 months.

Differentials in breastfeeding and in exposure to the risk of pregnancy

Table 5.6 Mean number of months of breastfeeding, postpartum amenorrhoea, postpartum abstinence, and postpartum insusceptibility, by selected background characteristics, Sudan DHS 1989-90

Background characteristic	Breast-feeding	Postpartum amenorrhoea	Postpartum abstinence	Postpartum insusceptibility[1]
Age				
15-29	19.3	13.5	5.4	14.8
30-49	19.8	14.5	4.5	15.7
Residence				
Urban	17.5	10.9	5.6	12.7
Rural	20.6	15.6	4.7	16.5
Region				
Khartoum	15.9	9.0	5.1	11.0
Northern	19.6	12.5	5.8	14.4
Eastern	19.9	13.1	5.8	14.4
Central	20.4	14.5	4.1	15.2
Kordofan	19.6	14.9	5.6	16.3
Darfur	21.5	18.2	5.0	18.9
Education				
No education	20.0	16.0	5.0	17.0
Primary incomplete	19.7	13.0	4.9	14.3
Primary complete	18.2	11.7	5.1	13.7
Junior secondary	18.9	10.0	5.0	11.7
Senior secondary+	17.8	8.8	5.6	10.1
Total	19.5	13.9	5.0	15.2

Note: Includes births 1-36 months before the survey. Estimates are based on prevalence/incidence method (see footnote 3 this page).

[1]Either amenorrhoeic or abstaining at the time of the survey.

[3] Estimates of mean duration are calculated using the prevalence/incidence method. The duration of breastfeeding, for example, is defined as the prevalence (number of children whose mothers are breastfeeding at the time of the survey) divided by the incidence (average number of births per month over the last 36 months).

There is no indication of a decline in breastfeeding among younger mothers; women under 30 years and those over 30 years breastfeed their children for almost the same length of time (Figure 5.3). Younger women are amenorrhoeic one month less than older women, but they abstain one month longer than older women. Older women seem to be insusceptible slightly longer (16 months) than younger women (15 months).

Differentials by place of residence (Figure 5.3 and Table 5.6) show that rural women have longer mean durations of breastfeeding and amenorrhoea than urban women, with differences of three months and five months, respectively. As a result, rural women have a longer period of insusceptibility to pregnancy, 17 months compared with 13 months for urban women. On the other hand, the mean duration of postpartum abstinence is slightly shorter among rural women than urban. Differentials in breastfeeding and amenorrhoea in Table 5.6 show that, while women in the Khartoum region have the shortest average duration of breastfeeding (16 months) and amenorrhoea (9 months), women in the Darfur region have the longest durations of breastfeeding (22 months) and amenorrhoea (18 months). In the other regions, the mean duration of breastfeeding is 20 months, while the duration of amenorrhoea varies between 13 and 15 months. Postpartum abstinence is shorter among women in the Central region (4 months) than among women in the Darfur and Khartoum regions (5 months) and other regions (around 6 months).

Figure 5.3
Mean Duration of Breastfeeding, Amenorrhoea and Postpartum Abstinence

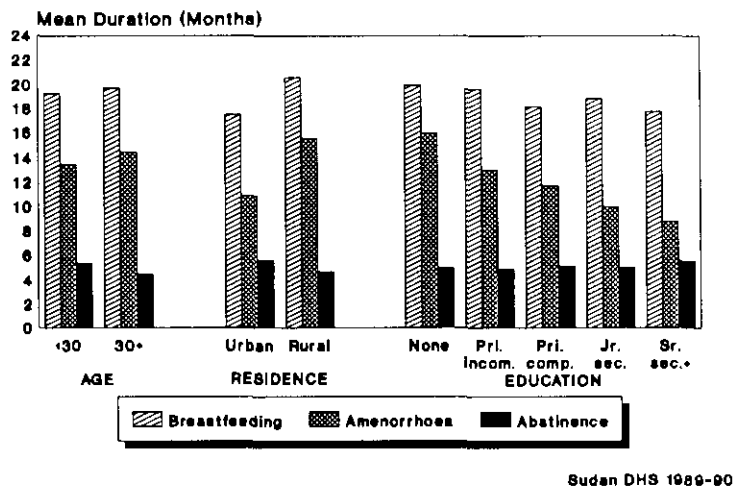


Table 5.6 shows an inverse relationship between education and the mean duration of breastfeeding, amenorrhoea and insusceptibility. This may be explained by the fact that better educated women are more likely to participate in the labour force which makes breastfeeding more difficult. There are only minor differences in the duration of postpartum abstinence by education level.

CHAPTER 6

FERTILITY PREFERENCES

Insight into the fertility desires in a population is important, both for predicting future fertility and estimating the potential unmet need for family planning. In this chapter, data on the desire for additional children, preferred birth intervals, ideal family size, mistimed and unwanted pregnancies and the potential need for family planning are examined.

The SDHS questionnaire included a number of questions to ascertain fertility preferences. Only currently married women were asked the question, "Would you like to have a (another) child or would you prefer not to have any (more) children?" The words in parentheses were used for women who had already given birth. For pregnant women, the question was prefixed by the wording, "After the child you are expecting, . . . " Women who wanted additional children were then asked how long they would like to wait before the birth of their next child.

All ever-married women were asked how many children they would want to have if they could go back to the time when they did not have any children and choose the exact number to have in their whole life. This is called "ideal family size." Finally, women who had a birth in the five years before the survey were asked whether at the time they got pregnant with their last child, they had wanted to have that child then, later, or not at all. In interpreting the results, it should be remembered that women may tend to rationalize the births they already have and, consequently, may be reluctant to state a number that is less than their achieved family size or to report mistimed or unwanted births in the past.

Interpretation of data on fertility preferences has long been the subject of controversy. Survey questions have been criticized on the grounds that answers are misleading because: (a) they may reflect unformed, ephemeral views, which are held with weak intensity and little conviction; and (b) they may not take into account the effect of social pressures or the attitudes of other family members, particularly the husband, who may exert a considerable influence over reproductive decisions. The first objection has greater force in low contraceptive prevalence countries such as Sudan, where the idea of being able to control one's fertility is limited. The second objection may be correct in theory; however, in practice, its importance is doubtful. For instance, the evidence from surveys in which both husbands and wives are interviewed suggests that there is no substantial difference between the views of the two sexes. Considering the low contraceptive prevalence rate in Sudan, caution should be exercised in the interpreting the SDHS findings on fertility preferences.

6.1 DESIRE FOR CHILDREN

Fertility Intentions by Current Family Size

Table 6.1 shows future reproductive intentions among currently married women by the number of living children (including a current pregnancy). As shown in the table and in Figure 6.1, one of three currently married women wants to have a child within two years. Thirty-two percent would like to postpone the next birth for two or more years. About 25 percent of currently married women say that they do not want any more children, while 8 percent are undecided and about 2 percent believe they cannot have any more children (i.e., they are infecund). Thus, about 57 percent of all currently married women can be considered potential users of contraception for the purpose of either spacing births or limiting family size.

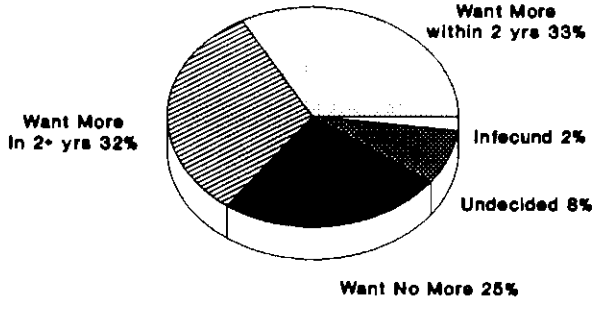
Future reproductive intentions according to number of living children

Table 6.1 Percent distribution of currently married women by desire for future children, according to number of living children, Sudan DHS 1989-90

Desire for more children	Number of living children[1]							Total
	None	1	2	3	4	5	6+	
Want no more	0.7	3.3	10.9	16.2	23.3	36.5	49.3	24.9
Want more children								
After 2 or more years	7.3	53.0	48.6	40.4	33.1	30.0	16.3	31.9
Within 2 years	85.1	38.0	34.3	34.8	33.2	23.1	18.7	33.1
Unsure about timing	5.0	2.0	0.3	0.1	0.2	0.4	0.3	0.9
Undecided	1.2	3.7	5.0	7.4	8.7	9.0	11.5	7.5
Declared infecund	0.7	0.0	0.8	1.2	1.6	1.1	3.7	1.7
Missing	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1
Total percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of women	423	810	740	679	623	554	1571	5400

[1]Includes current pregnancy.

Figure 6.1
Fertility Preferences among
Currently Married Women 15-49

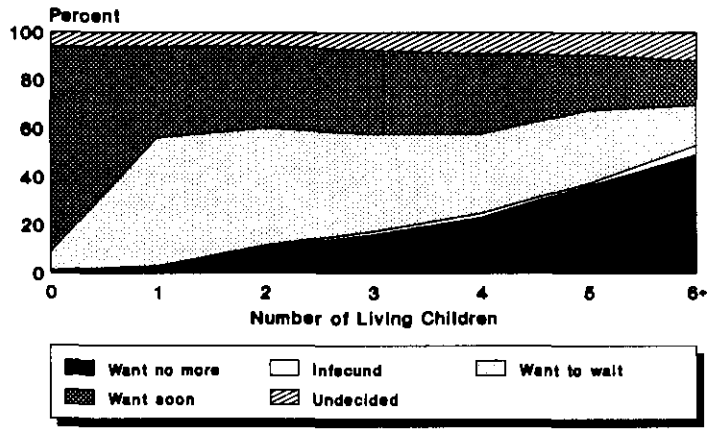


Note: Undecided includes those who want more but are unsure about timing (1%).

Sudan DHS 1989-90

The proportion of currently married women who want to stop childbearing rises with the number of living children, from less than 1 percent of childless women, to one-quarter of those with four children, to one-half of women with six or more children (see Figure 6.2). In terms of the proportion of women who want no more children, when Sudan is compared with other African countries in which DHS surveys were carried out, it is about in the middle.

Figure 6.2
Fertility Preferences among Currently Married Women 15-49 by Number of Living Children



For those who want to space (i.e., those who want another child after two years or more), the pattern is different. Seven percent of childless women want to wait at least two years to have their first child, compared with 53 percent of those with one child. Thereafter, the proportion of women who want to space declines steadily to a low of 16 percent among women with six or more children.

The desire to have a child soon, that is, within two years of the time of the interview, also declines as the number of children increases. For example, while 38 percent of women with one child want to have another child soon, the proportion decreases slightly to 33 percent of women with four children, then drops sharply to 23 percent for women with five children. The proportion of mothers with at least six children who want to have another child soon (19 percent) is half that of mothers with one child.

The findings presented in Table 6.1 indicate there is a strong desire for children in Sudanese society; even among women with six or more children, more than one-third (35 percent) still want to have more children. On the other hand, spacing of children is also strongly desired, even among women with only one or two children. Around half of mothers with one or two children want to wait at least two years for the next child.

Reproductive Intentions by Age

Table 6.2 presents the percent distribution of currently married women by future reproductive intentions according to age. The proportion of women who want no more children is only 3 percent in the youngest age group, but increases to 15 percent among those in age group 25-29. It is interesting to note that the proportion of women who express the desire to cease childbearing increases approximately 10 percentage points with each succeeding age group, reaching 55 percent for women in age group 45-49.

Future reproductive intentions according to age

Table 6.2 Percent distribution of currently married women by desire for future children, according to age, Sudan DHS 1989-90

Desire for more children	Age							
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	Total
Want no more	3.0	7.9	15.3	24.0	36.3	46.0	55.4	24.9
Want more children								
After 2 or more years	47.1	49.7	42.8	34.2	17.8	9.9	4.9	31.9
Within 2 years	41.1	36.1	34.5	31.3	32.9	29.8	24.5	33.1
Unsure about timing	4.4	1.4	0.4	0.8	0.2	0.4	0.7	0.9
Undecided	4.1	4.9	6.8	8.2	11.4	9.4	6.0	7.5
Declared infecund	0.3	0.0	0.2	1.4	1.4	4.4	8.2	1.7
Missing	0.0	0.0	0.0	0.1	0.0	0.0	0.4	0.1
Total percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of women	367	900	1276	906	955	543	453	5400

The pattern is different for women who want to wait two or more years to have another child. With the exception of the first age-group (15-19), the proportion of women wanting another child after two or more years declines sharply with age. Almost half of the women age 20-24 want to wait two or more years for their next child, compared with one-third of those age 30-34. Among women age 45-49 only 5 percent want to postpone their next birth.

The desire for additional children within two years declines as the woman's age increases (see Table 6.2). This is because younger women are likely to have fewer children, while the older women have many. The desire for another child within the next two years is greatest among women in their teens, 41 percent of whom want to have a child soon; desire is lowest among those age 45-49 (25 percent). The proportion of women who declared themselves infecund is very low in the age groups under 30 (0.3 percent or less); however, it increases to 8.2 percent among women age 45-49.

Other Differentials in Reproductive Intentions

Table 6.3 shows the percentage of currently married women who want no more children by the number of living children they already have, according to urban-rural residence, region of residence and education. A substantial difference can be observed in the reproductive intentions of urban and rural women; 30 percent of urban women do not want to have another child, compared with 22 percent of rural dwellers. This is true despite the fact that rural women already have more children than urban women (see Table 3.1). The desire for smaller families among urban women can be seen by the fact that, among those with six or more children, 60 percent want no more children, while only 43 percent of rural women desire to stop with that family size.

Desire to limit childbearing

Table 6.3 Percentage of currently married women who want no more children by number of living children and selected background characteristics, Sudan DHS 1989-90

Want no more children	Number of living children[1]							
	None	1	2	3	4	5	6+	Total
Residence								
Urban	0.6	1.7	14.3	22.2	30.7	44.4	60.3	30.4
Rural	0.8	4.3	9.1	13.0	18.5	31.7	43.2	21.7
Region								
Khartoum	0.8	3.9	21.3	23.2	39.2	49.6	66.3	32.8
Northern	3.3	3.8	9.5	27.5	29.8	62.2	66.0	34.8
Eastern	0.0	8.2	9.7	12.5	14.8	24.2	39.3	17.5
Central	0.0	0.5	9.2	11.7	19.0	32.5	46.0	23.0
Kordofan	2.0	4.5	7.6	22.0	24.1	29.4	50.7	27.9
Darfur	0.0	2.4	5.7	8.1	14.4	29.3	34.7	16.6
Education								
No education	1.2	5.3	9.2	12.6	17.2	31.4	44.6	25.1
Primary incomplete	0.0	4.4	11.9	22.5	27.4	36.9	60.7	31.9
Primary complete	0.0	1.1	7.3	12.1	29.8	55.6	54.8	16.0
Junior secondary	0.0	1.0	12.3	16.4	34.1	48.1	74.3	18.3
Senior secondary+	1.4	0.7	19.8	29.2	50.0	83.3	81.3	19.3
Total	0.7	3.3	10.9	16.2	23.3	36.5	49.3	24.9

[1]Includes current pregnancy.

An examination of regional differences reveals that the percentage of women who want no more children is highest in the Northern region (35 percent) and Khartoum (33 percent); it is lowest in the Darfur and Eastern regions (about 17 percent). The Central (23 percent) and Kordofan (28 percent) regions fall in the middle. This pattern generally holds true regardless of the number of living children.

For women with three children or less, there is no consistent relationship between mother's level of education and the desire to limit family size. However, among women with four or more children,

there is generally a positive relationship between education and desire to limit children, that is, women with higher levels of education are more likely to say that they want to stop having children.

6.2 IDEAL FAMILY SIZE

In order to obtain greater insight into fertility preferences among Sudanese women, all ever-married women, irrespective of their current family size, were asked a hypothetical question about the number of children they would choose to have if they could start their reproductive years again. Those who gave non-numeric responses were not forced to give an exact number. Table 6.4 presents the distribution of ever-married women by ideal number of children, according to the actual number of living

Ideal number of children

Table 6.4 Percent distribution of ever-married women by ideal number of children and mean ideal number of children for ever-married and currently married women, according to number of living children, Sudan DHS 1989-90

Ideal number of children	Number of living children[1]							
	None	1	2	3	4	5	6+	Total
0	0.4	0.2	0.5	0.1	0.4	0.0	0.2	0.3
1	0.8	0.8	0.6	0.3	0.3	0.0	0.1	0.4
2	5.0	5.7	5.6	2.4	3.9	4.1	2.1	3.8
3	9.6	8.0	5.3	6.5	1.9	3.2	1.9	4.7
4	18.6	20.1	18.1	12.6	13.7	6.1	5.6	12.5
5	7.8	11.1	8.9	8.7	6.7	7.7	3.3	7.2
6+	22.6	18.9	22.6	24.6	27.5	27.3	24.9	24.0
Non-numeric response	35.1	35.2	38.3	44.8	45.6	51.2	61.9	47.2
As many as God sends	32.1	30.3	33.6	39.1	41.0	44.4	55.0	41.6
Dont care	0.4	0.9	0.9	0.9	1.2	0.7	1.0	0.9
Dont know	2.6	3.7	3.6	4.6	3.1	6.1	5.7	4.4
Other	0.0	0.2	0.2	0.1	0.3	0.0	0.2	0.2
Missing	0.0	0.0	0.1	0.0	0.0	0.3	0.2	0.1
Total percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of ever-married women	499	899	807	739	673	586	1657	5860
Ever-married women[2]								
Mean	5.1	4.9	5.5	5.7	5.8	6.5	7.2	5.8
Number of women	324	583	497	408	366	284	628	3090
Currently married women[2]								
Mean	5.0	4.8	5.6	5.8	5.8	6.5	7.2	5.9
Number of women	280	525	456	378	338	273	605	2855

[1]Includes current pregnancy.
[2]Excludes women giving non-numeric responses.

children (including current pregnancy). It should be noted that almost half of the respondents (47 percent) gave a non-numeric response to the hypothetical question on ideal family size. This failure to specify an ideal family size suggests either an absence of conscious consideration about family size, or a strong fatalistic belief that family size is determined by God. Interestingly, currently married women who were undecided about their future reproductive intentions and those who wanted to have more children but were not sure about the timing, were most likely to give non-numeric responses, 76 percent and 65 percent, respectively (not shown in the table). The overall proportion of non-numeric answers was higher in Sudan than in any other DHS survey. Only women who gave a numeric response are represented in the following discussion.

Large families are much desired in Sudan. Twenty-four percent of all women interviewed (45 percent of those who gave numeric responses) consider six or more children to be the ideal family size; 13 percent think the ideal number of children is four. Overall, less than 10 percent of the women interviewed consider the ideal family size to be three children or less.

The mean ideal family size based on numeric responses is 5.8 for ever-married women and 5.9 for currently married women. Ideal family size tends to increase with family size, which may reflect the fact that women who want more children actually end up having them, or that some women with large families find it difficult to admit that ideally they would like to have had fewer children. It is also possible that desired family size is declining and that younger women who are just starting their families actually want fewer children than their mothers.

Table 6.5 shows the mean ideal number of children for ever-married women by age group and selected background characteristics. The table also shows the proportion of women who gave non-numeric answer by age group (last row) and by background characteristics (last column). It should be noted that level of education is inversely related to the likelihood of a non-numeric response being given. Uneducated women are more likely to give a non-numeric responses (61 percent) than those who have attended school (38 percent of women with primary incomplete schooling; 12 percent of those with senior secondary education). Older women prefer larger families than younger women. The mean ideal number of children steadily increases from 5.0 for women age 15-19 years to 7.4 for women age 45-49, although almost 60 percent of women over 40 did not give a numeric response. If younger women have only the number of children they desire, fertility rates will decline in the future.

The mean ideal number of children for rural women (6.3) is one child greater than for urban women (5.3). In all age groups, rural women desire larger families than urban women, with the differences being increasingly more pronounced at the older ages. Differentials by region are even more striking. In Khartoum and the Northern region, desired family size is about 5 children, while in the Eastern and Central regions it is about 6 and in the Kordofan region it is 6.5. The highest mean ideal number of children is in Darfur, 6.9, which is two children more than the ideal expressed by women in Khartoum.[1] However, it should be pointed out that the mean ideal family size is calculated based on only 30 percent of the women in Darfur, compared with 75 percent of the women in Khartoum who give numeric responses. Regarding education, the mean ideal family size drops sharply from 6.8 for women with no schooling to 5.0 or less for those who have completed primary school. Women with senior secondary education have the smallest ideal family size (4.4). Smaller ideal family size for women with schooling is generally true for each age group, though some means are based on small numbers of cases.

[1] The mean ideal number of children for currently married women in Khartoum (4.9) is almost the same as the mean calculated for husbands (4.7) in a male attitude survey conducted in 1985 (Khalifa, 1988).

Mean ideal number of children, by background characteristics

Table 6.5 Mean ideal number of children for ever-married women by age and background characteristics, Sudan DHS 1989-90

Background characteristic	Age							Total	Percentage of non-numeric respones
	15-19	20-24	25-29	30-34	35-39	40-44	45-49		
Residence									
Urban	4.9	4.5	5.0	5.1	5.6	6.1	6.7	5.3	34.1
Rural	5.1	5.6	6.1	6.4	7.1	7.9	8.0	6.3	54.1
Region									
Khartoum	4.4	4.1	4.7	4.7	5.4	6.0	6.3	4.9	25.3
Northern	(5.2)	4.9	5.1	5.1	5.4	(4.9)	(7.3)	5.3	48.0
Eastern	5.2	5.7	5.5	5.8	6.9	7.0	(6.3)	5.9	51.3
Central	4.8	5.4	6.0	6.3	6.9	8.1	8.5	6.2	46.0
Kordofan	4.9	5.8	5.9	7.1	7.1	7.6	8.6	6.5	51.2
Darfur	6.9	6.2	6.8	6.3	7.3	6.9	8.3	6.9	68.6
Education									
No education	5.7	6.3	6.5	6.8	7.1	7.4	7.6	6.8	61.1
Primary incomplete	5.1	5.0	5.5	5.4	6.0	6.9	6.4	5.7	37.7
Primary complete	4.5	4.9	5.4	5.0	(5.1)	(4.4)	(8.5)	5.0	26.4
Junior secondary	4.4	4.6	5.0	5.2	5.6	(5.7)	(7.0)	4.9	18.3
Senior secondary+	(4.7)	4.1	4.4	4.2	4.5	(4.9)	(6.5)	4.4	11.8
Total	5.0	5.2	5.6	5.7	6.4	6.9	7.4	5.8	47.1
Percentage of non-numeric responses	43.4	34.1	41.3	46.2	54.2	60.8	59.1	47.1	

Note: Women who gave non-numeric responses were excluded from the calculation of the means. Figures in parentheses are based on fewer than 20 cases.

It should be noted that Sudan is one of the few DHS countries in which ideal family sizes is greater than the total fertility rate (see Chapter 3). This discrepancy may have been caused by a number of factors including increasing age at first marriage, the difficult economic situation in the country, and the absence of men for long periods of time to work in Saudi Arabia and the Gulf states.

6.3 FERTILITY PLANNING

Table 6.6 summarizes the planning status of births in the twelve months preceding the survey: whether the birth was wanted then, wanted later, or not wanted at all. Overall, slightly less than three-quarters (74 percent) of births in the last 12 months were wanted at the time they occurred, while 22 percent were wanted later and 4 percent were unwanted. First and second order births were more likely to have been planned (80 percent) than third or higher order births (71 percent). Conversely, only 1 percent of lower order births were unwanted, compared with 6 percent of higher order births.

Planning status of births in the preceding year

Table 6.6 Percent distribution of women who had a birth in the last 12 months by fertility planning status according to birth order, Sudan DHS 1989-90

Planning status of birth	Birth order 1-2	3+	Total
Wanted then	79.9	71.0	74.1
Wanted later	19.3	23.4	22.0
Not wanted	0.6	5.5	3.8
Not classifiable	0.2	0.1	0.1
Total percent	100.0	100.0	100.0

6.4 NEED FOR FAMILY PLANNING

In section 6.1, it was pointed out that more than half of the currently married women in Sudan are potential users of family planning—i.e., they want to space their next child (postpone their next birth for two or more years) or they want to limit births (not have any more children). Since only 9 percent of the currently married women are using a contraceptive method, it is apparent there is substantial unmet need for family planning.

Estimates of unmet need for family planning and total need for family planning are made using a method developed by Charles Westoff (1988). Women who are currently using a family planning method are a measure of the *met need* for family planning. *Unmet need* is derived from the group of fecund women who do not want to have a child soon and who are not using a contraceptive method. Among these women, those who are not pregnant or amenorrhoeic form one segment of unmet need; pregnant or amenorrhoeic women whose last birth was either mistimed or unwanted constitute a second segment of unmet need. The total need for family planning is the sum of the met need for family planning and the unmet need for family planning.

Table 6.7 presents estimates for unmet, met, and total need for family planning services by selected background characteristics. Overall, 29 percent of currently married women have an unmet need for family planning services; 16 percent for birth spacing and 13 percent for limiting births. In addition, 9 percent of currently married women are using a method (met need for family planning), 5 percent for spacing and 4 for limiting births. If all unmet need were satisfied, 38 percent of Sudanese married women would be using a contraceptive method. However, at present only one-fourth of those in need are using a method and the majority (three-fourths) of noncontracepting women say they do not intend to use a contraceptive method in the future (see Chapter 4).

The highest level of unmet need for family planning, by age, is among women 45-49 (51 percent), the majority of whom want no more children. In contrast, the youngest women have the lowest level of unmet need (18 percent) and are interested primarily in birth spacing. The level of unmet need for family planning varies little between urban and rural women and among women with different levels

of education. However, the percentage of need that is satisfied is much greater in urban areas, especially in Khartoum. Regional differences in unmet need are more marked. In the Darfur and Eastern regions, one-fifth and one-fourth of the women, respectively, are in need of family planning, compared with about one-third of currently married women in other regions.

Unmet need for family planning

Table 6.7 Percentage of currently married women with unmet need for family planning, met need for family planning, and the total need for family planning services, by background characteristics, Sudan DHS 1989-90

Background characteristic	Unmet need for family planning[1]			Met need for family planning (currently using)[2]			Total need for family planning			Percentage of need satisfied
	Want to space	Want to limit	Total	Want to space	Want to limit	Total	Want to space	Want to limit	Total	
Age										
15-19	17.2	1.1	18.3	3.5	0.3	3.8	20.7	1.4	22.1	17.3
20-24	20.7	2.0	22.7	7.1	0.7	7.8	27.8	2.7	30.4	25.5
25-29	21.1	5.0	26.1	5.5	1.6	7.1	26.6	6.6	33.2	21.3
30-34	17.7	9.1	26.7	7.6	4.7	12.4	25.3	13.8	39.1	31.6
35-39	10.9	19.2	30.1	3.8	6.2	9.9	14.7	25.3	40.0	24.9
40-44	7.2	29.3	36.5	2.6	8.8	11.4	9.8	38.1	47.9	23.8
45-49	3.8	47.5	51.2	1.1	4.4	5.5	4.9	51.9	56.7	9.7
Residence										
Urban	16.8	15.3	32.1	9.3	7.6	17.0	26.2	22.9	49.1	34.6
Rural	14.8	12.4	27.1	2.5	1.3	3.9	17.3	13.7	31.0	12.5
Region										
Khartoum	17.0	14.9	31.9	12.2	9.9	22.1	29.2	24.7	54.0	40.9
Northern	19.2	17.0	36.2	6.3	5.8	12.1	25.5	22.7	48.2	25.0
Eastern	15.6	10.9	26.5	2.1	2.3	4.4	17.7	13.1	30.8	14.2
Central	17.4	12.6	30.1	4.9	2.6	7.6	22.4	15.3	37.6	20.1
Kordofan	15.3	16.9	32.2	2.1	1.0	3.0	17.4	17.9	35.3	8.6
Darfur	9.6	10.3	19.9	0.6	0.3	0.9	10.3	10.6	20.8	4.4
Education										
No education	11.9	16.0	27.8	1.5	1.7	3.2	13.4	17.7	31.0	10.3
Primary incomplete	17.2	14.1	31.4	6.0	6.7	12.7	23.3	20.8	44.1	28.8
Primary complete	27.0	5.3	32.4	8.0	3.5	11.5	35.0	8.8	43.9	26.2
Junior secondary	23.7	6.7	30.4	12.6	6.7	19.3	36.3	13.3	49.6	38.8
Senior secondary+	20.2	6.5	26.7	18.4	7.7	26.0	38.6	14.2	52.8	49.3
Total	15.5	13.4	28.9	5.0	3.6	8.7	20.5	17.1	37.6	23.0

[1]Women with unmet need for family planning who want to space births include pregnant and amenorrhoeic women whose last birth was mistimed and women who are neither pregnant nor amenorrhoeic and who are not using any method of family planning and say that they want to wait two or more years. Women with unmet need for family planning who want to limit births include pregnant and amenorrhoeic women whose last child was unwanted and women who are neither pregnant nor amenorrhoeic and are not using any method of family planning and who say they want no more children.
[2]Contraceptive use for the purpose of spacing births includes women who are using a method of family planning and say that they want to wait two years or more for their next child. Contraceptive use for the purpose of limiting births includes women who are using a method of family planning and want no more children.

CHAPTER 7

CHILDHOOD MORTALITY

In countries like Sudan, where vital registration data are lacking or unreliable, sample surveys often represent the only means to establish levels, trends and age patterns in childhood mortality through direct procedures. The birth history data from the 1989-90 Sudan Demographic and Health Survey (coupled with similar data from the 1978-79 Sudan Fertility Survey) now permit analysis of changes in the age-specific mortality rates among Sudanese children over the last decade. This chapter begins with an evaluation of the SDHS data used to calculate rates of childhood mortality. Next, levels and trends in age-specific mortality estimated from the SDHS birth history data are presented and compared with similarly calculated rates from the SFS. Lastly, differentials in childhood mortality for various socio-economic and demographic subgroups are presented.

7.1 CHILDHOOD MORTALITY DATA

All female respondents in the SDHS were asked to provide a complete birth history, including the sex, birth date, survival status, and current age or age at death for each live birth. These data were used to calculate the following direct period estimates of early childhood mortality:

Neonatal mortality rate (NMR) - the probability of dying in the first month of life,
Post-neonatal mortality rate (PMR) - the arithmetic difference between the infant and neonatal mortality rates,
Infant mortality rate (${}_1q_0$) - the probability of dying before the first birthday,
Child mortality rate (${}_4q_1$) - the probability of dying between the first and fifth birthdays, and
Under-five mortality rate (${}_5q_0$) - the probability of dying before the fifth birthday.

7.2 ASSESSMENT OF DATA QUALITY

Rates of childhood mortality are subject to both sampling and non-sampling errors. This section describes the results of some basic checks for various non-sampling errors; namely, underreporting of early childhood deaths (which would result in underestimates of mortality) and misreporting age at death (which may distort the age pattern for under-five mortality).

Conventional wisdom suggests that underreporting of childhood deaths is more likely for those deaths occurring very shortly after birth. In Sudan, children are given names on the seventh day after birth, and it is thought that women may be more reluctant to discuss or even mention children who died before being named (i.e., those dying during the early neonatal period). If early neonatal deaths are selectively underreported, then an abnormally low ratio of deaths under seven days to all neonatal deaths and an abnormally low ratio of neonatal to infant mortality would be observed. If such underreporting is related to the child's sex or time since the interview, then the ratios would be affected in proportion to the extent of the underreporting. The ratios are given in Table 7.1.

The proportion of neonatal deaths reported to have occurred during the first week of life (0-6 days) ranges between 0.65 and 0.77, with no clear trend in the proportion over time or between the sexes. The ratio of neonatal to infant mortality ranges from values of 0.45 to 0.66, with the ratio being slightly lower for both sexes during the periods before 1985 than for the most recent period, 1985-90. While no

Underreporting of early infant deaths

Table 7.1 Indices for detecting underreporting of early infant deaths by sex and calendar period of death, Sudan DHS 1989-90

Index	Calendar period of death		
	1985-90[a]	1980-84	1975-79
Ratio of early neonatal deaths (0-6 days) to all neonatal deaths			
Male	.65	.75	.65
Female	.77	.71	.73
Total	.70	.73	.68
Ratio of neonatal to infant mortality			
Male	.66	.53	.52
Female	.57	.45	.46
Total	.63	.50	.49

[a]Includes deaths and exposure during 1990 up to the month preceding the interview.

model age patterns exist against which to compare these figures, the values of the two ratios are very similar to those computed using the DHS data from other countries at similar levels of childhood mortality (Sullivan et al., 1990).[1] These results show no evidence of severe underreporting of childhood deaths during the fifteen-year period before the SDHS, although the time trend in the ratio of neonatal to infant mortality may point to a slight underreporting of early deaths in the periods before 1985. If so, this would tend to partially mask an actual decline in rates of childhood mortality, especially in neonatal rates.

A problem common to most retrospective surveys of this sort is heaping at 12 months (reported age at death). Table 7.2 shows that such heaping occurred in the SDHS.[2] The deficit of deaths in the 10th and 11th months suggests that some fraction of the deaths reported at 12 months occurred in fact before

[1] Rutstein (1983) calculated a neonatal to under-five mortality ratio of 0.27 from the SFS data, which compares well with the ratio of 0.28 calculated from the SDHS data for the same time period and nearly the same level of under-five mortality.

[2] The level of heaping is of roughly the same magnitude as that found in other DHS surveys carried out in sub-Saharan Africa (Sullivan et al., 1990).

Heaping of reported age at death

Table 7.2 Frequency distribution of deaths at 0-23 months of age by reported month at death and calendar period of death, Sudan DHS 1989-90

Reported month at death	Calendar period of death		
	1985-90[a]	1980-84	1975-79
0	290	272	204
1	16	36	28
2	16	24	21
3	18	25	20
4	22	25	17
5	12	23	13
6	20	24	29
7	19	40	21
8	13	19	20
9	23	35	22
10	5	15	5
11	8	14	5
12	73	110	63
13	6	5	3
14	2	4	3
15	4	10	3
16	6	4	3
17	1	7	1
18	33	39	36
19	3	1	1
20	8	3	7
21	2	1	0
22	1	2	2
23	1	8	1
Total (0-23 months)	602	746	528

[a]Includes deaths during 1990 up to the month preceding the interview.

the first birthday.[3] While the estimates of infant and child mortality presented in this report are not adjusted for heaping, it should be borne in mind that infant mortality may be understated by 3-6 percent and child mortality overstated by 2-7 percent.[4] However, it should also be mentioned that there appears to

[3] It should be noted that for the deaths reported before the second birthday, interviewers were instructed to record the age at death *in months*. Experience with other surveys indicates that many of the deaths reported at "12 months" probably represent actual responses of "one year." One can argue that these deaths are more likely to be drawn from the 12-23 months age segment (post-infant age segment) than from the infant age segment (0-11 months). Any adjustment procedure that involves reassigning deaths from the post-infant to the infant age segment is thus undertaken with a great deal of uncertainty.

[4] These are the results of a simulation of the effects of heaping of age at death at 12 months on estimates of infant and child mortality. The range represents the results obtained using two sets of assumptions described by Sullivan et al. (1990) in a comparative analysis of DHS data quality.

be no marked time trend in the tendency to "heap" age at death at 12 months, indicating that even if mortality *level* estimates are on the whole too low for infant mortality and too high for child mortality, there is no reason to expect that estimates of mortality *trend* (i.e., percent change) will be affected by heaping.

Unreported age at death is another potential problem. However, in only 20 (0.6 percent) of the 3614 deaths reported in the SDHS was age at death not provided. In these cases, age at death was imputed using the hot-deck procedure.[5]

Table 7.3 provides data on the mean number of children ever born, surviving, and dead, and the proportion dead by women's age, which may be used in applying indirect techniques of childhood mortality estimation (United Nations, 1983).

Mean number of children ever born, surviving, and dead

Table 7.3 Mean number of children ever born, surviving and dead, and the proportion dead among children ever born to women 15-49, by age group of women, Sudan DHS 1989-90

Age of women	Mean Number of Children[a]			Proportion dead	Number of ever-married women
	Ever born	Surviving	Dead		
15-19	0.75	0.69	0.06	0.074	380
20-24	1.74	1.55	0.19	0.109	938
25-29	3.02	2.62	0.40	0.132	1355
30-34	4.68	4.00	0.69	0.146	970
35-39	6.29	5.41	0.88	0.139	1047
40-44	7.24	5.98	1.26	0.174	630
45-49	7.62	6.44	1.18	0.155	540
Total	4.40	3.76	0.64	0.145	5860

[a]The means are based on all women (not just those ever married). The figure for all women is determined by dividing the number ever married by the proportion ever-married by age group. This procedure assumes that never-married women have never given birth.

7.3 LEVELS AND TRENDS IN CHILDHOOD MORTALITY

Rates of childhood mortality for three five-year periods prior to the SDHS are shown in Table 7.4. Under-five mortality ($_5q_0$) fell 14 percent from 143 to 123 deaths per thousand births over the 1975-79 to 1985-90 period. Much of this improvement is due to a decline in postneonatal mortality (35 percent), although mortality between ages one and five also dropped (16 percent). Neonatal mortality, on the other hand, has apparently not improved over the period under study and may have increased slightly. However, as noted above, it is possible that neonatal deaths have been underreported for the 1975-79 and

[5] The procedure assigns an age at death equal to that of the last death of the same birth order in the data file.

Infant and child mortality rates by five-year calendar periods

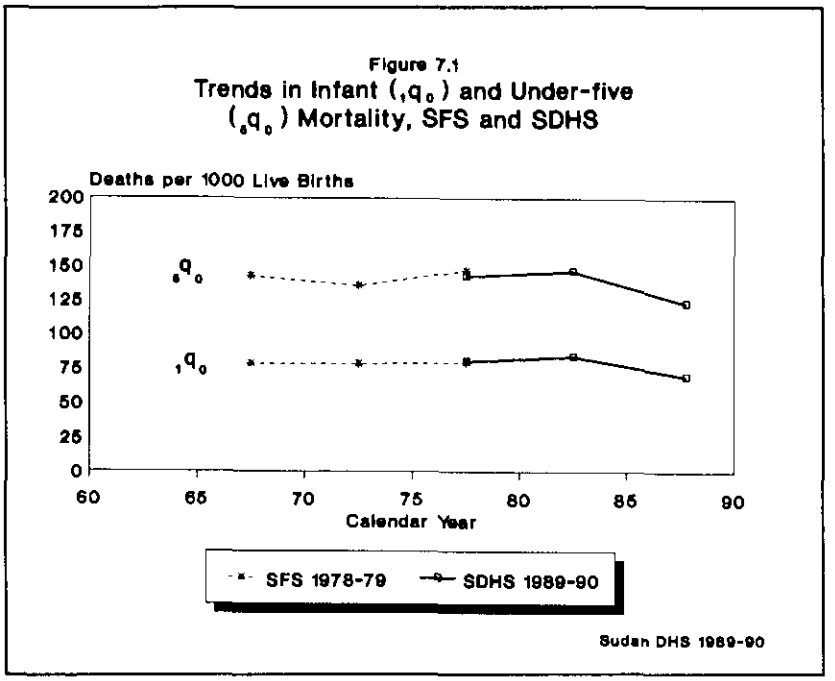
Table 7.4 Infant and child mortality rates by five-year calendar periods, Sudan DHS 1989-90 and Sudan Fertility Survey (SFS) 1978-79

Reference period	Neonatal mortality rate	Post-neonatal mortality rate	Infant mortality rate ($_1q_0$)	Child mortality rate ($_4q_1$)	Under-five mortality rate ($_5q_0$)
1985-1990 (SDHS)[1]	43.7	26.3	69.9	57.4	123.4
1980-1984 (SDHS)	41.7	42.4	84.1	68.5	146.8
1975-1979 (SDHS)	39.5	40.5	80.0	68.5	143.1
1975-79 (SFS)[2]	42.0	37.3	79.4	73.8	147.3
1970-74 (SFS)	43.8	34.5	78.3	62.5	135.9
1965-69 (SFS)	48.1	30.4	78.5	69.8	142.8
Percent change					
Between SDHS periods 1975-80 to 1985-90	+10.6	-35.1	-12.6	-16.2	-13.8
Between SFS 1975-79 and SDHS 1985-90	+ 4.0	-29.5	-12.0	-22.2	-16.2

[1]Includes calendar year 1990 up to the month preceding date of interview.
[2]SFS figures are taken from Rutstein (1983).

1980-84 periods, in which case the estimated increase in neonatal mortality (11 percent) may not be real and the observed decline between 1975-79 and 1985-90 in infant and under-five mortality may be slightly underestimated. The mortality decline at all ages seems to have been recent—that is, the SDHS rates are about the same for 1975-79 and 1980-84 and begin to fall only after the 1980-84 period.

Also shown in Table 7.4 are estimates of childhood mortality from the 1978-1979 SFS. The SFS estimates for the period 1975-79 are remarkably similar at all ages to the SDHS estimates for the same period. This suggests that the SDHS mortality data are of high quality and further supports the finding of a 14-16 percent fall in under-five mortality over the decade, 1975-79 with 1985-90. This corresponds to an annual rate of decline of about 1.5 percent, compared with 2.0 percent for sub-Saharan Africa, 3.1 percent for Asia, 3.6 percent for the Middle East, and 4.0 percent for Latin America, according to a recent analysis of global trends in childhood mortality over the 1980-85 period (Hill and Pebley, 1989). Figure 7.1 underscores the fact that little improvement in child survival had occurred in Sudan until the small, but encouraging, decline in mortality seen in the latter half of the 1980s. Whether such improvement in child survival can be extended and accelerated into the next decade remains to be seen.



7.4 DIFFERENTIALS IN CHILDHOOD MORTALITY

This section presents the differentials in childhood mortality according to socioeconomic and demographic characteristics of mothers and children. Mortality rates are calculated for the ten-year period, 1980-90, so that the rates for each population subgroup are based on an adequate number of events.

In Table 7.5, mortality rates are shown by urban-rural residence, region of residence, and level of mother's education. Under-five mortality ($_5q_0$) is 19 percent lower in urban Sudan (117 per 1000 births) than in the rural setting (144 per 1000 births). This urban-rural differential is explained in large part by the urban-rural difference in child mortality (35 percent).

Regional differentials in childhood mortality are large in Sudan. Under-five mortality is lowest in Khartoum (108 per 1000 births) and highest in the Darfur (161 per 1000 births) and Eastern (179 per 1000 births) regions. This pattern of regional variation generally holds across all ages, except that in Khartoum, unlike other areas, postneonatal mortality constitutes the larger component of infant mortality. Mortality between ages one and five is most sensitive to regional factors; child mortality ($_4q_1$) is 2.3 times higher in Darfur region and 2.7 times higher in the Eastern region than in the Khartoum region.

Childhood mortality in Sudan is closely related to maternal education. Children of uneducated mothers experience nearly twice the level of under-five mortality as children of women educated to the secondary level or higher. The education advantage is most pronounced when children are one to five years of age. Child mortality ($_4q_1$) is five times greater for children of women with no formal education than for children of women with at least a secondary level of schooling.

Childhood mortality rates by background characteristics

Table 7.5 Childhood mortality rates for the ten-year period preceding the survey, by background characteristics of the mother, Sudan DHS 1989-90

Background characteristic of mother	Neonatal mortality rate	Post-neonatal mortality rate	Infant mortality rate ($_1q_0$)	Child mortality rate ($_4q_1$)	Under-five mortality rate ($_5q_0$)
Residence					
Urban	37.4	36.8	74.1	46.4	117.1
Rural	45.4	33.2	78.6	70.9	143.9
Region					
Khartoum	38.2	39.0	77.3	33.3	108.0
Northern	36.8	33.8	70.6	45.0	112.5
Eastern	53.3	43.5	96.8	90.6	178.6
Central	34.9	27.4	62.3	63.4	121.7
Kordofan	41.0	33.8	74.8	64.4	134.4
Darfur	55.1	35.7	90.8	77.3	161.1
Education					
No education	44.9	37.2	82.1	75.5	151.5
Primary incomplete	40.1	29.6	69.7	42.8	109.5
Primary complete	46.1	28.4	74.5	34.6	106.5
Junior secondary	30.8	30.0	60.8	30.2	89.1
Senior secondary+	35.0	29.8	64.7	14.5	78.3
Total	42.7	34.4	77.1	62.7	134.9

In Table 7.6, differentials in childhood mortality are presented by demographic characteristics of the mother and child. The expected biological effects of sex on age-specific mortality are observed. Neonatal mortality is 39 percent higher among boys than girls; however, mortality after the first month is virtually unaffected by the sex of the child. Thus, there do not appear to be any sex-related differentials in child survival due to child care practices.

Differences in under-five mortality ($_5q_0$) by maternal age at birth and birth order follow the expected pattern: mortality is highest for first births and births to young mothers; it falls for births 2-6 and births to mothers age 20-39; then it rises again for higher order births and births to women 40 and older. The birth order effect is, however, only observed during the neonatal period, during which time first births experience 87 percent higher mortality than second and third order births. The effect of young maternal age is most apparent during the neonatal period and then again after the first birthday.

The pace of childbearing has a powerful effect on the survival chances of Sudanese children. Under-five mortality ($_5q_0$) is 2.7 times higher among children born after an interval of less than two years than among children born after an interval of four years or more. Interestingly, the birth interval effect is marked during all four age segments. This may indicate that the birth interval effect in Sudan is not simply related to maternal depletion and pregnancy outcome (which would be expected to specifically influence early infant mortality), but may also be associated with constraints on breastfeeding and other nutritional inputs, child care, and the use of health services.

Childhood mortality by demographic characteristics

Table 7.6 Childhood mortality by selected demographic characteristics, for the ten-year period preceding the survey, Sudan DHS 1989-90

Demographic characteristic	Neonatal mortality rate	Post-neonatal mortality rate	Infant mortality rate ($_1q_0$)	Child mortality rate ($_4q_1$)	Under-five mortality rate ($_5q_0$)
Sex of the child					
Male	49.6	33.9	83.4	62.2	140.5
Female	35.7	34.9	70.6	63.1	129.3
Maternal age					
<20	52.4	35.0	87.5	79.0	159.6
20-29	39.7	36.1	75.8	61.4	132.5
30-39	43.2	30.2	73.3	53.6	123.0
40-49	41.9	37.8	79.7	65.9	140.4
Birth order					
1	63.3	33.8	97.2	64.3	155.2
2-3	34.0	31.7	65.7	66.6	127.9
4-6	37.0	34.2	71.3	57.6	124.8
7+	45.3	38.2	83.5	63.5	141.8
Birth interval					
<2 years	48.0	46.5	94.5	86.0	172.3
2-3 years	30.2	27.8	58.0	50.2	105.3
4+ years	22.8	14.5	37.4	26.4	62.8
Total	42.7	34.4	77.1	62.7	134.9

In sum, the results of the SDHS indicate that under-five mortality has fallen slowly during the period 1975-79 to 1985-90 from 143 to 123 deaths per thousand births. Much of the decline appears to be due to improved survival after the first month of life. Neonatal mortality did not decline during the same period, but this may be an artifact of underreporting of neonatal deaths before 1985.

Rates of childhood mortality vary markedly across regions of Sudan, with the Darfur and Eastern regions experiencing the highest mortality levels and the Khartoum and Northern regions the lowest. Mother's education and the length of the birth interval also play important roles in childhood survival.

CHAPTER 8

MATERNAL AND CHILD HEALTH

As mentioned earlier, one of the major objectives of the SDHS was to provide information on maternal and child health indicators for Sudan. The survey collected data on the health status of young children (below five years of age) and their mothers. The information collected on maternal health concerned care obtained during pregnancy (antenatal checkup and tetanus toxoid immunisation) and at the time of delivery. Regarding respondent's children under five years of age, the survey included a series of questions on preventive health measures, recent illnesses, and treatment practices. Key topics for child health included: (1) the level of immunisation; (2) the prevalence and treatment of cough and acute respiratory infection; and (3) the prevalence and treatment of diarrhoeal disease. In addition, for all women in the survey, information on knowledge and use of oral rehydration salts (ORS) for treatment of diarrhoea was collected.

8.1 MATERNAL CARE INDICATORS

One of the priorities of the Ministry of Health is the provision of medical care during pregnancy and at delivery, which is essential for the health and survival of both the mother and her infant. The SDHS results provide an evaluation of the utilization of these health services as well as information with which to assess the need for additional services. The data on maternal care indicators were collected by asking mothers for each birth within the last five years if they had seen someone for a checkup before the birth and whether they received a tetanus toxoid (TT) injection. Those who had had antenatal checkups were asked who provided the care, and recipients of TT injections were asked the number of injections received. Respondents were also queried about assistance received at the delivery. In case more than one provider was mentioned for antenatal care or assistance at delivery, the interviewer marked the most qualified provider. In examining the results, it should be kept in mind that some respondents may have recall problems, or may not distinguish between a routine checkup and a visit for a medical problem not related to the pregnancy but occurring during pregnancy. Similarly, a respondent may confuse TT injections with other injections. It should also be noted that failure to receive two doses of TT vaccine during a pregnancy does not necessarily mean that the woman lacks protection against tetanus, since TT inoculation during previous pregnancies may still be effective. The focus in this chapter is on TT coverage not on the proportion having full protection.

Antenatal Care

Table 8.1 shows that for 70 percent of births in the five years before the survey, the mother received at least one antenatal checkup from trained health personnel; 26 percent from doctors and 44 percent from trained health workers (health visitor, assistant health visitor, nurse, or medical assistant) or trained midwives. In addition, 5 percent reported that they had checkups from traditional birth attendants (TBA). In other words, one-fourth of births in Sudan do not receive any antenatal care. There are almost no differentials by age of the mother or by birth order in the proportion of births for which mothers received antenatal care. Neither the proportion receiving antenatal care nor the mix of care providers has substantially changed in the last five years (see months since births), except for a slightly greater tendency for mothers of younger children to have consulted doctors for an antenatal checkup in the last two years before the survey.

Antenatal care

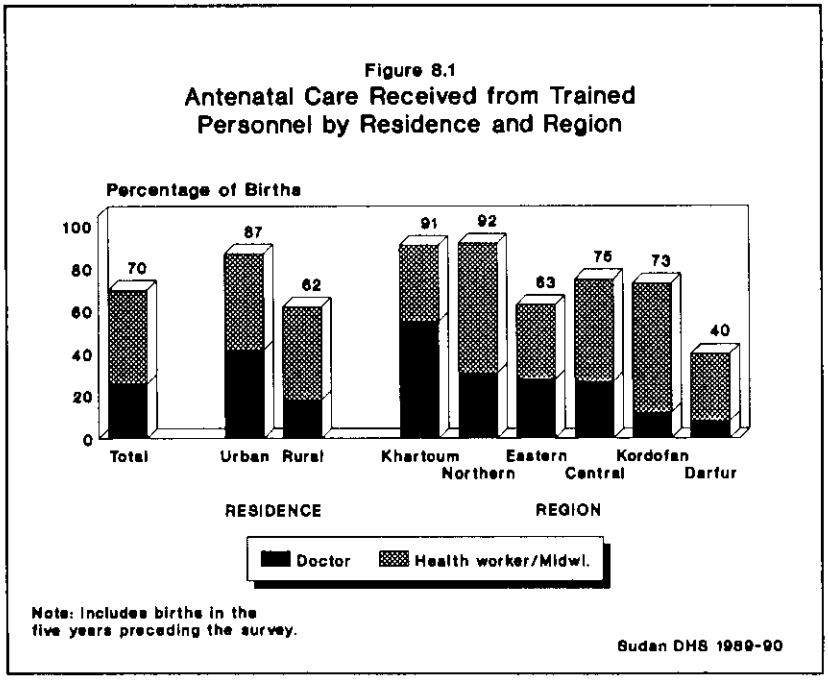
Table 8.1 For all births in the five years preceding the survey, the percentage whose mothers received antenatal care from a doctor, trained health worker/midwife, or traditional birth attendant, by selected background characteristics, Sudan DHS 1989-90

Background characteristic	Antenatal care provider			Number of births
	Doctor	Trained health worker[1]/ midwife	Tradi-tional birth attend.	
Months since birth				
0-11	29.1	42.2	5.6	1383
12-23	29.5	43.8	5.3	1241
24-35	25.6	44.9	5.7	1332
36-59	24.0	45.1	5.1	2688
Age of mother				
15-29	28.2	43.5	5.0	3509
30-49	24.4	45.0	5.8	3135
Residence				
Urban	41.6	45.8	2.9	2277
Rural	18.5	43.3	6.7	4367
Region				
Khartoum	54.6	36.3	2.4	1200
Northern	31.3	61.1	0.2	409
Eastern	28.2	34.5	5.9	799
Central	27.1	48.0	6.6	1868
Kordofan	12.3	61.0	8.7	1109
Darfur	8.3	31.9	4.8	1259
Education of mother				
No education	13.3	43.9	7.2	3820
Primary incomplete	28.9	54.9	4.2	1345
Primary complete	43.7	47.3	3.4	531
Junior secondary	52.9	39.4	1.7	480
Senior secondary+	79.5	17.3	0.0	468
Birth order				
1	38.4	36.3	4.4	1197
2-3	28.4	42.4	6.0	1911
4-5	24.1	47.0	6.0	1438
6+	19.3	48.4	5.0	2098
Total	26.2	44.2	5.4	6644

[1]Includes health visitor, assistant health visitor, nurse, and medical assistant.

There are, however, large differences in antenatal care according to other characteristics. Figure 8.1 shows that almost 90 percent of births in urban areas benefitted from professional antenatal care, compared with 62 percent in rural areas. The proportion of pregnant women seen by a doctor is much higher in urban than in rural areas (42 and 19 percent, respectively), partly due to the fact that physicians are concentrated in urban areas. The percentages seen by a trained health worker/midwife are similar in urban and rural areas. Regional differences are also marked; for over 90 percent of births in Khartoum and the Northern regions, the mother visited either a doctor or a trained health worker/midwife, compared with only 40 percent of births in the Darfur region. The proportion of births receiving antenatal care increases with the level of education of the mother (see Table 8.1). For example, only 57 percent of births to mothers with no education benefitted from an antenatal checkup, compared with over 90 percent of births to mothers with post-primary education. Moreover, the higher the proportion receiving antenatal checkups, the higher the proportion of births in which doctors provided the antenatal care.

Figure 8.1
Antenatal Care Received from Trained Personnel by Residence and Region



Note: Includes births in the five years preceding the survey.

Sudan DHS 1989-90

Tetanus Toxoid Immunisation

Table 8.2 presents the level of tetanus toxoid coverage by selected background characteristics. For almost half the births, the mothers received at least one injection, while for only one-third of the births the mother received two or more TT injections. The total percentage of births for which mothers received at least one TT injection is lower than the percentage of mothers receiving antenatal care (45 vs. 70). The most likely explanation is that the vaccine was not available at the time of the antenatal care, although it is also possible that health workers may have missed opportunities to give TT injections. The proportion of births whose mothers were vaccinated against neonatal tetanus is higher in Sudan than in Egypt (11 percent), Mali (18 percent), Senegal (31 percent), and Tunisia (33 percent), but lower than in eight other African countries for which DHS data are available (Boerma et al., 1990).

Tetanus toxoid immunisation

Table 8.2 For all births in the five years preceding the survey, the percentage whose mothers received tetanus toxoid vaccinations, by selected background characteristics, Sudan DHS 1989-90

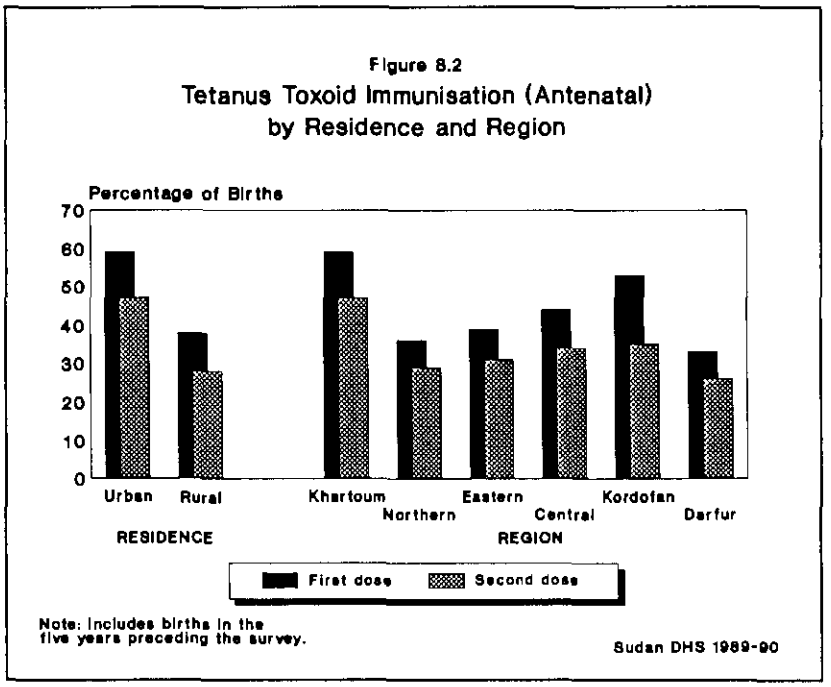
Background characteristic	Received tetanus toxoid vaccine: First dose	Received tetanus toxoid vaccine: Second dose	Number of births
Months since birth			
0-11	58.1	41.7	1383
12-23	55.5	43.2	1241
24-35	46.1	36.4	1332
36-59	32.9	25.6	2688
Age of mother			
15-29	49.5	38.0	3509
30-49	40.0	30.4	3135
Residence			
Urban	58.6	47.4	2277
Rural	37.9	27.6	4367
Region			
Khartoum	58.8	47.2	1200
Northern	35.7	29.1	409
Eastern	39.4	30.8	799
Central	43.8	34.3	1868
Kordofan	52.9	35.3	1109
Darfur	33.2	25.6	1259
Education of mother			
No education	35.5	25.9	3820
Primary incomplete	51.4	40.1	1345
Primary complete	62.9	52.0	531
Junior secondary	65.4	51.7	480
Senior secondary+	63.2	50.0	468
Birth order			
1	52.6	42.9	1197
2-3	45.7	33.3	1911
4-5	46.6	36.0	1438
6+	38.9	29.5	2098
Total	45.0	34.4	6644

Unlike antenatal care, TT coverage has shown rapid improvement in the last two years.[1] Mothers who gave birth in the last two years preceding the survey (0-23 months) were more likely to have received a TT injection to prevent neonatal tetanus than mothers of births occurring earlier. Births

[1] TT coverage may increase in the future because according to decree No. 21 signed by the Government of Sudan on 18 January 1990, the presentation of a vaccination certificate against TT is obligatory before marriage for women of childbearing age (15-49) (Sudanow, 1991).

occurring to younger mothers were also better protected (38 percent with two injections) against tetanus than births to older women (30 percent). The child's birth order and level of mother's education have opposite effects on the likelihood of the mother receiving either the first or second dose of TT vaccine during pregnancy; the higher the level of education, the more likely a mother is to have received full TT immunisation. Figure 8.2 and Table 8.2 show that the proportion of births whose mothers receive two injections is higher in urban (47 percent) than in rural areas (28 per cent). In terms of regional differences, Khartoum has the highest level of antenatal tetanus coverage (almost half of the births were to the mother with two or more TT injections), compared with only one-quarter to one-third of births in other regions. Surprisingly, less than 30 percent of births in the Northern region were fully protected (two TT injections) while over 90 percent of births were reported to have benefitted from an antenatal checkup by a health professional.

Figure 8.2
Tetanus Toxoid Immunisation (Antenatal)
by Residence and Region



Note: Includes births in the five years preceding the survey.

Sudan DHS 1989-90

Assistance at Delivery

Table 8.3 shows that 60 percent of births in the five years before the survey were assisted by trained health workers/midwives at the time of delivery, 9 percent by doctors and 26 percent by traditional birth attendants. The pattern has remained unchanged for births occurring at different periods during the last five years. Urban mothers are more likely to receive professional assistance (from a doctor or trained health worker/midwife) than rural mothers. However, the trained health worker remains the dominant assistant for both urban and rural mothers. As expected, the proportion of births attended by doctors was higher in urban areas (18 percent) and the Khartoum region (26 percent); the proportion of births assisted by TBAs was higher in rural areas (34 percent) and the Darfur region (48 percent). Outside the Khartoum region, less than 8 percent of the deliveries were assisted by doctors. Regarding regional differences, it is notable that in the Northern region almost all deliveries were assisted by professionals (6 percent by doctors and 92 percent by a trained health worker/midwife); by contrast in Darfur, more births were assisted by TBAs than by trained professionals. Educational attainment of the mother affects both the likelihood of receiving assistance at delivery and the quality of that assistance.

Assistance during delivery

Table 8.3 Percent distribution of births in the last five years by type of assistance during delivery according to selected background characteristics, Sudan DHS 1989-90

Background characteristic	Doctor	Trained health worker[1]/ midwife	Tradi-tional birth attend.	Other[2]	No one	Total percent	Number of births
Months since birth							
0-11	9.6	59.8	25.2	1.2	4.2	100.0	1383
12-23	10.2	59.6	25.0	0.9	4.2	100.0	1241
24-35	8.1	60.9	25.2	1.4	4.5	100.0	1332
36-59	7.6	59.5	26.6	1.7	4.5	100.0	2688
Age of mother							
15-29	9.4	60.2	24.5	1.7	4.3	100.0	3509
30-49	7.8	59.5	27.1	1.1	4.5	100.0	3135
Residence							
Urban	18.1	67.8	10.5	1.1	2.4	100.0	2277
Rural	3.6	55.7	33.7	1.6	5.4	100.0	4367
Region							
Khartoum	25.7	62.2	10.2	1.2	0.8	100.0	1200
Northern	6.4	92.2	1.2	0.2	0.0	100.0	409
Eastern	7.6	47.3	34.3	1.7	9.1	100.0	799
Central	6.6	69.6	18.7	0.9	4.1	100.0	1868
Kordofan	3.1	62.3	32.6	0.7	1.4	100.0	1109
Darfur	1.5	38.6	47.5	3.2	9.2	100.0	1259
Education of mother							
No education	3.1	49.5	38.4	1.8	7.3	100.0	3820
Primary incomplete	8.1	78.9	11.5	0.8	0.7	100.0	1345
Primary complete	11.5	76.5	11.3	0.8	0.0	100.0	531
Junior secondary	21.0	71.5	5.6	1.0	0.8	100.0	480
Senior secondary+	38.9	59.6	0.6	0.8	0.0	100.0	468
Total	8.6	59.9	25.7	1.4	4.4	100.0	6644

[1]Includes health visitor, assistant health visitor, nurse, and medical assistant.
[2]Includes missing

For example, mothers with a senior secondary or higher education received professional assistance at delivery for almost all births (40 percent from doctors), while almost 40 percent of the deliveries to women without schooling were attended by TBAs and 7 percent were not assisted at all.

Examining the utilization of professional health care for the last birth that occurred in the five years before the survey, it was found that 62 percent of women were served by health workers; that is, they received at least one TT injection during pregnancy or received an antenatal checkup or intranatal care from professional health workers. One in five urban mothers and almost half of the rural mothers neither received a TT injection nor had contact with a professional health worker for their last birth (not shown in table).

In sum, 70 percent of pregnant women received some antenatal care and 69 percent of deliveries were assisted by a professional health worker. The latter proportion is unusually high considering the level of antenatal care. Comparing health care in urban and rural areas, the proportion of women

receiving antenatal care and the proportion of deliveries assisted by professional health workers are on the same order of magnitude: 87-86 percent in urban areas and 62-59 percent in the rural areas. Overall, doctors are more likely to be involved in the provision of antenatal care than in the provision of delivery care.

8.2 UTILISATION OF CHILD HEALTH SERVICES

The SDHS provides information on a number of indicators of the utilization of child health services. The survey included a series of questions on immunisation coverage and on the prevalence and treatment of diarrhoea, fever, and respiratory illness among children under five. The data in the DHS surveys are restricted to the children of respondents and do not include children whose mothers have died or who were not interviewed for some reason. However, since over 95 percent of the eligible women were successfully interviewed (see Chapter 1), only a small proportion of eligible children were excluded, and this has had little effect on the survey findings.

Immunisation

The Sudan Expanded Programme on Immunisation (EPI) started in 1976; in 1985 national and regional plans were developed to achieve universal child immunisation by 1990. Achieving this goal will help reduce infant and child mortality, since the six vaccine-preventable infectious diseases, considered together, constitute one of the four main killers of children under five years. In spite of difficult conditions in Sudan, the Ministry of Health, WHO and UNICEF have worked hard to achieve the target. The following immunisation schedule has been used nationally:[2]

Age	Immunisation
Birth	BCG
6 weeks	DPT, polio
10 weeks	DPT, polio
14 weeks	DPT, polio
9 months	Measles

In the SDHS, information on the immunisation status of children was obtained in two ways. First, women who had children under five were asked to produce their children's "Road to Health" card.[3] If the card was available, the interviewer copied onto the questionnaire the dates on which the child had received immunisations against the following diseases: tuberculosis (BCG); diphtheria, whooping cough (pertussis) and tetanus (DPT); polio and measles. When a card was not available, the mothers were asked if the child had received specific vaccinations, and the number of doses where relevant. To help mothers recall the vaccination referred to in the question, interviewers indicated with gestures the site and manner of administration of the vaccination. Children reported by their mothers to have been vaccinated with

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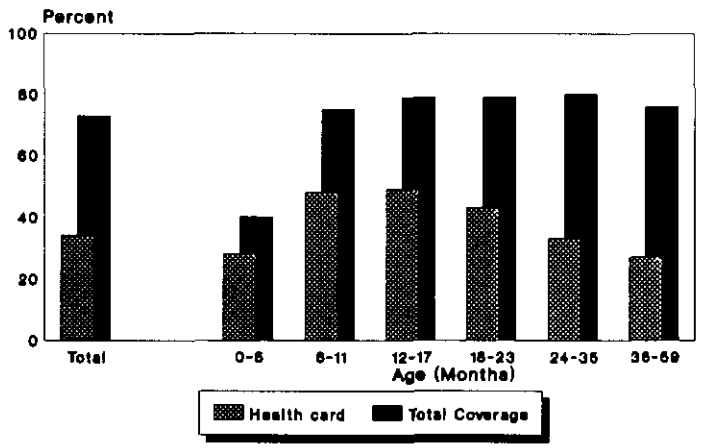
[2] In countries where tuberculosis and polio have not been controlled, the WHO EPI Global Advisory Committee has strongly recommended that BCG and polio vaccination begin at birth or at first contact with the health system. Since March 1990 the Ministry of Health in Sudan has recommended giving an additional polio vaccination at birth.

[3] This card is also used for recording other information, e.g., monitoring the growth of the child, but as the EPI is the most widely implemented programme, the card is commonly referred to as an immunisation card and, in areas where other services are still unavailable, it is used only to record immunisations.

BCG were checked for the presence of a BCG scar whenever the child was available at the time of the interview. In case of discrepancy, the mother's report was taken as indication that the vaccination occurred (for one out of eight children checked, a scar was not visible or present). The SDHS pretest[4] and other studies in Sudan have shown that mothers' recall of their children's immunisation status is fairly accurate.

Figure 8.3 shows the percentage of children under five for whom a health card was presented and immunisation coverage for all children under five. The proportion of children with health cards is highest for children 6-11 and 12-17 months of age. This may be because the cards tend to get lost as the years pass—which is less likely in the future because of decree No. 21[5]—but it also suggests better performance by immunisation programmes in recent years. For all children under five, 34 percent had a card available (almost all had received at least one immunisation), 39 percent did not have a card but were reported by their mothers to have been immunised, and 27 percent neither had a card nor were reported to have had any immunisations. Thus, almost three-quarters of Sudanese children under five have received at least one vaccination. For children 6 months and older, there is almost no variation by age in the proportion of children with at least one vaccination. It should be pointed out, however, that for effective protection against disease the full course of the specific vaccine should be received.

Figure 8.3
Children Under 5 With a Health Card and Immunisation Coverage for All Children Under 5



Note: Includes children who have received at least one vaccination.

Sudan DHS 1989-90

[4] In the SDHS pretest, mothers were asked to report on children's vaccinations before asking them to show health cards.

[5] The Government of Sudan's decree No. 21 signed on 18 January 1990 has two objectives relevant to the immunisation of children: (1) Acceptance of pupils into elementary school by the academic year 1994-95 will necessitate the presentation of both the birth certificate and a certificate of completion of immunisation, and (2) presentation of an immunisation certificate of any newborn before addition of an individual to the commodities supply card (Sudanow, 1991).

Table 8.4 shows immunisation coverage for all children under five and for those with health cards. Among those who had a card (top panel of the table), almost all had received a BCG vaccination (97 percent), 71 percent had received three doses of DPT, the same proportion had received three doses of

Immunisation coverage among children under five

Table 8.4 Among children under five, the percentage vaccinated for BCG, DPT, polio, and measles, for whom a health card was seen and for all children, according to child's age, Sudan DHS 1989-90

Age in months	BCG	DPT			Polio			Measles	All primary immunisations[1]	Number of children
		1	2	3+	1	2	3+			
CHILDREN UNDER FIVE YEARS WITH A HEALTH CARD[2]										
0-5	95.0	83.1	42.3	16.4	84.6	43.8	17.9	0.5	0.5	201
6-11	96.1	97.9	83.4	60.4	98.6	83.7	59.7	25.1	18.7	283
12-17	97.1	98.4	87.5	76.7	99.0	89.1	78.9	74.4	62.9	313
18-23	95.0	98.2	87.6	78.4	98.6	87.2	78.9	78.0	67.0	218
24-35	97.2	98.5	89.9	81.5	98.7	90.4	81.0	81.0	68.9	395
36-59	96.8	98.3	92.6	81.5	98.3	92.1	82.3	89.5	74.4	649
Total	96.5	96.8	84.6	71.2	97.2	84.9	71.8	66.8	55.9	2059
ALL CHILDREN UNDER FIVE YEARS										
0-5	38.7	31.1	15.5	5.8	32.4	16.6	6.9	1.4	0.7	729
6-11	72.6	72.8	60.1	45.1	73.5	60.8	45.1	21.8	17.2	592
12-17	76.9	76.0	67.0	57.7	75.9	68.4	59.6	59.3	49.4	646
18-23	75.2	77.0	70.0	62.1	77.2	69.6	63.5	63.7	54.4	504
24-35	77.7	77.2	71.4	64.9	77.5	72.1	66.0	67.3	58.3	1198
36-59	73.2	72.6	68.0	61.4	72.9	68.4	62.3	66.0	56.3	2393
Total	70.5	69.3	61.6	53.5	69.7	62.3	54.5	53.3	45.3	6062

[1]BCG, measles and at least three doses each of polio and DPT.
[2]Health card was seen by interviewer.

polio vaccine, and a slightly lower proportion had received measles vaccine (67 percent). Fifty-six percent of the children with cards fully immunised against the six preventable childhood diseases, i.e., they had received BCG, measles, and at least three doses of DPT and polio vaccines. Except for children in the two youngest age groups, who were not expected to have received all vaccinations, there were only small differences by age in the proportion of children who were fully immunised, with older children more likely to be fully vaccinated than younger children. This apparent declining trend seems to be due to a decrease in the proportion of children immunised against measles, since many children were

vaccinated at older ages.[6] The lower panel of the table shows the immunisation status of all living children under age five, including information on mother's recall of immunisations. Among these children, 71 percent received BCG and 53 to 55 percent received DPT3, polio3, and measles vaccination while 45 percent are fully immunised.

Table 8.5 presents data on immunisation coverage for children 12-23 months. This age group is important because the EPI objective in Sudan is to vaccinate all children by their first birthday. The subgroup is also the focus of the Sudan EPI Evaluation Surveys, the last of which was conducted in 1989. Among children 12-23 months, 76 percent had received BCG, 60 percent had three doses of DPT vaccine, 61 percent had three doses of polio vaccine and the same proportion had been immunised against measles. Slightly over half (52 percent) of the children 12-23 months of age have had all the primary vaccinations. The findings of the SDHS 1989-90 and the 1988 EPI coverage survey, which used different sampling and survey methodologies, are remarkably close—the SDHS figures are 4 to 9 percentage points higher—considering the time difference between the two surveys.[7] Compared with other countries in North Africa where DHS surveys have been done, the proportion of children 12-23 months who have received all primary immunisations in Sudan is approximately the same as in Egypt and Morocco, but not as high as in Tunisia (78 percent).

In Table 8.5, negligible differences are seen in immunisation coverage between male and female children with boys generally having a slight edge. However, marked differences can be observed in the proportion who received all primary immunisations by area of residence, region, and level of mother's education. Urban children are more likely to be fully vaccinated (61 percent) than rural children (47 percent). Two-thirds of children 12-23 months in the Khartoum and the Northern regions were fully vaccinated, compared with one-half in the Central and Kordofan regions and one-third in the Eastern and Darfur regions. Mother's education is positively related to full immunisation of children. The children of mothers with at least a senior secondary education are twice as likely to receive all of the recommended vaccinations (79 percent) as those whose mothers have no schooling (40 percent). The major contributing factors to the differences are probably increased awareness of the need for immunisation among more educated mothers and the greater accessibility of immunisation services in urban areas where better educated women are most likely to live.

[6] During the emergency situation in August 1988 caused by heavy rains and flooding in Sudan, especially in Khartoum city and the Northern and Eastern regions, the age range for measles vaccination was expanded from 9 to 60 months (Ministry of Health, 1990).

[7] The coverage survey used the WHO 30 cluster survey methodology, collecting information from seven children 12-23 months in each cluster. The results show the following percentage of children were vaccinated against specific diseases: BCG (67 percent), DPT1 (71 percent), DPT2 (64 percent), DPT3 (53), and measles (57 percent) (Ministry of Health, 1990).

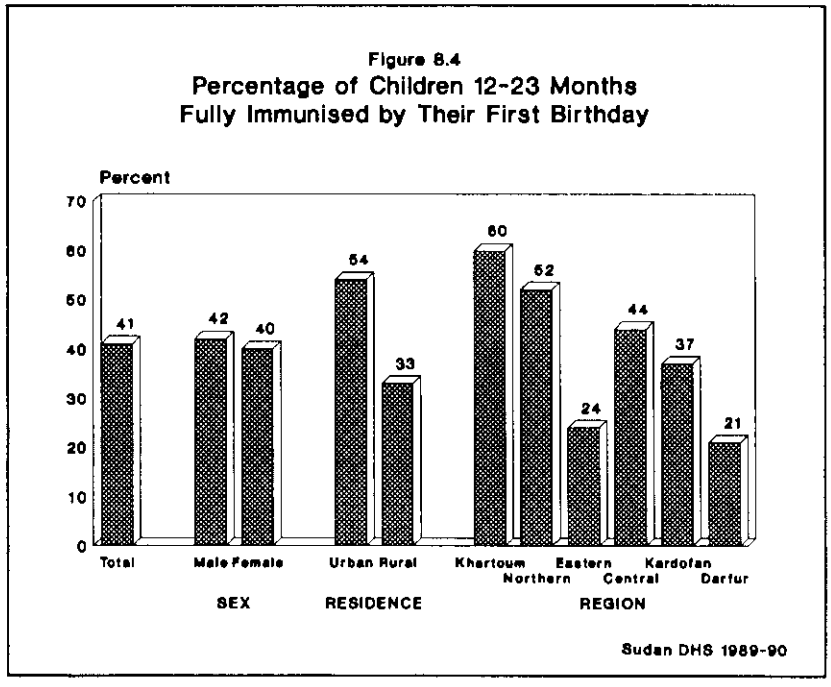
Immunisation coverage among children 12-23 months

Table 8.5 Among all children 12-23 months, the percentage ever vaccinated and the percentage who received specific vaccines according to health card information or mother's reports, by selected background characteristics, Sudan DHS 1989-90

Background characteristic	Percentage ever vaccinated			BCG	DPT			Polio			Measles	All primary immunisations[1]	Number of children
	Health card info.	Mother's report	Total		1	2	3+	1	2	3+			
Sex of child													
Male	47.5	32.6	80.0	77.5	77.5	69.1	60.6	77.0	69.5	62.4	62.2	52.9	596
Female	44.6	33.2	77.8	74.7	75.3	67.5	58.7	75.8	68.4	60.1	60.1	50.2	554
Residence													
Urban	52.8	35.4	88.2	85.3	86.3	79.8	71.3	86.0	80.7	73.3	69.9	60.5	415
Rural	42.3	31.4	73.7	71.0	70.9	61.9	53.1	71.0	62.3	54.6	56.3	46.5	735
Region													
Khartoum	53.3	38.9	92.1	89.1	89.1	86.9	77.7	89.5	88.2	80.3	76.9	66.8	229
Northern	48.4	34.4	82.8	80.6	81.7	75.3	71.0	81.7	75.3	71.0	73.1	67.7	93
Eastern	37.4	37.4	74.8	71.3	67.8	58.3	44.3	67.8	59.1	47.0	50.4	34.8	115
Central	47.0	32.7	79.7	77.5	78.4	70.5	62.5	77.5	71.1	64.4	62.9	54.3	315
Kordofan	48.2	29.8	78.0	73.8	76.4	65.4	58.6	77.0	66.5	59.7	55.0	49.2	191
Darfur	38.6	26.1	64.7	62.8	61.8	49.8	39.6	62.3	49.3	40.6	47.8	34.8	207
Education of mother													
No education	40.8	29.5	70.3	67.4	67.5	56.6	47.3	67.0	56.8	48.9	50.3	40.2	579
Primary incomplete	50.2	31.4	81.6	79.9	78.7	72.8	61.5	79.9	73.6	63.6	63.2	53.1	239
Primary complete	53.3	32.0	85.2	82.8	82.0	77.0	71.3	82.8	77.9	72.1	68.9	60.7	122
Junior secondary	55.1	37.8	92.9	89.8	92.9	85.7	79.6	92.9	89.8	82.7	80.6	72.4	98
Senior secondary+	49.1	50.0	99.1	94.6	97.3	94.6	89.3	96.4	93.8	90.2	88.4	78.6	112
Total	46.1	32.9	79.0	76.2	76.4	68.3	59.7	76.4	69.0	61.3	61.2	51.6	1150

[1] BCG, measles and at least three doses each of polio and DPT.

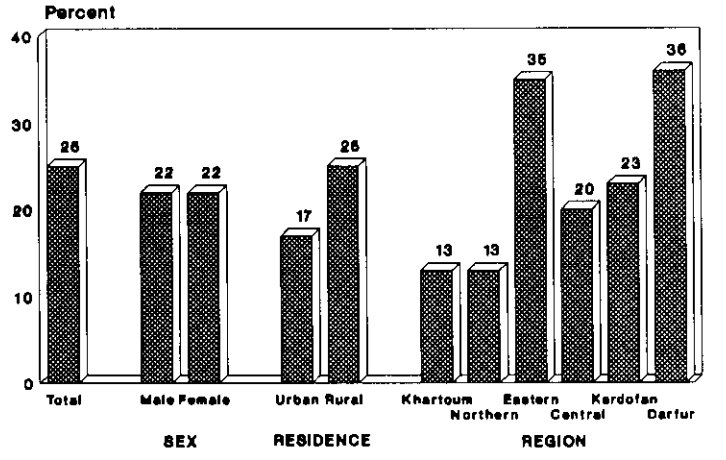
Figure 8.4 presents information on the percentage of children 12-23 months fully immunised by the child's first birthday.[8] Overall, 41 percent of children age 12-23 months received all the primary vaccinations before their first birthday. This proportion varies by region, ranging from 21 percent in Darfur to over 50 percent in the Northern region and 60 percent in the Khartoum region. According to the 1988 EPI coverage survey, the proportion of children receiving all vaccinations during infancy in various regions are as follows: Khartoum (68 percent), the Northern region (51 percent), the Eastern region (34 percent), the Central region (44 percent), the Kordofan region (42 percent) and the Darfur region (32 percent). It is surprising that although the overall proportion of children receiving each vaccination in the SDHS is only slightly higher than the proportion reported in the 1988 coverage survey, the proportion receiving all vaccination by their first birthday for the Eastern and Darfur regions is substantially lower in the SDHS than reported by the EPI coverage survey. One explanation of this variation is the higher DPT1-DPT3 dropout rates in these two regions, which is discussed below.



The dropout rate for DPT—the percentage of children who received the first but not the third dose of DPT—is generally considered an indication of the effectiveness of the immunisation programme. The dropout rates for the SDHS and the Sudan EPI reporting system (1989), between DPT1 and DPT3 are 25 and 21 percent, respectively. The differentials presented in Figure 8.5 show that one of six urban children and one of four rural children who received the first dose of DPT did not complete the full DPT schedule. The regional differences were more striking; the DPT1-DPT3 dropout rate was 13 percent for Khartoum and the Northern regions, around 20 percent in the Central and Kordofan regions and 35 percent in the Eastern and Darfur regions. It is interesting to note that the level of DPT1 immunisation (shown in Table 8.5) and the dropout rates for regions in Figure 8.5 are negatively related, that is, the higher the proportion of children receiving DPT1, the lower the dropout rate.

[8] The proportions are estimated for all children using information on full vaccination (by first birthday) from children with health cards.

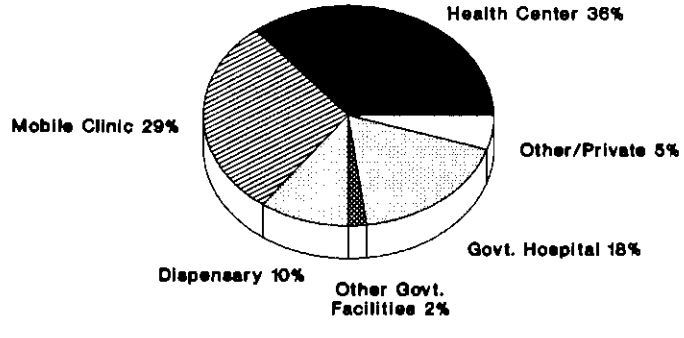
Figure 8.5
Drop-out Rates between DPT1 and DPT3
among Children 12-23 Months



Sudan DHS 1989-90

For children who had at least one vaccination, mothers were asked to report the primary source of the immunisations. As Figure 8.6 shows, health centres (36 percent) and mobile clinics (29 percent) are the two most commonly mentioned sources of children's immunisations in Sudan. Government hospitals were mentioned by mothers for 18 percent of children vaccinated and dispensaries for 10 percent. Private doctors and clinics provide vaccinations for only 2 percent of the children. As practically all immunisation services at dispensaries and "other" governmental facilities (dressing stations, primary health facilities, and outreach stations) are provided by mobile clinics, this makes mobile clinics the largest single source of immunisation in Sudan—serving more than four of every ten children who receive a vaccination.

Figure 8.6
Source of Immunisation Services
for Children Under 5 Years

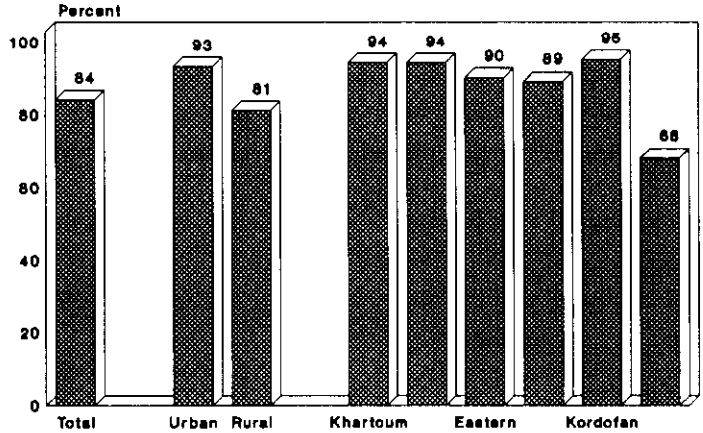


Note: Other/Private Includes Private Doctors 2%, Other 2%, Don't Know 1%

Sudan DHS 1989-90

Although mothers of unvaccinated children were not asked why their children were not vaccinated, all ever-married women were asked if they knew where they could go to have children vaccinated. The question was asked to measure the knowledge of immunisation services among women and to find out if lack of knowledge of immunisation services was a factor in not immunising children. More than one response was allowed. Figure 8.7 shows that, among mothers with children under age five with no vaccinations, 84 percent know a source for vaccination services. These results suggest that lack of knowledge about the availability of immunisation services is not a serious problem affecting immunisation coverage, although knowledge is comparatively low in rural areas (81 percent) and in the Darfur region (68 percent). The lower level of knowledge of sources of immunisations and, as mentioned earlier, the higher dropout rate between DPT1 and DPT3 in these areas indicate that more efforts are needed to inform and motivate women to vaccinate their children, in addition to increasing the accessibility of immunisation services.

Figure 8.7
Knowledge of Source of Immunisation Services among Mothers With Children Under 5 Who Were Not Immunised



8.3 CHILD MORBIDITY AND TREATMENT

Acute Respiratory Infection

A substantial number of child deaths in Sudan are preceded by illness in which the child suffers from coughing and difficult breathing, symptoms of acute lower respiratory tract infection (mostly pneumonia). Information was collected in the SDHS for all children under age five on the occurrence of respiratory illness in the two weeks preceding the interview and treatment provided for children experiencing the illnesses. Table 8.6 presents data on the prevalence of cough and cough with difficult breathing during the two weeks before the survey among children under age five.

Prevalence of cough and use of health care providers for treatment of cough

Table 8.6 Among children under five, the percentage having a cough and percentage having a cough with difficult breathing in the two weeks preceding the survey, and, among all children with cough, the percentage for whom treatment was sought from various health care providers, by selected background characteristics, Sudan DHS 1989-90

Background characteristic	Percentage of children having:		Among children with cough, the percentage for whom treatment was sought from[1]:			Number of children
	Cough	Cough with difficult breathing	Government health facility	Private facility	Pharmacy	
Age of child						
0-5 months	40.6	18.1	36.1	7.8	2.4	729
6-11 months	57.3	25.7	53.7	11.5	4.4	592
12-17 months	54.3	20.9	54.7	12.3	6.0	646
18-23 months	50.8	21.2	49.6	12.9	3.9	504
24-59 months	45.7	18.2	51.3	10.0	4.2	3591
Sex of child						
Male	48.0	20.3	51.2	10.8	4.0	3073
Female	47.1	18.6	49.4	10.2	4.5	2989
Age of mother						
15-29	49.1	20.2	47.3	11.4	4.0	3192
30-49	45.8	18.6	54.0	9.4	4.5	2870
Residence						
Urban	47.6	20.0	49.4	25.0	9.4	2084
Rural	47.5	19.2	50.8	2.9	1.5	3978
Region						
Khartoum	51.5	22.0	47.9	29.1	10.7	1107
Northern	28.2	10.6	52.8	10.4	4.7	376
Eastern	52.8	27.2	51.5	7.5	4.5	710
Central	48.0	22.2	58.4	8.5	3.3	1720
Kordofan	46.6	15.2	52.9	2.3	1.3	1007
Darfur	47.0	14.7	36.9	3.0	1.1	1142
Education of mother						
No education	46.6	19.2	49.5	3.7	2.1	3443
Primary incomplete	49.0	21.1	54.7	11.4	4.9	1239
Primary complete	51.6	19.3	55.4	14.7	6.8	486
Junior secondary	49.4	19.9	48.2	25.4	6.3	453
Senior secondary+	44.7	16.8	39.6	40.6	14.2	441
Total	47.5	19.4	50.3	10.5	4.2	6062

[1]Multiple responses permitted.

Overall, approximately half the children under age five were reported to have had a cough in the two weeks prior to the survey and more than one-third of these (or about one in five children) suffered from cough and difficult breathing. With the exception of children under six months of age and those from the Northern region who had lower prevalence, the proportion of children with a cough varies only slightly for the background characteristics presented in the table. Also, there is no appreciable difference in the proportion of children showing symptoms of acute lower respiratory tract infection (both cough and difficult breathing) by urban/rural residence, mother's age and sex of the child. However, there are differences by age of the child and region. The prevalence of cough with difficult breathing was highest among children 6-11 months (26 percent); and the lowest proportion of children with cough and difficult breathing was observed in the Northern region (11 percent), followed by the Darfur and Kordofan regions (15 percent). The highest proportion of children with cough and difficult breathing is in the Eastern region (27 percent), followed by the Khartoum and Central regions (22 percent).

Table 8.6 also shows the proportion of children with respiratory illness for whom treatment was sought from various health care providers. The figures are not additive since more than one provider may have been consulted during illness. Half of the children with coughs were taken to a government facility for treatment, while 11 percent consulted a private doctor or hospital and 4 percent went to a pharmacy. Private facilities were used more often for urban children (25 percent) than for rural (3 percent). There are also substantial differences by region and mother's education in the proportion of cases of respiratory illness in which a private doctor or hospital was consulted. The proportion of children receiving treatment from a private doctor or a private hospital was 29 percent in Khartoum, 10 percent in the Northern region, 8 percent in the Eastern and Central regions, and 3 percent or less in Kordofan and Darfur. Utilization of private doctors and clinics is related to the mother's educational attainment; private treatment facilities were used for only 4 percent of the children whose mothers had no schooling and 15 percent of children whose mothers had completed primary school, compared with 41 percent of children whose mothers had a senior secondary education. Pharmacies are more commonly used by mothers with senior secondary or higher education and by mothers in Khartoum.

Table 8.7 shows the type of treatment received by children under five with a cough in the two weeks preceding the survey. Multiple answers were possible, so numbers do not add to 100 percent. Overall, three-quarters of children with a cough (with or without difficult breathing) were given some type of treatment. The table also shows that 28 percent of children with cough only and 23 percent of children with cough and difficult breathing received no treatment. The proportion of children receiving treatment was higher among children 12-17 months (82 percent) and lower among those who were younger than six months (55 percent). Differences in the proportion receiving treatment by sex of the child and by age of the mother are minor, although male children are slightly more likely to receive treatment. Children in urban areas and in the Khartoum and Northern regions are more likely to receive treatment. The likelihood of a child with cough or cough and difficult breathing being treated increases with mother's education. For example, two-thirds of children of uneducated mothers were treated compared with over 90 percent of children whose mothers had attained at least senior secondary education. The most common treatment given was antibiotic syrup (60 percent), followed by non-antibiotic pill/syrup (33 percent), injection (8 percent) and antibiotic pills (8 percent). Caution should be used in the interpreting these data since the information is based on the mother's recall of the type of medicine given. There are only slight differences in the type of treatment given to children with cough only, and cough with difficult breathing. It appears, however, that in Sudan a large proportion of children with respiratory infection are taken to health care providers for treatment and are likely to be given antibiotics.

Treatment for cough

Table 8.7 Among children under five with a cough in the two weeks preceding the survey, the percentage who received no treatment and of those who were treated, the percentage who received specific treatments, by selected background characteristics, Sudan DHS 1989-90

Background characteristic	Percentage of children who received no treatment	Treatment[1]							Number of children treated	Number of children with cough
		Antibiotic		Other pill/ syrup	Injection	Intravenous	Home remedy	Other		
		Pill	Syrup							
Age of child										
0-5 months	44.6	7.9	61.0	28.7	4.9	0.0	4.3	5.5	164	296
6-11 months	24.2	8.2	65.0	31.5	5.1	0.8	3.5	5.8	257	339
12-17 months	17.9	10.1	65.6	31.9	8.0	1.4	3.5	3.5	288	351
18-23 months	25.8	6.8	56.3	34.2	7.4	0.0	3.7	5.8	190	256
24-59 months	25.1	7.6	58.8	33.2	8.2	0.8	6.0	4.0	1228	1640
Sex of child										
Male	23.5	8.3	60.7	31.6	7.6	0.9	4.9	4.3	1127	1474
Female	29.0	7.6	60.1	33.7	7.3	0.6	5.2	4.5	1000	1408
Age of mother										
15-29	27.4	7.1	61.3	32.2	6.5	0.6	5.2	3.7	1139	1568
30-49	24.8	8.9	59.4	33.0	8.6	0.9	4.9	5.3	988	1314
Residence										
Urban	15.1	6.7	68.5	35.4	5.6	0.5	5.5	2.3	841	991
Rural	32.0	8.8	55.1	30.7	8.7	0.9	4.7	5.8	1286	1891
Region										
Khartoum	14.7	7.4	70.0	39.3	6.8	0.4	5.6	1.9	486	570
Northern	15.1	0.0	70.0	30.0	10.0	1.1	1.1	0.0	90	106
Eastern	28.5	6.0	64.6	36.9	7.1	0.4	7.1	1.9	268	375
Central	21.5	7.3	60.8	32.4	9.0	1.2	3.4	1.9	648	825
Kordofan	26.9	9.6	56.0	22.4	4.1	0.0	4.4	12.5	343	469
Darfur	45.6	12.7	42.1	30.5	8.9	1.4	7.9	8.6	292	537
Education of mother										
No education	34.4	8.5	53.4	33.0	8.3	0.8	6.5	6.2	1052	1603
Primary incomplete	20.3	8.7	62.6	32.2	7.4	0.8	2.7	2.7	484	607
Primary complete	15.1	5.6	68.1	28.2	6.6	1.4	5.2	3.8	213	251
Junior secondary	12.9	5.6	71.3	33.3	4.1	0.5	5.1	2.6	195	224
Senior secondary+	7.1	8.2	74.3	35.5	7.7	0.0	2.7	1.6	183	197
Total with cough	26.2	7.9	60.4	32.6	7.5	0.8	5.0	4.4	2127	2882
Total with cough only	28.2	8.3	60.7	30.2	6.5	0.3	4.8	4.7	1222	1703
Total with cough and difficult breathing	23.2	7.5	60.0	35.8	8.8	1.3	5.3	4.1	905	1179

[1]Multiple responses permitted.

Fever

For each child under five years of age, the respondents were asked if the child had fever in the two weeks prior to the survey and what treatment was given to those who had a fever (data not shown). Thirty-nine percent of children under five had a fever in the two weeks before the survey. In the preceding section on acute respiratory infection, the children who had both a cough *and* a fever were included. Among the 600 children who had a fever but *no* cough, 38 percent were given antibiotic pills or syrup, 28 percent other pills or syrup, 6 percent injection and 3 percent home remedies. Twenty-nine percent were not treated either with medicine or a home remedy.

Diarrhoea Prevalence

Diarrhoeal disease is one of the leading causes of infant and child deaths in developing countries. In the SDHS, information was collected on whether children under age five had experienced an episode of diarrhoea during the 24 hours and the two weeks prior to the interview, and what, if anything, was used to treat the children.

Table 8.8 indicates that overall, 18 percent of children under age five had experienced an episode of diarrhoea during the 24 hours preceding the survey and 30 percent during the two weeks preceding the survey. A small proportion of children had diarrhoea with bloody stools (2 and 4 percent in the 24 hours and two weeks preceding the survey, respectively). The higher prevalence of diarrhoea in children 6-23 months is most likely associated with the weaning process, which takes place at these ages. The sex differential is negligible and the impact of other demographic factors is weak. The prevalence of diarrhoea in the two weeks preceding the survey is slightly higher among rural children (31 percent) than among urban (28 percent). By region, diarrhoeal prevalence is higher in the Eastern region (38 percent) and Darfur (33 percent) than in the other regions. Maternal education has almost no effect on the incidence of diarrhoea except that the lowest prevalence of diarrhoea was among children whose mothers had senior secondary education (21 percent). The prevalence of diarrhoea differs slightly between children living in households with piped water (27 percent) and those without this facility (32 percent). But socioeconomic factors reflected in other housing characteristics show an impact on the prevalence of diarrhoea; the children in households with flush toilets (20 percent) and ceramic tile flooring (21 percent) have lower prevalence of diarrhoea than children in households with pit toilets, and cement or dirt floors.

Diarrhoea Treatment

Table 8.9 shows the type of treatment received by children with diarrhoea in the two weeks preceding the survey. Thirty-six percent of the children received oral rehydration therapy (ORT)—either solution prepared from ORS packets (29 percent) or recommended home solution prepared from salt and sugar (8 percent)—during their most recent diarrhoeal episode. Fifty-four percent of children with a recent diarrhoeal episode were taken to a health facility for consultation. It should be pointed out that an important factor that determines whether a child receives treatment is the mother's perception of the severity of the diarrhoea and the need for treatment and health care.

Children in the age group 12-17 months are more likely than other children to have visited a health facility (64 percent) and to have received treatment for diarrhoea—ORT (43 percent). Moreover, a substantial proportion of children under 6 months who had experienced an episode of diarrhoea were neither treated nor taken to a health facility (41 percent). Again, no sex differences exist in treatment patterns. One-fifth of urban children and one-third of rural children did not receive any treatment.

Prevalence of diarrhoea among children under five

Table 8.8 Among children under five, the percentage who had diarrhoea in the past 24 hours and in the past two weeks, by background characteristics, Sudan DHS 1989-90

Background characteristic	Children with diarrhoea in the past 24 hours		Children with diarrhoea in the past 2 weeks		Number of children
	All diarrhoea	Diarrhoea with blood	All diarrhoea	Diarrhoea with blood	
Age of child					
0-5 months	18.7	0.7	26.9	1.2	729
6-11 months	27.2	2.0	44.4	2.9	592
12-17 months	24.6	2.0	40.9	3.6	646
18-23 months	24.2	3.4	38.3	5.0	504
24-59 months	14.4	2.3	24.8	4.1	3591
Sex of child					
Male	18.3	2.0	30.6	3.6	3073
Female	17.8	2.3	29.1	3.7	2989
Residence					
Urban	15.3	1.7	27.2	2.7	2084
Rural	19.6	2.4	31.2	4.2	3978
Region					
Khartoum	16.0	1.5	28.2	2.5	1107
Northern	14.6	0.8	24.7	1.6	376
Eastern	24.6	3.8	37.5	4.8	710
Central	16.2	1.5	27.3	2.7	1720
Kordofan	15.9	2.3	29.3	5.6	1007
Darfur	22.0	3.1	32.6	4.6	1142
Education of mother					
No education	20.0	3.0	31.2	5.2	3443
Primary incomplete	16.4	1.2	29.3	1.9	1239
Primary complete	17.1	0.4	30.0	1.2	486
Junior secondary	15.2	1.3	28.9	2.2	453
Senior secondary+	11.6	0.5	21.3	0.9	441
Source of water					
Piped water	16.0	1.6	27.5	2.8	3157
Unpiped water	20.3	2.7	32.4	4.6	2905
Sanitation facility					
Flush toilet	11.0	1.7	19.5	3.4	292
Pit latrine	17.0	1.7	29.1	2.9	3428
Other/none	20.6	2.8	32.2	4.9	2342
Floor material					
Ceramic tile	11.5	1.0	20.9	1.5	401
Cement/brick	19.2	2.5	29.8	3.3	359
Earth/sand/other	18.5	2.2	30.5	3.9	5302
Total	18.1	2.1	29.8	3.7	6062

Treatment practices for children with diarrhoea

Table 8.9 Among children under five who had diarrhoea in the two weeks preceding the survey, the percentage taken to a health facility, the percentage who received treatment, the percentage who received no treatment, and the percentage not taken for treatment and who received no treatment, by background characteristics, Sudan DHS 1989-90

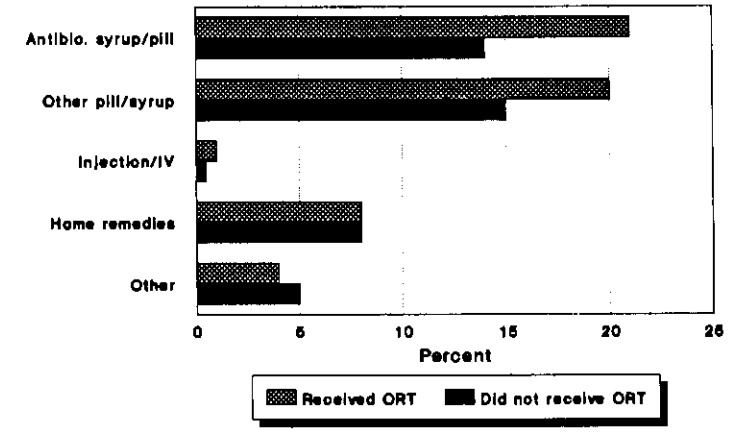
Background characteristic	Percentage taken to a health facility	Percentgage treated with: ORS packets	Home solution	Other treatment[1]	Percentage who received no treatment	Percentage not taken for treatment and who received no treatment	Number of children with diarrhoea
Age of child							
0-5 months	42.3	18.4	13.8	25.5	52.0	40.8	196
6-11 months	54.0	31.6	6.5	42.6	40.7	32.3	263
12-17 months	64.4	36.0	6.8	48.9	29.2	20.8	264
18-23 months	55.4	30.6	7.3	44.6	36.3	30.1	193
24-59 months	52.8	27.4	7.3	45.1	37.6	29.1	892
Sex of child							
Male	53.8	28.4	6.8	44.4	39.2	29.9	939
Female	53.9	28.8	8.9	41.7	37.2	29.6	869
Residence							
Urban	65.0	35.5	10.4	52.1	27.6	20.7	566
Rural	48.7	25.4	6.6	39.0	43.1	33.9	1242
Region							
Khartoum	65.4	31.1	11.2	54.5	27.6	21.5	312
Northern	50.5	33.3	7.5	44.1	33.3	29.0	93
Eastern	55.6	30.8	5.6	45.5	37.6	27.8	266
Central	57.7	26.2	9.6	41.1	37.7	28.3	470
Kordofan	51.9	30.8	9.2	46.1	34.9	27.5	295
Darfur	40.3	25.0	3.2	31.7	52.2	41.9	372
Education of mother							
No education	48.8	25.1	6.1	39.2	44.9	35.2	1074
Primary incomplete	56.7	32.8	10.5	44.6	29.5	24.0	363
Primary complete	57.5	30.8	8.2	45.2	34.2	27.4	146
Junior secondary	67.2	32.8	12.2	60.3	22.9	15.3	131
Senior secondary+	75.5	42.6	9.6	54.3	23.4	13.8	94
Total	53.8	28.6	7.8	43.1	38.2	29.8	1808

[1]May be in addition to oral rehydration solution or homemade solution.

Although the prevalence of diarrhoea is high in the Darfur region, only a small proportion of children received ORT (28 percent) or were taken to a health facility (40 percent). More than two of five children with diarrhoea in this region received no treatment whatsoever. Treatment for diarrhoea is associated with maternal education. Children whose mothers have no schooling are much less likely to be treated for diarrhoea than children whose mothers have some education.

The mothers were asked what, if anything (other than ORT), was given for diarrhoea. Multiple answers were accepted. Figure 8.8 shows that among children who received ORT (ORS packet or homemade solution), 21 percent were also given an antibiotic pill or syrup and almost the same proportion received other kinds of pills and syrups. Eight percent of children were treated with home remedies or herb medicine. Among those children who were not given ORT for diarrhoea, 14 percent

Figure 8.8
Treatment for Diarrhoea (other than ORT) among Children Under 5 Years with Diarrhoea



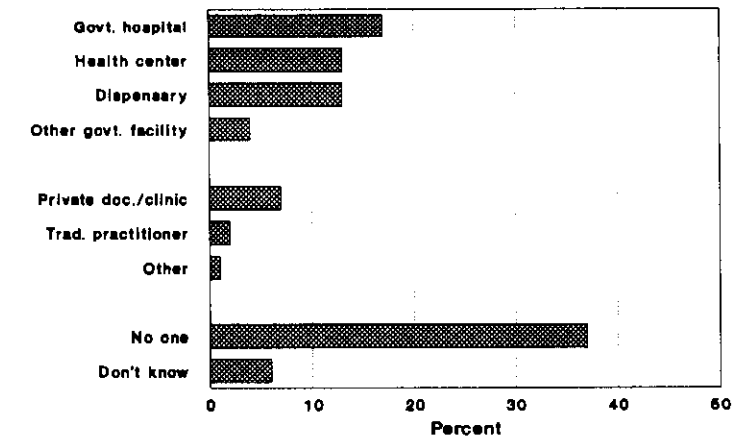
Note: Includes children who had diarrhoea in the two weeks preceding the survey. Multiple responses permitted.

Sudan DHS 1989-90

were given antibiotics, 15 percent were given some other pill or syrup, and 8 percent were treated with home remedies. It is notable that six in ten children with diarrhoea who were not given any ORT also did not receive any other treatment.

Mothers were also asked where their children were taken for treatment or whom they consulted for the treatment of diarrhoea. Respondents were allowed multiple responses and 5 percent did mention more than one source. Figure 8.9 indicates that 37 percent of children with diarrhoea were not taken

Figure 8.9
Sources of Treatment for Diarrhoea among Children Under 5 Years with Diarrhoea



Note: Includes children who had diarrhoea in the two weeks preceding the survey. Multiple responses permitted.

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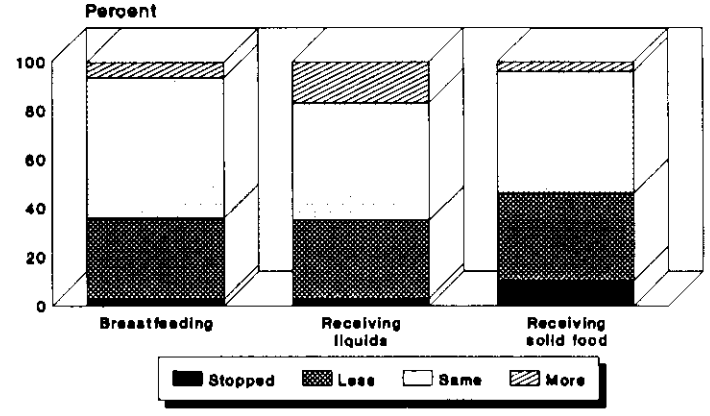
anywhere for treatment and the mothers of 6 percent did not know the source of treatment. Children who had diarrhoea received health care from private doctors and hospitals (7 percent), pharmacies (4 percent) and traditional doctors (2 percent). The public sector provided services through government hospitals (17 percent), health centres and dispensaries (13 percent each), and at dressing stations and other health facilities (4 percent).

Feeding Practices During Diarrhoea

The SDHS included questions on feeding practices for children who experienced diarrhoea during the two weeks preceding the interview. Mothers were asked about any changes in the quantity of liquids and solid food given to the children, and breastfeeding practices for children not yet weaned.

As can be observed in Figure 8.10, a sizable proportion of mothers reduce the fluid intake of their child with diarrhoea. Among children who were breastfed and not yet weaned, more than one-third were breastfed less or stopped receiving breastmilk during diarrhoea. Also, approximately one-third of the mothers said they reduced the amount of other fluids given to the children.

Figure 8.10
Feeding Practices During Diarrhoea
Among Children Under 5 with Diarrhoea



Note: Includes children who had diarrhoea in the two weeks preceding the survey.

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8.4 KNOWLEDGE AND USE OF ORS

The SDHS provides information about respondents' knowledge of ORS packets and preparation of rehydration solution from the packets. Women who had not used an ORS packet for their child's diarrhoeal illness were asked questions to determine their familiarity with the packets. Respondents who were familiar with ORS packets were asked where they could obtain them, how much an ORS packet cost, whether they had a packet at home, and if so, to show it to the interviewer. Those who had ever prepared a rehydration solution with an ORS packet were asked the type of packet used the last time, the quantity of water with which the packet was mixed, and whether anything besides the packet was added to prepare the solution.

Knowledge of ORS and Sources for the Packets

Of 5860 women interviewed, 4968 or 85 percent had seen an ORS packet. Almost all women who had seen an ORS packet knew where to get it (98 percent). Government hospitals (40 percent) and health centres (33 percent) were the most commonly mentioned sources for ORS packets.

When asked how much an ORS packet cost, 13 percent of women said they did not know the price, 84 percent said it was free, and 2 percent said it cost 1-5 Sudanese pounds (approximately US $0.25 - $1.00 at the official government exchange rate). Only 15 percent of women who had seen an ORS packet said they had a packet at home at the time of interview. Among those who said they had a packet at home, only half could show it to the interviewer (7 percent).

Preparation of Rehydration Solution from ORS Packets

In order to learn about ORS treatment practices, all women who knew about ORS packets were asked if they had ever prepared solution from the packets. Those who had ever used an ORS packet were asked: (1) whether they used a UNICEF packet or some other ORS packet; (2) whether they used all or only part of the packet; (3) what, if anything, was added to the rehydration solution and (4) to show how much water they added to one ORS packet. The interviewer measured and recorded in the questionnaire the quantity of water actually used.

Fifty-nine percent of ever-married women said they had used an ORS packet at some time. As Table 8.10 indicates, 99 percent of those women said that they had used the UNICEF packet. One in five had used less than the full packet. A higher proportion of women in urban areas (84 percent) than in rural

Use of ORS packets

Table 8.10 Among ever-married women who have ever used an ORS packet, the percent distribution of ORS packets according to the type of packet and amount used, by area of residence and region, Sudan DHS 1989-90

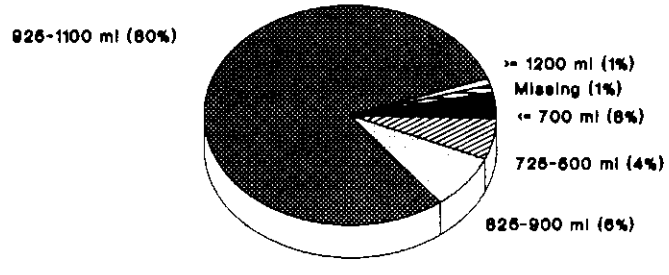
Background characteristic	UNICEF ORS packet: Used all	UNICEF ORS packet: Used part	Other ORS packet	Don't know/ not sure	Total percent	Number of women
Residence						
Urban	83.9	14.9	0.5	0.7	100.0	1351
Rural	76.7	22.4	0.2	0.6	100.0	2090
Region						
Khartoum	84.2	13.7	0.8	1.2	100.0	722
Northern	72.4	27.6	0.0	0.0	100.0	250
Eastern	79.7	20.1	0.0	0.3	100.0	394
Central	77.1	21.6	0.6	0.6	100.0	954
Kordofan	83.8	15.3	0.0	0.9	100.0	582
Darfur	75.9	23.7	0.0	0.4	100.0	539
Total	79.5	19.5	0.3	0.7	100.0	3441

areas (77 percent) had used the full packet. The proportion of women who had used the full packet was higher in Khartoum and Kordofan (84 percent) and lower in the Northern region (72 percent) than in other regions.

Figure 8.11 shows the percent distribution of women who have used full packets of ORS by the quantity of water they demonstrated using to prepare ORS. The measurements were rounded to the nearest multiple of 25 millilitres. The Ministry of Health and UNICEF recommend that a whole packet should be mixed in one litre (1000 ml) of water; the National Control of Diarrhoeal Diseases Department considers 925-1100 ml as the acceptable quantity of water to use to obtain the optimal concentration of the electrolytes. Eighty percent of those who had prepared the rehydration solution showed that they had mixed the packet in 925-1100 ml of water. The proportion of women using the correct amount of water was higher in rural areas than in urban (83 vs. 75 percent). It should be pointed out that many women used six tea or water glasses to measure exactly one litre of water. Others guessed, and thus the quantity of water used by the latter may not correctly represent the quantity actually used in past preparation of ORS solution. Only 1 percent of the women used more water in preparing the solution than acceptable, but a substantial minority (18 percent) used 900 ml or less, including 8 percent who used 700 ml or less of water in preparing the solution.

Regarding additives to rehydration solution prepared from ORS packets, 5 percent of women said they put in additional sugar and 1 percent said they added juice. Sweet drinks, such as tea with three or four spoonfuls of sugar, are favoured in Sudan, so it is not surprising that some women add sweeteners to make the ORS solution more palatable to children.

Figure 8.11
Quantity of Water Used to Prepare ORT Solution from (UNICEF) ORS Packets



Note: Based on observation of ever-married women who have ever prepared ORT solution from an ORS packet.

Sudan DHS 1989-90

CHAPTER 9

MATERNAL MORTALITY

9.1 INTRODUCTION

Data were collected in the SDHS which are suitable for estimating maternal mortality using either a direct or an indirect estimation technique (Graham et al., 1989; Rutenberg et al., 1990). The data concern the survivorship of sisters of survey respondents. For each of a respondent's sisters, information was collected on current age or, if deceased, age at death and the number of years ago the death occurred. For dead sisters, additional questions were asked to determine if the death was maternity related, i.e., did the death occur during pregnancy, during delivery or within two months following a delivery or pregnancy termination.

The direct approach for estimation of maternal mortality uses data on the age of surviving sisters, the age at death of sisters who died, and the number of years ago the sisters died. For well-defined reference periods, the data are aggregated to determine the number of person-years of exposure to mortality and the number of maternal deaths occurring in each reference period. Maternal mortality rates are then directly estimated by dividing the number of deaths by the person-years of exposure. The result is the proportion of sisters who died of maternal causes among all sisters of respondents. This is an unbiased estimate of the probability of maternal death, provided that the mortality risk to all sisters is the same (Trussell and Rodriguez, 1990). The direct approach for estimating maternal mortality is more demanding of the data than the indirect approach—respondents must report not only a sister's death and if that death was maternity related, but also the ages of living sisters and the age at death and years since death for dead sisters.

The indirect approach for estimation of maternal estimation does not use the information on sister's age at death and the number of years ago the sister died of maternal causes. Instead, this approach estimates the life-time risk of maternal death for all sisters of respondents. As the estimates pertain to the life-time experience of sisters of respondents, they do not apply to a well-defined time period but represent mortality conditions over the last 50 years. The lack of a designated time period to which the estimates apply is circumvented by assuming that any changes in mortality are linear. Under this assumption it is possible to specify the number of years ago to which an estimate of maternal mortality applies.

9.2 DATA COLLECTION

The questionnaire used to collect information on maternal mortality is reproduced in Appendix C (section 8 of the Individual Questionnaire). The respondent is first asked to list all of her brothers and sisters, that is, all of the children born to her mother, starting with the first. Then the respondent is asked if each sibling is still alive. For living siblings, current age is asked. For dead siblings, the respondent is asked the number of years ago that the sibling died and his/her age at the time of death. It was stressed during training that the interviewers, while being sensitive to the delicate nature of the data, must make every effort to obtain answers to these questions. Interviewers were instructed that, when a respondent could not provide precise information on ages or the number of years ago the death occurred, approximate answers were acceptable.

For deceased sisters who were ever married, two questions were asked to determine if a death was maternity related: "Did [NAME OF THE SISTER] die during pregnancy or at childbirth?" and if the answer was negative, the respondent was asked: "Did she die within two months of a pregnancy termination or birth of a child?" These questions were phrased to encourage the respondent to report mortality following an induced abortion, while not directly asking about such events. Due to the sensitivity of the issue of pregnancy before marriage, these questions were not asked for deceased sisters who had never married. Thus, the questionnaire does not attempt to capture maternal deaths to single women which may have occurred under unfavourable conditions at delivery or as the result of attempts to abort an unwanted pregnancy.

9.3 ASSESSMENT OF DATA QUALITY

The estimation of maternal mortality by either the direct or indirect approach requires accurate reporting of the number of sisters the respondent ever had, the number that have died, and the number that have died of maternity-related causes. There is no definitive procedure for establishing the completeness of data collected by a retrospective household survey on the survivorship of sisters. In addition to accurate survivorship data, the direct estimation approach requires data on the ages and number of years since the death of siblings—information which respondents may be uncomfortable reporting and may not know with precision. The number of siblings reported by the respondents and the completeness of the reported data on age, age at death, years since death, and marital status are shown in Table 9.1.

Siblings of respondents

Table 9.1 Number of siblings reported by survey respondents and completeness of the reported data on age, age at death, years since death and marital status, Sudan DHS 1989-90

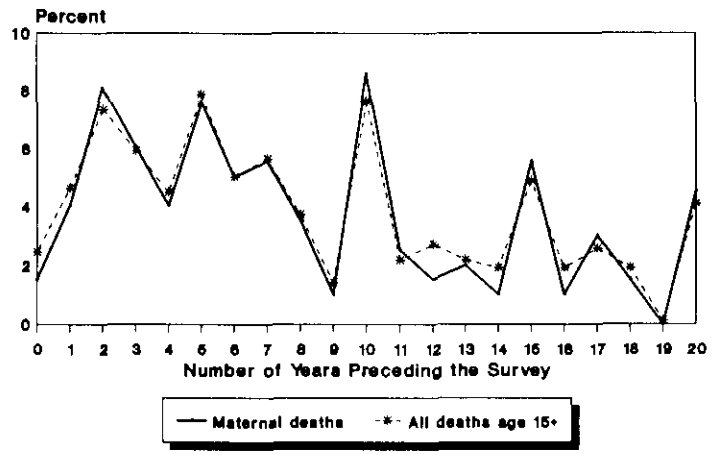
Siblings by selected characteristics	Sisters		Brothers	
	Number of cases	Percent	Number of cases	Percent
Total siblings	17918	100.0	18788	100.0
Living	14772	82.4	15053	80.1
Dead	3136	17.5	3719	19.8
Missing survival status	10	0.1	16	0.1
Living siblings	14772	100.0	15053	100.0
Age reported	14718	99.6	14979	99.5
Missing age	54	0.4	74	0.5
Dead siblings	3136	100.0	3719	100.0
Age at death & years since death both reported	3049	97.2	3623	97.4
Missing age at death	7	0.2	12	0.3
Missing years since death	56	1.8	58	1.6
Missing both	25	0.8	26	0.7
Dead siblings, age 10+[a]	730	100.0	b	b
Reported ever married	435	59.5		
Reported never married	242	33.2		
Missing marital status	53	7.3		

[a]Age at death, reported or imputed
[b]Marital status not determined for deceased brothers

Little can be said about completeness of reporting other than that the sex ratio of siblings enumerated by respondents (the ratio of brothers to sisters) as shown in Table 9.1 is 1.05, which is consistent with reported international data.[1] Complete data were obtained for almost all sisters, regardless of their survival status. An age was reported for over 99 percent of living sisters, and an age at death and the number of years ago the death occurred was reported for 97 percent of the dead sisters. Rather than exclude siblings with missing data from further analysis, information on the birth order of siblings was used, in conjunction with other information, to impute the missing data.[2] The sibling survivorship data, including cases with imputed values were used for the direct calculation of adult mortality rates and maternal mortality rates.

A potential problem with these data is the heaping of responses on preferred digits by respondents who are unable to report the exact number of years ago that a death occurred but can provide an estimate. The distribution of deaths occurring at age 15 or above, for all sisters and for those dying of maternal causes is shown in Figure 9.1 by the number of years preceding the survey that the death occurred.

Figure 9.1
Percent Distribution of Dead Sisters of Respondents by Time of Death



Sudan DHS 1989-90

[1] The remaining discussion on data quality is in terms of the reported data for sisters. The reported data for brothers are similar (see Table 9.1).

[2] The imputation is based on the assumption that the ordering of siblings is correct. First, a birth date was calculated for each living sibling with an age and each dead sibling with complete information on age at death and the number of years ago the death occurred. For a sibling missing these data, a birth date was imputed within the range defined by the birth dates of the bracketing siblings. In the case of living siblings, an age was calculated from the imputed birth date. In the case of dead siblings, if either age at death or the number of years ago the death occurred was reported, that information was combined with the imputed birth date to produce the missing information. If both pieces of information were missing, the distribution of age at death for siblings for whom the number of years ago the death occurred was unreported, but age at death was reported, was used as the basis for imputing age at death.

Heaping is evident at two, five, ten and fifteen years ago. Heaping is especially severe on year ten, for which the number of events is seven or eight times the number in the adjacent years. In order to minimize the impact of heaping, mortality estimates are made for time periods, the boundaries of which are set so as to minimize transference of events between periods. Fortunately, the pattern of event reporting with peaks at five, ten, and fifteen years, lends itself to defining the reference periods as 0 to 6 and 7 to 13 years before the survey.

9.4 DIRECT ESTIMATES OF ADULT MORTALITY

Age-specific mortality estimates for males and females for the period 0 to 13 years before the survey, calculated from the reported survivorship data by direct procedures, are shown in Table 9.2. The number of sibling deaths during the reference period in the age range 15 to 49 was not great (347 females and 404 males), so that the individual rates are based on relatively few events and are subject to sampling variability.

For females, the estimated rates display a flat pattern from age 15 to 39 and then increase, as expected, for age groups 40-44 and 45-49. The overall pattern appears plausible with an increase by a factor of about two between the rates for the two youngest age groups (about 2.1 per 1000 women) and the two oldest age groups (about 4.5 per 1000 women). The mortality rates for males display a similar age pattern—the magnitude of the increase between the average of the two youngest and the two oldest age groups being, again, about a factor of two (from 2.17 to 5.13 per 1000). Typically, the male rates are slightly higher than the female rates.

It is important to evaluate the reliability of the direct mortality estimates, as the mortality data for all sisters are the basis for the data on maternal mortality. If the former are defective, the latter can hardly be reliable. In the absence of mortality data of established accuracy for Sudan, the evaluation is undertaken in terms of a comparison of the estimated rates with rates from the Regional Model Life Tables (Coale and Demeny, 1966) and with a life table for Sudan estimated by indirect procedures with 1983 census data (Elyaman and Hamaza, 1991).

Schedules of age-specific mortality rates from the four regional life tables are shown in Table 9.2. The schedules were selected at a level of mortality approximately equal to the childhood mortality rate($_5q_0$) estimated for the ten-year period preceding the SDHS.[3] For females, the estimated rates agree quite well with the schedule of rates from the South model table but are lower than the rates from the East, North and West model tables—lower by a factor of about two for age group 45-49. For males, results are similar: the agreement is reasonable with the South table but poor with the other model tables, especially at the older ages.

Mortality rates based on the 1983 census data are shown in Table 9.2. The level of adult female mortality for 1973-76, based on maternal orphanhood data reported by respondents age 15-25, was estimated to be at level 18.5 of the West model life tables. Questions on paternal orphanhood were not included in the census. The age-specific rates are somewhat higher than the rates based on the sisterhood data but by no more than might be associated with a moderate decline in mortality between 1975 and 1982, the midpoints of the two periods being compared. The rates are distinctly lower than the rates from the North and West model tables selected on the basis of the level of childhood mortality.

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[3] Estimates of ($_5q_0$), the probability of dying between birth and exact age five, were 129 per 1000 births for females and 140 per 1000 for males for the period 1980-89 (see Chapter 7).

Estimates of age-specific mortality

Table 9.2 Direct estimates of age-specific mortality based on the survivorship of siblings of survey respondents, by age and sex, Sudan 1976-1989; model life table rates; and estimated rates based on maternal orphanhood data for 1973-1976

FEMALES

Age group	Estimated rates for 1976-89			Model life table rates[a]				Estimated rates for 1973-76, based on 1983 Census data[b]
	Deaths	Exposure years	Rate (000)	South (e°=62.5)	East (e°=60.0)	North (e°=57.5)	West (e°=57.5)	
15-19	69	32353	2.13	1.54	1.95	3.11	2.99	1.85
20-24	67	32327	2.07	2.06	2.62	3.81	3.94	2.49
25-29	66	28301	2.33	2.39	3.07	4.42	4.53	2.91
30-34	67	21110	3.17	2.62	3.54	5.05	5.18	3.39
35-39	27	13920	1.94	3.04	4.21	5.82	5.95	4.04
40-44	33	7745	4.26	3.78	5.04	6.91	6.95	4.98
45-49	18	3877	4.64	4.74	6.53	7.89	8.54	6.54
Total	347							

MALES

				South (e°=58.6)	East (e°=56.0)	North (e°=53.8)	West (e°=61.2)	
15-19	76	31625	2.40	1.83	2.45	3.75	3.16	b
20-24	63	32237	1.95	2.77	3.56	5.39	4.49	
25-29	70	28979	2.42	2.80	3.61	5.63	4.85	
30-34	82	22460	3.65	3.40	3.99	6.03	5.54	
35-39	45	15651	2.88	3.95	4.94	6.80	6.71	
40-44	41	9044	4.53	5.36	6.59	8.26	8.63	
45-49	27	4723	5.72	7.30	9.33	10.19	11.36	
Total	404							

[a]Model life tables were selected at a level of mortality approximately equal to the probability of dying between birth and exact age 5 estimated for the period 1980-89 (i.e., $_5q_0$ of 129 per 1000 female births and 140 per 1000 male births).
[b]Estimates for females are based on maternal orphanhood data. Paternal orphanhood data were not collected in the 1983 Sudan Census and mortality estimates were not made.

The evaluation tends to substantiate the quality of the sibling survivorship data. Estimates based on the sibling data appear plausible, are consistent with estimates based on the South Model Life Table and are consistent with estimates based on data from the 1983 census. Retrospective survey data are susceptible to event omission and the estimates probably suffer from some underreporting of events, although evidence suggests serious underreporting has not occurred.

9.5 DIRECT ESTIMATES OF MATERNAL MORTALITY

Direct estimates of maternal mortality derived from the reported survivorship of sisters are shown in Table 9.3. The number of maternal deaths is small: 49 for the period 1976-82, 72 for 1983-89 and 121 overall for 1976-89. The age pattern of the estimated rates for each time period is somewhat erratic,

although there is a trend toward higher rates at the older ages. Given the relatively small number of events, the preferred approach is to estimate a single rate for the childbearing years. The overall estimates of maternal mortality expressed per 1000 woman-years of exposure are 0.81 for the period 1976-82, 0.91 for the period 1983-89 and 0.87 for the total 14-year period (1976-89). These estimates are all within sampling error of each other.[4]

Direct estimates of maternal mortality

Table 9.3 Direct estimates of maternal mortality based on the survivorship of sisters of survey respondents, by time period, Sudan 1989-90

	1983-89			1976-82			1976-89		
Age group	Maternal deaths	Exposure years	Rate (000)	Maternal deaths	Exposure years	Rate (000)	Maternal deaths	Exposure years	Rate (000)
15-19	9	14981	0.60	9	17372	0.52	18	32353	0.56
20-24	15	16984	0.88	12	15343	0.78	27	32327	0.84
25-29	15	16106	0.93	12	12194	0.98	27	28300	0.95
30-34	18	13381	1.35	9	7729	1.16	27	21111	1.28
35-39	5	9321	0.54	5	4599	1.09	10	13920	0.72
40-44	9	5499	1.64	2	2246	0.89	11	7745	1.42
45-49	1	3044	0.33	0	833	0.00	1	3877	0.26
15-49	72	79316	0.91	49	60316	0.81	121	139632	0.87
Maternal mortality ratio[1]			552			352			456
General fertility rate			.165			.231			.190

[1]Per 100,000 births; calculated as the maternal mortality rate/general fertility rate X 100

The rates can be converted to maternal mortality ratios and expressed per 100,000 live births by dividing by a period-specific general fertility rate (Table 9.3). Expressed in this way, the obstetric risk of pregnancy and childbearing is highlighted. The maternal mortality ratios are 352 maternal deaths per 100,000 births for 1976-82, 552 for 1983-89 and 456 overall for 1976-89. Thus, although there is little difference between estimates of the maternal mortality rate for 1976-82 and 1983-89, the ratios differ more substantially reflecting the higher fertility of the earlier period. The increasing ratios can be interpreted in two ways: actual increases in the obstetric risk in the more recent period or underreporting of maternity-related deaths in the earlier period.

[4] Under the assumption of a simple random sample, the sampling variance of the estimates can be approximated by (PQ)/N. The estimated standard errors are 0.1 per 1000 for the first two rates and 0.08 for the third where the number of woman-years of exposure is greatest. For practical purposes the standard errors can be taken as 0.1 per 1000.

9.6 INDIRECT ESTIMATES OF MATERNAL MORTALITY

The data on the survivorship of sisters can also be used to estimate maternal mortality by the indirect approach (Graham et al., 1989). In this case the data are aggregated by five-year age groups of respondents. For each age group, information on the number of maternal deaths among all sisters of respondents and on the number of "sister units" of risk is used to estimate the life-time risk of dying from maternal causes. The indirect approach also provides an overall estimate of maternal mortality for sisters of all respondents combined which pertains to a period of time centred on approximately 12 years prior to the survey. When dealing with small samples it is preferable to use the overall estimate, which is subject to less sampling variability.

Indirect estimates of maternal mortality are shown in Table 9.4. Excluding the youngest age group, for which very few units of exposure were observed, the estimates of the life-time risk of dying from maternal causes by age group vary from .048 to .033. In general the pattern of the estimates is flat, although the estimates associated with the younger age groups are somewhat higher. To the extent this trend is real it can be interpreted as either recent increases in the risk of dying from maternal causes or as more complete reporting of recent events by younger respondents. When aggregating across all respondents, the life-time risk of maternal death is .037 or, in other words, a life-time risk of dying of maternity-related causes of about 1 in 27. This can be transformed into an estimate of the maternal mortality ratio (maternal deaths per 100,000 births). The estimate, which pertains to about 12 years before the survey (1977), is 537.

9.7 DISCUSSION

Data on maternal mortality in Sudan are scarce, although it has been suggested that maternal mortality is relatively high due to the widespread practice of female circumcision. The radical forms of female circumcision can lead to obstruction at the time of delivery as a result of distortion of the entrance to the birth canal and loss of muscle tone due to scarification (Royston and Armstrong, 1989). Nearly three-quarters of ever-married women in Sudan have undergone the most radical form of circumcision, i.e., Pharaonic circumcision, in which all of the external genitalia are cut away and the two sides of the vulva are stitched together leaving only a small opening for elimination of urine and menstrual blood. Another 15 percent of women have been circumcised with a less radical form which leaves a greater amount of the genitalia intact (see Chapter 10).

A few estimates of maternal mortality in Sudan are available from hospital data. UNICEF gave a ratio of 660 per 100,000 live births, based on data for hospitals in 1967-68 (Grant, 1990). A similar rate, 607 maternal deaths per 100,000 births, excluding deaths due to abortions, is given for Khartoum Teaching Hospital in the mid-1970's (Abbo, 1982). The only non-hospital estimate is for Khartoum Province in 1982: 320 deaths per 100,000 live births (Bayomi, 1976).

The direct estimate of the maternal mortality ratio from the SDHS for the period 1976-82 is 352 maternal deaths per 100,000 live births; for the period 1983-89 it is 552 deaths per 100,000 births. The indirect estimate of the maternal mortality ratio is 537, which is the average of women's experience over an extended period before the survey, centred on approximately 12 years prior to the survey (i.e., 1977).

Table 9.4 Estimates of maternal mortality using the indirect method, Sudan DHS 1989-90

Respondents' age group	Number of respondents (a)	Number of sisters 15+ (b)	Sisters 15+ ever-married (c)	Maternal deaths (d)	Adjustment factor (e)	Sister units of risk exposure (f)[a]	Lifetime risk of maternal death (g=d/f)	Proportion of dead sisters dying of maternal causes (h)
15-19	380	631	691[b]	4	.107	74	.054	.29
20-24	938	1924	1705[b]	14	.206	351	.040	.37
25-29	1355	3357	2150	35	.343	737	.048	.34
30-34	970	2497	1770	31	.503	890	.035	.33
35-39	1047	2501	2024	47	.664	1343	.035	.41
40-44	630	1422	1236	35	.802	991	.035	.34
45-49	540	1170	1078	32	.900	970	.033	.29
Total	5860	13502	10654	198		5356	.037	.34

Maternal mortality ratio[c] = 537

[a]For age groups 15-19 through 45-49, column (f) = (column c) X (column e).

[b]Derived by multiplying the number of respondents by the average number of ever-married sisters per respondent reported for respondents age 30-34 (1.82)

[c]$MMR = (1 - [1 - \text{Lifetime Risk}]^{1/TFR}) \times (100{,}000)$,
where TFR represents the total fertility rate 10-14 years before the survey which was estimated as 7.0,
and 100,000 is a factor which converts the estimated risk per birth to risk per 100,000 births.

While there is general consistency between the SDHS estimates and previous estimates, little can be concluded from comparing hospital-based studies with population-based studies, or by comparing a study conducted in one region with a study covering six regions. However, other results support the SDHS findings of high maternal mortality in Sudan.

First, 35 percent of deaths to adult sisters in the SDHS were attributed to maternal causes. A regression of the proportion of maternal deaths among female deaths, for women age 15-49, on the maternal mortality ratio for selected populations (Boerma, 1987) suggests that a proportion of female deaths due to maternal causes of greater than 30 percent is associated with maternal mortality ratios of 500 or higher. Furthermore, the level of adult female mortality from all causes in Sudan is similar to that found in Bolivia where a DHS study of maternal mortality was recently carried out (Rutenberg et al., 1990). Both countries had mortality rates of about 2.5 per 1,000, for women 15-49; however, in Bolivia only 23 percent of the deaths were attributed to maternal causes, while 35 percent were in the Sudan.

Trends in the maternal mortality rate and ratio in the 20 years preceding the survey provide some clues to the pattern of maternal mortality in Sudan. The maternal mortality rate has remained nearly constant, while the maternal mortality ratio has risen. During the same period, fertility has decreased with the decline accelerating near the time of the survey. Generally, decreasing fertility is associated with a decreasing lifetime risk of maternal mortality because fewer pregnancies or births implies that a woman reduces her exposure to a maternal death. Thus, when fertility has been declining one would expect a decreasing maternal mortality rate.

However, in Sudan the maternal mortality rate has remained unchanged, despite decreasing fertility. Even though Sudanese women are experiencing fewer pregnancies and births, and thus should have lowered their exposure to a maternal death, this does not appear to be the case and the risk to each woman has remained constant. One explanation for the unchanged risk of maternal mortality is underreporting of maternal deaths in the earlier period; however, the degree of underreporting would have to be extensive to have an effect on the reported maternal mortality rate.

The SDHS results suggest that an important contribution to maternal mortality in Sudan is a risk behaviour that is not mitigated by a switch from high to moderate fertility. One such "risk" behaviour would be the first birth. Analysis of differentials in maternal mortality by parity hint at an elevated risk of maternal mortality for first births; however, due to ambiguity in the coding of the data on the parity of women at the time of death, these findings are only speculative.

It is hypothesized that an important component of the high maternal mortality rate in Sudan is the high rate of maternal mortality at the time of the first birth. A major factor in these deaths would be complications, most likely obstructed labour, caused by the physiological results of female circumcision. If this hypothesis is correct, lowering maternal mortality in Sudan will require action on two fronts: 1) the abolition or reduction of the practice of female circumcision (or at least the advocacy of less radical forms of circumcision) and 2) educating women, their families, and health workers to recognize the signs of high risk pregnancies, particularly prolonged labour. Educational programmes should emphasize that high risk pregnant women should be taken to a facility equipped to handle complicated maternity cases.

CHAPTER 10

FEMALE CIRCUMCISION

Female circumcision is widely practised in all regions of northern Sudan, although there is variation in prevalence, type of circumcision, and associated customs. Female circumcision is called *Khifad* in classical Arabic, which means reduction. In popular Arabic and in Sudan, it is called *Tahur*, meaning purity and cleanliness.

There are three types of female circumcision in Sudan. Sunna circumcision, the mildest type, consists of removing the tip of the prepuce of the clitoris, and is analogous to male circumcision. The second type is Pharaonic circumcision, which consists of removing the clitoris, labia minora and labia majora and sewing the two sides of the wound together. Pharaonic circumcision is, in fact, excision plus infibulation, i.e., closing of the vagina by various means so that only a small opening is left for passage of urine and menstrual blood. The third type, *Matwasat*, or intermediate circumcision, came into being after legislation forbidding Pharaonic circumcision was passed in 1946. This type lies between Sunna and Pharaonic circumcision in terms of the amount of tissue excised; Matwusat varies greatly, but generally entails removal of the clitoris, anterior parts or all of the labia minora, and some or all of the labia majora. The two sides are then stitched together as in the Pharaonic form, but the opening left may be slightly larger.

The practice of female circumcision in Sudan is based mainly on tradition and not on religion. Female circumcision is not explicitly enjoined in the Koran, although according to an *Ahadith* (saying of the Prophet) male circumcision is an ordinance while female circumcision is said to be "preferable," *makrama* or embellishment. In most areas there exists strong social pressure to maintain the tradition and uncircumcised girls are generally viewed as unmarriageable. Traditionally, some tribes in northern Sudan did not have female circumcision, but the practice was adopted after coming in contact with tribes that did. The circumcision operation is performed on girls as young as a few days old to a maximum of eleven years, although the most common age is six to eight years.

As early as 1946, legislation was passed banning Pharaonic circumcision, but the law was not enforced. In 1947 a national committee was formed, the Committee for Fighting Female Circumcision, comprised of members from various social and professional groups. After a number of nongovernmental conferences and seminars were held (including a World Health Organization seminar in 1979), the government approved the WHO's recommendation for an explicit policy to abolish the practice; however, the government has not yet declared an explicit policy or enacted specific laws to eradicate female circumcision, although it supports private efforts to abolish the practice.

The SDHS questionnaire included a series of questions on female circumcision. The main aim was to assess the impact of the eradication campaign and to collect data on women's attitudes and behaviour regarding the practice. In addition, the questionnaire sought to obtain women's suggestions for ways to structure new campaigns to abolish the practice.

Data were collected on the type of circumcision received by respondents and who performed the operation. Women were asked if their daughters were circumcised and whether they planned to have all their daughters circumcised. Questions were asked about attitudes toward female circumcision in general and reasons for supporting or opposing the practice. Women who said they were opposed to female

circumcision were asked why they thought the practice continues and what the best way is to eradicate it. In the case of married women, data were collected on their perceptions of their husbands' attitudes toward female circumcision and the type of circumcision their husbands preferred.

10.1 PRACTICE OF FEMALE CIRCUMCISION

Prevalence of Female Circumcision

Table 10.1 indicates that 89 percent of ever-married women in Sudan are circumcised, which represents a slight drop from the 96 percent reported in the 1977-78 Sudan Fertility Survey. The SDHS data show practically no difference in circumcision prevalence by age, the lowest being among teenage

Prevalence and types of female circumcision

Table 10.1 Percentage of ever-married women circumcised and the percent distribution of circumcised women by type of circumcision, according to selected background characteristics, Sudan DHS 1989-90

Background characteristic	Percentage of women circumcised	Type of circumcision[1]				Number of circumcised women	Number of ever-married women
		Pharaonic	Intermediate	Sunna	Total percent		
Age							
15-19	86.8	73.9	4.2	21.8	100.0	330	380
20-24	89.7	77.9	3.2	18.8	100.0	841	938
25-29	88.6	81.0	2.7	16.3	100.0	1201	1355
30-34	89.7	83.6	3.0	13.4	100.0	870	970
35-39	89.0	85.1	2.6	12.3	100.0	932	1047
40-44	89.0	84.7	2.5	12.7	100.0	561	630
45-49	90.9	88.8	1.8	9.4	100.0	491	540
Residence							
Urban	93.0	82.1	3.9	14.0	100.0	2028	2181
Rural	86.9	82.5	2.1	15.4	100.0	3198	3679
Region							
Khartoum	96.1	83.6	5.5	10.9	100.0	1200	1249
Northern	98.7	98.2	0.3	1.5	100.0	389	394
Eastern	86.5	73.1	1.9	24.8	100.0	577	667
Central	94.6	85.7	1.5	12.7	100.0	1512	1599
Kordofan	95.5	82.5	2.4	15.1	100.0	867	908
Darfur	65.3	71.2	3.5	25.3	100.0	681	1043
Religion							
Muslim	90.0	82.9	2.6	14.5	100.0	5170	5745
Christian	46.8	26.9	26.9	46.2	100.0	52	111
Total	89.2	82.3	2.7	14.8	100.0	5226	5860

[1]The "other" responses are included in the Intermediate category and the percents for six missing cases are not shown but are included in the total percent.

women (87 percent) and the highest among women 45-49 (91 percent). As mentioned earlier, the tradition of female circumcision is not confined to Muslims; 47 percent of Christian women have also been circumcised. Differentials by region reflect the fact that certain tribes in the Darfur and Eastern regions do not practice female circumcision. Only 65 percent of women in Darfur and 87 percent of women in the Eastern region are circumcised, compared with at least 95 percent of the ever-married women in other regions. Since the two regions with lower levels of female circumcision are largely rural, a slightly higher proportion of women residing in urban areas (93 percent) than in rural areas (87 percent) report having been circumcised. The differentials by education are not considered because women are circumcised at too young an age for education to have any effect.

Type of Circumcision and Circumcision Provider

Table 10.1 also shows the percent distribution of circumcised women by the type of circumcision performed. The overwhelming majority received Pharaonic circumcision (82 percent of circumcised women). Fifteen percent underwent Sunna circumcision, and 3 percent had the intermediate type of circumcision. Although the prevalence of circumcision has not changed appreciably over the years, it appears that the Pharaonic type is on the decline and the Sunna type is on the rise. Sunna circumcision is more than twice as prevalent among women below 25 years of age (about 20 percent) as it is for those in their forties (10 percent). The proportions of various types of circumcision in the urban and rural areas are almost identical. Pronounced differentials are observed between the regions. One-fourth of women in the Eastern and Darfur regions (regions with the lowest proportions of women circumcised) were Sunna circumcised, while only a negligible proportion of those residing in the Northern region (less than 2 percent) had the same type of circumcision. The proportions of women in other regions with Sunna circumcision vary only slightly and range between 11 percent (Khartoum) to 15 percent (Kordofan). Among Christian women, Sunna was more common (46 percent) than Pharaonic (27 percent) and intermediate (27 percent).

Table 10.2 shows that traditional birth attendants (TBA) perform most circumcisions (64 percent), while trained midwives perform around one-third and doctors less than one percent. However,

Persons who perform female circumcision

Table 10.2 Percent distribution of circumcised women by person who performed the circumcision according to the type of circumcision, Sudan DHS, 1989-90

Type of circumcision	Type of circumcisor						
	Doctor	Trained midwife	TBA	Other	Missing	Total percent	Number of women
Pharaonic	0.3	33.9	65.3	0.3	0.2	100.0	4303
Intermediate	2.9	64.0	32.4	0.7	0.0	100.0	139
Sunna	2.2	35.0	61.9	0.4	0.5	100.0	775
Total	0.7	34.9	63.9	0.3	0.2	100.0	5226

Note: Total includes nine women whose circumcision type was "other" or not given.
TBA = Traditional birth attendant

the intermediate type of circumcision is twice as likely to be performed by a trained midwife (64 percent) as by a TBA (32 percent).

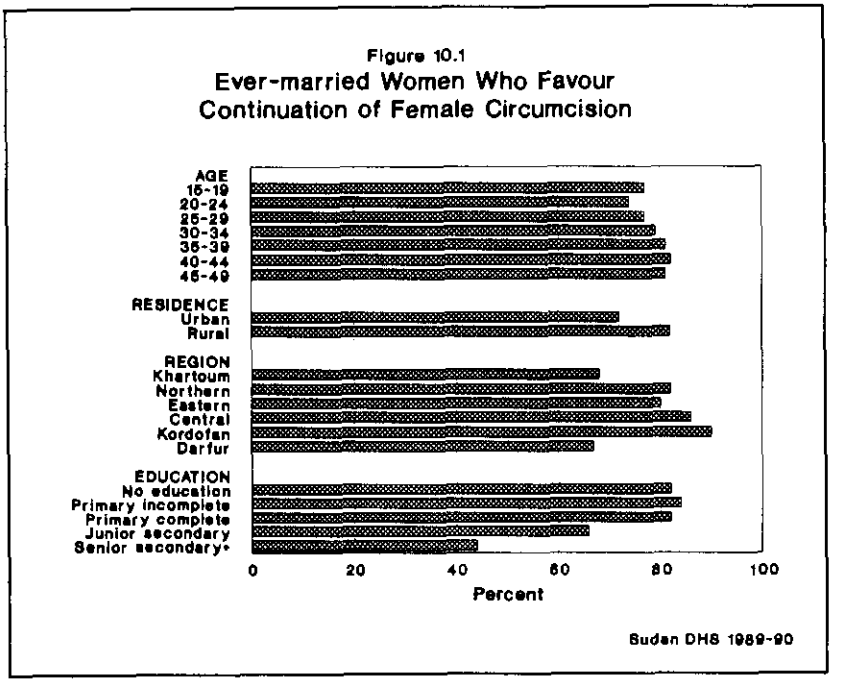
10.2 ATTITUDES TOWARD CIRCUMCISION

Women's Attitude Toward Female Circumcision

All women surveyed were asked, "Do you think female circumcision should continue?" Those who supported retaining the practice were also asked the type of circumcision they preferred.

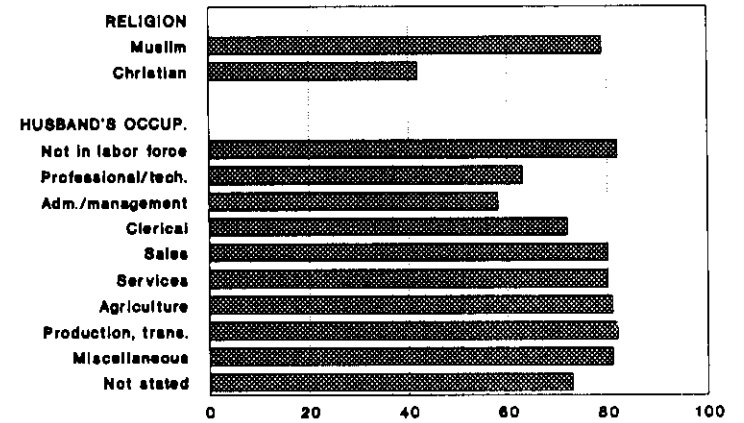
The majority of ever-married women (79 percent) support female circumcision (Figure 10.1), although younger women are less likely to support the practice than older women; 74 percent of women age 20-24 support continuation of female circumcision, compared with 80 percent of women over 34 years. Also the proportion of women who think circumcision should continue is smaller in urban areas (72 percent) than in rural (82 percent). The greater opposition to female circumcision among urban women may be explained by higher education in urban areas. Only two-thirds of women with junior secondary and less than half (44 percent) of those with secondary or higher schooling support the practice

Figure 10.1
Ever-married Women Who Favour Continuation of Female Circumcision



of female circumcision, compared with over four-fifths of less educated women. Regarding regional differentials, two factors seem to be operating in women's attitudes toward female circumcision—education of women and the proportion of women circumcised. Less than 70 percent of women in Khartoum and Darfur, around 80 percent in the Northern and Eastern regions, and 90 percent in the Central and Kordofan regions approve of circumcision. The lower level of support in Khartoum is presumably related to the presence of more highly educated women, while the lower level of support in Darfur is most likely due to the fact that circumcision is not uniformly practised there. As expected, Christian women are much less likely to approve of female circumcision than Muslim women (Figure 10.2). The relation between husband's occupation and wife's attitude toward female circumcision shows that women whose husbands had administrative or professional jobs were less likely to approve of the practice than wives whose husbands were employed in other types of jobs.

Figure 10.2
Ever-married Women Who Favour Continuation of Female Circumcision by Religion and Husband's Occupation



Attitude Toward Circumcision of Daughters

In addition to a question on attitudes toward circumcision in general, respondents were asked two questions to ascertain their attitude towards circumcising their own daughters. All women who had living daughters were asked, "Are all of your daughters circumcised?" Those who had one or more daughters still uncircumcised were also asked, "Do you plan to have all your daughters circumcised?" Table 10.3 compares circumcision approval rates for respondents' own daughters and for female circumcision in general according to the type of circumcision the respondent had and also according to the circumcision status of their daughters. The table reveals that, except for those who were themselves not circumcised, the support for circumcising daughters is even stronger than support for circumcising women in general. For example, among those who had Pharaonic circumcision, although only 85 percent say they favour the continuation of female circumcision, 94 percent plan to circumcise their own daughters. Thus, 9 percent of women with the Pharaonic type of circumcision do not favour the practice of circumcision but feel compelled to have their own daughters circumcised.

Considering the circumcision status of daughters and approval of female circumcision, Table 10.3 shows that the approval of circumcision is less than 20 percent among women whose daughters were uncircumcised, although they had attained the age at which the operation is generally performed, compared with 90 percent or more among those who had either all or some of their daughters circumcised.

Type of Circumcision Preferred

It should be noted that the type of circumcision preferred was asked only of those who approved of female circumcision in general, thus, the results may not necessarily reflect the attitudes of women regarding their own daughters. Nevertheless, it is useful to examine the type of circumcision preferred by circumcision status of the respondent as well as of her daughters. Table 10.3 indicates that Sunna circumcision (48 percent) is slightly more favoured than Pharaonic (46 percent) and only 5 percent prefer the intermediate type.

Preferred type of female circumcision according to circumcision status of respondents and respondents' daughters

Table 10.3 Percentage of ever-married women who plan to have their daughters circumcised and who think female circumcision should continue, and among those favouring continuation of circumcison, the percent distribution by type of circumcision favoured, according to the type of circumcision they have had and whether their daughters have been circumcised, Sudan DHS 1989-90

Circumcision status	Plan daughters' circumcision	Favour continuation of circumcision	Among those favouring female circumcision in general, the type of circumcision preferred							
			Pharaonic	Intermediate	Sunna	Other	Missing	Total percent	Number of women	Number of ever-married women
Respondent's status										
Never circumcised	15.6	16.9	15.0	5.6	73.8	5.6	0.0	100.0	107	634
Pharaonic	94.4	85.4	56.7	4.4	38.4	0.4	0.1	100.0	3675	4303
Intermediate	88.4	83.5	3.4	49.1	47.4	0.0	0.0	100.0	116	139
Sunna	92.2	89.7	2.4	1.0	96.4	0.1	0.0	100.0	695	775
Daughters' status										
Have no daughters	NA	69.3	44.6	4.6	50.1	0.7	0.0	100.0	1022	1474
All circumcisied	NA	87.7	54.9	4.8	39.8	0.3	0.2	100.0	1230	1403
Elder daughters circumcised	97.2	95.0	46.1	5.5	47.9	0.5	0.1	100.0	1072	1128
Daughters not old enough	85.5	81.7	39.6	5.4	54.2	0.7	0.1	100.0	1206	1477
Daughters old enough but not circumcised	19.6	19.1	29.6	2.8	64.8	2.8	0.0	100.0	71	372
Total	81.6	78.5	46.1	5.0	48.2	0.6	0.1	100.0	4602	5860

Note: Total includes nine women whose circumcision type was "other" or not given and six women whose daughters' circumcision status was missing.

NA=Not applicable

Table 10.3 also shows that a large majority of uncircumcised (74 percent) and Sunna circumcised women (96 percent) favour the Sunna type. It is noteworthy that 15 percent of the uncircumcised women who favour continuation of the practice prefer Pharaonic circumcision, the most severe form. The difference in attitudes is most noticeable among those who received Pharaonic circumcision. A substantial minority (38 percent) of these women prefer Sunna, the less severe type of circumcision, although most (57 percent) would still like the Pharaonic type to continue.

The majority of women with no daughters, with no daughters circumcised, or with daughters not old enough to be circumcised favour Sunna circumcision, while the majority of mothers whose daughters have all been circumcised show a preference for Pharaonic circumcision.

Table 10.4 gives preferred type of circumcision by selected background characteristics. In general, the weaker the reported support for female circumcision, the stronger the preference for the Sunna type. For example, younger women and urban residents favour Sunna circumcision slightly more than older women and rural dwellers. It is also notable that only 10 percent of women in the highest education category and less than 25 percent of women living in Darfur region prefer Pharaonic circumcision, while 85 percent and 68 percent favour Sunna circumcision. The type of circumcision preferred is sometimes influenced by tribal affiliation. Thus, although women in the Kordofan region overwhelmingly support female circumcision (90 percent), the majority prefer Sunna circumcision, while

Preferred type of female circumcision according to selected background characteristics

Table 10.4 Percentage of ever-married women who favour continuation of female circumcision, and among those favouring continuation, the percent distribution of the type of circumcision favoured, according to selected background characteristics, Sudan DHS 1989-90

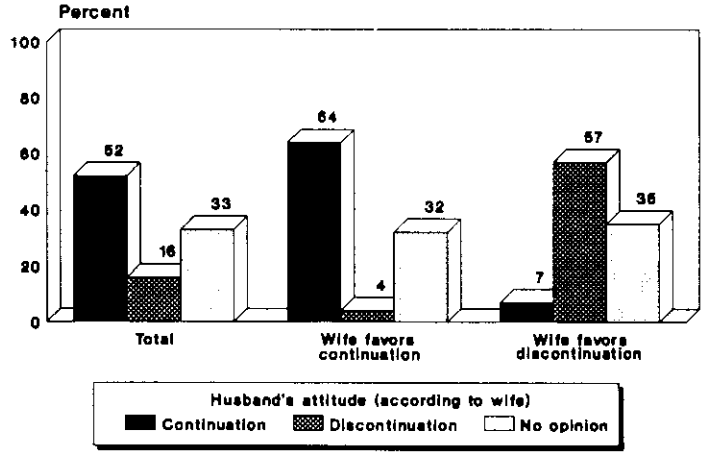
Background characteristic	Favour continuation of circumcision	Among those who favour continuation of circumcision, the type preferred						Number of women	Number of ever-married women
		Pharaonic	Intermediate	Sunna	Other	Missing	Total Percent		
Age									
15-19	77.1	47.4	3.4	48.8	0.3	0.0	100.0	293	380
20-24	74.4	45.4	4.6	49.1	0.9	0.0	100.0	698	938
25-29	76.7	42.5	5.0	51.8	0.7	0.0	100.0	1039	1355
30-34	78.9	44.1	4.6	50.5	0.7	0.3	100.0	765	970
35-39	81.2	46.8	5.9	46.6	0.6	0.1	100.0	850	1047
40-44	82.2	51.2	5.4	43.4	0.0	0.0	100.0	518	630
45-49	81.3	51.3	5.7	42.1	0.7	0.2	100.0	439	540
Residence									
Urban	72.1	39.7	6.2	53.4	0.6	0.1	100.0	1573	2181
Rural	82.3	49.5	4.4	45.4	0.6	0.1	100.0	3029	3679
Region									
Khartoum	68.1	42.8	7.6	48.5	1.1	0.0	100.0	851	1249
Northern	81.7	67.7	2.5	29.5	0.3	0.0	100.0	322	394
Eastern	79.9	54.2	2.8	42.4	0.4	0.2	100.0	533	667
Central	85.9	52.6	4.2	42.5	0.6	0.1	100.0	1374	1599
Kordofan	90.3	43.9	4.3	51.6	0.1	0.1	100.0	820	908
Darfur	67.3	24.1	7.3	67.7	0.9	0.1	100.0	702	1043
Education									
No education	82.4	50.7	4.4	44.3	0.6	0.1	100.0	2822	3425
Primary incomplete	84.3	46.4	6.2	46.8	0.4	0.1	100.0	963	1142
Primary complete	82.3	43.3	7.3	48.2	1.2	0.0	100.0	330	401
Junior secondary	65.8	29.2	5.3	65.1	0.4	0.0	100.0	281	427
Senior secondary+	44.3	10.2	4.4	84.5	1.0	0.0	100.0	206	465
Religion									
Muslim	79.2	46.4	4.9	48.2	0.5	0.1	100.0	4551	5745
Christian	42.3	27.7	21.3	44.7	6.4	0.0	100.0	47	111
Husband's occupation									
Not in labor force	82.1	34.8	17.4	47.8	0.0	0.0	100.0	23	28
Professional/technical/ Administrative/ managerial	62.8	31.2	6.3	61.8	0.6	0.0	100.0	317	504
Clerical	72.3	37.9	4.5	57.6	0.0	0.0	100.0	269	372
Sales	80.0	49.9	4.1	45.3	0.4	0.3	100.0	735	919
Service workers	79.6	45.2	5.7	48.7	0.4	0.0	100.0	787	989
Agricultural, animal husbandary	81.1	49.4	3.9	46.0	0.6	0.1	100.0	1569	1935
Production, transportion	81.5	43.3	7.5	48.4	0.8	0.0	100.0	637	782
Miscellaneous worker	81.0	52.9	4.6	41.2	1.3	0.0	100.0	238	294
Not stated	73.0	51.9	3.7	40.7	3.7	0.0	100.0	27	37
Total	78.5	46.1	5.0	48.2	0.6	0.1	100.0	4602	5860

in the Northern region, two-thirds of the women prefer Pharaonic and less than one-third Sunna circumcision. The husband's occupation is associated with the wife's attitude regarding preferred type of circumcision. Wives of men in professional/technical/administrative/managerial, or clerical occupations are not only less likely to favour continuation of female circumcision, but among those who favour continuation a majority prefer Sunna (58-80 percent). The support for Sunna circumcision is not as strong among women whose husbands have been engaged in other occupations (41 to 49 percent). The preferences of Christian women closely parallel their level of practice and they are less likely than Muslim women to favour Pharaonic circumcision.

Husbands' Attitudes Toward Female Circumcision

Currently married women were also asked about their perception of their husband's attitude toward circumcision. The data are presented in Figure 10.3 and Table 10.5. The figure shows that overall 52 percent of the husbands are perceived to be in favour of the continuation of circumcision and 16 percent in favour of discontinuation; one-third of currently married women either did not know their husband's opinion or stated that their husbands have no opinion about female circumcision. In general,

Figure 10.3
Wife's Perception of Husband's Attitude Toward Female Circumcision by Attitude of Wife



women think their husbands have attitudes toward female circumcision similar to their own. Only 7 percent of women who favour discontinuation believe their husbands favour continuation, while 4 percent of those who favour continuation believe their husbands favour discontinuation.

Husband-wife preferences for the type of circumcision are also examined in Table 10.5. The wives' preferences and their perception of their husbands' preferences differ only slightly. A substantial proportion of women reported that their husbands had no opinion on female circumcision, probably implying that men were less concerned with the practice. Women generally reported that their husbands

Husband's attitude toward female circumcision

Table 10.5 Percent distribution of currently married women by husband's attitude toward female circumcision, according to wife's circumcision preference, Sudan DHS 1989-90

Wife's circumcision preference	Wife's perception of husband's attitude toward female circumcision								
	Husband favours circumcision				Husband favours discon-tinuation	Husband has no opinion	Wife does not know/ missing	Total percent	Number of wives
	Pharaonic	Inter-mediate	Sunna	Other					
Pharaonic	58.3	0.3	5.4	2.0	2.3	31.5	0.3	100.0	1943
Intermediate	6.1	46.2	7.5	4.2	4.2	30.7	0.9	100.0	212
Sunna	2.9	0.8	55.5	2.3	5.6	32.9	0.1	100.0	2051
Other	3.8	0.0	7.7	38.5	0.0	50.0	0.0	100.0	26
Favours discontinuation	2.8	0.5	3.4	0.3	57.4	35.4	0.2	100.0	1164
Total	22.9	2.3	24.1	2.0	15.5	32.9	0.2	100.0	5400

Note: Total includes four women whose circumcision preference was missing.

who had an opinion on the subject, preferred the same type of circumcision as they themselves did. Overall, husbands are perceived as having about equal preference for Sunna (24 percent) and Pharaonic circumcision (23 percent). Women are also equally divided in their preferences for the two types of circumcision; 38 percent of currently married women prefer Sunna circumcision and 36 percent prefer Pharaonic circumcision.

10.3 REASONS FOR ATTITUDES TOWARD CIRCUMCISION

Reasons for Favouring Continuation of Female Circumcision

Respondents who favoured continuation were asked the reason for their attitude. Table 10.6 summarizes respondents' answers to the question, "Why do you think female circumcision should continue?" The first and second reasons (if any) given by each respondent were recorded. Table 10.6 shows that more than two-thirds (68 percent) of women who support continuation want the practice to continue because it is a "tradition" and 19 percent consider female circumcision a "good tradition." Although female circumcision is not explicitly enjoined in the Koran, almost one in seven women gave "religion" as a reason for supporting it. The other reasons mentioned were "cleanliness" (8 percent), "preserves virginity/prevents immorality" (7 percent), and "better marriage prospects" (5 percent). Except for some minor differentials according to respondents' area of residence and education, the order of reasons given is the same. Surprisingly, among urban and more educated women a high proportion approve of circumcision because they believe it is a religious demand, or that the practice results in "cleanliness," or that it helps "preserve virginity/prevent immorality."

Reasons for favouring continuation of female circumcision

Table 10.6 Among ever-married women who favour continuation of female circumcision, percentage giving specific reasons for their attitude, according to area of residence and level of education, Sudan DHS 1989-90

Reason for favouring continuation[1]	Area of residence		Level of education					
	Urban	Rural	No education	Primary incomplete	Primary complete	Junior secondary	Senior secondary+	Total
Tradition	62.6	71.3	71.2	65.1	68.2	64.4	49.0	68.3
Good tradition	18.8	18.4	19.5	18.3	17.3	14.6	13.6	18.5
Religious demand	14.9	13.6	13.2	14.7	13.0	17.4	19.4	14.0
Cleanliness	11.1	5.7	5.8	8.1	7.9	12.8	21.8	7.6
Better marriage prospects	4.6	5.0	4.4	6.5	5.2	3.6	5.3	4.9
Greater pleasure for husband	2.2	1.2	1.2	2.1	1.8	1.8	3.4	1.6
Preserves virginity/ prevents immorality	11.8	5.2	5.6	9.4	8.5	10.3	17.5	7.4
Increases fertility	0.5	0.2	0.2	0.2	0.6	0.4	1.0	0.3
Never thought about reason	2.3	1.8	1.9	2.0	1.8	2.1	2.9	2.0
Other	0.6	0.5	0.5	0.3	0.6	1.1	1.0	0.5
Missing	0.3	0.5	0.5	0.3	0.0	0.4	0.5	0.4
Number of women	573	3029	2822	963	330	281	206	4602

[1]The percentages do not sum to 100 percent because up to two reasons were accepted.

Reasons for Not Favouring Continuation of Female Circumcision

Those who indicated that they would like to see female circumcision stopped were asked why they were opposed to female circumcision. For these respondents, as for those who favoured continuation, the first and second reasons were recorded. As Table 10.7 shows, half of the women cited medical complications as a reason for their opposing the practice, while over one-fourth cited pain associated with the operation. Surprisingly, over one-fourth said that female circumcision was not a Sudanese custom. Religious prohibition was mentioned as a reason for opposing the practice by one in eight women who do no support female circumcision. There was equal mention of the religious prohibition by urban and rural women, but urban women were much more likely to oppose female circumcision because of the medical complications arising from the operation or because it is a painful experience, while rural women were more likely to say that circumcision is not a Sudanese custom. Similarly, educated women were much more likely than uneducated women to oppose circumcision because of medical complications or on the grounds that the practice was a painful personal experience.

Reasons for favouring discontinuation of female circumcision

Table 10.7 Among ever-married women who think female circumcision should not continue, the percentage stating specific reasons for their attitude, according to area of residence and level of education, Sudan DHS 1989-90

Reason for favouring discontinuation[1]	Area of residence		Level of education					Total
	Urban	Rural	No education	Primary incomplete	Primary complete	Junior secondary	Senior secondary+	
Medical complications	69.7	30.7	16.6	74.9	74.6	81.5	83.8	49.6
Not Sudanese custom	9.5	48.0	59.7	3.9	2.8	0.7	0.0	29.4
Painful personal experience	40.6	17.3	8.0	48.0	52.1	44.5	47.5	28.6
Religious prohibition	11.5	12.8	16.0	8.9	4.2	8.2	10.0	12.2
Failure to achieve sexual satisfaction	9.4	2.2	0.8	8.4	5.6	10.3	12.4	5.7
Against woman's dignity	3.0	1.1	0.8	1.7	1.4	3.4	4.2	2.0
Missing	2.0	2.8	3.3	1.7	2.8	0.0	1.9	2.4
Other	1.8	2.6	3.3	1.7	0.0	0.0	1.9	2.2
Number of women	608	648	601	179	71	146	259	1256

[1]The percentages do not sum to 100 percent because up to two reasons were accepted.

10.4 ERADICATION OF FEMALE CIRCUMCISION

Why Female Circumcision Continues

Ever-married women opposing continuation of circumcision were asked why they think female circumcision continues. The results in Table 10.8 reveal that fear of social criticism (27 percent), ignorance of the consequences (21 percent), and the influence of old women/grandmothers (13 percent) are the answers most frequently given. However, it should be pointed out that one in four women overall, four in ten rural women and almost half of the uneducated women said that they do not know why the practice continues. Among urban women only 5 percent women said "don't know." Among those who gave specific answers, higher proportions of urban women and of women with post-primary education mention the influence of old women/grandmothers than of rural women and of those less educated. Other urban-rural and educational differentials in reasons cited for continuing the practice are minimal.

Reasons female circumcision continues

Table 10.8 Percent distribution of ever-married women who oppose continuation of female circumcision by the reason they think female circumcision continues, according to selected background characteristics, Sudan DHS 1989-90

Reason practice continues	Area of residence		Level of education					Total
	Urban	Rural	No education	Primary incomplete	Primary complete	Junior secondary	Senior secondary+	
Fear of social criticism	34.0	20.5	17.5	39.7	32.4	34.9	34.7	27.1
Ignorance of consequences	27.6	15.4	11.8	25.1	33.8	27.4	34.0	21.3
Influence of old women/ grandmothers	17.4	8.0	6.5	17.9	12.7	19.2	19.3	12.6
Fear of intitiating social change	4.9	3.4	3.3	5.0	4.2	4.1	5.4	4.1
Influence of parents	3.8	2.0	2.2	2.8	2.8	5.5	3.1	2.9
Men like it	2.1	2.9	4.8	0.6	0.0	1.4	0.0	2.5
It is a custom	0.5	3.4	3.8	0.6	0.0	0.0	0.4	2.0
Other	1.6	1.5	2.0	1.1	2.8	2.1	0.4	1.6
Insuficient health education	0.8	0.8	0.2	0.6	4.2	2.1	0.8	0.8
Lack of government effort	1.0	0.2	0.0	0.6	2.8	1.4	0.8	0.6
Law not enforced	0.2	0.2	0.2	0.0	0.0	0.7	0.0	0.2
Don't know	5.3	41.4	47.4	5.0	2.8	1.4	0.8	23.9
Missing	0.7	0.3	0.3	1.1	1.4	0.0	0.4	0.5
Total percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of women	608	648	601	179	71	146	259	1256

Abolishing the Practice of Female Circumcision

Ever-married women who disapprove of female circumcision were asked their opinion about the best way to abolish the practice. Again, a large proportion of rural (53 percent) and uneducated (60 percent) women did not give a definite response to the question (Table 10.9). Education campaigns for women and enforcing laws against the practice of were most often mentioned as the best ways to abolish female circumcision. Fifty-five percent of urban women and 27 percent of rural women suggested education campaigns for women as the best way to abolish the practice. The higher the level of education, the greater the proportion of women who gave this suggestion for the eradication of female circumcision. But these differences are in fact minimal; the proportion of women who responded "don't know" is so large it distorts the picture. Only a small percentage of women suggested involving fathers, improving women's status, or sex education as the best way to abolish circumcision.

Women's opinions of the best way to abolish female circumcision

Table 10.9 Percentage of ever-married women who oppose continuation of female circumcision by best way to abolish the practice, according to selected background characteristics, Sudan DHS 1989-90

Best way to abolish female circumcision	Area of residence		Level of education					
	Urban	Rural	No education	Primary incomplete	Primary complete	Junior secondary	Senior secondary+	Total
Enforce laws	23.8	15.7	15.1	26.3	23.9	30.8	18.1	19.7
Education campaign for women	54.9	26.7	20.6	51.4	52.1	61.0	63.7	40.4
Involve fathers	4.8	3.2	3.0	4.5	8.5	2.1	5.8	4.0
Improve women's status	0.8	0.3	0.2	1.1	0.0	0.7	1.2	0.6
Sex education	0.7	0.5	0.2	0.6	1.4	1.4	0.8	0.6
Other/don't know	14.3	52.8	60.2	15.1	12.7	4.1	9.7	34.2
Missing	0.7	0.8	0.7	1.1	1.4	0.0	0.8	0.7
Total percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of women	608	648	601	179	71	146	259	1256

10.5 CONCLUSIONS

While a large majority (78 percent) of women in northern Sudan still favour the continuation of female circumcision, most prefer to see a less severe form of the practice. The reasons cited by those who favour continuation of circumcision (tradition and good tradition) and by those who favour discontinuation for why the practice continues (fear of social criticism, ignorance of consequences) make it clear that change is extremely difficult to bring about in a traditional society such as Sudan. The reasons for favouring discontinuation of the practice (namely, medical complications, painful personal experience, and the fact that female circumcision is not obligatory in Islam and is not viewed as a Sudanese custom by many) can be used in educational campaigns to eradicate the practice. Female educational opportunities, by themselves, may contribute to changes in attitudes and loosen the hold that tradition plays in the continuation of the practice among many who might want to discontinue it. The other approach mentioned—enforcing laws against female circumcision—would require enactment of laws declaring all female circumcision illegal or at least enforcement of laws against Pharaonic circumcision. The chances of the enactment of new laws to abolish female circumcision totally are not promising, especially in light of the recent movement toward conservatism in the country. The increasing level of women's education and the efforts being made to improve the role of women in society are positive factors for those who would like to see the practice of female circumcision made less severe or discontinued entirely.

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APPENDIX A

SAMPLE DESIGN FOR THE SUDAN DEMOGRAPHIC AND HEALTH SURVEY

SAMPLE DESIGN FOR THE SUDAN DEMOGRAPHIC AND HEALTH SURVEY

The sample design used for the Sudan Demographic and Health Survey was a stratified, clustered, self-weighted probability sample of ever-married women 15-49. Due to security problems at the time of the survey, southern Sudan was excluded from the survey. The sample for the Sudan DHS survey was drawn from the six regions in northern Sudan: Darfur, Kordofan, Northern, Central, Eastern, and Khartoum. The nomadic population of northern Sudan was also excluded from the survey.

An important element in the sample selection was the utilization of a combination of sampling procedures to overcome the lack of an adequate sample frame. Threee major area groups were considered: major cities, all other urban areas, and all rural areas. The main objective of one of the sampling procedures was to allocate the sample size in each of the areas; a secondary objective was to update the data for the major cities.

Based on the most available information, the target sample size was fixed at 5,000 completed interviews. Specific numbers of clusters were selected for the Sudan DHS survey with an average sample take of 10 households for the major cities (except Khartoum), 20 for Khartoum city and the rest of the urban area, and 30 for the rural area.

The major cities were sampled with special procedure by selecting 116 areas with probability proportional to the surface area. Each listed area contained 50 households (100 in Khartoum). The area encompassed by the households listed was measured for each primary sampling unit (PSU), and the density calculated. Finally, a sample take for each area was calculated as

$$b_i = b(d_i/d^*)$$

where

d_i is the density of households per km^2 of surface,

d^* is the average of densities values in a domain area, and
b is equal to 10 households (20 in Khartoum).

In the rest of the urban area, the major sampling unit was defined on the basis of the town council. A designated number of town councils were systematically selected in each province with probability proportional to size. Then two quarter councils within each town council were systematically selected with probability proportional to size (size = census population of 1983). After a household listing operation was carried out in each selected quarter council, 20 households were selected from each quarter council.

In the rural areas, rural councils were selected as PSUs with probability proportional to size (size = census population of 1983). Similar to the procedure in the rest of the urban area, two villages councils were selected for the Sudan DHS. Prior to the final selection of households, every village council's chief gave information about the actual composition of villages together with an estimation of the actual number of households in each village. According to this information, one village (or one combined group of villages) was selected. Finally in each selected village, 30 households were chosen for the sample. The final number of clusters points by provinces is given in Table A.1.

The total of targeted households in the sample was estimated by using the following parameters:

- ratio of completed household interviews to the total number of households selected,

  (12,028 / 13,923) = 0.86

- ratio of completed individual interviews to the number of ever-married women age 15-49 contacted.

  (3,204 / 3,923) = 0.81

For the 1989-90 Sudan DHS survey, the above parameters were rounded off to be 0.85 and 0.80, respectively. Because of the requirement for a target sample size of 5,000 completed interviews, it was necessary to target a selection of 7,360 households. Actually, 7,280 households were selected and 5,860 eligible women completed interviews in 314 sample points.

Table A.1 Clusters points by province, SDHS 1989-90

Province	City	Other urban	Rural	Total
KHARTOUM REGION				
Khartoum	56	1[a]	9	66
NORTHERN REGION				
Northern		2	6	8
Nile		4	6	10
EASTERN REGION				
Kassala	12	4	16	32
Red Sea	12		4	16
CENTRAL REGION				
Blue Nile		8	12	20
White Nile	8	6	8	22
Gazeira	8	6	26	40
KORDOFAN REGION				
N. Kordofan	8	4	18	30
S. Kordofan		4	14	18
DARFOUR REGION				
N. Darfour	4	2	18	24
S. Darfour	8	2	24	34
TOTAL	116	43	161	320

[a]After selection, it was observed that one selected cluster in this area was rural.

APPENDIX B

SAMPLING ERRORS

APPENDIX B

SAMPLING ERRORS

Sampling error is defined as the difference between the expected value for any variable measured in a survey and the value estimated by the survey. The estimates from a sample survey are affected by two types of errors: (1) sampling error and (2) nonsampling error. Nonsampling error is the result of mistakes made in carrying out data collection and data processing, including the failure to locate and interview the correct household, errors in the way questions are asked, and data entry errors. Although efforts were made during the implementation of the SDHS to minimize this type of error, nonsampling errors are impossible to avoid and difficult to evaluate statistically.

Sampling error is a measure of the variability between all possible samples that could have been selected from the same population using the same design and size. For the entire population and for large subgroups, the SDHS sample is sufficiently large so that the sampling error for most estimates is small. However, for small subgroups, sampling errors are larger and, thus, affect the reliability of the data.

Sampling error is usually measured in terms of the standard error for a particular statistic (mean, percentage, ratio, etc.), i.e., the square root of the variance. The standard error can be used also to calculate confidence intervals within which the true value for the population can reasonably be assumed to fall. For example, for any given statistic calculated from a sample survey, the value of that statistic as measured in 95 percent of all possible samples with the same design will fall within a range of plus or minus two times the standard error for that statistic.

The computations required to provide sampling errors for survey estimates which are based on complex sample designs like those used for the SDHS survey are more complicated than those based on simple random samples. The software package CLUSTERS was used to assist in computing the sampling errors with the proper statistical methodology. The CLUSTERS program treats any percentage or average as a ratio estimate, r=y/x, where y represents the total sample value for variable y and x represents the total number of cases in the group or subgroup under consideration.

To compute the variance, the package makes use of the formula:

$$\text{var}(r) = \frac{1-f}{x^2} \sum_{h=1}^{H} \left[\frac{m_h}{m_h - 1} \left(\sum_{i=1}^{m_h} z_{hi}^2 - \frac{z_h^2}{m_h} \right) \right]$$

where:

z_{hi} = $y_{hi} - rx_{hi}$;
z_h = $y_h - rx_h$;
H = the number of strata;
m_h = the number cases in stratum h;
y_{hi} = the sum of the values of variable y in cluster i in the h-th stratum;
x_{hi} = the sum of the number of cases in cluster i in the h-th stratum; and
f = the overall sampling fraction, which is so small that the CLUSTERS program ignores it.

In addition to the standard errors, CLUSTERS computes the design effect (DEFT) for each estimate, which is defined as the ratio between the standard error using the given sample design and the standard error that would result if a simple random sample had been used. A DEFT value of 1.0 indicates that the sample design is as efficient as a simple random sample, while a value greater than 1.0 indicates the increase in the sampling error due to the use of a more complex and less statistically efficient design. CLUSTERS also computes the relative error and confidence limits for estimates.

Sampling errors are presented below for selected variables considered to be of major interest. Results are presented for the whole country, urban and rural areas. For each variable, the type of statistic (mean, proportion) and the base population are given in Table B.1. For each variable, Tables B.2-B.4 present the value of the statistic, its standard error, the number of cases, the design effect, the relative standard errors, and the 95 percent confidence limits.

The relative standard error for most estimates for the country as a whole is small, which means that the SDHS results are reliable. There are some differentials in the relative standard error for the estimates by urban-rural residence. For example, for the variable, the proportion ever using a contraceptive method, the relative standard error as a percent of the estimated proportion for the whole country, for urban areas and for rural areas is 4.3 percent, 3.9 percent and 8.2 percent, respectively.

The confidence interval has the following interpretation. The mean number of children ever born among ever-married women is 4.404 and its standard error is 0.046. Therefore, to obtain the upper bound of the 95 percent confidence limit, twice the standard error, i.e., 0.092 is added to the sample mean. To obtain the lower bound, the same amount is subtracted from the mean. There is a high probability (95 percent) that the true mean ideal number of children falls within the interval of 4.311 and 4.496.

Table B.1 List of selected variables with sampling errors, Sudan DHS 1989-90

Variable	Description	Estimate	Population
NOEDUC	With no education	Proportion	Ever-married women 15-49
SECOND	With secondary education or higher	Proportion	Ever-married women 15-49
MIGRAT	Migrated from the South	Proportion	Ever-married women 15-49
MARRIED	Currently married	Proportion	Ever-married women 15-49
POLYG	In polygynous union	Proportion	Ever-married women 15-49
MBEF20	Married before age 20	Proportion	Ever-married women 15-49
SUNNA	Circumcised - Sunna	Proportion	Ever-married women 15-49
PHARON	Circumcised - Pharonic	Proportion	Ever-married women 15-49
APPRFC	Approve female circumcision	Proportion	Ever-married women 15-49
HUSAFC	Husbands approve female circumcision	Proportion	Currently married women 15-49
BBEF18	Has a birth before age 18	Proportion	Ever-married women 15-49
EVBORN	Children ever born	Mean	Ever-married women 15-49
SURVIV	Children surviving	Mean	Ever-married women 15-49
EVB4049	Children ever born	Mean	Ever-married women 40-49
PREGNANT	Currently pregnant	Proportion	Ever-married women 15-49
KNOW	Knowing any contraceptive method	Proportion	Currently married women 15-49
KNOWMOD	Knowing a modern method	Proportion	Currently married women 15-49
KNOWSRC	Knowing source for a modern method	Proportion	Currently married women 15-49
KNOWOV	Knowing fertile period of cycle	Proportion	Ever-married women 15-49
EVERUSE	Ever used any contraceptive method	Proportion	Currently married women 15-49
CURUSE	Currently using any method	Proportion	Currently married women 15-49
CURUSEMO	Currently using a modern method	Proportion	Currently married women 15-49
APPRFP	Approving of family planning	Proportion	Currently married women 15-49 who know a method
NOMORE	Wanting no more children	Proportion	Currently married women 15-49
DELAY	Wanting to delay at least 2 years	Proportion	Currently married women 15-49
IDEAL	Ideal number of children	Mean	Currently married women 15-49
BREASTF	Length of breastfeeding	Mean	Births in last 3 years
AMENOR	Length of amenorrhea	Mean	Births in last 3 years
ABSTAIN	Length of postpartum abstinence	Mean	Births in last 3 years
TETANUS	Mothers received tetanus injection	Proportion	Births in last 5 years
MDCARE	Received medical care at birth	Proportion	Births in last 5 years
HCARD	Having health card	Proportion	Children 12-23 months
BCG	Received BCG vaccination	Proportion	Children 12-23 months
DPT3	Received DPT vaccination (3 doses)	Proportion	Children 12-23 months
POLIO3	Received polio vaccination (3 doses)	Proportion	Children 12-23 months
MEASLES	Received measles vaccination	Proportion	Children 12-23 months
FULLIM	Fully immunized	Proportion	Children 12-23 months
DIAR2W	Had diarrhoea in last 2 weeks	Proportion	Children under 5
ORST	Treated with ORS packets	Proportion	Children under 5 with diarrhoea in last 2 weeks
HOMSOL	Treated with home solution	Proportion	Children under 5 with diarrhoea in last 2 weeks
DIARMF	Consulted a medical facility	Proportion	Children under 5 with diarrhoea in last 2 weeks
COUGH	With cough in last 2 weeks	Proportion	Children under 5
COUGHMF	Consulted a medical facility	Proportion	Children under 5 with cough in last 2 weeks

Table B.2 Sampling Errors - Entire Sample, Sudan DHS 1989-90

Variable	Value (R)	Standard error (SE)	Number of cases	Design effect	Relative error	Confidence limits R-2SE	Confidence limits R+2SE
NOEDUC	.584	.015	5860	2.262	.025	.555	.614
SECOND	.152	.009	5860	1.863	.057	.135	.170
MIGRAT	.011	.002	5860	1.414	.172	.008	.015
MARRIED	.922	.004	5860	1.002	.004	.914	.929
POLYG	.202	.007	5387	1.285	.035	.188	.216
MBEF20	.753	.007	5860	1.273	.010	.739	.768
SUNNA	.132	.007	5860	1.658	.055	.118	.147
PHARON	.734	.012	5860	2.015	.016	.711	.758
APPRFC	.785	.012	5860	2.244	.015	.761	.809
HUSAFC	.515	.010	5400	1.543	.020	.494	.536
BBEF18	.379	.007	5860	1.126	.019	.365	.394
EVBORN	4.404	.046	5860	1.082	.010	4.311	4.496
SURVIV	3.763	.039	5860	1.065	.010	3.685	3.842
EVB4049	7.412	.094	1170	.984	.013	7.225	7.599
PREGNANT	.160	.005	5400	1.043	.033	.149	.170
KNOW	.714	.013	5400	2.037	.018	.689	.739
KNOWMOD	.708	.013	5400	2.066	.018	.683	.734
KNOWSRC	.592	.013	5400	1.957	.022	.565	.618
KNOWOV	.292	.009	5860	1.545	.031	.273	.310
EVERUSE	.252	.011	5400	1.825	.043	.231	.274
CURUSE	.087	.005	5400	1.293	.057	.077	.097
CURUSEMO	.055	.004	5400	1.250	.070	.047	.063
APPRFP	.716	.011	3856	1.179	.015	.694	.737
NOMORE	.249	.007	5400	1.222	.029	.234	.263
DELAY	.319	.007	5400	1.141	.023	.304	.333
IDEAL	5.864	.074	2856	1.264	.013	5.717	6.012
BREASTF	19.647	.283	3956	1.099	.014	19.081	20.213
AMENOR	14.032	.318	3956	1.225	.023	13.396	14.669
ABSTAIN	5.060	.213	3956	1.087	.042	4.634	5.485
TETANUS	.450	.012	6644	1.613	.026	.427	.474
MDCARE	.685	.016	6644	2.116	.024	.653	.717
HCARD	.462	.018	1150	1.235	.040	.425	.498
BCG	.762	.016	1150	1.292	.022	.729	.795
DPT3	.597	.020	1150	1.383	.034	.556	.637
POLIO3	.613	.020	1150	1.376	.033	.573	.653
MEASLES	.612	.019	1150	1.331	.032	.573	.651
FULLIM	.516	.019	1150	1.301	.038	.477	.554
DIAR2W	.298	.007	6062	1.165	.024	.284	.313
ORST	.286	.014	1808	1.189	.049	.258	.314
HOMSOL	.078	.008	1808	1.116	.097	.063	.093
DIARMF	.538	.016	1808	1.219	.029	.507	.569
COUGH	.475	.009	6062	1.242	.020	.457	.494
COUGHMF	.620	.014	2882	1.268	.022	.593	.647

Table B.3 Sampling Errors - Urban Area, Sudan DHS 1989-90

Variable	Value (R)	Standard error (SE)	Number of cases	Design effect	Relative error	Confidence limits R-2SE	Confidence limits R+2SE
NOEDUC	.395	.020	2181	1.953	.052	.354	.436
SECOND	.285	.017	2181	1.792	.061	.251	.320
MIGRAT	.029	.005	2181	1.486	.183	.019	.040
MARRIED	.907	.006	2181	1.017	.007	.895	.920
POLYG	.160	.011	1974	1.274	.066	.139	.181
MBEF20	.699	.013	2181	1.280	.018	.674	.724
SUNNA	.130	.011	2181	1.505	.083	.109	.152
PHARON	.764	.016	2181	1.771	.021	.732	.796
APPRFC	.721	.015	2181	1.590	.021	.691	.752
HUSAFC	.478	.015	1979	1.291	.030	.449	.507
BBEF18	.368	.011	2181	1.082	.030	.345	.390
EVBORN	4.286	.072	2181	1.038	.017	4.142	4.429
SURVIV	3.751	.061	2181	1.001	.016	3.628	3.873
EVB4049	7.000	.160	484	1.047	.023	6.680	7.320
PREGNANT	.145	.008	1979	1.047	.057	.128	.162
KNOW	.916	.010	1979	1.630	.011	.895	.936
KNOWMOD	.913	.010	1979	1.628	.011	.892	.933
KNOWSRC	.834	.014	1979	1.638	.016	.807	.862
KNOWOV	.437	.014	2181	1.351	.033	.408	.466
EVERUSE	.455	.018	1979	1.576	.039	.420	.491
CURUSE	.170	.010	1979	1.227	.061	.149	.191
CURUSEMO	.113	.009	1979	1.218	.077	.095	.130
APPRFP	.731	.014	1812	1.242	.019	.704	.759
NOMORE	.304	.012	1979	1.144	.039	.280	.327
DELAY	.325	.012	1979	1.147	.037	.301	.350
IDEAL	5.282	.098	1300	1.248	.019	5.086	5.478
BREASTF	17.660	.471	1378	1.073	.027	16.719	18.602
AMENOR	10.972	.490	1378	1.174	.045	9.992	11.953
ABSTAIN	5.669	.382	1378	1.095	.067	4.906	6.433
TETANUS	.586	.016	2277	1.310	.028	.554	.619
MDCARE	.859	.017	2277	1.732	.019	.826	.893
HCARD	.528	.029	415	1.163	.055	.470	.585
BCG	.853	.021	415	1.178	.024	.812	.894
DPT3	.713	.027	415	1.183	.037	.660	.766
POLIO3	.733	.027	415	1.228	.037	.679	.786
MEASLES	.699	.028	415	1.234	.040	.643	.755
FULLIM	.605	.029	415	1.203	.048	.546	.663
DIAR2W	.272	.012	2084	1.123	.043	.248	.295
ORST	.355	.023	566	1.070	.066	.308	.402
HOMSOL	.104	.016	566	1.195	.155	.072	.137
DIARMF	.650	.025	566	1.172	.038	.600	.700
COUGH	.476	.014	2084	1.084	.029	.448	.503
COUGHMF	.762	.019	991	1.201	.025	.724	.799

Table B.4 Sampling Errors - Rural Area, Sudan DHS 1989-90

Variable	Value (R)	Standard error (SE)	Number of cases	Design effect	Relative error	Confidence limits R-2SE	Confidence limits R+2SE
NOEDUC	.697	.018	3679	2.427	.026	.660	.734
SECOND	.073	.007	3679	1.627	.095	.059	.087
MIGRAT	.001	.000	3679	.000	.000	.001	.001
MARRIED	.930	.004	3679	.970	.004	.922	.938
POLYG	.226	.009	3413	1.256	.040	.208	.244
MBEF20	.786	.008	3679	1.202	.010	.770	.802
SUNNA	.133	.010	3679	1.740	.073	.114	.153
PHARON	.717	.016	3679	2.127	.022	.685	.748
APPRFC	.823	.017	3679	2.637	.020	.790	.856
HUSAFC	.537	.014	3421	1.667	.026	.509	.566
BBEF18	.386	.009	3679	1.144	.024	.368	.405
EVBORN	4.473	.059	3679	1.098	.013	4.355	4.592
SURVIV	3.771	.051	3679	1.102	.014	3.669	3.873
EVB4049	7.703	.112	686	.932	.015	7.478	7.927
PREGNANT	.168	.007	3421	1.035	.039	.155	.181
KNOW	.597	.017	3421	2.073	.029	.563	.632
KNOWMOD	.590	.018	3421	2.102	.030	.555	.626
KNOWSRC	.451	.017	3421	1.974	.037	.418	.485
KNOWOV	.205	.011	3679	1.685	.055	.183	.228
EVERUSE	.135	.011	3421	1.885	.082	.113	.157
CURUSE	.039	.004	3421	1.183	.101	.031	.046
CURUSEMO	.022	.003	3421	1.102	.126	.016	.027
APPRFP	.702	.016	2044	1.138	.023	.670	.733
NOMORE	.217	.009	3421	1.261	.041	.199	.234
DELAY	.315	.009	3421	1.139	.029	.297	.333
IDEAL	6.350	.097	1556	1.169	.015	6.157	6.544
BREASTF	20.709	.351	2578	1.110	.017	20.008	21.410
AMENOR	15.668	.406	2578	1.247	.026	14.856	16.480
ABSTAIN	4.734	.255	2578	1.082	.054	4.224	5.244
TETANUS	.379	.015	4367	1.738	.039	.349	.409
MDCARE	.594	.022	4367	2.253	.038	.549	.639
HCARD	.424	.023	735	1.271	.055	.378	.471
BCG	.710	.022	735	1.303	.031	.666	.755
DPT3	.531	.027	735	1.454	.051	.476	.585
POLIO3	.546	.026	735	1.410	.048	.493	.598
MEASLES	.563	.025	735	1.352	.045	.513	.613
FULLIM	.465	.025	735	1.345	.054	.415	.515
DIAR2W	.312	.009	3978	1.191	.030	.294	.331
ORST	.254	.017	1242	1.269	.069	.220	.289
HOMSOL	.066	.008	1242	1.056	.122	.050	.082
DIARMF	.487	.019	1242	1.208	.039	.449	.525
COUGH	.475	.012	3978	1.314	.026	.451	.500
COUGHMF	.546	.018	1891	1.327	.033	.510	.582

APPENDIX C

QUESTIONNAIRES

REPUBLIC OF THE SUDAN
MINISTRY OF ECONOMIC AND NATIONAL PLANNING
DEPARTMENT OF STATISTICS

SUDAN DEMOGRAPHIC AND HEALTH SURVEYS
HOUSEHOLD SCHEDULE

IDENTIFICATION	
REGION.....	☐
PROVINCE.....	☐☐
URBAN/RURAL (urban=1, rural=2).....	☐
PLACE NAME _____	
CLUSTER NUMBER.....	☐☐☐
HOUSEHOLD NUMBER.....	☐☐☐
SAME HEAD OF HH ☐ DIFF. HEAD OF HH ☐ ADDITIONAL HH ☐	

INTERVIEWER VISITS				
	1	2	3	FINAL VISIT
DATE.....	_____	_____	_____	MONTH ☐☐ YEAR ☐☐
INTERVIEWER'S NAME	_____	_____	_____	☐☐
RESULT**	_____	_____	_____	☐
NEXT VISIT: DATE	_____	_____		TOTAL NUMBER OF VISITS ☐
TIME	_____	_____		

**RESULT CODES:
1 COMPLETED
2 HOUSEHOLD PRESENT BUT NO COMPETENT RESP. AT HOME
3 HOUSEHOLD ABSENT NIGHT BEFORE INTERVIEW
4 POSTPONED
5 REFUSED
6 DWELLING VACANT OR ADDRESS NOT A DWELLING
7 DWELLING DESTROYED
8 DWELLING NOT FOUND
9 OTHER _____ (SPECIFY)

TOTAL IN HOUSEHOLD ☐☐

TOTAL ELIGIBLE WOMEN ☐☐

	FIELD EDITED BY	OFFICE EDITED BY	CODED BY	KEYED BY
NAME.....	_____	_____	_____	_____
DATE.....	_____	_____	_____	_____
	☐☐	☐☐	☐☐	☐☐

ALL INFORMATION COLLECTED IS CONFIDENTIAL AND IS ONLY FOR RESEARCH

HOUSEHOLD SCHEDULE

Now we would like some information about the people who usually live in your household or who are staying with you now.

NO.	USUAL RESIDENTS AND VISITORS	RESIDENCE		SEX	AGE	EDUCATION		MARRIAGE	ELIGIBILITY
						ALL AGE 10 AND ABOVE			
(1)	Please give me the names of the persons who usually live in your household or are staying with you now, starting with the head of the household. (2)	Does (NAME) usually live here? (3)	Did (NAME) sleep here last night? (4)	Is (NAME) male or female? (5)	How old is he/she in completed years? (6)	What is the highest level and grade of school (NAME) completed? (7)		Has (NAME) ever been married? (8)	CIRCLE LINE NUMBER OF ALL EVER-MARRIED WOMEN AGE 15 - 49. (9)
		YES NO	YES NO	M F	IN YEARS	LEVEL	GRADE	YES NO	
01		1 2	1 2	1 2				1 2	01
02		1 2	1 2	1 2				1 2	02
03		1 2	1 2	1 2				1 2	03
04		1 2	1 2	1 2				1 2	04
05		1 2	1 2	1 2				1 2	05
06		1 2	1 2	1 2				1 2	06
07		1 2	1 2	1 2				1 2	07
08		1 2	1 2	1 2				1 2	08
09		1 2	1 2	1 2				1 2	09
10		1 2	1 2	1 2				1 2	10
11		1 2	1 2	1 2				1 2	11
12		1 2	1 2	1 2				1 2	12
13		1 2	1 2	1 2				1 2	13
14		1 2	1 2	1 2				1 2	14

TICK HERE IF CONTINUATION SHEET USED ☐ TOTAL NUMBER OF ELIGIBLE WOMEN ☐☐

Just to make sure that I have a complete listing:

1) Are there any other persons such as small children or infants that we have not listed? YES ☐ → ENTER EACH IN TABLE NO ☐

2) In addition, are there any other people who may not be members of your family, such as domestic servants, lodgers or friends who usually live here? YES ☐ → ENTER EACH IN TABLE NO ☐

3) Do you have any guests or temporary visitors staying here, or anyone else who slept here last night? YES ☐ → ENTER EACH IN TABLE NO ☐

NO.	USUAL RESIDENTS AND VISITORS	RESIDENCE		SEX	AGE	EDUCATION	MARRIAGE	ELIGIBILITY
						ALL AGE 10 AND ABOVE		
(1)	Please give me the names of the persons who usually live in your household or are staying with you now, starting with the head of the household. (2)	Does (NAME) usually live here? (3)	Did (NAME) sleep here last night? (4)	Is (NAME) male or female? (5)	How old is he/she in completed years? (6)	What is the highest level and grade of school (NAME) completed? (7)	Has (NAME) ever been married? (8)	CIRCLE LINE NUMBER OF ALL EVER-MARRIED WOMEN AGE 15 - 49. (9)
		YES NO	YES NO	M F	IN YEARS	LEVEL GRADE	YES NO	
15		1 2	1 2	1 2			1 2	15
16		1 2	1 2	1 2			1 2	16
17		1 2	1 2	1 2			1 2	17
18		1 2	1 2	1 2			1 2	18
19		1 2	1 2	1 2			1 2	19
20		1 2	1 2	1 2			1 2	20
21		1 2	1 2	1 2			1 2	21
22		1 2	1 2	1 2			1 2	22
23		1 2	1 2	1 2			1 2	23
24		1 2	1 2	1 2			1 2	24
25		1 2	1 2	1 2			1 2	25
26		1 2	1 2	1 2			1 2	26
27		1 2	1 2	1 2			1 2	27
28		1 2	1 2	1 2			1 2	28
29		1 2	1 2	1 2			1 2	29
30		1 2	1 2	1 2			1 2	30

NOTE: IN ARABIC QUESTIONNAIRE THE SPACE IS PROVIDED TO RECORD UPTO 39 HOUSEHOLD MEMBERS

REPUBLIC OF THE SUDAN
MINISTRY OF ECONOMIC AND NATIONAL PLANNING
DEPARTMENT OF STATISTICS

SUDAN DEMOGRAPHIC AND HEALTH SURVEY
INDIVIDUAL QUESTIONNAIRE

IDENTIFICATION	
REGION.....	☐
PROVINCE.....	☐☐
PLACE NAME _____	
URBAN/RURAL (urban=1, rural=2).....	☐
CLUSTER NUMBER.....	☐☐☐
HOUSEHOLD NUMBER.....	☐☐☐
NAME AND LINE NUMBER OF WOMAN.....	☐☐

INTERVIEWER VISITS				
	1	2	3	FINAL VISIT
DATE.....	_____	_____	_____	MONTH ☐☐ YEAR ☐☐
INTERVIEWER'S NAME.	_____	_____	_____	☐☐
RESULT**.....	_____	_____	_____	☐
NEXT VISIT: DATE TIME	_____ _____	_____ _____		TOTAL NUMBER OF VISITS ☐

**RESULT CODES:
1 COMPLETED
2 NOT AT HOME
3 POSTPONED
4 REFUSED
5 PARTLY COMPLETED
6 OTHER _____
(SPECIFY)

	FIELD EDITED BY	OFFICE EDITED BY	CODED BY	KEYED BY
NAME.....	_____	_____	_____	_____
DATE.....	_____	_____	_____	_____
	☐☐	☐☐	☐☐	☐☐

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SECTION 1. RESPONDENT'S BACKGROUND

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP TO
103	RECORD THE TIME.	HOUR..... ☐☐ MINUTES..... ☐☐	
104	First I would like to ask some questions about you and your household. For most of the time until you were 12 years old, did you live in a village or a town?	VILLAGE.....1 TOWN.....2	
104A	What was the name of the province in which you lived as child? RECORD NAME OF PROVINCE, OR IF PLACE WAS OUTSIDE OF SUDAN, NAME OF COUNTRY.	NAME OF PLACE_____ _____ ☐☐	
105	How long have you been living continuously in (NAME OF VILLAGE OR TOWN)?	ALWAYS.....95 VISITOR.....96 → 107 YEARS..... ☐☐	
106	Just before you moved here, did you live in a village or a town?	VILLAGE.....1 TOWN.....2	
106A	What was the name of the province in which you lived just before you moved here? RECORD NAME OF PROVINCE, OR IF PLACE WAS OUTSIDE OF SUDAN, NAME OF COUNTRY.	NAME OF PLACE_____ _____ ☐☐	
106B	What was the reason for you move?	DROUGHT/DESERTIFICATION.....1 FAMINE.....2 EMPLOYMENT.....3 SECURITY.....4 MARRIAGE.....5 OWN OR BETTER HOME.....6 OTHER_____ 7 (SPECIFY)	
107	In what month and year were you born?	MONTH*..... ☐☐ DK MONTH.....98 YEAR..... ☐☐ DK YEAR.....98	
108	How old are you now in completed years? COMPARE AND CORRECT 107 AND/OR 108 IF INCONSISTENT.	AGE IN COMPLETED YEARS..... ☐☐	

* FALL=21, WINTER=22, SUMMER=23

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP TO
108A	Are you now married, widowed, divorced or separated?	MARRIED.....1 WIDOWED.....2 DIVORCED/SEPARATED.....3	
109	Have you ever attended school?	YES.....1 NO.....2	→ 113
110	What was the highest level of school you attended: primary, junior secondary, higher secondary, or higher?	PRIMARY.....1 JUNIOR SECONDARY.....2 HIGHER SECONDARY.....3 HIGHER EDUCATION.....4	
111	What was the highest grade you completed at that level?	GRADE..... ☐	
112	CHECK 110: PRIMARY ☐ ↓ JUNIOR, SECONDARY, OR HIGHER ☐		→ 114
113	Can you read a letter or newspaper easily, with difficulty, or not at all?	EASILY.....1 WITH DIFFICULTY.....2 NOT AT ALL.....3	
114	Do you usually listen to a radio at least once a week?	YES.....1 NO.....2	
115	What is the major source of water for members of your household?	PIPED INTO RESIDENCE.....01 PIPED OUTSIDE.....02 PUBLIC WELL.....03 RIVER, SURFACE WATER.....04 VENDOR.....05 RAINWATER.....06 OTHER _____ (SPECIFY) 07	
117	What kind of toilet facility does your household have?	FLUSH.....1 BUCKET.....2 PIT.....3 OTHER _____ (SPECIFY) .....4 NO FACILITIES.....5	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP TO
120	Does your house have: Electricity? A radio? A television? A refrigerator?	YES NO ELECTRICITY.....1 2 RADIO.....1 2 TELEVISION.....1 2 REFRIGERATOR.....1 2	
120A	What kind of cooking fuel do you use?	GAS.....1 ELECTRICITY.....2 CHARCOAL.....3 WOOD.....4 OTHER_____.5 (SPECIFY)	
121	Does any member of your household own: A bicycle? A motorcycle? A car? A tractor?	YES NO BICYCLE.....1 2 MOTORCYCLE.....1 2 CAR.....1 2 TRACTOR.....1 2	
122	MAIN MATERIAL OF THE FLOOR. RECORD OBSERVATION.	CERAMIC TILES.....1 EARTH/SAND.....2 CEMENT.....3 BRICK.....4 WOOD.....5 OTHER _____.6 (SPECIFY)	
122A	MAIN MATERIAL OF THE WALLS. RECORD OBSERVATION.	BRICK.....1 MUD.....2 CEMENT/CONCRETE.....3 STRAW.....4 WOOD.....5 OTHER _____.6 (SPECIFY)	
130	What is your religion?	MOSLEM.....1 CHRISTIAN.....2 OTHER_____.3 (SPECIFY)	

SECTION 2. REPRODUCTION

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP TO
201	Now I would like to ask about all the births you have had during your life. Have you ever given birth?	YES.....1 NO.....2	→206
202	Do you have any sons or daughters you have given birth to who are now living with you?	YES.....1 NO.....2	→204
203	How many sons live with you? And how many daughters live with you? IF NONE ENTER '00'.	SONS AT HOME..... DAUGHTERS AT HOME.....	
204	Do you have any sons or daughters you have given birth to who are alive but do not live with you?	YES.....1 NO.....2	→206
205	How many sons are alive but do not live with you? And how many daughters are alive but do not live with you? IF NONE ENTER '00'.	SONS ELSEWHERE..... DAUGHTERS ELSEWHERE.....	
206	Have you ever given birth to a boy or a girl who was born alive but later died? IF NO, PROBE: Any (other) boy or girl who cried or showed any sign of life but only survived a few hours or days?	YES.....1 NO.....2	→208
207	How many boys have died? And how many girls have died? IF NONE ENTER '00'.	BOYS DEAD..... GIRLS DEAD.....	
208	SUM ANSWERS TO 203, 205, AND 207, AND ENTER TOTAL. IF NONE ENTER '00'.	TOTAL.....	
209	CHECK 208: Just to make sure that I have this right: you have had in TOTAL ____ live births during your life. Is that correct? YES ☐ ↓ NO ☐→ PROBE AND CORRECT 201-209 AS NECESSARY		
210	CHECK 208: ONE OR MORE BIRTHS ☐ ↓ NO BIRTHS ☐		→220

211 Now I would like to talk to you about all of your births, whether still alive or not, starting with the first one you had. RECORD NAMES OF ALL THE BIRTHS IN 212. RECORD TWINS ON SEPARATE LINES AND CONNECT THEIR SERIAL NUMBERS.

212 What name was given to your (first, next) baby?	213 Is (NAME) a boy or a girl?	214 In what month and year was (NAME) born? PROBE: What is his/her birthday? OR: In what season?	215 Is (NAME) still alive?	216 IF DEAD: How old was (NAME) when he/she died? RECORD DAYS IF LESS THAN ONE MONTH, MONTHS IF LESS THAN TWO YEARS, OR YEARS.	217 IF ALIVE: How old was (NAME) at his/her last birthday? RECORD AGE IN COMPLETED YEARS.	218 IF ALIVE: Is he/she living with you?
01 (NAME)	BOY 1 GIRL 2	MONTH... YEAR....	YES 1 NO 2 → (GO TO 217)	DAYS.....1 MONTHS...2 YEARS....3 (GO TO NEXT BIRTH)	AGE IN YEARS..	YES 1 NO 2
02 (NAME)	BOY 1 GIRL 2	MONTH... YEAR....	YES 1 NO 2 → (GO TO 217)	DAYS.....1 MONTHS...2 YEARS....3 (GO TO NEXT BIRTH)	AGE IN YEARS..	YES 1 NO 2
03 (NAME)	BOY 1 GIRL 2	MONTH... YEAR....	YES 1 NO 2 → (GO TO 217)	DAYS.....1 MONTHS...2 YEARS....3 (GO TO NEXT BIRTH)	AGE IN YEARS..	YES 1 NO 2
04 (NAME)	BOY 1 GIRL 2	MONTH... YEAR....	YES 1 NO 2 → (GO TO 217)	DAYS.....1 MONTHS...2 YEARS....3 (GO TO NEXT BIRTH)	AGE IN YEARS..	YES 1 NO 2
05 (NAME)	BOY 1 GIRL 2	MONTH... YEAR....	YES 1 NO 2 → (GO TO 217)	DAYS.....1 MONTHS...2 YEARS....3 (GO TO NEXT BIRTH)	AGE IN YEARS..	YES 1 NO 2
06 (NAME)	BOY 1 GIRL 2	MONTH... YEAR....	YES 1 NO 2 → (GO TO 217)	DAYS.....1 MONTHS...2 YEARS....3 (GO TO NEXT BIRTH)	AGE IN YEARS..	YES 1 NO 2
07 (NAME)	BOY 1 GIRL 2	MONTH... YEAR....	YES 1 NO 2 → (GO TO 217)	DAYS.....1 MONTHS...2 YEARS....3 (GO TO NEXT BIRTH)	AGE IN YEARS..	YES 1 NO 2

SEASON CODES: FALL=21, WINTER=22, SUMMER=23

212 What name was given to your next baby?	213 Is (NAME) a boy or a girl?	214 In what month and year was (NAME) born? PROBE: What is his/her birthday? OR: In what season?	215 Is (NAME) still alive?	216 IF DEAD: How old was (NAME) when he/she died? RECORD DAYS IF LESS THAN ONE MONTH, MONTHS IF LESS THAN TWO YEARS, OR YEARS.	217 IF ALIVE: How old was (NAME) at his/her last birthday? RECORD AGE IN COMPLETED YEARS.	218 IF ALIVE: Is he/she living with you?
08 _____ (NAME)	BOY 1 GIRL 2	MONTH... ☐☐ YEAR.... ☐☐	YES 1 NO 2 → (GO TO 217)	DAYS.....1 ☐☐ MONTHS...2 ☐☐ YEARS....3 ☐☐ (GO TO NEXT BIRTH)	AGE IN YEARS.. ☐☐	YES 1 NO 2
09 _____ (NAME)	BOY 1 GIRL 2	MONTH... ☐☐ YEAR.... ☐☐	YES 1 NO 2 → (GO TO 217)	DAYS.....1 ☐☐ MONTHS...2 ☐☐ YEARS....3 ☐☐ (GO TO NEXT BIRTH)	AGE IN YEARS.. ☐☐	YES 1 NO 2
10 _____ (NAME)	BOY 1 GIRL 2	MONTH... ☐☐ YEAR.... ☐☐	YES 1 NO 2 → (GO TO 217)	DAYS.....1 ☐☐ MONTHS...2 ☐☐ YEARS....3 ☐☐ (GO TO NEXT BIRTH)	AGE IN YEARS.. ☐☐	YES 1 NO 2
11 _____ (NAME)	BOY 1 GIRL 2	MONTH... ☐☐ YEAR.... ☐☐	YES 1 NO 2 → (GO TO 217)	DAYS.....1 ☐☐ MONTHS...2 ☐☐ YEARS....3 ☐☐ (GO TO NEXT BIRTH)	AGE IN YEARS.. ☐☐	YES 1 NO 2
12 _____ (NAME)	BOY 1 GIRL 2	MONTH... ☐☐ YEAR.... ☐☐	YES 1 NO 2 → (GO TO 217)	DAYS.....1 ☐☐ MONTHS...2 ☐☐ YEARS....3 ☐☐ (GO TO NEXT BIRTH)	AGE IN YEARS.. ☐☐	YES 1 NO 2
13 _____ (NAME)	BOY 1 GIRL 2	MONTH... ☐☐ YEAR.... ☐☐	YES 1 NO 2 → (GO TO 217)	DAYS.....1 ☐☐ MONTHS...2 ☐☐ YEARS....3 ☐☐ (GO TO 219)	AGE IN YEARS.. ☐☐	YES 1 NO 2

219 COMPARE 208 WITH NUMBER OF BIRTHS IN HISTORY ABOVE AND MARK:

NUMBERS ARE SAME ☐ ↓

NUMBERS ARE DIFFERENT ☐→ (PROBE AND RECONCILE)

INTERVIEWER: FOR EACH LIVE BIRTH: YEAR OF BIRTH IS RECORDED
FOR EACH LIVE CHILD: CURRENT AGE IS RECORDED
FOR EACH DEAD CHILD: AGE AT DEATH IS RECORDED ☐

SEASON CODES: FALL=21, WINTER=22, SUMMER=23

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP TO
220	Are you pregnant now?	YES.....1 NO.....2 UNSURE.....8	→225
221	For how many months have you been pregnant?	MONTHS..... ☐☐	
222	Since you became pregnant, have you been given any injection to prevent the baby from getting tetanus, that is, convulsions after birth?	YES.....1 NO.....2 DK.....8	→223
222A	How many injections did you receive for this pregnancy?	NUMBER..... ☐ DK.....8	
222B	Where did you go to get the (last) injection?	GOVERNMENT HOSPITAL.....01 GOVERNMENT HEALTH CENTER.....02 DISPENSARY.....04 DRESSING STATION.....05 PRIMARY HEALTH UNIT.....06 MOBILE CLINIC.....07 PRIVATE DOCTOR.....08 PRIVATE HOSPITAL .....09 OTHER_____.10 (SPECIFY) DK.....98	
223	Did you see anyone for a check on this pregnancy?	YES.....1 NO.....2	→226
224	Whom did you see? PROBE FOR TYPE OF PERSON AND RECORD MOST QUALIFIED.	DOCTOR.....1 TRAINED HEALTH WORKER/MIDWIFE...2 TRADITIONAL BIRTH ATTENDANT.....3 OTHER _____.4 (SPECIFY)	→226
225	How long ago did your last menstrual period start?	DAYS AGO.....1 ☐☐ WEEKS AGO.....2 ☐☐ MONTHS AGO.....3 ☐☐ YEARS AGO.....4 ☐☐ BEFORE LAST BIRTH.....995 NEVER MENSTRUATED.....996	
226	When during her monthly cycle do you think a woman has to be careful to avoid becoming pregnant?	DURING HER PERIOD.....1 RIGHT AFTER HER PERIOD HAS ENDED.....2 IN THE MIDDLE OF THE CYCLE.....3 JUST BEFORE HER PERIOD BEGINS...4 AT ANY TIME.....5 OTHER _____.6 (SPECIFY) DK.....8	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP TO
227	Have you ever been circumcised?	YES.....1 NO.....2	→230
228	What type of circumcision did you have? Did you have pharonic, intermediate or sunna circumcision?	PHARONIC.....1 INTERMEDIATE.....2 SUNNA.....3 OTHER_____.4 (SPECIFY)	
229	Who performed the circumcision?	DOCTOR.....1 TRAINED MIDWIFE.....2 TRADITIONAL MIDWIFE.....3 OTHER_____.4 (SPECIFY)	
230	CHECK 203, 205 AND WRITE TOTAL NUMBER OF DAUGHTERS [ ][ ] Are all of your daughters circumcised? PROBE AND MARK THE APPROPRIATE ANSWER	NO DAUGHTERS.....1 ALL ARE.....2 ELDER DAUGHTERS ARE.....3 DAUGHTERS NOT OLD ENOUGH.....4 DAUGHTERS OLD ENOUGH BUT UNCIRCUMCISED.....5	→232
231	Do you plan to have all of your daughters circumcised?	YES.....1 NO.....2	
232	Do you think female circumcision should continue?	YES.....1 NO.....2	→235
233	What type of circumcision would you prefer?	PHARONIC.....1 INTERMEDIATE.....2 SUNNA.....3 OTHER_____.4 (SPECIFY)	
234	Why do you think female circumcision should be continued? CIRCLE FIRST TWO REASONS MENTIONED. IF ONLY ONE REASON GIVEN CIRCLE CODE 95 FOR THE SECOND REASON	GOOD TRADITION.....01 CUSTOM AND TRADITION.....02 RELIGIOUS DEMAND.....03 CLEANLINESS.....04 BETTER MARRIAGE PROSPECTS.....05 GREATER PLEASURE OF HUSBAND....06 PRESERVATION OF VIRGINITY/ PREVENTION OF IMMORALITY.....07 INCREASED FERTILITY.....08 NEVER THINK ABOUT REASON.....09 OTHER _____.10 NO SECOND REASON GIVEN 95	→238

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP TO
235	Why are you opposed to female circumcision? CIRCLE FIRST TWO REASONS MENTIONED. IF ONLY ONE REASON GIVEN CIRCLE CODE 95 FOR THE SECOND REASON	RELIGIOUS PROHIBITION.....01 FAILURE TO ACHEIVE SEXUAL SATISFACTION.....02 MEDICAL COMPLICATIONS.....03 PAINFUL PERSONAL EXPERIENCE....04 AGAINST DIGNITY OF WOMEN.....05 OTHER _____.06 (SPECIFY) NO SECOND REASON GIVEN 95	
236	Why do you think this practice continues?	IGNORANCE OF CONSEQUENCES.....01 FEAR OF SOCIAL CRITICISM.....02 FEAR OF INITIATING SOCIAL CHANGE.....03 INFLUENCE OF PARENTS.....04 INFLUENCE OF OLD WOMEN/ GRANDMOTHERS.....05 NON-ENFORCEMENT OF THE LAW.....06 LACK OF GOVT EFFORTS TO ENLIGHTEN PEOPLE.....07 INSUFFICIENT HEALTH EDUCATION..08 OTHER _____.09 (SPECIFY)	
237	What, in your opinion, is the best way to abolish the practice?	ENFORCED LEGISLATION.....1 EDUC CAMPAIGNS FOR WOMEN.....2 INVOLVEMENT OF FATHERS.....3 IMPROVEMENT OF WOMENS STATUS....4 SEX EDUCATION.....5 OTHER _____.6 (SPECIFY)	
238	CHECK 108A: MARRIED ☐ WIDOWED, DIVORCED/ SEPARATED ☐		→241
239	Is your husband in favor of continuation or discontinuation of female circumcision?	FAVORS CONTINUATION.....1 FAVORS DISCONTINUATION.....2 HAS NO OPIONION.....3 DK.....8	→241
240	What type of female circumcision does your husband favors?	PHARONIC.....1 INTERMEDIATE.....2 SUNNA.....3 OTHER.....4 DK.....8	
241	PRESENCE OF OTHERS AT THIS POINT.	CHILDREN UNDER 10.....1 2 HUSBAND.....1 2 OTHER MALES.....1 2 OTHER FEMALES.....1 2	

SECTION 3: CONTRACEPTION

301 Now I would like to talk about a different topic. There are various ways or methods that a couple can use to delay or avoid a pregnancy. Which of these ways or methods have you heard about? CIRCLE CODE 1 IN 302 FOR EACH METHOD MENTIONED SPONTANEOUSLY. THEN PROCEED DOWN THE COLUMN, READING THE NAME AND DESCRIPTION OF EACH METHOD NOT MENTIONED SPONTANEOUSLY. CIRCLE CODE 2 IF METHOD IS RECOGNIZED, AND CODE 3 IF NOT RECOGNIZED. THEN, FOR EACH METHOD WITH CODE 1 OR 2 CIRCLED IN 302, ASK 303-305 BEFORE PROCEEDING TO THE NEXT METHOD.

		302 Have you ever heard of (METHOD)? READ DESCRIPTION.	303 Have you ever used (METHOD)?	304 Where would you go to obtain (METHOD) if you wanted to use it? (CODES BELOW)	305 In your opinion, what is the main problem, if any, with using (METHOD)? (CODES BELOW)
01	PILL Women can take a pill every day.	YES/SPONT.....1 YES/PROBED.....2 NO.....3 →	YES.....1 NO.....2	☐☐ OTHER _____	☐☐ OTHER _____
02	IUD Women can have a loop or coil placed inside them by a doctor or a nurse.	YES/SPONT.....1 YES/PROBED.....2 NO.....3 →	YES.....1 NO.....2	☐☐ OTHER _____	☐☐ OTHER _____
03	INJECTIONS Women can have an injection by a doctor or nurse which stops them from becoming pregnant for several months.	YES/SPONT.....1 YES/PROBED.....2 NO.....3 →	YES.....1 NO.....2	☐☐ OTHER _____	☐☐ OTHER _____
04	JELLY/DIAPHRAGM/FOAM Women can place a sponge, suppository, diaphragm, jelly or cream inside them before intercourse.	YES/SPONT.....1 YES/PROBED.....2 NO.....3 →	YES.....1 NO.....2	☐☐ OTHER _____	☐☐ OTHER _____
05	CONDOM Men can use a rubber sheath during sexual intercourse.	YES/SPONT.....1 YES/PROBED.....2 NO.....3 →	YES.....1 NO.....2	☐☐ OTHER _____	☐☐ OTHER _____
06	FEMALE STERILIZATION Women can have an operation to avoid having any more children.	YES/SPONT.....1 YES/PROBED.....2 NO.....3 →	YES.....1 NO.....2	☐☐ OTHER _____	☐☐ OTHER _____
07	MALE STERILIZATION Men can have an operation to avoid having any more children.	YES/SPONT.....1 YES/PROBED.....2 NO.....3 →	YES.....1 NO.....2	☐☐ OTHER _____	☐☐ OTHER _____
08	PERIODIC ABSTINENCE Couples can avoid having sexual intercourse on certain days of the month when the woman is more likely to become pregnant.	YES/SPONT.....1 YES/PROBED.....2 NO.....3 →	YES.....1 NO.....2	Where would you go to obtain advice on periodic abstinence? ☐☐ OTHER _____	☐☐ OTHER _____
09	WITHDRAWAL Men can be careful and pull out before climax.	YES/SPONT.....1 YES/PROBED.....2 NO.....3 →	YES.....1 → NO.....2		☐☐ OTHER _____
10	ANY OTHER METHODS? Have you heard of any other ways or methods that women or men can use to avoid pregnancy? 1 _____ (SPECIFY) 2 _____ (SPECIFY) 3 _____ (SPECIFY)	YES/SPONT.....1 NO.....3	YES.....1 NO.....2 YES.....1 NO.....2 YES.....1 NO.....2	CODES FOR 304 01 GOVERNMENT HOSPITAL 02 GOVERNMENT HEALTH CNTR 03 FAMILY PLANNING CLINIC 04 DISPENSARY 05 OTH. GOVT. HLTH FAC. 06 PHARMACY 07 MOBILE CLINIC 08 PRIVATE DOCTOR 09 PRIVATE HOSPITAL 10 FRIENDS AND RELATIVES 11 OTHERS (SPECIFY) 98 DONT KNOW	CODES FOR 305 02 NOT EFFECTIVE 03 HUSBAND DISAPPROVES 04 OTHERS DISAPPROVE 05 HEALTH CONCERNS 06 ACCESS/AVAILABILITY 07 COSTS TOO MUCH 08 INCONVENIENT TO USE 09 PERMANENT METHOD 11 RELIGION 12 OTHER (SPECIFY) 13 NONE 98 DONT KNOW

306 CHECK 303: NOT A SINGLE "YES" (NEVER USED) ☐ → ; AT LEAST ONE "YES" (EVER USED) ☐ → SKIP TO 309

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP TO
307	Have you ever used anything or tried in any way to delay or avoid getting pregnant? CIRCLE THE APPROPRIATE RESPONSE.	YES.....1 NO.....2	→316
308	What have you used or done? CORRECT 302-303 AND OBTAIN INFORMATION FOR 304 TO 306 AS NECESSARY.		
309	CHECK 303: EVER USED PERIODIC ABSTINENCE ☐ NEVER USED PERIODIC ABSTINENCE ☐		→311
310	The last time you used periodic abstinence, how did you determine on which days you had to abstain?	BASED ON CALENDAR.....1 BASED ON BODY TEMPERATURE.....2 BASED ON CERVICAL MUCUS (BILLINGS) METHOD.....3 BASED ON BODY TEMPERATURE AND MUCUS.....4 OTHER _____ (SPECIFY).....5 NO SPECIFIC SYSTEM.....6	
311	How many living children, if any, did you have when you first did something or used a method to avoid getting pregnant? IF NONE ENTER '00' IN THE BOXES.	NUMBER OF CHILDREN..... ☐☐	
311A	CHECK 108A: MARRIED ☐ WIDOWED, DIVORCED/ SEPARATED ☐		→315F
312	CHECK 220: NOT PREGNANT OR UNSURE ☐ PREGNANT ☐		→316
313	Are you currently doing something or using any method to avoid getting pregnant?	YES.....1 NO.....2	→315F
314	Which method are you using?	PILL.....01 IUD.....02 INJECTIONS.....03 JELLY/DIAPHRAGM/FOAM.....04 CONDOM.....05 FEMALE STERILIZATION.....06 MALE STERILIZATION.....07 PERIODIC ABSTINENCE.....08 WITHDRAWAL.....09 OTHER _____ (SPECIFY).....10	→315 →315A →315B →319

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP TO
314A	Please show me the package of pills you are now using. (RECORD NAME OF BRAND.)	BRAND NAME ☐☐ NOT ABLE TO SHOW.....96	
314B	How much does one packet (cycle) of pills cost you?	COST ☐☐ FREE.....96 DONT KNOW.....98	
315	Where did you obtain (METHOD) the last time?	GOVERNMENT HOSPITAL .....01 GOVERNMENT HEALTH CENTRE.....02 FAMILY PLANNING CLINIC .....03 DISPENSARY.....04 OTH. GOVT. HLTH FAC.....05 PHARMACY.....06 MOBILE CLINIC.....07 PRIVATE DOCTOR.....08 PRIVATE HOSPITAL.....09 FRIENDS AND RELATIVES.....10 OTHERS (SPECIFY)_____11 DONT KNOW.....98 → 319	
315A	Where did the sterilization take place?		
315B	Where did you obtain instructions for this method?		
315C	Was there anything you particularly disliked about the (SOURCE OF LAST METHOD) or the services you received there?	NONE.....1 TOO FAR.....2 WAIT TOO LONG.....3 NOT COMFORTABLE WITH STAFF.....4 SERVICES EXPENSIVE.....5 DESIRED METHOD UNAVAILABLE.....6 OTHER_____.7 (SPECIFY) UNSURE.....8	
315D	CHECK 314: USING PILL, INJECTIONS, DIAPHRAGM/FOAM/JELLY OR CONDOM ☐ V USING ANY OTHER METHOD ☐ → 319		
315E	Did you ever stop using your method because you could not get supplies at the (SOURCE OF CURRENT METHOD)?	YES.....1 NO.....2 → 319	
315F	CHECK 208: ANY BIRTHS? YES ☐ V NO ☐ → 316		
315G	Since your last birth have you done anything or used any method to avoid getting pregnant?	YES.....1 NO.....2 → 316	
315H	What was the last method you used?	PILL.....01 IUD.....02 INJECTIONS.....03 DIAPHRAGM/FOAM/JELLY.....04 CONDOM.....05 FEMALE STERILIZATION.....06 MALE STERILIZATION.....07 PERIODIC ABSTINENCE.....08 → 315J WITHDRAWAL.....09 OTHER_____.10 → 315K (SPECIFY)	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP TO
315I	Where did you obtain (METHOD) the last time?	GOVERNMENT HOSPITAL .....01 GOVERNMENT HEALTH CNTR E.....02 FAMILY PLANNING CLINIC .....03 DISPENSARY.....04 OTH. GOVT. HLTH FAC.....05 PHARMACY.....06 MOBILE CLINIC.....07 PRIVATE DOCTOR.....08 PRIVATE HOSPITAL.....09 FRIENDS AND RELATIVES.....10 OTHERS (SPECIFY).....11 (SPECIFY) DK.....98	
315J	Where did you obtain instructions for this method?		
315K*	What was the main reason you stopped using (LAST METHOD) then?	TO BECOME PREGNANT.....01 METHOD FAILED.....02 HUSBAND DISAPPROVED.....03 OTHERS DISAPPROVED.....04 HEALTH CONCERNS.....05 ACCESS/AVAILABILITY.....06 COSTS TOO MUCH.....07 INCONVENIENT TO USE.....08 INFREQUENT SEX/HUSB. NOT PRES..10 RELIGION.....11 OTHER _____.12 (SPECIFY) DK.....98	
316	Do you intend to use a method to avoid pregnancy at any time in the future?	YES.....1 NO.....2 DK.....8	319
317	Which method would you prefer to use?	PILL.....01 IUD.....02 INJECTIONS.....03 DIAPHRAGM/FOAM/JELLY.....04 CONDOM.....05 FEMALE STERILIZATION.....06 MALE STERILIZATION.....07 PERIODIC ABSTINENCE.....08 WITHDRAWAL.....09 OTHER_____.10 (SPECIFY) UNSURE.....98	
318	Do you intend to use (PREFERRED METHOD) in the next 12 months?	YES.....1 NO.....2 DK.....8	
319	Is it acceptable or not acceptable to you for family planning information to be provided on radio or television?	ACCEPTABLE.....1 NOT ACCEPTABLE.....2 DK.....8	

* Interviewers were instructed to skip to 319 if sterilization was the answer in 315H

SECTION 4. HEALTH AND BREASTFEEDING

401 CHECK 214:
ONE OR MORE LIVE BIRTHS SINCE JAN. 1984 [ ] (continue)
NO LIVE BIRTHS SINCE JAN. 1984 [ ] → (SKIP TO 445)

402 ENTER THE LINE NUMBER, NAME AND SURVIVAL STATUS OF EACH BIRTH SINCE JAN. 1984 IN THE TABLE. BEGIN WITH THE LAST BIRTH. ASK THE QUESTIONS ABOUT ALL OF THESE BIRTHS.

	(1)	(2)	(3)	(4)
LINE NUMBER FROM Q. 212	[ ][ ]	[ ][ ]	[ ][ ]	[ ][ ]
FROM Q. 212	LAST BIRTH NAME ______	NEXT-TO-LAST BIRTH NAME ______	SECOND-FROM-LAST NAME ______	THIRD-FROM-LAST NAME ______
FROM Q. 215	ALIVE [ ] DEAD [ ]	ALIVE [ ] DEAD [ ]	ALIVE [ ] DEAD [ ]	ALIVE [ ] DEAD [ ]
403 When you were pregnant with (NAME) were you given an an injection in the arm to prevent the baby from getting tetanus, that is, convulsions after birth?	YES...............1 NO...............2 DK...............8 (SKIP TO 404)	YES...............1 NO...............2 DK...............8 (SKIP TO 404)	YES...............1 NO...............2 DK...............8 (SKIP TO 404)	YES...............1 NO...............2 DK...............8 (SKIP TO 404)
403A How many times did you get this injection?	TIMES.......... [ ] DK...............8	TIMES.......... [ ] DK...............8	TIMES.......... [ ] DK...............8	TIMES.......... [ ] DK...............8
404 When you were pregnant with (NAME), did you see anyone for a check on this pregnancy? IF YES: Whom did you see? PROBE FOR THE TYPE OF PERSON AND RECORD THE MOST QUALIFIED.	DOCTOR............1 TRAINED HEALTH WORKER/MIDWIFE...2 TRADITIONAL BIRTH ATTENDANT........3 OTHER ________.4 (SPECIFY) NO ONE 5	DOCTOR............1 TRAINED HEALTH WORKER/MIDWIFE...2 TRADITIONAL BIRTH ATTENDANT........3 OTHER ________.4 (SPECIFY) NO ONE 5	DOCTOR............1 TRAINED HEALTH WORKER/MIDWIFE...2 TRADITIONAL BIRTH ATTENDANT........3 OTHER ________.4 (SPECIFY) NO ONE 5	DOCTOR............1 TRAINED HEALTH WORKER/MIDWIFE...2 TRADITIONAL BIRTH ATTENDANT........3 OTHER ________.4 (SPECIFY) NO ONE 5
405 Who assisted with the delivery of (NAME)? PROBE FOR THE TYPE OF PERSON AND RECORD THE MOST QUALIFIED.	DOCTOR............1 TRAINED HEALTH WORKER/MIDWIFE...2 TRADITIONAL BIRTH ATTENDANT........3 OTHER ________.4 (SPECIFY) NO ONE............5	DOCTOR............1 TRAINED HEALTH WORKER/MIDWIFE...2 TRADITIONAL BIRTH ATTENDANT........3 OTHER ________.4 (SPECIFY) NO ONE............5	DOCTOR............1 TRAINED HEALTH WORKER/MIDWIFE...2 TRADITIONAL BIRTH ATTENDANT........3 OTHER ________.4 (SPECIFY) NO ONE............5	DOCTOR............1 TRAINED HEALTH WORKER/MIDWIFE...2 TRADITIONAL BIRTH ATTENDANT........3 OTHER ________.4 (SPECIFY) NO ONE............5
405A How many months after the birth of (NAME) did your period return?	MONTHS....... [ ][ ] NOT RETURNED.....96	MONTHS....... [ ][ ] NEVER RETURNED...96	MONTHS....... [ ][ ] NEVER RETURNED...96	MONTHS....... [ ][ ] NEVER RETURNED...96
405B Have you resumed sexual relations since the birth of (NAME)?	YES (OR PREGN.)...1 NO................2 (SKIP TO 406)			
405C How long after the the birth of (NAME) did you resume sexual relations?	MONTHS....... [ ][ ] 40 DAYS..........96	MONTHS....... [ ][ ] 40 DAYS..........96	MONTHS....... [ ][ ] 40 DAYS..........96	MONTHS....... [ ][ ] 40 DAYS..........96
	(1)	(2)	(3)	(4)

	(1)	(2)	(3)	(4)
406 Did you ever feed (NAME) at the breast?	YES.....1 (SKIP TO 407) NO.....2	YES.....1 (SKIP TO 408) NO.....2	YES.....1 (SKIP TO 408) NO.....2	YES.....1 (SKIP TO 408) NO.....2
406A Why did you not feed (NAME) at the breast?	INCONVENIENT.....01 HAD TO WORK.....02 INSUFFICNT MILK..03 BABY REFUSED.....04 CHILD DIED.....05 CHILD SICK.....06 OTHER_____.07 (SPECIFY) (BACK TO 403, COL. 2)	INCONVENIENT.....01 HAD TO WORK.....02 INSUFFICNT MILK..03 BABY REFUSED.....04 CHILD DIED.....05 CHILD SICK.....06 OTHER_____.07 (SPECIFY) (BACK TO 403, COL. 3)	INCONVENIENT.....01 HAD TO WORK.....02 INSUFFICNT MILK..03 BABY REFUSED.....04 CHILD DIED.....05 CHILD SICK.....06 OTHER_____.07 (SPECIFY) (BACK TO 403, COL. 4)	INCONVENIENT.....01 HAD TO WORK.....02 INSUFFICNT MILK..03 BABY REFUSED.....04 CHILD DIED.....05 CHILD SICK.....06 OTHER_____.07 (SPECIFY) (ALL SKIP TO 412)
407 Are you still breast-feeding (NAME)? (IF DEAD, CIRCLE '2')	YES.....1 (BACK TO 403, COL.2) NO (CHILD DEAD)...2			
408 How many months did you breastfeed (NAME)?	MONTHS..... UNTIL DEATH.....96 (BACK TO 403, COL. 2)	MONTHS..... UNTIL DEATH.....96 (BACK TO 403, COL. 3)	MONTHS..... UNTIL DEATH.....96 (BACK TO 403, COL. 4)	MONTHS..... UNTIL DEATH.....96 (SKIP TO 412)
408A Why did you stop breastfeeding (NAME)?	INCONVENIENT.....01 HAD TO WORK.....02 INSUFFICNT MILK..03 BABY REFUSED.....04 CHILD DIED.....05 CHILD SICK.....06 CH HAD DIARRHEA..07 CH WEANING AGE...08 BECAME PREGNANT..09 OTHER_____.10 (SPECIFY) (BACK TO 403, COL.2)	INCONVENIENT.....01 HAD TO WORK.....02 INSUFFICNT MILK..03 BABY REFUSED.....04 CHILD DIED.....05 CHILD SICK.....06 CH HAD DIARRHEA..07 CH WEANING AGE...08 BECAME PREGNANT..09 OTHER_____.10 (SPECIFY) (BACK TO 403, COL.3)	INCONVENIENT.....01 HAD TO WORK.....02 INSUFFICNT MILK..03 BABY REFUSED.....04 CHILD DIED.....05 CHILD SICK.....06 CH HAD DIARRHEA..07 CH WEANING AGE...08 BECAME PREGNANT..09 OTHER_____.10 (SPECIFY) (BACK TO 403, COL.4)	INCONVENIENT.....01 HAD TO WORK.....02 INSUFFICNT MILK..03 BABY REFUSED.....04 CHILD DIED.....05 CHILD SICK.....06 CH HAD DIARRHEA..07 CH WEANING AGE...08 BECAME PREGNANT..09 OTHER_____.10 (SPECIFY) (ALL GO TO 412)
	(1)	(2)	(3)	(4)

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP TO
412	CHECK 407 COL.1 FOR LAST BIRTH: LAST CHILD STILL BREASTFED ☐ NAME_____ LAST CHILD DEAD OR NO BREASTFEEDING NOW ☐ 407 IS BLANK ☐		→417A →418
413	How many times did you breastfeed last night between sundown and sunrise?	NUMBER OF TIMES..... ☐☐ AS OFTEN AS CHILD WANTED.....96	
414	How many times did you breastfeed yesterday during the daylight hours?	NUMBER OF TIMES..... ☐☐ AS OFTEN AS CHILD WANTED.....96	
415	At any time yesterday or last night, was (NAME OF LAST CHILD) given any of the following: Sugar water? Plain water? Juice? Powdered milk? Cow's or goat's milk? Bottled baby's formula Any other liquid? Any solid or mushy food?	YES NO SUGAR WATER.....1 2 PLAIN WATER.....1 2 JUICE.....1 2 POWDERED MILK.....1 2 COW'S OR GOAT'S MILK.....1 2 BOTTLED BABY'S FORMULA.....1 2 ANY OTHER LIQUID _____.1 2 (SPECIFY) ANY SOLID OR MUSHY FOOD.....1 2	
416	CHECK 415: WAS GIVEN FOOD OR LIQUID ☐ NO FOOD OR LIQUID GIVEN ☐		→417A
417	Were any of these given in a bottle with a nipple?	YES.....1 NO.....2	
417A	Have you given (Did you give) (NAME OF LAST CHILD) milk other than breast milk on a regular daily basis?	YES.....1 NO.....2	→417C
417B	How many months after the birth of (NAME OF LAST CHILD) did you start giving him/her any kind of milk other than breast milk?	MONTHS..... ☐☐	
417C	Have you given (Did you give) (NAME OF LAST CHILD) solid or semi-solid food on a regular daily basis?	YES.....1 NO.....2	→418
417D	How many months after the birth of (NAME OF LAST CHILD) did you start giving him/her the food?	MONTHS..... ☐☐	
418	At the time you became pregnant with (NAME OF LAST CHILD), did you want to have that child <u>then</u>, did you want to wait until <u>later</u>, or did you want <u>no (more)</u> children at all?	THEN.....1 LATER.....2 NO MORE.....3	

419 ENTER THE NAME, LINE NUMBER, AND SURVIVAL STATUS OF EACH BIRTH SINCE JAN. 1984 BELOW. BEGIN WITH THE LAST BIRTH
THE INFORMATION ABOUT THE CHILDREN IN THE TABLE SHOULD BE EXACTLY THE SAME AS THOSE AFTER Q. 402.
ASK THE QUESTIONS ONLY FOR LIVING CHILDREN.

	(1)	(2)	(3)	(4)
LINE NUMBER FROM Q. 212	☐☐	☐☐	☐☐	☐☐
	LAST BIRTH NAME_____ ALIVE ☐ DEAD ☐	NEXT-TO-LAST BIRTH NAME_____ ALIVE ☐ DEAD ☐	SECOND-FROM-LAST NAME_____ ALIVE ☐ DEAD ☐	THIRD-FROM-LAST NAME_____ ALIVE ☐ DEAD
420 Do you have an immunization card for (NAME)? IF YES: May I see it please?	YES, SEEN.....1 YES, NOT SEEN/NOT CLEAR.....2 (SKIP TO 422) NO CARD.....3	YES, SEEN.....1 YES, NOT SEEN/NOT CLEAR.....2 (SKIP TO 422) NO CARD.....3	YES, SEEN.....1 YES, NOT SEEN/NOT CLEAR.....2 (SKIP TO 422) NO CARD.....3	(GO TO 445) YES, SEEN.....1 YES, NOT SEEN/NOT CLEAR.....2 (SKIP TO 422) NO CARD.....3
421 RECORD DATES OF IMMUNIZATIONS FROM HEALTH CARD.	NOT GIVEN / DA / MO / YR	NOT GIVEN / DA / MO / YR	NOT GIVEN / DA / MO / YR	NOT GIVEN / DA / MO / YR
BCG	1	1	1	1
POLIO 1	1	1	1	1
POLIO 2	1	1	1	1
POLIO 3	1	1	1	1
DPT 1	1	1	1	1
DPT 2	1	1	1	1
DPT 3	1	1	1	1
MEASLES	1	1	1	1
	(SKIP TO 425)	(SKIP TO 425)	(SKIP TO 425)	(SKIP TO 425)
422 Please tell me if (NAME) received any of the following vaccinations? A. BCG, an injection in the arm?	YES, SCAR SEEN.....1 NO SCAR PRESENT.....2 CHILD AWAY.....3 NO/DK.....8	YES, SCAR SEEN.....1 NO SCAR PRESENT.....2 CHILD AWAY.....3 NO/DK.....8	YES, SCAR SEEN.....1 NO SCAR PRESENT.....2 CHILD AWAY.....3 NO/DK.....8	YES, SCAR SEEN.....1 NO SCAR PRESENT.....2 CHILD AWAY.....3 NO/DK.....8
B. Polio, drops by mouth? IF YES: How many times?	YES, TIMES..... ☐ NO/DK.....8	YES, TIMES..... ☐ NO/DK.....8	YES, TIMES..... ☐ NO/DK.....8	YES, TIMES..... ☐ NO/DK.....8
C. DPT IF YES: How many times?	YES, TIMES..... ☐ NO/DK.....8	YES, TIMES..... ☐ NO/DK.....8	YES, TIMES..... ☐ NO/DK.....8	YES, TIMES..... ☐ NO/DK.....8
D. An injection against measles? IF YES:Times?	YES, TIMES..... ☐ NO/DK.....8	YES, TIMES..... ☐ NO/DK.....8	YES, TIMES..... ☐ NO/DK.....8	YES, TIMES..... ☐ NO/DK.....8
424 CHECK 422:	☐ SOME VACCINATION ☐ NO VACCINATION → (SKIP TO 426)	☐ SOME VACCINATION ☐ NO VACCINATION → (SKIP TO 426)	☐ SOME VACCINATION ☐ NO VACCINATION → (SKIP TO 426)	☐ SOME VACCINATION ☐ NO VACCINATION → (SKIP TO 426)
	(1)	(1)	(1)	(1)

	(1)	(1)	(1)	(1)
425 Where did (NAME) receive most of the vaccines?	GOVERNMENT HOSP....01 HEALTH CENTRE......02 MOBILE CLINIC .....03 PRIVATE DOCTOR.... 04 PRIVATE CLINIC.....05 DISPENSARY.........06 DRESSING STATION...07 PRIMARY HEALTH FAC.08 OUTREACH STATION...09 OTHER———10 (SPECIFY) DK.................98	GOVERNMENT HOSP....01 HEALTH CENTRE......02 MOBILE CLINIC .....03 PRIVATE DOCTOR.... 04 PRIVATE CLINIC.....05 DISPENSARY.........06 DRESSING STATION...07 PRIMARY HEALTH FAC.08 OUTREACH STATION...09 OTHER———10 (SPECIFY) DK.................98	GOVERNMENT HOSP....01 HEALTH CENTRE......02 MOBILE CLINIC .....03 PRIVATE DOCTOR.... 04 PRIVATE CLINIC.....05 DISPENSARY.........06 DRESSING STATION...07 PRIMARY HEALTH FAC.08 OUTREACH STATION...09 OTHER———10 (SPECIFY) DK.................98	GOVERNMENT HOSP....01 HEALTH CENTRE......02 MOBILE CLINIC .....03 PRIVATE DOCTOR.... 04 PRIVATE CLINIC.....05 DISPENSARY.........06 DRESSING STATION...07 PRIMARY HEALTH FAC.08 OUTREACH STATION...09 OTHER———10 (SPECIFY) DK.................98
426 Has (NAME) had fever during the last two weeks?	YES.................1 NO..................2 DK..................8	YES.................1 NO..................2 DK..................8	YES.................1 NO..................2 DK..................8	YES.................1 NO..................2 DK..................8
427 Has (NAME) been ill with cough at any time during the last two weeks?	YES.................1 NO..................2 (SKIP TO 430) <— DK..................8	YES.................1 NO..................2 (SKIP TO 430) <— DK..................8	YES.................1 NO..................2 (SKIP TO 430) <— DK..................8	YES.................1 NO..................2 (SKIP TO 430) <— DK..................8
428 How many days did the cough last?	DAYS........... [ ][ ] DK.................98	DAYS........... [ ][ ] DK.................98	DAYS........... [ ][ ] DK.................98	DAYS........... [ ][ ] DK.................98
429 When (NAME) had cough did he/she breathe faster than usual?	YES.................1 NO..................2 DK..................8	YES.................1 NO..................2 DK..................8	YES.................1 NO..................2 DK..................8	YES.................1 NO..................2 DK..................8
430 CHECK 426 AND 427:	[ ] FEVER [ ] NEITHER [ ] COUGH (SKIP TO 433)	[ ] FEVER [ ] NEITHER [ ] COUGH (SKIP TO 433)	[ ] FEVER [ ] NEITHER [ ] COUGH (SKIP TO 433)	[ ] FEVER [ ] NEITHER [ ] COUGH (SKIP TO 433)
431 From whom, if anyone, did you seek advice or treatment fever/cough? Anyone else? (CIRCLE EACH MENTIONED)	GOVERNMENT HOSP.....1 HEALTH CENTRE.......1 PRIVATE DOCTOR......1 PRIVATE HOSPITAL....1 PHARMACY............1 DISPENSARY..........1 DRESSING STATION....1 PRIMARY HEALTH FAC..1 OUTREACH STATION....1 TRADITIONAL DOCTOR..1 OTHER———1 (SPECIFY) DK..................1 NO ONE..............1	GOVERNMENT HOSP.....1 HEALTH CENTRE.......1 PRIVATE DOCTOR......1 PRIVATE HOSPITAL....1 PHARMACY............1 DISPENSARY..........1 DRESSING STATION....1 PRIMARY HEALTH FAC..1 OUTREACH STATION....1 TRADITIONAL DOCTOR..1 OTHER———1 (SPECIFY) DK..................1 NO ONE..............1	GOVERNMENT HOSP.....1 HEALTH CENTRE.......1 PRIVATE DOCTOR......1 PRIVATE HOSPITAL....1 PHARMACY............1 DISPENSARY..........1 DRESSING STATION....1 PRIMARY HEALTH FAC..1 OUTREACH STATION....1 TRADITIONAL DOCTOR..1 OTHER———1 (SPECIFY) DK..................1 NO ONE..............1	GOVERNMENT HOSP.....1 HEALTH CENTRE.......1 PRIVATE DOCTOR......1 PRIVATE HOSPITAL....1 PHARMACY............1 DISPENSARY..........1 DRESSING STATION....1 PRIMARY HEALTH FAC..1 OUTREACH STATION....1 TRADITIONAL DOCTOR..1 OTHER———1 (SPECIFY) DK..................1 NO ONE..............1

	(1)	(2)	(3)	(4)
432 What was given to treat the fever/cough, if anything? Anything else? (CIRCLE EACH MENTIONED)	NO TREATMENT........1 ANTIBIOTIC PILL.....1 ANTIBIOTIC SYRUP....1 OTHER PILL OR OTHER SYRUP.........1 INJECTION...........1 (I.V.) INTRAVENOUS..1 HOME REMEDIES/ HERBAL MEDICINES...1 OTHER ____________1 (SPECIFY)	NO TREATMENT........1 ANTIBIOTIC PILL.....1 ANTIBIOTIC SYRUP....1 OTHER PILL OR OTHER SYRUP.........1 INJECTION...........1 (I.V.) INTRAVENOUS..1 HOME REMEDIES/ HERBAL MEDICINES...1 OTHER ____________1 (SPECIFY)	NO TREATMENT........1 ANTIBIOTIC PILL.....1 ANTIBIOTIC SYRUP....1 OTHER PILL OR OTHER SYRUP.........1 INJECTION...........1 (I.V.) INTRAVENOUS..1 HOME REMEDIES/ HERBAL MEDICINES...1 OTHER ____________1 (SPECIFY)	NO TREATMENT........1 ANTIBIOTIC PILL.....1 ANTIBIOTIC SYRUP....1 OTHER PILL OR OTHER SYRUP.........1 INJECTION...........1 (I.V.) INTRAVENOUS..1 HOME REMEDIES/ HERBAL MEDICINES...1 OTHER ____________1 (SPECIFY)
433 Has (NAME) diarrhea now or had it in the last 24 hours?	YES.................1 (SKIP TO 435) NO..................2	YES.................1 (SKIP TO 435) NO..................2	YES.................1 (SKIP TO 435) NO..................2	YES.................1 (SKIP TO 435) NO..................2
434 Has (NAME) had diarrhea in the last two weeks?	YES.................1 NO..................2 (BACK TO 420, COL.2) DK..................8	YES.................1 NO..................2 (BACK TO 420, COL.3) DK..................8	YES.................1 NO..................2 (BACK TO 420, COL.4) DK..................8	YES.................1 NO..................2 (SKIP TO 445) DK..................8
435 Now I have some questions about (NAME's) last episode of diarrhea. How many days ago did the diarrhea start?	DAYS........... [ ][ ] DK.................98	DAYS........... [ ][ ] DK.................98	DAYS........... [ ][ ] DK.................98	DAYS........... [ ][ ] DK.................98
436 Was there any blood in the stools?	YES.................1 NO..................2 DK..................8	YES.................1 NO..................2 DK..................8	YES.................1 NO..................2 DK..................8	YES.................1 NO..................2 DK..................8
437 CHECK 407: LAST CHILD STILL BREASTFED?	YES [ ] NO [ ] (SKIP TO 439)			
438 During the diarrhea, did you <u>continue</u> breastfeeding as usual, or did you <u>increase</u> the number of feeds or reduce it, or did you <u>stop completely</u>?	MORE................1 LESS................2 SAME................3 STOPPED BREASTFEEDING.....4			
439 (Aside from breastmilk) Was he/she given the same amount to drink as before the diarrhea, or more, or less?	MORE................1 LESS................2 SAME................3 DK..................8	MORE................1 LESS................2 SAME................3 DK..................8	MORE................1 LESS................2 SAME................3 DK..................8	MORE................1 LESS................2 SAME................3 DK..................8
440 Was (NAME) given more, less, or the same amount of solid food as was given before he/she had diarrhea?	MORE................1 LESS................2 SAME................3 STOPPED SOLID FOODS.4 SOLID FOOD NOT YET GIVEN.............5 DK..................8	MORE................1 LESS................2 SAME................3 STOPPED SOLID FOODS.4 SOLID FOOD NOT YET GIVEN.............5 DK..................8	MORE................1 LESS................2 SAME................3 STOPPED SOLID FOODS.4 SOLID FOOD NOT YET GIVEN.............5 DK..................8	MORE................1 LESS................2 SAME................3 STOPPED SOLID FOODS.4 SOLID FOOD NOT YET GIVEN.............5 DK..................8
	(1)	(2)	(3)	(4)

	(1)	(2)	(3)	(4)
441 Was (NAME) given ORS solution made from a special packet? SHOW PACKET.	YES.....1 (SKIP TO 443) NO.....2	YES.....1 (SKIP TO 443) NO.....2	YES.....1 (SKIP TO 443) NO.....2	YES.....1 (SKIP TO 443) NO.....2
442 Was (NAME) given a special home fluid made from sugar, salt and water?	YES.....1 NO.....2 DK.....8	YES.....1 NO.....2 DK.....8	YES.....1 NO.....2 DK.....8	YES.....1 NO.....2 DK.....8
443 What was given for diarrhea, if anything, (other than the mixture you mentioned)?	NO TREATMENT.....1 ANTIBIOTIC PILL.....1 ANTIBIOTIC SYRUP....1 OTHER PILL OR OTHER SYRUP.....1 INJECTION.....1 (I.V.) INTRAVENOUS..1 HOME REMEDIES/ HERBAL MEDICINES...1 OTHER _____1 (SPECIFY)	NO TREATMENT.....1 ANTIBIOTIC PILL OR..1 SYRUP.....1 OTHER PILL OR SYRUP.....1 INJECTION.....1 (I.V.) INTRAVENOUS..1 HOME REMEDIES/ HERBAL MEDICINES...1 OTHER _____1 (SPECIFY)	NO TREATMENT.....1 ANTIBIOTIC PILL OR..1 SYRUP.....1 OTHER PILL OR SYRUP.....1 INJECTION.....1 (I.V.) INTRAVENOUS..1 HOME REMEDIES/ HERBAL MEDICINES...1 OTHER _____1 (SPECIFY)	NO TREATMENT.....1 ANTIBIOTIC PILL.....1 ANTIBIOTIC SYRUP....1 OTHER PILL OR OTHER SYRUP.....1 INJECTION.....1 (I.V.) INTRAVENOUS..1 HOME REMEDIES/ HERBAL MEDICINES...1 OTHER _____1 (SPECIFY)
444 From whom, if anyone, did you seek advice or treatment of diarrhea?	GOVERNMENT HOSP.....1 HEALTH CENTRE.....1 PRIVATE DOCTOR.... .1 PRIVATE HOSPITAL....1 PHARMACY.....1 DISPENSARY.....1 DRESSING STATION....1 PRIMARY HEALTH FAC..1 OUTREACH STATION....1 TRADITIONAL DOCTOR..1 OTHER_____1 (SPECIFY) NO ONE.....1 DK.....1 (ALL BACK TO 420, COL. 2)	GOVERNMENT HOSP.....1 HEALTH CENTRE.....1 PRIVATE DOCTOR.... .1 PRIVATE HOSPITAL....1 PHARMACY.....1 DISPENSARY.....1 DRESSING STATION....1 PRIMARY HEALTH FAC..1 OUTREACH STATION....1 TRADITIONAL DOCTOR..1 OTHER_____1 (SPECIFY) NO ONE.....1 DK.....1 (ALL BACK TO 420, COL. 3)	GOVERNMENT HOSP.....1 HEALTH CENTRE.....1 PRIVATE DOCTOR.... .1 PRIVATE HOSPITAL....1 PHARMACY.....1 DISPENSARY.....1 DRESSING STATION....1 PRIMARY HEALTH FAC..1 OUTREACH STATION....1 TRADITIONAL DOCTOR..1 OTHER_____1 (SPECIFY) NO ONE.....1 DK.....1 (ALL BACK TO 420, COL. 4)	GOVERNMENT HOSP.....1 HEALTH CENTRE.....1 PRIVATE DOCTOR.... .1 PRIVATE HOSPITAL....1 PHARMACY.....1 DISPENSARY.....1 DRESSING STATION....1 PRIMARY HEALTH FAC..1 OUTREACH STATION....1 TRADITIONAL DOCTOR..1 OTHER_____1 (SPECIFY) NO ONE.....1 DK.....1 (ALL GO TO 445)
	(1)	(2)	(3)	(4)

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES
445	CHECK 441: ORS SOLUTION NOT GIVEN OR 441 NOT ASKED ☐ ↓ ORS SOLUTION GIVEN ☐ →448	
446	Have you ever heard of a special product called ORS you can get for the treatment of diarrhea?	YES.....1 NO.....2
447	Have you ever seen a packet of ORS like this before? SHOW PACKET.	YES.....1 NO.....2 →455
448	Have you ever prepared one of these ORS packets for yourself or for someone else?	YES.....1 NO.....2 →452
449	In what kind of container did you prepare the mixture of the packet and the water?	JUG.....1 BOTTLE.....2 GLASS.....3 CUP.....4 COOKING POT.....5 OTHER_____.6 (SPECIFY)
450	Please fill the container the way you filled it the last time you prepared one packet of the mixture. LET THE RESPONDENT POUR THE FLUID INTO HER VESSEL, THEN POUR THE FLUID INTO YOUR MEASURING CONTAINER AND RECORD THE QUANTITY OF FLUID IN ML.	FULL UNICEF..1 FULL HYDRON...3 PART UNICEF..2 PART HYDRON...4 OTHER.....8 ☐☐☐☐
451	When you prepared the solution of packet and water, did you add anything else to the mixture? IF YES, ASK: What did you add?	SUGAR.....1 JUICE.....2 OTHER SWEETNERS_____3 (SPECIFY) OTHER_____4 (SPECIFY) ADDED NOTHING.....5
452	Where can you get the ORS packets? PROBE: Anywhere else? CIRCLE ALL PLACES MENTIONED.	GOVERNMENT HOSPITAL.....1 GOVERNMENT HEALTH CENTER.....1 DISPENSARY.....1 DRESSING STATION.....1 PRIMARY HEALTH FACILITY.....1 MOBILE CLINIC.....1 PRIVATE DOCTOR.....1 PRIVATE CLINIC.....1 PHARMACY.....1 SHOP.....1 TRADITIONAL DOCTOR.....1 OTHER_____.1 (SPECIFY) DK..... 1
453	How much do (you think) the packets cost?	COST..... ☐☐ FREE.....96 DK.....98
454	Do you have one of these packets in your house now? IF YES: Can I see the packet?	YES, SHOWS PACKET.....1 YES, DOES NOT SHOW PACKET.....2 NO PACKET IN HOUSE.....3
455	Which places can you go if you want to get a vaccination for a child? CIRCLE ALL PLACES MENTIONED.	GOVERNMENT HOSPITAL.....1 GOVERNMENT HEALTH CENTER.....1 MOBILE CLINIC.....1 PRIVATE DOCTOR.....1 PRIVATE HOSPITAL.....1 DISPENSARY.....1 DRESSING STATION.....1 PRIMARY HEALTH FACILITY.....1 OUTREACH STATION.....1 OTHER_____.1 (SPECIFY) DK..... 1

SECTION 5. MARRIAGE

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP TO
502	CHECK 108A AND CIRCLE CURRENT MARITAL STATUS.	MARRIED.....1 WIDOWED.....2 DIVORCED/SEPARATED.....3	→507
503	Does your husband live with you or is he now staying elsewhere?	LIVING WITH HER.....1 STAYING ELSEWHERE.....2	
504	Does your husband now have any other wives besides yourself?	YES.....1 NO.....2	→507
505	How many other wives does he have?	NUMBER..... DK.....8	→507
506	Are you currently the first, second, ... wife?	RANK.....	
507	Have you been married only once, or more than once?	ONCE.....1 MORE THAN ONCE.....2	
508	In what month and year did you start living with [ZAFAF] your (first) husband or partner?	MONTH..... DK.....98 YEAR..... DK YEAR.....98	→515
509	How old were you when you started living with [ZAFAF] him?	AGE.....	
515	Right after you got married, did you and your (first) husband live with your parents or his parents for at least six months?	YES.....1 NO.....2	→516
515A	Why not?	NO LIVING PARENT.....1 HAD OWN HOUSE.....2 OTHER_____.3 (SPECIFY)	→517
516	For about how many years did you live together with a parent at that time?	YEARS..... UP TO THE PRESENT.....96	→518
517	Are you now living either with your parents or your (current) husband's parents?	YES.....1 NO.....2	
518	In how many villages or towns have you lived for six months or more since you were first married including this place?	NUMBER OF VILLAGES/TOWNS...	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP TO
518A	CHECK 502: CURRENTLY MARRIED ☐ → WIDOWED, DIVORCED/ SEPARATED ☐ → 528		
521	Now we need some details about your sexual activity in order to get a better understanding of contraception and fertility. Have you had sexual intercourse in the last four weeks?	YES.....1 NO.....2 → 523	
522	How many times did you have the sexual intercourse?	TIMES..... ☐☐	
523	When was the last time you had sexual intercourse?	DAYS AGO.....1 ☐☐ WEEKS AGO.....2 ☐☐ MONTHS AGO.....3 ☐☐ YEARS AGO.....4 ☐☐ BEFORE LAST BIRTH.....996 → 528	
524	CHECK 220: NOT PREGNANT OR UNSURE ☐ → PREGNANT ☐ → 528		
525	CHECK 313: NOT USING CONTRACEPTION ☐ → USING CONTRACEPTION ☐ → 528		
526	If you became pregnant in the next few weeks, would you feel happy, unhappy, or would it not matter very much?	HAPPY.....1 → 528 UNHAPPY.....2 WOULD NOT MATTER.....3	
527	What is the main reason that you are not using a method to avoid pregnancy?*	LACK OF KNOWLEDGE.....01 OPPOSED TO FAMILY PLANNING.....02 HUSBAND DISAPPROVES.....03 OTHERS DISAPPROVE.....04 HEALTH CONCERNS.....05 ACCESS/AVAILABILITY.....06 COSTS TOO MUCH.....07 INCONVENIENT TO USE.....08 INFREQUENT SEX.....09 FATALISTIC.....10 RELIGION.....11 POSTPARTUM/BREASTFEEDING.....12 MENOPAUSAL/SUBFECUND.....13 OTHER _____ (SPECIFY).....14 DK.....98	
528	PRESENCE OF OTHERS AT THIS POINT.	YES NO CHILDREN UNDER 10.....1 2 HUSBAND.....1 2 OTHER MALES.....1 2 OTHER FEMALES.....1 2	

SECTION 6. FERTILITY PREFERENCES

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP TO
601	CHECK 502: CURRENTLY MARRIED ☐ — WIDOWED, DIVORCED/ SEPARATED ☐		→609
602	Now I have some questions about the future. CHECK 220 AND MARK BOX. NOT PREGNANT OR UNSURE ☐ Would you like to have a (another) child or would you prefer not to have any (more) children? PREGNANT ☐ After the child you are expecting, would you like to have another child or would you prefer not to have any (more) children?	HAVE ANOTHER.....1 NO MORE.....2 SAYS SHE CAN'T GET PREGNANT.....3 UNDECIDED OR DK.....8	→604A
603	How long would you like to wait from now before the birth of a (another) child?	DURATION MONTHS.....1 ☐☐ YEARS.....2 ☐☐ DK.....998	→604A
604	CHECK 202 AND 204: How old would your youngest child be? IF NO LIVING CHILDREN, CIRCLE '96'.	AGE OF YOUNGEST YEARS..... ☐☐ NO LIVING CHILDREN.....96 DK.....98	
604A	Do you think your husband would like to have a (another) child or do you think he would prefer not to have any more children?	HAVE ANOTHER.....1 NO MORE.....2 DK.....8	
607	Do you think that your husband approves or disapproves of couples using a method to avoid pregnancy?	APPROVES.....1 DISAPPROVES.....2 DK.....8	
608	How often have you talked to your husband about family planning in the past year?	NEVER.....1 ONCE OR TWICE.....2 MORE OFTEN.....3	
609	In general, do you approve or disapprove of couples using a method to avoid pregnancy?	APPROVE.....1 DISAPPROVE.....2	
610	CHECK 202 AND 204: NO LIVING CHILDREN ☐ If you could choose exactly the number of children to have in your whole life, how many would that be? HAS LIVING CHILDREN ☐ 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? RECORD SINGLE NUMBER OR OTHER ANSWER.	NUMBER..... ☐☐ OTHER ANSWER _____ (SPECIFY)	

SECTION 7. HUSBAND'S BACKGOUND

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP TO
701	CHECK 502: CURRENTLY MARRIED ☐ USE PRESENT TENSE IN QUESTIONS 706-711 DIVORCED OR WIDOWED ☐ USE PAST TENSE IN QUESTIONS 706-711		
702	Now I have some questions about your (most recent) husband. Did your husband ever attend school?	YES.....1 NO.....2 DK.....8	706
703	What was the highest level of school he attended: primary, junior secondary, higher secondary, or higher?	PRIMARY .....1 JUNIOR SECONDARY.....2 HIGHER SECONDARY.....3 HIGHER EDUCATION.....4 DK.....8	706
704	What was the highest grade he completed at that level?	GRADE..... ☐☐ DK.....8	
705	CHECK 703: PRIMARY ☐ SECONDARY OR HIGHER ☐		707
706	Can (could) he read a letter or newspaper easily, with difficulty, or not at all?	EASILY.....1 WITH DIFFICULTY.....2 NOT AT ALL.....3	
707	What is (was) the main job of your husband?	_____ ☐☐ _____ _____	
708	CHECK 707: DOES (DID) NOT WORK IN AGRICULTURE ☐ WORKS (WORKED) IN AGRICULTURE ☐		710
709	What is (was) the employment status of your husband? Is he an employee, employer, own account worker, or unpaid family business worker?	EMPLOYEE.....1 EMPLOYER.....2 OWN ACCOUNT WORKER.....3 FAMILY BUSINESS (UNPAID).....4	712
710	Does (did) your husband work mainly on his or family land, or on someone else's land?	HIS/FAMILY LAND.....1 SOMEONE ELSE'S LAND.....2	712

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP TO
711	Does (did) he work mainly for money or does (did) he work for a share of the crops?	MONEY.....1 A SHARE OF CROPS.....2	
712	Before you married your (first) husband, did you yourself ever work regularly to earn money, other than on a farm or in a business run by your family?	YES.....1 NO.....2	→714
713	When you were earning money then, did you turn most of it over to your family or did you keep most of it yourself?	FAMILY.....1 SELF.....2 BOTH.....3	
714	Since you were first married, have you ever worked regularly to earn money other than on a farm or in a business run by your family?	YES.....1 NO.....2	→801
717	Are you now working to earn money other than on a farm or in a business run by your family?	YES.....1 NO.....2	→801
717A	What is your job?	_____ ☐☐ _____ _____	

SECTION 8. MATERNAL MORTALITY

801 Now I would like to ask you about your brothers and sisters, that is, the children born to your own mother. Please tell me the names of all your brothers and sisters including those who have died and those who are living elsewhere. RECORD NAMES OF ALL BROTHERS AND SISTERS.

IF NO BROTHERS AND SISTERS ☐ → SKIP TO 816.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
802 What name was given to your oldest (next oldest) brother or sister?	----------	----------	----------	----------	----------	----------	----------
803 Is (NAME) male or female?	MALE.....1 FEMALE.....2	MALE.....1 FEMALE.....2	MALE.....1 FEMALE.....2	MALE.....1 FEMALE.....2	MALE.....1 FEMALE.....2	MALE.....1 FEMALE.....2	MALE.....1 FEMALE.....2
804 Is (NAME) still alive?	YES.....1 NO.....2 GO TO 807 DK.....8 GO TO (2)	YES.....1 NO.....2 GO TO 807 DK.....8 GO TO (3)	YES.....1 NO.....2 GO TO 807 DK.....8 GO TO (4)	YES.....1 NO.....2 GO TO 807 DK.....8 GO TO (5)	YES.....1 NO.....2 GO TO 807 DK.....8 GO TO (6)	YES.....1 NO.....2 GO TO 807 DK.....8 GO TO (7)	YES.....1 NO.....2 GO TO 807 DK.....8 GO TO (8)
805 How old is (NAME)?	☐☐ <10 GO TO (2)	☐☐ <10 GO TO (3)	☐☐ <10 GO TO (4)	☐☐ <10 GO TO (5)	☐☐ <10 GO TO (6)	☐☐ <10 GO TO (7)	☐☐ <10 GO TO (8)
806 Has (NAME) ever married?	YES.....1 NO.....2 GO TO (2)	YES.....1 NO.....2 GO TO (3)	YES.....1 NO.....2 GO TO (4)	YES.....1 NO.....2 GO TO (5)	YES.....1 NO.....2 GO TO (6)	YES.....1 NO.....2 GO TO (7)	YES.....1 NO.....2 GO TO (8)
807 How many years ago did (NAME) die?	☐☐	☐☐	☐☐	☐☐	☐☐	☐☐	☐☐
808 How old was (NAME) when she/he died?	☐☐ IF MALE OR DIED BEFORE 10 YEARS OF AGE GO TO (2)	☐☐ IF MALE OR DIED BEFORE 10 YEARS OF AGE GO TO (3)	☐☐ IF MALE OR DIED BEFORE 10 YEARS OF AGE GO TO (4)	☐☐ IF MALE OR DIED BEFORE 10 YEARS OF AGE GO TO (5)	☐☐ IF MALE OR DIED BEFORE 10 YEARS OF AGE GO TO (6)	☐☐ IF MALE OR DIED BEFORE 10 YEARS OF AGE GO TO (7)	☐☐ IF MALE OR DIED BEFORE 10 YEARS OF AGE GO TO (8)
809 Has (NAME) ever married?	YES.....1 NO.....2 GO TO (2)	YES.....1 NO.....2 GO TO (3)	YES.....1 NO.....2 GO TO (4)	YES.....1 NO.....2 GO TO (5)	YES.....1 NO.....2 GO TO (6)	YES.....1 NO.....2 GO TO (7)	YES.....1 NO.....2 GO TO (8)
810 Did she die during pregnancy or childbirth?	YES.....1 GO TO 812 NO..... 2	YES.....1 GO TO 812 NO..... 2	YES.....1 GO TO 812 NO..... 2	YES.....1 GO TO 812 NO..... 2	YES.....1 GO TO 812 NO..... 2	YES.....1 GO TO 812 NO..... 2	YES.....1 GO TO 812 NO..... 2
811 Did (NAME) die within two months after the end of a pregnancy or after childbirth?	YES.....1 NO.....2	YES.....1 NO.....2	YES.....1 NO.....2	YES.....1 NO.....2	YES.....1 NO.....2	YES.....1 NO.....2	YES.....1 NO.....2
812 How many children did (NAME) ever give birth to?	☐☐	☐☐	☐☐	☐☐	☐☐	☐☐	☐☐
813 What was name of her husband?	----------	----------	----------	----------	----------	----------	----------

	(8)	(9)	(10)	(11)	(12)	(13)	(14)
802 What name was given to your oldest (next oldest) brother or sister?	----------	----------	----------	----------	----------	----------	----------
803 Is (NAME) male or female?	MALE.....1 FEMALE.....2	MALE.....1 FEMALE.....2	MALE.....1 FEMALE.....2	MALE.....1 FEMALE.....2	MALE.....1 FEMALE.....2	MALE.....1 FEMALE.....2	MALE.....1 FEMALE.....2
804 Is (NAME) still alive?	YES.....1 NO.....2 GO TO 807 DK.....8 GO TO (9)	YES.....1 NO.....2 GO TO 807 DK.....8 GO TO (10)	YES.....1 NO.....2 GO TO 807 DK.....8 GO TO (11)	YES.....1 NO.....2 GO TO 807 DK.....8 GO TO(12)	YES.....1 NO.....2 GO TO 807 DK.....8 GO TO (13)	YES.....1 NO.....2 GO TO 807 DK.....8 GO TO (14)	YES.....1 NO.....2 GO TO 807 DK.....8 GO TO (15)
805 How old is (NAME)?	<10 GO TO (9)	<10 GO TO (10)	<10 GO TO (11)	<10 GO TO (12)	<10 GO TO (13)	<10 GO TO (14)	<10 GO TO (15)
806 Has (NAME) ever married?	YES.....1 NO.....2 GO TO (9)	YES.....1 NO.....2 GO TO (10)	YES.....1 NO.....2 GO TO (11)	YES.....1 NO.....2 GO TO (12)	YES.....1 NO.....2 GO TO (13)	YES.....1 NO.....2 GO TO (14)	YES.....1 NO.....2 GO TO (15)
807 How many years ago did (NAME) die?							
808 How old was (NAME) when she/he died?	IF MALE OR DIED BEFORE 10 YEARS OF AGE GO TO (9)	IF MALE OR DIED BEFORE 10 YEARS OF AGE GO TO (10)	IF MALE OR DIED BEFORE 10 YEARS OF AGE GO TO (11)	IF MALE OR DIED BEFORE 10 YEARS OF AGE GO TO (12)	IF MALE OR DIED BEFORE 10 YEARS OF AGE GO TO (13)	IF MALE OR DIED BEFORE 10 YEARS OF AGE GO TO (14)	IF MALE OR DIED BEFORE 10 YEARS OF AGE GO TO (15)
809 Has (NAME) ever married?	YES.....1 NO.....2 GO TO (9)	YES.....1 NO.....2 GO TO (10)	YES.....1 NO.....2 GO TO (11)	YES.....1 NO.....2 GO TO (12)	YES.....1 NO.....2 GO TO (13)	YES.....1 NO.....2 GO TO (14)	YES.....1 NO.....2 GO TO (15)
810 Did she die during pregnancy or childbirth?	YES.....1 GO TO 812 NO..... 2	YES.....1 GO TO 812 NO..... 2	YES.....1 GO TO 812 NO..... 2	YES.....1 GO TO 812 NO..... 2	YES.....1 GO TO 812 NO..... 2	YES.....1 GO TO 812 NO..... 2	YES.....1 GO TO 812 NO..... 2
811 Did (NAME) die within two months after the end of a pregnancy or after childbirth?	YES.....1 NO.....2	YES.....1 NO.....2	YES.....1 NO.....2	YES.....1 NO.....2	YES.....1 NO.....2	YES.....1 NO.....2	YES.....1 NO.....2
812 How many children did (NAME) ever give birth to?							
813 What was name of her husband?	----------	----------	----------	----------	----------	----------	----------

814 Let me see if I have this right. You have a total of _____brothers and sisters including those who live elsewhere.

YES ☐ NO ☐ → PROBE AND CORRECT

815 Does any of your sister (from your mother) who are over 14 years old live now live in this house?

YES ☐ NO ☐ → (SKIP TO 816)

V

CHECK WITH RESPONDENT WHICH OF THE ELIGIBLE WOMEN IN THE HOUSEHOLD QUESTIONNAIRE ARE HER SISTERS AND WRITE THEIR LINE NUMBERS BELOW.

☐☐ ☐☐ ☐☐ ☐☐

816 RECORD THE TIME.

HOUR..... ☐☐

MINUTES..... ☐☐

SECTION 9. LANGUAGE INFORMATION AND OBSERVATIONS

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
901	WHAT IS THE RESPONDENT'S OWN LANGUAGE?	ARABIC.....01 OTHER_____98 (SPECIFY) ☐☐	
902	IN WHAT LANGUAGE DID YOU CONDUCT THE INTERVIEW?	ARABIC.....01 OTHER_____98 (SPECIFY) ☐☐	
903	FOR HOW MUCH OF THE INTERVIEW DID YOU DEPEND ON A THIRD PERSON TO INTERPRET FOR YOU?	NONE OF THE INTERVIEW.....1 SOME OF THE INTERVIEW.....2 MOST OF THE INTERVIEW.....3	

INTERVIEWER'S OBSERVATIONS

Person Interviewed: _____

_____

_____

Specific Questions: _____

_____

_____

Other Aspects: _____

_____

I CERTIFY THAT I REVIEWED THE QUESTIONNAIRE IN THE RESPONDENT'S PLACE.

HOUR..... ☐☐

MINUTES..... ☐☐

Name of Interviewer: _____

SUPERVISOR'S OBSERVATIONS

_____

_____

_____

_____

Name of Supervisor: _____ Date: _____

EDITOR'S OBSERVATIONS

Name of Field Editor: _____ Date: _____

Name of Keyer: _____ Date: _____