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FERTILITY AND FAMILY PLANNING PATTERNS

IN QATAR

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M.B.B.Ch.

A thesis submitted for the Degree of
Doctor of Philosophy

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DECLARATION

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ABSTRACT

This study is concerned with an analysis of demographic and socio-economic determinants of reproductive patterns in Qatar. The main source of data for this study is the 1987 Qatar Child Health Survey. The determinants of age at first marriage and fertility are examined in chapters 2 and 3, respectively. There follows an analysis of patterns of maternal care (chapter 4), and of breastfeeding and weaning practices (chapter 5). In chapter 6, an attempt is made to investigate the determinants of contraceptive use.

Substantial decreases in the propensity of first marriage at teenages and an upward trend in age at first marriage were observed. A multivariate analysis of factors affecting age at first marriage revealed that education, work status and consanguinity are the main determinants of age at first marriage in Qatar.

A significant decline in the fertility of Qatari women was observed. A mulivariate analysis of factors affecting fertility revealed that achieving an education level of at least a preparatory certificate and reducing the occurrence of child deaths are the most important determinants of fertility in Qatar. The analysis, however, shows a positive association between contraceptive use and achieved fertility. The implication of this reverse causation is that those women most likely to use contraceptive methods are those who already have achieved high parities. The results also imply that contraception is used mainly for stopping rather than spacing of children.

The analysis of data on maternal care revealed that the vast majority of women received ante-natal care and gave birth to their most recent birth in a hospital. A substantially lower proportion of women, however, had received post-natal care.

A growing pattern of early weaning and early supplementation with a bottle was identified. This pattern has adverse implications for the health and nuritional status of infants and points to urgent health education needs.

Only a quarter of currently married Qatari women were using a contraceptive method at the time of the survey. A multivariate analysis of the correlates of family planning revealed that maternal education is by far the most important predictor of contraceptive use.

Thus, the analysis suggests that the health and well-being of the family in Qatar, more specifically, mothers and chilren, depends a great deal on increasing maternal levels of education. Educated women will not, through regulating their fertility, have too many children, at very young or very old ages, or too close to each other in a manner that is detrimental to their health and well-being and to their children's health and survival.

CHAPTER 1

OBJECTIVES AND DATA SOURCES

1.1 INTRODUCTION

This study is concerned with an analysis of the determinants of nuptiality, fertility, maternal care and family planning in Qatar. The main source of data for this study is the 1987 Qatar Child Health Survey.

The State of Qatar occupies a roughly oval peninsula along the western coast of the Arabian Gulf. The peninsula is separated from the coast of Saudia Arabia by the Gulf of Bahrain. The length of the peninsula from south to north is about 160 kilometres and the total area, including the islands, is about 11427 square kilometres. Qatar is bordered by Saudia Arabia to the south, the United Arab Emirates to the south-east and Bahrain to the west.

Most of the peninsula consist of a low plateau about 250 feet (75 meters) above sea level, which rises rather abruptly from the shore. The terrain is mostly flat, with occasional ridges of limestone, and the soil is generally barren, composed of gravel or sand. The land slopes very gradually from west to east.

Surface features characteristic of Qatar are *duhlans*, or crevices formed by rainwater collecting in cracks in the ground. The water eroded the underlying limestone and created underground caverns, which in turn led to the cracking of the surface and the formation of holes that collect water. Other features are the *riyadhs* (gardens), which are pools where rainwater has collected, and the *wadis* (dry valleys), where water flows only after rainfall. The coast of Qatar has many brackish pools and salt marshes, and a number of small islands.

The climate is of the desert type, with a long, very hot summer, and a mild, often warm winter. The average rainfall is 2 to 3 inches annually. Humidity is high, especially in summer. The temperature in summer averages 32 degrees Celsius and may reach 49 degrees Celsius. The winter average is 16 degrees, but the temperature can drop to 5 degrees Celsius.

The land is largely arid, sustaining relatively few plants and animals. However, water development schemes have converted sizeable areas to agriculture in recent years. Native wild plants include palms, acacias and other thorny small trees and shrubs and the lotus tree, or jujube, which produces a small, yellow , edible fruit.

Numerous species of birds (among them flamingos, cormorants, swallow and larks) are found along with jerboas (jumping rats), lizards, rabbits and gazelles. Qatar is the home of a herd of Arabian oryxes, an antelope that has become largely extinct throughout the rest of the Arabian peninsula.

The largest city, and the capital, of Qatar is Doha, situated on a bay midway along the east coast of the country. Qatar has one important natural resource, petroleum, which has become the basis of economic development and modernisation.

Information on the country's demographic situation was scanty and relatively unreliable until 1986 when the Central Statistical Organisation conducted the first comprehensive national census. According to the data obtained from the 1986 census, the population of Qatar was estimated at 369,079 persons; 247,852 males and 121,227 females. The census figures cover all persons resident in Qatar at the time of enumeration regardless of nationality; i.e., the figures include native Qataris, non-Qatari Arab nationals and non-Arab expatriates. Accord-

ing to official figures, the population of Qatar in 1990 was estimated at 486,473 persons.

Most of the sharp increase in population size had occurred during the period from the mid-1970's to the mid-1980's. For Qataris, this growth may be explained by a continuing high level of fertility combined with rapidly declining mortality rates. For non-Qataris, the high growth is explained by the great influx of considerably large numbers of foreign workers who migrated to Qatar to fulfil labour requirements necessary to implement ambitious development plans.

The 1986 census showed a very young age structure for the population of Qatar, with 28 percent of the population aged under 15 years and only two percent aged 60 and over. Among the female population, 17 percent were under 5 years of age and 41 percent were under 15 years of age.

The high fertility of Qatar is desired and encouraged by the state's pro-natalist policies. There are no major limits on access to contraception and there is no government support of contraceptive use or distribution. Abortion is strictly restricted and permitted by Islamic law only to save the life of the mother.

The marital status of the population has also had an influence on population growth. In Qatar, the demand for education, which is free through the university level, entry into the labour force, rapid urbanisation and the very significant improvement in the status of women have led to a sharp decline in early marriage and a rise in average age at first marriage.

While marital status affects population growth through fertility, the educational attainment of Qataris affects the indigenous labour supply

and thus exerts an influence on the demand for imported labour. The expansion of facilities for education, particularly for females, has led to higher educational attainment among the entire population. For example, according to the 1986 census, the level of literacy among the female population has increased from 52 percent among women aged 40-49 years, to 77 percent among women 30-34 years of age, 89 percent among those aged 20-24 years and 94 percent for those currently at ages 10-19 years. This rapid improvement in the educational status of younger generations is expected to have a significant impact on the future development of the society.

The government has enacted a development programme with all the necessary facilities such as health centres, educational institutions, social services and youth welfare aiming to encourage settlement in urban areas outside of Doha. Through the establishment of various industrial complexes in Qatar, new urban settlements have been developed.

The government's objectives in its social welfare programme included strengthening child welfare and maternal and child health, improving environmental sanitation, and providing increased activities for the improvement of the situation of girls and women.

Qatar has been transformed since 1949 from a land whose only wealth lay in its pearl fisheries, into a modern state. The first step in this direction came in 1940 when oil was struck, but production was discontinued during World War II. However, after 1949, oil became the mainstay of the economy and oil revenues the basis of all social development.

Ports have been deepened and modernised, highways built and factories constructed, including steel mills, desalination plants, and fertiliser and petrochemical factories.

The oil fields of Qatar fall into two groups, an onshore belt along the west coast and an offshore zone along the east coast. Qatar's abundant natural gas is liquefied in local installations and then pumped aboard giant tankers for export.

In Qatar, the Ministry of Health provides health services to all residents, Qataris as well as expatriates, free of charge. The services are provided through three hospitals and 22 health centres. The three hospitals, general, maternity and chronic diseases, constitute the Hammed Medical Corporation. Other ministries and public agencies share in the provision of health care; the armed forces, the police, and the Qatar General Petroleum Corporation provide health care for their work-force and their families.

The national health system requires that comprehensive primary health care (PHC) services constitute the basis for supporting hospital services. Health centres provide preventive as well as curative and re-habilitative services, in addition to maternal and child care, and family and individual health registration.

The approach to PHC that MOH has implemented follows the general practitioner / family doctor clinic model. The responsibilities of health centres include the provision of ante-natal care, neonatal clinics, well-baby clinics and immunisation services. From the 34th week of pregnancy the care for pregnant women is provided by the Women's Hospital Out-patient Clinic, where follow-up care and the delivery is carried out. In Qatar, BCG immunisation is given to all new bornes within the first two days of life; for pre-mature birth, it is given about 3-4 weeks after delivery.

While treatment services are available at all health centres, and in-patient services in a few centres, the physicians at PHC centres refer

difficult or risk cases to either Hammed General Hospital or to the Women's Hospital in the capital. It has been proposed to develop a more specialised secondary referral service within the primary health care centres, particularly for the maternal and child health services.

1.2 QATAR CHILD HEALTH SURVEY

1.2.1 Introduction

The 1987 Qatar Child Health Survey (QCHS) was designed to provide factual data that can be used in the evaluation of on-going maternal and child health programmes as well as in the formulation of new health policies and programmes, in a cost-effective manner. The QCHS was conducted during November-December 1987.

The QCHS was a household sample survey. A nationally representative probability sample of all households, irrespective of nationality, was drawn from a multi-stage sampling design which was developed at the Central Statistical Organisation. The sample was a probability, stratified, multi-stage sample, with equal probability of selection.

The survey included a basic household survey, a maternal care survey and a child health survey.

1.2.2 Sample Design and Implementation

Sampling Plan

The sample for the Qatar Child Health Survey was a probability, stratified, multi-stage sample with equal probability of selection. The sample covered all households in the country. It was designed to

provide separate estimates of all major parameters at the national level and for each of the following three types of households: Qatari, non-Qatari Arab, and non-Qatari non-Arab. The sampling frame for the survey was based on data collected in the 1986 population census. The sample was designed in consultation with the Central Statistical Organisation.

Selection of Primary Sampling Units

The sampling plan called for the QCHS sample to be selected in two stages. The sampling units at the first stage were districts which were grouped into categories according to the number of households residing in each. A sampling fraction was then calculated for each of these categories. In view of the wide variation in the number of households in these districts, some form of probability proportionate to size (PPS) sampling was appropriate for them. Thus, on the basis of sampling fractions and the number of "districts" in each category, the number of districts to be selected from each category was determined. The selection of districts and clusters was then made by systematic sampling. This procedure resulted in the selection of 233 clusters.

Sample of Households

The second stage of selection consisted of drawing a sample of households from the selected clusters. A complete listing of all households residing in the selected sample areas was furnished by the Central Statistical Organisation. Using the household lists, a systematic random sample of households was chosen with probability proportionate to size. All ever-married women under 50 years of age, reported as usual residents in the sample households, were eligible for the individual maternal care interview. All children under six years of age who were enumerated in the household survey were eligible for the child health interview.

Coverage of the Sample

A total of 4194 households were selected for the QCHS sample. Of these, 3868 households, or 92.2 percent of the target sample, were successfully interviewed. Most of the remaining 326 households could not be contacted either because no competent respondent was at home or because the household was outside the country. The distribution of the sample households according to nationality was as follows : 1491 Qatari households; 1515 non-Qatari Arab households; and 862 non-Qatari non-Arab households.

A total of 25,826 persons were enumerated in the household survey. Within the 3868 households successfully interviewed for the household survey, a total of 3958 ever-married women under 50 years of age were identified as eligible for the individual maternal care interview (i.e. an average number of eligible women per household equal to 1.023). The number of ever-married women successfully interviewed for the maternal care survey was 3918, or 99 percent of the possible maximum.

A total of 4921 children under six years of age were enumerated in the household survey. Of these, 4901 children were successfully covered in the child health survey.

1.2.3 Development of the Questionnaires

From the outset, it was recognised that child mortality should be studied more as a chronic disease process with multi-factorial origins than as an acute, single-cause phenomenon. The framework adopted was based on the premise that social and economic determinants of

child health necessarily operate through a common set of biological mechanisms, or "proximate determinants" to exert an impact on mortality. The framework incorporated both biological and socio-economic determinants and integrated research method employed by both medical scientists and demographic statisticians.

With these considerations in mind, it was decided to use the following four questionnaires :

1. The Household Schedule.
2. The Household Utilities Module.
3. The Maternal Care Questionnaire.
4. The Child Health Questionnaire.

These questionnaires were phrased in simplified classical Arabic. A description of the contents of these questionnaires is given below.

1.2.3.1 The household schedule

The household schedule consisted of two blocks of questions :

BLOCK A : which contained all the information on the identification of the sample household, the number of visits required to obtain the interview, details of field and administrative controls, summary data on the number of eligible women and children.

BLOCK B : which included the following items for members of the household :

- name
- relationship to head
- residence (*de jure*)
- sex
- age

- educational level (for persons aged 6 or more years)
- marital status (for persons aged 12 or more years)
- identification of women eligible for the maternal care interview
- identification of children eligible for the child health interview

1.2.3.2 The household utilities module

The household utilities module was designed to yield information on environmental conditions in the child's surroundings which can influence levels of morbidity and mortality. The module covered the following environmental conditions :

- crowding
- flooring material
- source of lighting
- source and treatment of drinking water
- type of toilet facilities
- means of garbage disposal

The module also included questions on ownership of consumer durables (radio, television, video, refrigerator, telephone, car).

The amenities of a household reflect its socio-economic status, to a large extent they are indicators of the level of services available in an area and to particular groups. Unlike ownership of consumer durables which may reflect unproductive investment and conspicuous consumption, household amenities such as inside taps for drinking water and sanitary toilet facilities are considered important factors in protecting the health of a population and represent improvements in living standards.

1.2.3.3 The maternal care questionnaire

This questionnaire was administered to all eligible women in the sample households successfully interviewed for the household survey. Eligibility for the individual maternal care interview depended on three criteria. First, the woman had to be ever-married, that is married currently or previously. Secondly, she had to be under 50 years of age. Thirdly, she should be a usual member of the household, i.e. she should belong to the *de jure* population.

It should be noted that in Qatar, as in almost all Arab countries, a distinction is made between formal or legal marriage as witnessed by the marriage contract, known as *Katb el-kitab* - writing the book - and the social marriage which marks the consummation of marriage, *Zifaf*. The period between these two dates varies and can even extend to many months. There are usually separate ceremonies, one for each event, though quite a few marriages involve *katb el-kitab* and *zifaf* at the same time.

In this survey, women who had been legally married but whose marriage had not been consummated were not considered eligible for the individual maternal care interview.

The maternal care questionnaire was divided into six sections, with cover sheet which contained information on identification of the sample household, the number of visits required to obtain the interview, the duration of the interview, and details about field and administrative controls. These sections are described below.

Section 1 : Respondent's Background

In this section information was obtained on three items: residential status, literacy and current work status. The respondent was first asked if she had always lived in "this town/city", and if not, the duration of

present residence was obtained. This was followed by asking if the respondent could read and write. The respondent was also asked if she was currently working for cash.

Section 2 : Demographic Characteristics

In this section information was obtained on the following items from all women in the sample :

- current age
- current marital status
- age at first marriage
- blood relationship and type of relation, if any, between the respondent and her current or last husband
- numbers of living children, by sex and whether living at home or away
- numbers of dead sons and dead daughters, if any

At this point, the interviewer had to determine whether the respondent belonged to a household whose head was a Qatari national. If so, a complete birth history of the respondent was obtained.

For women who did not belong to Qatari households, the following information was obtained :

- date of birth of last live birth,
- sex of last live birth,
- survival status of last live birth,
- if last live birth is dead, age at death.

The section began with a question on current age. Maternal age is, of course, a very important classificatory variable in any health survey. Recognising the difficulty of obtaining accurate data on age, and to

ensure that the interviewer would keep in mind this very important characteristic of the interviewee throughout the whole interview, the following procedure was used.

First, the respondent was asked to give her current age. The interviewer then probed by either consulting any documentary evidence available, or by referring to other events in the respondent's life. Next, the interviewer recorded her comments regarding age reporting and whether extensive probing was necessary.

In obtaining information on age at first marriage, the interest was in the age at which marriage was consummated and not that of the registration of the marriage contract. Information on age at first marriage serves two purposes : to examine recent trends in first marriage patterns, and to provide an indication of the respondent's duration-of-marriage (defined as the time elapsed since entry into first marriage).

The two basic classificatory variables used in presentation and analysis of the results of the survey are current age and duration since first marriage. The main reason for classifying the sample by marital duration is to control for exposure to the risk of childbearing. Further, women marrying about the same time (i.e. women comprising a marriage cohort) often share certain values and experiences, for example, availability or non-availability of a particular type of maternal care services.

The main source of information on reproductive patterns and infant and child mortality, for the whole sample, is provided by a sequence of questions on the number of living children, by sex and whether living at home or away, and the number of deceased sons and daughters. This was followed by a probe to confirm the number of live births so obtained.

In the birth history section, which was administered only to women living in Qatari households, data was obtained for each live birth, starting with the first born, on the name, sex, date of birth, and whether the child was still living. If the child was dead, it was determined for how long he/she had lived. If the calendar year of birth was not available, then the respondent was asked how many years ago was the child born. All births were plotted on the events chart so that any gross inconsistencies could be identified during the interview itself.

Thus, information on the last live birth can be derived from the birth history section for those women belonging to Qatari households and from the questions on the date of birth and survival status of the last birth for women living in non-Qatari households. The number of the births in last 12 months can then be calculated and hence a number of "period" fertility rates. Data on survival status of last live birth allow the estimation of current levels of infant mortality.

The section concluded by a question on current pregnancy status and perceived distance to the nearest health centre.

Section 3 : Breast-feeding

Breast-feeding can affect child survival by its role in nutrient intake, in birth spacing, and by its anti-infective properties. Though the principle interest in breast-feeding is usually in its effect on child health, there are also physiological effects on the mother. In particular, breast-feeding a child is associated with a delay in the return of ovulation and hence in the biological capacity to conceive. In the absence of any other form of fertility regulation, therefore, breast-feeding may extend the interval to the next conception and ultimately affect a woman's total fertility. Breast-feeding also represents one of

the mechanisms through which infant mortality may influence fertility, since the effect of an infant death before it is weaned may be a reduction in the period of non-susceptibility to conception.

In this section of the maternal care questionnaire, information was collected on the following items in relation to the last live birth where this had occurred during the five year period preceding the survey :

- prevalence of breast-feeding,
- interval between delivery and initiation of breast-feeding,
- duration of breast-feeding,
- frequency of breast-feeding,
- reasons for not breast-feeding,
- timing of introduction of supplementary foods,
- weaning patterns,
- current feeding patterns,
- source of advice on feeding.

Section 4 : Maternal Care

This section focused on the care a mother receives during pregnancy, at the delivery and in the post-natal period. Adequate care before, during and after childbirth is crucial in reducing the risks of infant and maternal mortality, in promoting child and maternal health and development and also indirectly in promoting the health and development of other living children as well as those yet to be born.

A series of questions pertaining to ante-natal care were asked in relation to current pregnancy and the last live birth where this had occurred five years or less prior to the survey. Questions about care at the delivery and post-natal care also were asked of women whose last live birth had occurred during the five years period preceding the

survey. These questions covered the following aspects of maternal care:

Ante-natal Care :

- coverage
- number of pregnancy checks
- nature of pregnancy checks
- accessibility of service
- medication during pregnancy
- reason for not having a pregnancy check.

Care at the Delivery :

- place of delivery
- attendance at delivery
- reason for not having last delivery in a health facility.

Post-natal Care :

- coverage
- nature of care.

Family Planning :

- ever-use of contraception
- current use of contraception.

Section 5 : Disability

This section of the maternal care questionnaire included a module on disablement which focused on obtaining basic information needed to estimate the demand for rehabilitative services or institutional services;

to assess the effectiveness of preventative programmes (e.g. polio), and to ascertain a few major causes of disablement.

Three aspects of disability were examined in relation to all children born during the five-year period preceding the survey :

- prevalence,
- type of disability, and
- cause of condition.

Section 6 : Satisfaction with Maternal Care Services

In this section, women who had a livebirth during the 12-month period preceding the survey, were asked to state their opinion and degree of satisfaction with respect to the quality of care received during pregnancy, at delivery, and during the two weeks following childbirth.

1.2.3.4 The child health questionnaire

The questionnaire was designed to collect information on all children, under six years of age, enumerated in the household schedule. The questionnaire was divided into four sections, with a cover sheet which contained information on identification of the sample household, date and duration of the interview, and details about field and administrative controls. The four sections of questionnaire are described below.

Section 1 : Immunisation

One of the primary mechanisms for improving child survival is increasing the proportion of children immunised against the major preventable childhood diseases. Information on the immunisation status on

children, under six years of age, was obtained in the QCHS in the following way. For each eligible child it was asked whether the child had an immunisation record or a birth certificate that includes an immunisation record. If the answer was yes, the interviewer asked to see the record and ascertained from it whether the child had received immunisations against: tuberculosis (BCG), polio, diphtheria, whooping cough and tetanus (DPT); and measles. One dose each of BCG and measles vaccines and three doses of polio and DPT vaccines are needed to establish immunity to the disease.

If the immunisation record was not available at the interview or if the child did not have an immunisation record, the respondent was asked if the child had received drops or an injection to protect against disease.

Section 2 : Diarrhoeal Diseases and Treatment

Diarrhoeal disease is one of the leading causes of infant and child mortality in Qatar. It is also one of the most frequent causes of childhood illness. In the QCHS, information was collected on whether children under six years of age had experienced an episode of diarrhoea during the two weeks preceding the interview. If an eligible child was reported to have had diarrhoea, questions were asked to establish what treatment(s) were administered, and who proffered advice on treatment.

Section 3 : Accidents

As mortality from infectious diseases and nutritional deficiency is reduced to low levels, external cause of death assume increasing importance in childhood. Because of the growing magnitude of the problems created by accidents and other external causes, this section of

the child health questionnaire included a module on accidents which focused on obtaining information on the following items :

- prevalence of accidents among children under 6 years of age during the 12-month period prior to the survey,
- whether medical advice and treatment was sought,
- place of accident,
- time of accident, and
- type of injury.

Section 4 : Nutritional Status of Children

One of the principal aims of QCHS was to obtain information that would help in the assessment of the nutritional status of children in Qatar. In this section data was collected on the height and weight of all children under 6 years of age, enumerated in the household survey.

1.3 BACKGROUND CHARACTERISTICS OF HOUSEHOLDS AND RESPONDENTS

1.3.1 Introduction

The QCHS 1987 consisted of three components : the household survey, the individual maternal care survey, and the child health survey. In the following chapters, information on reproductive patterns from the survey will be viewed in terms of the sample as a whole as well as for different subgroups of the sample. These subgroups will be defined by a number of background characteristics which were included in the questionnaires used in the QCHS partly because they have a proven capacity to capture significant dimensions of the Qatari society, and partly because they have hypothesised relationships to the survey's main focus of study.

This section gives a brief description of the data collected in the survey on these characteristics and provide a demographic and socio-economic profile of the QCHS sample.

1.3.2 Age-Sex Structure

A total of 3,868 households with a population of 25,827 were successfully interviewed for the household survey. Listing of household members was done on a *de jure* (usual resident) basis. The average household size based on the *de jure* population was 6.7 persons.

Table 1.1 shows the distribution of the survey households and the population enumerated in the household survey according to nationality. As may be seen, about 39 percent of the sample households but 50 percent of the population enumerated in the household survey were of Qatari nationality; about 39 percent of the households and 32 percent of the population were of other Arab nationalities, and the remaining 22 percent of households and 18 percent of the household survey population were of other nationalities. The average household size is highest among Qataris (8.6 persons), and this drops to about 5.4 for non-Qatari households.

Table 1.1 Distribution of the survey households and population by nationality, QCHS 1987

Nationality	Households		Population		Average
	Number	Percent	Number	Percent	Household size
Qatari	1491	38.5	12870	49.8	8.6
Arab	1515	39.2	8227	31.9	5.4
Other	862	22.3	4730	18.3	5.5
Total	3868	100	25827	100	6.7

The percent distribution of the Qatari population enumerated in the household survey, according to sex and age, is shown in Table 1.2. Similar information is shown in Table 1.3, but by nationality and for broader age groupings. The figures show a very young population for Qatar and conform to the pattern observed in developing countries. Thus, about 43 percent of the population enumerated in the survey are less than 15 years of age, while the percentage of persons aged 60 or more years is less than three percent. About 53 percent of the female population are in the childbearing age range 15-49 years.

Table 1.2 Percent distribution of the *de jure* population (of Qatari nationals) enumerated in the household survey according to age and sex, QCHS 1987

Age	Male	Female	Total
0 - 4	13.0	12.1	12.5
5 - 9	11.0	11.6	11.3
10 - 14	12.6	12.3	12.4
15 - 19	12.6	12.1	12.4
20 - 24	11.3	10.6	10.9
25 - 29	10.0	9.4	9.3
30 - 34	7.6	10.4	9.0
35 - 39	5.5	7.2	6.4
40 - 44	3.8	3.8	3.8
45 - 49	3.0	3.2	3.1
50 - 54	2.9	2.5	2.7
55 - 59	1.6	1.6	1.6
60 - 64	2.1	1.5	1.8
65 - 69	1.0	0.4	0.7
70 - 74	1.0	0.6	0.8
75 +	1.0	0.7	0.9
Total	100.0	100.0	100.0

Table 1.3 Percent distribution of the *de jury* population enumerated in the household survey in broad age groups, according to nationality and sex, QCHS 1987

Nationality	Sex	Age				Total
		< 15	15 - 49	50 - 59	60 +	
Qatari	Male	36.6	53.8	4.5	5.1	100.0
	Female	36.0	56.7	4.1	3.2	100.0
	Total	36.2	55.3	4.3	4.2	100.0
Arab	Male	49.6	44.6	4.6	1.2	100.0
	Female	46.8	50.5	2.0	0.7	100.0
	Total	48.2	47.5	3.3	1.0	100.0
Other	Male	49.9	44.4	4.8	0.9	100.0
	Female	50.2	47.2	1.9	0.7	100.0
	Total	50.0	45.8	3.4	0.8	100.0
All	Male	43.7	48.4	4.7	3.2	100.0
	Female	42.4	52.5	3.1	2.0	100.0
	Total	43.1	50.4	3.9	2.6	100.0

1.3.3 Educational Level

In the QCHS, for all household members six years and older, questions were asked to determine what level of education they had completed. Table 1.4 shows the percent distribution of the population aged 10 years or more by level of education, according to age and sex.

Broadly speaking, the education system in Qatar has four tiers : primary (6 years), intermediate or preparatory (3 years), secondary (3 years), and higher education. The figures in Table 1.4 show that 16 percent of men were illiterate, 22 percent could read and write but with less than primary education, 20 percent completed primary school, 14 percent intermediate school and 14 percent secondary school, while the percentage of men who attained higher education was almost 15 percent. The substantial improvement in educational attainment over time can be seen in the fact that younger males have attained much

higher levels than older men. The proportion of men with no education declines sharply as we approach the more recent and younger cohorts ; from 67 percent among men aged 60 or more years, to 16 percent among men 40-44 years and to less than ten percent among those at ages 10-19 years.

Table 1.4 Percent distribution of the QCHS household population by level of education, according to sex and age, QCHS 1987

Age	Illiterate	Incomplete primary	Primary	Prepa-ratory	Secon-dary	Univer-sity	Total
male							
10 - 14	7.5	55.2	34.6	2.7	-	-	100.0
15 - 19	3.2	12.2	33.8	42.1	8.1	0.6	100.0
20 - 24	8.9	10.0	20.8	22.0	31.1	7.2	100.0
25 - 29	15.4	16.8	14.3	13.4	17.6	22.5	100.0
30 - 34	14.3	15.9	13.0	11.6	19.3	25.9	100.0
35 - 39	13.6	13.5	10.3	8.1	22.3	32.2	100.0
40 - 44	16.4	14.8	10.1	6.3	20.4	32.0	100.0
45 - 49	22.5	15.0	13.6	5.9	16.4	26.6	100.0
50 -54	37.3	20.8	6.9	4.6	8.8	21.6	100.0
55 - 59	43.4	15.7	9.1	2.5	9.1	20.2	100.0
60 +	66.6	21.8	5.0	-	2.0	4.6	100.0
Total	15.6	22.0	19.6	13.7	14.2	14.9	100.0
Female							
10 - 14	7.5	52.2	36.7	3.6	-	-	100.0
15 - 19	4.8	7.8	29.0	42.8	15.1	0.5	100.0
20 - 24	13.1	8.1	13.1	15.8	37.1	12.8	100.0
25 - 29	18.9	11.1	10.7	11.7	25.0	22.6	100.0
30 - 34	27.0	17.5	11.0	7.5	20.4	16.6	100.0
35 - 39	36.6	15.8	8.7	7.9	17.6	13.4	100.0
40 - 44	49.4	7.9	8.1	5.6	16.6	12.4	100.0
45 - 49	67.9	6.4	4.3	4.6	10.4	6.4	100.0
50 -54	69.5	6.8	5.7	2.0	8.9	6.9	100.0
55 - 59	86.2	8.8	0.7	1.4	2.9	-	100.0
60 +	91.9	4.8	-	1.2	2.1	-	100.0
Total	25.7	18.1	16.8	12.7	16.9	9.8	100.0

Women in Qatar are, however, less educated than men. About 26 percent of women at ages ten and over in the QCHS household survey were illiterate, 18 percent with incomplete primary education, 17 percent completed primary school, 12 percent intermediate school, 17 percent secondary school and 10 percent attained university education. 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 aged 60-64, only less than three percent got as far as intermediate or higher level of education. Among women aged 20-24, however, about 66 percent had post-primary education and 38 percent had completed at least the secondary level of schooling.

1.3.4 Environmental Conditions

The Government of Qatar has adopted a comprehensive housing policy that aims at organising the growth of residential areas, reducing overcrowding and replacing, in planned way, unsanitary settlements with modern dwellings. Information from QCHS on household amenities conveys a very favourable picture of the environmental conditions and the socio-economic status of the population under study.

Crowding

In the household survey, information was collected on the number of rooms available for the exclusive use of the household. This number included bedrooms, dining and drawing rooms; it excludes servant's quarters, kitchen, store rooms, bathrooms and garages. Table 1.5 shows the percent distribution of households by number of rooms and by number of bedrooms.

At the national level, the distribution of households by number of rooms is uni-modal with the peak occurring at 4-5 rooms. About one-third of households reside in dwellings with 5-6 rooms and about one-sixth have 7-8 rooms. The average number of rooms per household comes to 4.9, and the average number of persons per room is about 1.4.

Table 1.5 Percent distribution of the sample households by number of rooms and number of bedrooms, QCHS 1987

Number of rooms	Room	Bedroom
1	0.7	12.8
2	7.2	32.9
3	19.3	35.0
4	22.7	10.7
5	21.8	3.6
6	11.6	2.0
7	5.3	1.3
8 +	11.4	1.7
Total	100.0	100.0
Average number of rooms per household	4.9	2.8
Average number of persons per room	1.4	2.4

Housing Characteristics

Table 1.6 shows the percent distribution of household by selected housing characteristics. About 89 percent of the sample households are supplied with drinking water from public network; 94 percent have flush toilet; 91 percent have floors covered with tiles; over 99 percent have electricity, and 91 percent of households have their garbage collected regularly by the municipality.

Table 1.6 Percent distribution of household by selected environmental characteristics, QCHS 1987

Source of drinking	Percent	Flooring material	Percent
Piped	88.7	Cement / Tiles	91.1
Tanker truck	9.2	Wood	4.8
Other	2.1	Earth	0.8
Treatment of water	**Percent**	Other	3.3
Filtering	83.8	**Lighting**	**Percent**
Boiling	0.7	Electric	99.4
Other	2.2	Other	0.6
No treatment	13.3	**Waste disposal**	**Percent**
Sanitation facility	**Percent**	Garbage collector	91.4
Flush	93.5	Dumping in special place	8.0
Other	6.5	Other	0.6

Presence of Durable Goods

Table 1.7 shows the percentage of households with specific durable consumer goods. Overall, about 99 percent of households have a radio, a television, and a refrigerator; about 95 percent have a car, and more than 92 percent have a telephone.

Table 1.7 Percentage of households with specific durable consumer goods, QCHS 1987

	Percent
Radio	98.9
Television	98.6
Video	83.9
Refrigerator	99.1
Telephone	92.5
Car	94.5

1.3.5 Background Characteristics of Ever-married Women

The main findings of the maternal care survey are presented in this report not only for the sample as a whole but also for different sub-groups of the sample. These sub-groups are defined by a number of geographic and socio-economic variables, which will be referred to as the "background characteristics". Table 1.8 shows the percent distribution of ever-married women interviewed in the maternal care survey, by age and by years since first marriage, according to nationality. Table 1.9 shows the percent distribution of ever-married and currently married women according to selected background characteristics.

Table 1.8 Percent distribution of ever-married women inter-viewed in the maternal care survey, by current age, and by years since first marriage, according to nationality, QCHS 1987

Variable	Nationality			Total
	Qatari	Arab	Other	
Age				
15 - 19	4.6	3.5	1.9	17.3
20 - 25	7.4	15.7	9.8	26.7
25 - 29	22.7	23.2	21.6	17.3
30 - 34	18.8	22.8	27.5	14.4
35 - 39	14.2	17.8	21.6	13.9
40 - 44	11.1	10.8	12.8	9.4
45 - 49	11.2	6.2	4.8	1.0
Total	100.0	100.0	100.0	100.0
Years since first marriage				
< 5	20.9	19.4	10.3	18.0
5 - 9	16.0	25.9	25.5	21.9
10 - 14	14.5	23.0	26.9	20.4
15 - 19	15.9	13.4	17.3	15.3
20 - 24	12.8	10.5	13.3	12.0
25 - 29	10.2	5.1	5.0	7.1
30 +	9.7	2.7	1.7	5.3
Total	100.0	100.0	100.0	100.0
Number of women	**1567**	**1489**	**862**	**3918**

Table 1.9 Percent distribution of ever-married, and currently married women, interviewed in the maternal care survey by selected background characteristics, QCHS 1987

Variable	Ever-married	Currently married
Nationality		
Qatari	40.0	38.1
Arab	38.0	39.2
Other	22.0	22.7
Total	100.0	100.0
Region		
Doha	57.9	58.4
Al-Rayyan	24.9	24.8
Al-Wahrah	7.3	7.4
Um-salal	3.6	3.6
Other	6.3	5.8
Total	100.0	100.0
Education		
Illiterate	29.7	28.8
Incomplete primary	10.9	10.8
Primary	10.5	10.4
Preparatory	10.0	10.1
Secondary	22.6	23.2
University	16.3	16.7
Total	100.0	100.0
Number of women	3918	3760

As expected, the distribution of ever-married Qatari women increases from ages 15-19 to ages 25-29, then declines as age increase. Qatari women, however, have a much younger age distribution than women of other nationalities.

About three-fifths of the respondents live in Doha, and almost one-quarter live in Al-Rayyan region.

About 70 percent of ever-married women in the individual survey are literate. The level of literacy is higher among younger cohorts; it increases from 32 percent among ever-married women aged 45-49, to 77 percent among women aged 30-34, and to 80 percent among ever-married women under 25 years of age. Among the ever-married women at ages 20-24, about 79 percent received post-primary education and 50 percent completed high school. These figures reflect the concerted efforts of the government to raise levels of educational attainment in the country and to improve the status of women.

1.4 SOCIAL CHANGES AND DETERMINANTS OF FERTILITY

As already mentioned, this study is concerned with an investigation of the determinants of reproductive patterns in Qatar. The long-standing interest in socio-economic differentials in fertility stems from their usefulness in addressing two separate, although related, sets of issues (Singh and Casterline,1985).

First, socio-economic differentials may indicate the considerations that underlay fertility decisions, though rarely are they directly interpretable in terms of reproductive motivations. For example, educational differentials are not solely the result of the substantive content of school curricula but also reflect greater social mobility through employment and a desire to emulate western life-style. In this fashion socio-economic differentials provide indirect evidence on the factors influencing reproductive motivations. Direct investigation of these factors would be desirable, but measures of them are not usually available.

Secondly, analysis of socio-economic differentials occupies a central position in the study of fertility changes. Here the interpretation of observed differentials is heavily conditioned by the recent demographic experience of the society. In societies where fertility within marriage is still beyond conscious control, socio-economic differentials reveal little about the future trends, rather, they reflect traditional customs. In societies where the transition to lower fertility is well under way, on the other hand, divergence can reveal much about the nature of change, indicating in turn the forces which lie behind the fertility transition.

Many studies have revealed that three socio-economic factors, namely: maternal education, type of place of residence and female employment, have a strong impact on fertility levels. Classic demographic transition theory stressed industrialisation and economic development and concomitant increases in urbanisation, income, and social mobility as the primary structural factors responsible for fertility decline, on the basis of the experience of developed countries. An increase in average educational attainment was seen as inevitable accompaniment to the economic restructuring of society, but its role in fertility decline was not particularly emphasised. More recently, however, the occurrence of substantial decline in many developing countries which have not experienced marked economic growth or industrialisation has focused attention on other types of societal changes that could change attitudes and motivation towards child-bearing. Large increase in the level of education have typically occurred slightly before or around the same time as fertility decline. Rapid urbanisation and expansion of the communication network also occurred, contributing, in conjunction with education, to increased exposure to the Western style of life. This has led some analysts to broaden the theory and to attribute a causative role to social development, with particular emphasis on the role of schooling.

Caldwell, 1976, pointed out that transition from high to low fertility is due to institutional changes that reverse the traditional flow of wealth from the younger to the older generation, thus increasing couples' motivation to have fewer children. Mass education is one institutional change that influences families to lower their fertility by increasing the transmission of wealth from the older to the younger generation.

Cartwright, 1983, revealed that the change in motivation from large to small family size according to the classic fertility transition theory to European population (from high fertility level to low level) was the change in macro-developmental variables, such as urbanisation, industrialisation, literacy and the like. This resulted in a shift from major dependence on relatively self-contained local institutions to dependence on larger social, economic and political units. The family gave up many of its functions to larger, specialised institutions which were of growing importance. Greater literacy and the development of effective communication and transportation networks were essential to all these changes. With development the burden of children increase, partly because they interfered with the new non-familiar activities and partly because the improved level of living, the increased education and the opportunities in the new expanded system, led to rising aspirations. Parents wanted more for themselves and their children. They were more likely to be able to satisfy the new aspirations with fewer children than with more.

In developing countries parents expect and receive significant economic support from their surviving children, especially sons, in their old age. The decrease of this reliance on children is traditionally thought to be one of the main ways in which economic development reduces fertility. Caldwell, 1983, shows that fertility is significantly lower in countries with social insurance benefits established for the elderly with other variables held equal.

Easterlin, 1978, pointed out that modernisation alters the demand for children, because the children's economic contributions fall off considerably in modernising societies as education gain importance, children become obsolete or unnecessary as the labour force shifts out of agriculture or as children are replaced by other institutions in providing security against risk in old age and as greater social mobility and weaker family ties reduces dependence on children. The value of parental time rises. All these components together produce a decline in demand for children with modernisation. But early in modernisation, before children's labour contribution is much reduced, the demand for children rises slightly.

Caldwell,1983, pointed out that in all countries and all areas, fertility follows changes in the demand for children, driven by consideration of both economics and taste. Fertility fails to fall in the early phases of most countries' development, and falls thereafter, for a straightforward reason, that the relative costlines of extra children fails to rise until a fairly advanced stage in development, i.e. until it appears therefore, that the fertility transition parallels the long-term pattern of child costs and benefits.

The employment of women may help in reducing fertility. It has long been recognised that some types of work are more compatible with having and raising children than others. In the early 1960s it was found that fertility is inversely related to women's labour force participation. In fact researchers see the promotion of female employment as a powerful means of reducing fertility. It is widely inferred that in low income countries, high levels of fertility would be encouraged to the extent that female labour force participation was low, i.e. if there were few opportunities for income earning, the cost of childbearing would be reduced. Work is more likely to affect fertility negatively. It is found that women who worked because they wanted to do so

appeared to have lower fertility than those who worked from economic necessity or for a higher level of living. Because this interest in work has typically been correlated with high status career jobs, making it likely for women to have relatively low fertility. Some studies have found no inverse relationship between fertility and female labour force participation in rural areas of low income countries and the inverse relationship exists only in the urban areas of these countries. It is observed that fertility levels of women working in what is called cottage industries and agricultural field work in the family farm were similar to those of the economically inactive and that only women who worked away from home had lower average fertility. Davanzo and Lee, 1978, mentioned that it is generally accepted that women doing agricultural work, in particular those on family farms where work schedules have been assumed to be flexible and child care can be combined with work rather easily, therefore they have a high fertility rate.

There are, however, two contrasting views about the effect of economic development on fertility. The first view is that economic development has an inhibiting effect on fertility and this is expressed in the transitional theory. The second view supports the idea that economic development promotes fertility because it would increase the demand for manpower.

The transition of high to low fertility passes through three stages:

(1) The Balanced Stage

Where infant mortality is high throughout the society without any differences among various socio-economic classes. Consequently, fertility tends to be as high as mortality and positively correlated with class position. European experience prior to 1850 indicates that there were no class differences in fertility. Notestein, 1953, demonstrated

that there was an increase in fertility in China with an increase of wealth among farm families, and data from India tend to confirm this pattern of association.

(2) The Transitional Stage

Begins with the improvement of the socio-cultural environment, i.e. better sanitation, medical science and practices, so that class differences show up in infant mortality. Usually the privileged classes experience an early decline in infant deaths which gradually induces attitudes favourable to smaller families. Once mortality starts to decline in the lower socio-economic categories more than in higher categories, the second phase of fertility decline gets underway.

(3) The Final Stage

Begins by the end of the transitional period which marks the disappearance of the inverse association of fertility with class position. Finally, fertility returns to the early pattern of direct association with socio-economic status, but at a relatively low level.

Economists and demographers have tried to explain the nature of the complex interaction between economic development and fertility. The complexity of this interaction emerges from the fact that while economic development could raise fertility in the short run, social and economic changes which are concomitant with the development, help to reduce fertility in the long run.

Another factor that may affect fertility levels is gender preference. There are also other considerations for wanting children. Chief among these are the following three economic reasons :

(1) Children as a source of labour in many developing countries make significant economic contributions. Work starts at an age well below 10 and the value of children's labour approaches that of an adult.

(2) Children for old age security. Savings, pensions, and social security incomes help to support many ageing parents in developed countries. But, in most developing societies, these sources are not available for the majority of people in rural areas who are usually engaged in agricultural activities. Therefore, they rely on their children (sons) for care and economic support in old age. Thus, preference of sons may have an impact on fertility in rural areas. For example, women in villages in upper Egypt have higher fertility and are less likely to be using contraceptives because they expect to receive help of some kind from their children in the future (Easterlin et al.,1998b).

(3) Children as an insurance against economic risk. Households living close to subsistence level are highly vulnerable to fluctuations in income or food supply. Perhaps the most serious threat to household's economic survival arises when the head of the family dies or become seriously ill or permanently disabled and there is no son to assume responsibility for the family. Parents will minimise the risk by increasing the number of children (sons) surviving to adulthood.

The value of children emphasised the role of children in the family. If parents perceive that having children has a positive value as opposed to a costly negative value, they will do nothing to deliberately avoid an extra child.

Parents may have children because they are seen as a gift of God and within God's domain, and they fear that any interference will anger God. They may see them also as a source of security, income, prestige

and power. On the other hand, children may be costly in terms of financial burdens, time, worry, emotions and responsibility. In other words, goods and services are provided by children to parents and parents in turn contribute goods and services to the children. If the cost of children outweighs the benefits realised then parents will seriously consider limiting the family size and vice versa.

CHAPTER 2

DETERMINANTS OF AGE AT MARRIAGE

2.1 INTRODUCTION

In Qatar, first marriage is essentially synonymous with first exposure to the likelihood of conception. Marriage and fertility are, therefore, viewed as interrelated as social and demographic processes. Thus, study of nuptiality patterns is essential to understanding reproductive patterns and to formulating maternal health programmes.

In this chapter, attention will be focused on the patterns and levels of first marriage, using data from the 1987 Qatar Child Health Survey. Sections 2.2, 2.3 and 2.4 deal, respectively, with current marital status, age patterns of first marriage and consanguinity patterns. Section 2.5 presents the results of a multivariate analysis of the determinants of age at marriage in Qatar.

2.2 CURRENT MARITAL STATUS

Table 2.1 shows the distribution of the population enumerated in the 1987 QCHS household survey by current age, sex and marital status, according to nationality. The figures give an overview of the relative frequency of the various possible statuses.

As may be seen, very few women under age 15 are married. The proportion of the population that is single declines very rapidly with increasing age. Qatari nationals, however, have a much older first-marriage pattern than that shown for the whole population. By ages 25-29, about 31 percent of Qatari women are single, compared with only 17 percent of all women.

Table 2.1 Percent distribution of the population enumerated in the QCHS 1987 household survey, by age, sex and marital status, according to nationality.

Age	Males					Females				
	Single	Married	Widowed	Divorced	Total	Single	Married	Widowed	Divorced	Total
A. Qatari Nationals										
10-14	99.9	0.1	-	-	100	99.1	0.1	-	-	100
15-19	98.0	1.2	0.7	-	100	90.0	9.6	0.1	0.3	100
20-24	81.1	17.3	1.1	0.5	100	55.6	42.1	0.4	1.9	100
25-29	45.1	53.0	0.6	1.2	100	30.5	65.1	1.0	3.5	100
30-34	28.0	70.0	1.0	1.0	100	24.1	69.0	4.0	2.8	100
35-39	14.8	83.8	1.1	0.3	100	16.7	76.2	4.3	2.8	100
40-44	18.0	80.7	0.8	0.4	100	8.5	82.5	4.9	4.1	100
45-49	3.6	94.4	0.5	1.5	100	3.9	81.8	9.9	4.4	100
50-54	5.9	91.5	1.1	1.6	100	6.9	65.0	24.4	3.8	100
55-59	3.0	97.0	0.0	0.0	100	4.8	60.6	29.8	4.8	100
60-64	1.5	97.7	0.8	0.0	100	13.3	40.8	44.9	1.0	100
65-69	0.0	97.0	1.5	1.5	100	10.7	32.1	57.1	0.1	100
70 +	5.4	84.6	10.0	-	100	19.8	19.8	55.5	4.9	100
B. All Nationalities										
10-14	99.9	0.1	-	-	100	99.9	0.1	-	-	100
15-19	98.1	1.2	0.7	-	100	87.2	12.4	0.3	0.2	100
20-24	77.9	20.7	1.0	0.4	100	43.6	54.9	0.4	1.1	100
25-29	36.4	61.9	0.6	1.1	100	17.4	79.7	0.8	2.1	100
30-34	12.9	85.9	0.5	0.7	100	11.6	84.0	2.4	1.9	100
35-39	4.0	95.3	0.5	0.2	100	7.3	88.4	2.6	1.7	100
40-44	3.3	95.6	0.6	0.6	100	3.2	90.9	4.0	1.9	100
45-49	1.0	98.0	0.4	0.6	100	2.0	87.7	7.9	2.3	100
50-54	2.6	95.4	1.3	0.8	100	4.1	74.2	18.4	3.3	100
55-59	1.5	97.5	1.0	0.0	100	3.0	63.0	29.6	4.4	100
60-64	2.2	97.3	0.5	0.0	100	9.3	44.4	45.4	0.9	100
65-69	0.0	97.4	1.3	1.3	100	5.9	41.2	52.9	0.0	100
70 +	4.3	86.4	9.3	0.0	100	16.2	18.2	60.6	5.1	100

As the proportion of single persons declines with increasing age, the proportion of the population that is ever married rises by a corresponding amount. The proportion of currently married women increases rapidly up to ages 40-44 and then starts to decline due to the effects of widowhood and divorce. Between ages 25 and 50, the proportion divorced among women ranges between 2 and 4 percent. The percentage of women who are widowed climbs steadily with age but is not substantial until about ages 50-54 where it reaches 24 percent among Qatari women and 18 percent among all women irrespective of nationality. Among Qatari women in the age range15-49, about 42 percent are single, 53 percent are currently married, while the remaining 5 percent are either widowed or divorced.

Table 2.2 Percent distribution of all ever-married women by current marital status, according to (a) current age, and (b) years since first marriage, QCHS 1987

Variable	Current marital status			Total
	Married	Widowed	Divorced	
A. Current Age				
15 - 19	98.6	-	1.4	100
20 - 24	97.8	0.3	1.9	100
25 - 29	97.3	0.6	2.1	100
30 - 34	95.9	2.0	2.2	100
35 - 39	96.1	2.7	1.2	100
40 - 44	95.1	2.9	2.0	100
45 - 49	88.7	8.7	2.6	100
B. Years since first marriage				
< 5	97.9	0.1	2.0	100
5 - 9	98.2	0.4	1.4	100
10 - 14	97.5	0.5	2.0	100
15 - 19	95.2	2.7	2.2	100
20 - 24	94.5	3.8	1.7	100
25 +	89.0	8.3	2.7	100
Total	96.0	2.1	1.9	100

The net effect of the three factors of first marriage, dissolution of marriage and remarriage on the current marital status of the evermarried women interviewed in the maternal care survey is shown in Table 2.2. The term marital status as used here classifies ever-married women into three categories: currently married, widowed, and divorced. As may be seen, at the time of the survey, 96 percent of all ever-married women at ages 15-49 were married, about two percent widowed and two percent divorced. The proportion currently married decreases from over 97 percent for women aged 25-29, to 95 percent for those aged 40-44 and to 89 percent for women aged 45-49 years, mainly due to the higher incidence of widowhood at older ages.

2.3 AGE PATTERNS OF FIRST MARRIAGE

In this section, recent trends in the tempo and level of female nuptiality will be analysed by linking data on date of first marriage obtained in the individual maternal care survey with data on current marital status from the household survey. Any analysis of age patterns of first marriage must take into account the fact that the data on age at first marriage are censored, i.e., the data are incomplete since information on the age at marriage is available only for women who have ever been married.

Table 2.3 shows the distribution of 'all' women in the sample by marital status and age at first marriage, according to nationality and current age. About 16 percent of all Qatari women aged 15-49 married for the first time before age of 15, more than 35 percent before age 18, and about 51 percent married before age 22 years. Cohort trends in age at marriage can be examined by comparing the distribution of the proportion of women ever-married by age for successive age cohorts. The figures in Table 2.3 shows a clear trend towards later marriage, and a concomitant tendency for first marriage to become spread over a

wider age range, as evidenced by the substantial decreases in the proportion of young marriages.

Table 2.3 Percent distribution of women by marital status and age at marriage according to age and nationality, QCHS 1987

Age	Never Married	Age at first marriage						Total
		< 15	15-17	18-19	20-21	22-24	25-49	
A. Qatari women								
15-19	90.0	1.1	6.9	2.0	-	-	-	100
20-24	55.6	5.2	11.9	10.7	10.6	6.0	-	100
25-29	30.5	10.7	19.7	11.9	10.2	11.5	5.5	100
30-34	24.1	25.3	24.8	10.1	6.5	3.6	5.6	100
35-39	16.7	35.5	26.5	10.4	5.2	1.5	4.1	100
40-44	8.5	38.4	33.1	5.8	9.0	0.5	4.7	100
45-49	3.9	40.1	33.0	11.0	8.2	2.8	1.0	100
Total	42.0	16.0	19.0	8.8	7.0	4.5	2.7	100
B. All women (irrespective of nationality)								
15-19	87.2	2.0	8.5	2.3	-	-	-	100
20-24	43.6	5.8	17.0	15.9	11.9	5.8	-	100
25-29	17.4	10.3	19.8	16.0	14.3	16.2	6.0	100
30-34	11.6	16.0	18.5	12.7	12.8	13.7	14.7	100
35-39	7.3	18.2	22.8	12.5	9.2	14.3	15.7	100
40-44	3.2	22.2	24.8	13.5	13.5	9.6	13.2	100
45-49	2.0	27.9	33.0	11.1	10.2	8.2	7.6	100
Total	30.0	12.1	18.7	12.1	10.1	9.7	7.3	100

Thus, the proportion of Qatari women who entered first marriage before reaching age 25 has decreased from over 90 percent among women currently at ages 40-49, to about 75 percent for women currently at ages 30-39, and to 64 percent for women currently at ages 25-29 years. Likewise, the proportion has declined, but more rapidly, for those marrying before age 20 ; from about 77 percent among the cohorts of women currently at ages 35 and over, to only 28 percent among the cohort aged 20-24.

The downward trend in teenage marriages has been even more striking. About 62 percent of women currently at ages 35-39 had entered first marriage before reaching age 18, whereas the figure was 50 percent for women currently 30-34 years, 30 percent for women currently 25-29, and only 17 percent for those aged 20-24.

There has also been a very sharp decline in the very early marriage. The proportion of women ever married by exact age 15 was about 40 percent among the women currently at ages 40-49. This proportion continued to decline gradually with every succeeding cohort until it reached a low of one percent among women currently aged 15-19.

This important transformation in the tempo of nuptiality of Qatari women reflects, of course, an upward trend in age at first marriage. This may be illustrated by an examination of trends in the ages at which certain proportions of successive age cohorts were married. In Table 2.4, figures are given showing the ages at which 10, 25, 50 and 75 percent of the initial size of each of the seven age cohorts considered had been married for the first time. The table also shows the inter-quartile range which obtained by subtracting the age at which the proportion ever married reached 25 percent from that age at which the proportion reached 75 percent.

The figures bring out in sharper focus the remarkable transformation in the age pattern of nuptiality which started with the cohorts of women born in the mid-1950s, and shows that the two dimensions of the tempo of nuptiality, namely the early-late dimension and the rapid-slow dimension, have worked, with only few exceptions, in such a way as to reinforce each other. Thus, for Qatari women, the age at which the proportion ever married reached 25 percent was less than 15 for each of the cohorts currently aged 35-39, 40-44, and 45-49. This age has risen to 17.2 years for the cohort aged 25-29, and

to 19.5 for the cohort aged 20-24. A similar upward shift is also shown for the ages at which 75 percent of the women in each cohort had entered first marriage.

Table 2.4 Estimated ages at which 10, 25, 50 and 75 percent of successive age cohorts of women had ever-married, according to nationality, QCHS 1987

Current age of cohort (as of 1987)	Percentage ever-Married				Inter-quartile age range
	10	25	50	75	
A. Qatari women					
15 - 19	16.5	-	-	-	-
20 - 24	16.2	19.5	-	-	-
25 - 29	15.0	17.2	21.4	25.8	8.6
30 - 34	13.9	15.0	18.0	20.1	5.1
35 - 39	13.7	14.1	16.6	20.6	6.5
40 - 44	13.7	14.0	16.5	19.2	5.2
45 - 49	13.5	14.2	15.9	18.4	4.2
B. All women					
15 - 19	16.9	-	-	-	-
20 - 24	15.7	18.3	-	-	-
25 - 29	15.0	17.5	20.6	25.8	8.3
30 - 34	14.4	16.1	20.5	25.8	9.7
35 - 39	14.2	16.1	19.6	25.0	8.9
40 - 44	13.9	15.4	18.5	22.4	7.0
45 - 49	13.7	14.8	17.0	20.5	5.7

Of special interest, however, is the trend in the median age at first marriage, i.e., the age by which half of the women of any given cohort had entered into a first marriage. The figures in Table 2.4 shows that

the median age at first marriage for Qatari women has risen from less than 17 years for the cohorts of women currently at ages 35 and over, to 18.0 years for women at ages 35-34, and to 21.4 years for women at ages 25-29. Information on women in their early twenties and late teens suggests that the upward shift in age at first marriage and the tendency for first marriages to be spread over a wider age range was continuing in the late 1980s.

Table 2.5 Percent distribution of ever-married women by blood relation between spouses, according to selected background characteristics, QCHS 1987

Variable	Relation			Total
	First cousin	Other relation	No relation	
Years since first marriage				
< 5	28	18	54	100
5 - 9	32	13	55	100
10 - 14	27	13	60	100
15 - 19	30	14	56	100
20 - 24	30	15	55	100
25 +	30	14	56	100
Nationality				
Qatari	35	18	47	100
Arab	29	14	57	100
Other	22	11	67	100
Literacy				
Illiterate	41	16	43	100
Literate	25	14	61	100
Total	30	15	55	100

2.4 CONSANGUINITY

Marriage between first cousins and, in general, between men and women who have a blood relation is quite common among the Qatari population. Among ever-married women under 50 years of age, about 45 percent reported having a blood relationship with their husbands (30 percent were 'first cousins' and 15 percent 'other' relation). Table 2.5 shows that consanguineous marriage is least common among non-Arab couples where just less than one-third of spouses have a blood relation.

2.5 DETERMINANTS OF AGE AT FIRST MARRIAGE

2.5.1 Differentials in Age at Marriage

The 1987 QCHS results have demonstrated wide differentials in age at first marriage among women with different characteristics. For the entire QCHS sample, the mean age at first marriage is only 18.6 years. However, it is only 17.0 years among the Qatari respondents, as may be seen in Table 2.6. While for recent marriage cohorts, ages at first marriage indicate some upward trends, the mean is only about 19 years for the most recent cohort (i.e. the cohort 0-4 years since first marriage) in Al-Rayyan region. Accordingly, a detailed investigation of the socio-economic determinants of the age at first marriage was required as a step towards understanding reproductive patterns in Qatar.

Bivariate analysis, presented in Table 2.6, indicates that regional differences in ages at first marriage are apparent among the four regions. The mean age at first marriage is almost two years younger in Al-Rayyan region, compared to that in Doha (17.4 vs. 19.2 years, respectively). Qatari women marry at younger ages (17.0 years) than

Table 2.6 Mean age at first marriage of ever-married women under 50 years of age, by region of residence and nationality, according to selected socio-economic factors, QCHS 1987

Variable	REGION OF RESIDENCE				NATIONALITY			TOTAL
	Doha	Al-Rayyan	Al-Wakrah	Others	Qatari	Arabs	Others	
REGION OF RESIDENCE								
Doha	-	-	-	-	17.22	20.27	19.79	19.21
Al-Rayyan	-	-	-	-	16.88	18.32	17.22	17.40
Al-Wakrah	-	-	-	-	17.25	18.98	20.12	18.82
Other regions	-	-	-	-	16.65	19.48	18.50	17.66
NATIONALITY								
Qatari	17.22	16.88	17.25	16.65	-	-	-	17.03
Arabs	20.27	18.32	18.98	19.48	-	-	-	19.75
Other	19.79	17.22	20.12	18.50	-	-	-	19.43
LEVEL OF EDUCATION								
Illiterate	16.30	17.43	16.12	16.29	16.04	16.82	16.66	16.34
Literate no schooling	16.45	17.56	22.00	16.00	15.17	19.50	18.36	16.75
Incomplete primary	16.26	16.35	16.74	15.64	15.56	17.07	16.92	16.22
Primary	17.52	16.55	17.33	16.78	16.90	17.46	17.38	17.18
Preparatory	18.17	17.57	18.41	18.00	17.74	18.05	18.84	18.05
Secondary	20.62	20.05	19.58	21.33	19.50	20.68	20.74	20.49
University	22.95	22.27	22.68	23.13	20.92	23.87	22.61	22.87
CURRENTLY WORKING FOR WAGE								
Working	21.62	20.33	22.10	20.98	19.33	22.49	22.03	21.43
Not working	18.51	17.07	18.39	17.10	16.66	19.03	18.75	17.99
RELATED TO HUSBAND								
Related	18.32	17.11	17.56	17.11	17.06	18.64	17.72	17.75
Unrelated	19.74	17.89	19.71	18.15	17.00	20.57	20.30	19.31
EVER USE OF FAMILY PLANNING								
Ever users	19.32	17.73	18.93	17.99	16.64	20.12	19.86	18.89
Never users	19.07	17.19	18.68	17.36	17.35	19.15	19.09	18.33
YEARS SINCE FIRST MARRIAGE								
0 - 4	21.49	19.05	20.63	20.27	20.44	20.85	21.49	20.74
5 - 9	20.90	18.99	20.48	20.26	18.71	21.21	20.65	20.36
10 -14	19.86	17.15	19.18	18.53	16.97	19.80	20.17	19.13
15 - 19	17.92	16.34	18.57	15.94	15.70	18.67	18.54	17.40
20 - 24	16.92	16.25	16.49	15.75	15.25	17.87	17.00	16.58
25 - 29	15.74	15.29	16.00	15.89	14.88	16.84	16.39	15.65
30 +	14.30	13.71	15.20	13.95	13.85	15.28	14,57	14.18
Total	19.21	17.40	18.82	17.66	17.03	19.75	19.43	18.62

other Arab women (19.8 years). A somewhat curvilinear relationship with education emerges for the total sample in which illiterates and literate women with no schooling marry at later ages than women with incomplete primary education. This is true for all regions except Al-Wakrah. Working women or women unrelated to their husbands marry somewhat later than non-working women or women related to their husbands. Ever users of family planning are those who usually got married at relatively later ages.

Analysis of marriage cohorts indicates an upward trend in ages at first marriage in all four regions, with a faster rate of increase in Doha, and the slowest rate of increase observed in Al-Rayyan and Al-Wakrah regions. Mean ages at first marriage in Doha increased from 14.3 years for women of at least 30 years since first marriage, to 21.5 years for women married in the five years preceding the survey. The two means are 13.7 and 19.1 years, respectively, for Al-Rayyan region, and 15.2 and 20.6 years, respectively, for Al-Wakrah region.

2.5.2 Analytical Procedures

The above results might be enhanced by conducting the multivariate analysis and controlling for various socio-economic factors. To investigate how various demographic and socio-economic factors affect the timing of marriage, multivariate regression models are fitted for the age at first marriage as a function of different subsets of these independent factors.

The basic multivariate model considered in this study assumes that a linear relationship exists between age at first marriage (AFM) as the dependent variable and a number of independent variables representing individual demographic and socio-economic characteristics of ever-married women. Accordingly, AFM is assumed to be a function of the woman's level of education, current work status, blood relationship to her husband, region of residence and nationality.

The Basic form of the model is

$$\text{Age at first marriage} = b_o + \sum_{i-1}^{K} b_i \; x_i + \varepsilon$$

where b_o is the age at first marriage when all independent variables, x_i's are equal to zero. For the categorical variables, namely, region of residence, level of education, work for cash, relation to husband and nationality, a set of binary indicators for each variable was created. Each binary indicator represents one category of the variable and its value depends on whether or not the respondent belongs to that category (1 = in category, 0 = not in category). The indicator of the reference category is omitted from estimation. The regression coefficient, b_i , is the incremental effect on the age at first marriage over b_o of having the characteristic x_i , for all characteristics included in the model. Thus, the following discussion of the multivariate results will be in terms of differences in ages at first marriage between each category of the demographic and socio-economic explanatory variables and the reference category, net of other variables.

2.5.3 Models of Age at Marriage

Table 2.7, presents the results of the multivariate analysis for age at first marriage for ever-married women under 50 years of age, using data from the 1987 QCHS.

In model 1, only the five education variables are included. This specification of the model allows testing of the hypothesis that age at first marriage may be delayed by women who take advantage of higher levels of education. The results indicate that, when it comes to age at first marriage, there is no significant difference between literate women with no schooling or those with incomplete primary education and

Table 2.7 Multivariate regression for age at first marriage, ever-married women, QCHS 1987

Variable	Model number				
	(1)	(2)	(3)	(4)	(5)
REGION OF RESIDENCE					
Doha	-	Reference	Reference	Reference	Reference
Al-Rayyan	-	-.2877*	-.1465	-.6133**	-.4871**
Al-Wakrah	-	-.2874	-.2594	-.1573	-.0365
Other region	-	-.1674	.0506	-.0817	-.0628
LEVEL OF EDUCATION					
Illiterate	Reference	Reference	Reference	Reference	Reference
Literate no schooling and incomplete primary	-.0723	-.1050	-.1172	-.8246**	-.9224**
Primary	.7952**	.7632**	.6688**	-.4036*	-.5054**
Preparatory	1.667**	1.613**	1.388**	.1148	-.0169
Secondary	4.101**	4.023**	3.629**	2.198**	1.905**
University	6.487**	6.403**	6.050**	4.483**	3.860**
CURRENTLY WORKING FOR WAGE	-	-	-	-	.8839**
RELATED TO HUSBAND	-	-	-	-	-.5839**
NATIONALITY					
Qatari	-	-	Reference	Reference	Reference
Arab	-	-	1.191**	1.100**	1.117**
Other nationalities	-	-	.9758**	.9314**	.8876**
YEARS SINCE FIRST MARRIAGE	-	-	-	-.1644**	-.1676**
CONSTANT	16.385**	16.531**	15.980**	19.176**	19.481**
R square	0.327	0.328	0.342	0.431	0.441
Number of cases	3770	3770	3770	3770	3770

\+ statistically significant at 10% level
* statistically significant at 5% level
** statistically significant at 1% level
\- indicates variable not included in model

illiterate women. However, women with primary education delay their marriages by an average of almost ten months, compared to illiterate

women. Postponement of marriage increases steadily to 1.7, 4.1, and 6.5 years for women with preparatory, secondary, and university education, respectively. Thus, education especially at higher levels, does exert a positive impact on age at first marriage.

Model 2, incorporates, in addition to the education variables, the region-of-residence variables. One can see that, after controlling for the effect of education, the three region-of-residence variables still show net negative, but insignificant, impacts, except for Al-Rayyan region which is significant at the 5% level, on the age at first marriage. The net negative effects of the three regions are small (between -0.17 and -0.29), when compared to Doha. The two models explain about 33% of the variation in the age at first marriage, a high proportion for this type of analysis.

When nationality variables are considered in the model (Model 3), all three net effects of region-of-residence became insignificant, while this inclusion resulted in a little detraction from the effect of the education variables on ages at first marriage. Both nationality variables show net positive effects. Arab women and women from other nationalities marry, on average, a year later than Qatari women, when regional and educational differences are accounted for.

Controlling for marriage cohorts, Model 4 includes years since first marriage. The term "marital duration" will refer to years since first marriage, even if marital dissolution, remarriage, etc., has occurred since that initial event. This inclusion resulted in enhancing the net negative effect of Al-Rayyan region to become highly significant, while detracting from the net effect of education. A curvilinear relationship is observed. An education attainment below the preparatory certificate is more likely to cause the age at first marriage to be, on average, below that of illiterate women. The relationship is reversed for higher education levels (i.e. secondary and university education). Years since

first marriage, as a measure of marriage cohorts, depicts a net negative and significant impact on ages at first marriage. The model explains about 43% of the differentials in ages at first marriage.

The next model controls for currently-working-for-wage and consanguineous-marriage variables, in addition to region, nationality, education and marital duration. The results regarding region of residence and level of education are very much similar to those of Models 3 and 4, respectively. On the other hand, women who marry to their relatives, do so at younger ages (about six or seven months younger, on average) than those who marry to non-relatives. Once marriage cohorts are controlled for, the model explains a higher proportion of the variation in the age at first marriage. Models 4 and 5 explain about 43% and 44%, respectively, of the variance. Apart from some region-of-residence variables, all other demographic and socio-economic factors which are assumed to affect the age at first marriage show highly significant effects. The results indicate that the overall relationship between the age at first marriage and the selected demographic and socio-economic factors is highly significant. The final model (Model 5) provides a useful summary of the relative importance of the explanatory variables on the age at first marriage. Among these demographic and socio-economic factors, it appears that education, nationality, work, and blood relationship are the main determinants of ages at first marriage in Qatar.

CHAPTER 3

DETERMINANTS OF FERTILITY

3.1 INTRODUCTION

Maternal health is closely related to reproductive behaviour, especially in the context of the traditional family building process, which is characterised by an early start to childbearing, by short birth intervals, lengthened primarily by prolonged breast-feeding, and by an ultimately high parity (Farid, 1993). High mortality in infancy and childhood generally features in this process. The analysis of reproductive patterns and the identification of the direction and magnitude of fertility differentials is thus an essential step towards an understanding of the determinants of maternal and child health.

This chapter is concerned with an analysis of fertility levels and differentials in Qatar. Whilst detailed information on fertility among couples in Qatar has been sparse until recently, the general impression has been one of pro-natalist society in which the average number of births per woman has been and remains high. The 1987 QCHS allows the validation or otherwise of this general statement and also the quantification of the rather vague expression 'high' fertility.

Qatar also features many of the characteristics which have been associated in other societies with fertility reduction. These include a major increase in the proportion of children who survive to adulthood, continuing urbanisation, and modernisation in respect of education, health and housing, and the possession of consumer durables, as well as an upward shift in the age pattern of first marriage. The QCHS allows the fertility implications, if any, of these to be assessed.

The bulk of the analysis in this chapter is oriented around age cohorts and marriage cohorts. Age cohorts identify women who were in particular age range at the time of the survey. Marriage cohorts identify the women who occupy the same interval of years since first marriage. The term "marital duration" will refer to years since first marriage, even if marital dissolution, remarriage, etc., has occurred since that initial event.

Women of about the same age, will tend to have shared certain socialising experiences, such as the prevailing level of education, health conditions, etc. Age is also a commonly applied classificatory variable in census and other survey work. Age is pertinent to fertility, in particular, and especially in countries such as Qatar, where there are large numbers of births to older women, because it is related to fecundity. This latter is the biological capacity to conceive; it is known to rise sharply from menarche at about age 13 to a peak around age 20, followed by a gradual decline in the 30s which becomes abrupt in the early 40s with the onset of menopause. Few births occur after the age of 45.

Marital duration is also a useful variable because, by and large, it measures the accumulated years of exposure to the risk of child-bearing. Women in the same marriage cohort also tend to share common attitudes towards family size and fertility regulation.

There is a large number of measures to describe different aspects of fertility. There are two fundamental dimensions to any individual woman's childbearing; how many children she has had (the "quantity" or "level") and how quickly she has had them (the "tempo"), and by extension these apply to any aggregate or subgroup as well. The central problem of fertility analysis is that these two dimensions cannot be fully separated. It is for this reason that the results using one

measure will not always seem to correspond with the results based on another measure.

Recent theories and methodologies of reproductive behaviour stress the interaction between the family's decisions relating to (1) children ever born, (2) age at first marriage, (3) the wife's characteristics,(e.g. education, work, occupation, etc.), (4) the husband's characteristics, (5) child deaths, and (6) family wealth and assets. Other intermediate variables such as the use of contraceptive methods and breast-feeding are also stressed as factors with direct impact on fertility behaviour. It thus seems appropriate to consider these factors simultaneously and in a format that draws out the inter-relationships among them.

This chapter begins with a discussion of the level and pattern of cumulative fertility as indicated by the number of children ever born or current parity (section 3.2). This measure is based on cross-sectional view at the time of the survey and makes no direct reference to the timing of fertility. Sections 3.3 and 3.4 discuss the level of current fertility and recent trends in fertility, respectively. Section 3.5 presents the results of a multivariate analysis of the determinants of fertility in Qatar.

3.2 CUMULATIVE FERTILITY

3.2.1 Introduction

Current parity is a measure of achieved fertility at the time of the survey and is simply the accumulated number of live births that a woman has had to date. The data on current parity or the number of

children ever born from the QCHS are cross-sectional and do not refer to the reproductive behaviour of a cohort of women as it grows older. Thus, for the younger women current parity will reflect their fertility during a limited period only, while for older women this measure comes close to their life-time fertility.

First, however, we will consider the sample as a whole. Table 3.1 shows that the mean parity for all ever-married women is identical to that for currently married women (4.0), indicating that the effect of marriage dissolution on the fertility of the whole sample is negligible. The overall mean parity of 4.0 children per woman reflects a high level of fertility, since the sample includes women who still expect long reproductive lives.

The parity distribution for the whole sample shows considerable dispersion with a skew toward the high parities. Thus, about 10 percent of all ever-married women are childless. Of the rest, 29 percent have had either one or two live births; 26 percent three or four; 15 percent five or six; 10 percent seven or eight; and the remaining 10 percent nine or more.

The distribution of the sample according to age of the women, age at first marriage and marriage duration will, however, have a profound effect on the mean parity. This is evident from the proportion of women childless, which reaches 10 percent for all ever-married women in the sample but less than 2 percent for those aged 45-49. Therefore, it is necessary to study parity in conjunction with controls for age and age at first marriage to gain further insight in the pattern of fertility.

3.2.2 Completed Fertility

The cumulative fertility or mean number of children ever born to women aged 45-49 can be taken as indicative of the level of completed fertility provided the data for these women are not subject to bias arising from mis-reporting of the age of woman and from recall lapse which affects the reporting of the number of children.

As shown by Table 3.1, the average woman of age 45-49 at the date of the survey who had ever been married had had seven live births. However, the distribution of these women by parity still exhibits a great deal of dispersion. Roughly speaking, one-quarter of these women are within one child of this mean (i.e. 6, 7, or 8 children), over one-third are below this range (5 or less births), and nearly two fifths are above it (9 or more births). One woman in 7 has had a family below "replacement" level(0,1 or 2 live births), but at the other extreme, one woman in two had had 8 or more children and one woman in four had had 10 or more children.

The fertility of currently married women aged 45-49 is also shown in Table 3.1. As may be seen no significant differences exist between the distributions of ever-married and currently married women by the number of children ever born.

One reason, however, for examining the group of currently married women aged 45-49 is that it gives an estimate of the level of primary sterility. Only 1.5 percent of these women had no children at all. This figure may be taken as the percentage of couples in which either the husband or the wife is incapable of having any children at all. It provides a clear indication of the low level of primary sterility, since, in Qatar prevailing norms do not support voluntary childlessness. In international terms, this low level of primary sterility implies a level of

general health in excess of the thresholds below which fertility is inhibited.

Table 3.1 Percent distribution of ever-married and currently married women according to the number of children ever-born, QCHS 1987

No. of Children ever-born	Ever-married women		Currently married women	
	All ages < 50	Age 45 - 49	All ages < 50	Age 45 - 49
0	9.6	1.6	9.4	1.5
1	11.0	4.9	11.0	4.0
2	18.2	7.1	18.6	8.0
3	15.4	7.4	15.5	6.9
4	11.3	7.8	11.4	7.7
5	7.9	7.8	7.8	6.6
6	6.9	7.8	7.0	8.4
7	4.8	8.1	4.7	6.9
8	4.8	10.0	4.9	10.6
9	3.7	9.1	3.7	9.5
10 +	6.4	28.4	6.0	29.9
Total	100.0	100.0	100.0	100.0
Mean parity	4.0	7.0	4.0	7.2
No. of women	3918	309	3760	274

Another way of describing the completed fertility of women in Qatar is in terms of "parity progression ratios", (PPR). Of women who ever achieved specific parities, these ratios give the proportion who later had at least one more child. For example, the parity progression ratio for parity 4 is derived by dividing the number of women who reported having five or more live births by the number of women who had four or more live births. In Table 3.2, it can be seen that over 98 percent of Qatari women did have a first child, and that, up to parity 5, over 90 percent of women went on to have another child. The table also shows that up to parity 4, the probability of having another child is highest among Qatari women, lower among Arab women and lowest among women of other nationalities.

Table 3.2 Parity progression ratios, per 1000 ever-married women aged 40-49, according to nationality, QCHS 1987

Parity Progression	Nationality			Total
	Qatari	Arab	Others	
0 - 1	986	976	942	973
1 - 2	968	968	895	954
2 - 3	969	879	703	890
3 - 4	966	824	733	884
4 - 5	926	838	803	884
5 - 6	903	779	830	858
6 - 7	893	752	841	849
7 - 8	880	859	865	873
8 - 9	741	658	812	729

3.2.3 Parity Within Age Groups

Having considered in some detail the level of completed fertility, attention now shifts to those women whose families are still being formed. A detailed picture of current parity by age groups as shown by the QCHS is given in Table 3.3. It should be noted that due to the cross-sectional nature of the survey, as mentioned earlier, there is a systematic exclusion of women who had not married by the time of the survey. As a result, there is an underestimation in the mean age at marriage. This effect extends through the entire reproductive history of respondents and results in a downward bias in the age at entry into each parity. The amount of bias, however, decreases with age, but cannot be specified entirely.

Table 3.3 Percent distribution of ever-married women by the number of children ever-born, according to current age, QCHS 1987

Age	Number of children ever-born											Total	Mean	No. of women
	0	1	2	3	4	5	6	7	8	9	10+			
< 20	52.2	25.4	17.4	5.1	-	-	-	-	-	-	-	100	0.8	140
20-24	21.8	28.2	26.5	13.7	6.4	2.4	1.0	-	-	-	-	100	1.7	592
25-29	9.6	14.2	22.4	19.7	15.2	8.8	5.7	2.3	1.0	0.3	0.7	100	2.9	887
30-34	5.4	5.7	19.5	20.2	13.5	9.1	10.3	6.3	4.4	2.9	2.7	100	4.0	871
35-39	3.3	3.0	12.9	13.8	13.2	10.4	9.2	9.9	8.8	7.3	8.2	100	5.3	674
40-44	3.4	4.3	12.4	11.0	9.0	10.1	8.8	4.5	11.9	9.0	15.6	100	5.8	445
45-49	1.6	4.9	7.1	7.4	7.8	7.8	7.8	8.1	10.0	9.1	28.4	100	7.0	309
Total	9.6	11.0	18.2	15.4	11.3	7.9	6.9	4.8	4.8	3.7	6.4	100	4.0	3918

As may be seen, the proportion of childless women declines rapidly between ages 15 and 25. Among ever-married women aged 30 or more years, less than five percent are childless. The data also show high level of fertility by women of all ages. Among women aged 20-24, the mean number of children ever born is 1.7, and 24 percent of these women have had three or more live births. Among women aged 25-29, who have had on average three children, 34 percent have already had four or more children, and among women aged 35-39, 34 percent have had seven or more children. Thus, as age increases, the distribution of women by current parity becomes more spread and the modal parity tends to occur at a higher number with lesser magnitude. These data indicate that fertility in Qatar is high.

Finally, one important goal of maternal and child care programmes is to prevent infant and maternal deaths by assisting women to avoid high risk pregnancies. Evidence suggests that pregnancies among women who have already had five or more births are associated with increased mortality and morbidity for both the mother and the child. The figures in Table 3.4 show that many women in Qatar, particularly those in the older age groups, are in this high parity risk category.

Overall, about one in two Qatari women has had five or more births. By age, the proportion with five or more births increases from about 23 percent among Qatari women at ages 25-29 to as much as 57 percent in the 30-34 group. Among Qatari women at ages 35 and over, who already are at greater pregnancy risk because of their age, the proportion in the high parity risk group increases to nearly 80 percent in the 35-39 cohort and to 85 percent in the 45-49 cohort.

Table 3.4 Percentage of ever-married women who have had five or more live births, according to nationality and age, QCHS 1987

Age	Nationality			Total
	Qatari	Arab	Other	
20 - 24	2.5	4.3	3.6	3.4
25 - 29	23.0	15.3	17.2	18.8
30 - 34	56.5	26.9	21.9	35.6
35 - 39	79.7	45.3	34.9	53.9
40 - 44	81.1	55.3	33.7	60.0
45 - 49	84.6	60.9	38.0	71.2
Total	**46.1**	**28.2**	**23.8**	**34.3**

3.2.4 Parity and Age at Marriage

In Qatar, where deliberate fertility regulation is not widely practised, age at first marriage can be important determinant of achieved fertility. On one hand, in conjunction with current age, it defines the length of the risk of exposure to pregnancy. On the other hand, women marrying at very young ages will experience an initial period of low fertility due to adolescent sub-fecundity, while women marrying at 30 or more are likely to be less fecund.

Table 3.5 provides information on the mean number of children ever-born to ever-married women by current age and by age at first marriage. For all ever-married women, the mean parity is 6.4 for women who married below age 15, this declines to 4.7 births for women who married at age 15-17, to 3.5 for women who married at age 18-19, and to 2.9 for those married at age 20-21.

Table 3.5 Mean number of children ever-born to ever-married women, by current age and age at first marriage, QCHS 1987

Age	Age at first marriage							Total
	< 15	15-17	18-19	20-21	22-24	25-29	30-49	
< 20	1.4	0.7	0.1	-	-	-	-	0.7
20 - 24	3.0	2.3	1.5	0.9	0.5	-	-	1.7
25 - 29	4.6	4.0	3.1	2.2	1.7	0.8	-	2.9
30 - 34	5.7	5.2	4.1	3.5	2.9	2.1	0.9	4.0
35 - 39	7.8	6.2	5.4	4.3	3.6	2.9	2.0	5.3
40 - 44	8.5	6.7	5.2	4.8	3.6	3.2	2.9	5.8
45 - 49	8.8	7.8	7.4	4.7	4.0	3.8	2.0	7.0
Total	6.4	4.7	3.5	2.9	2.5	2.3	2.1	4.0
Number of women	676	1047	677	566	543	368	41	3918

Within each age group, the mean parity tends to decline steadily with increasing age at marriage. For example, among women currently at ages 30-34, the mean parity declines gradually from 5.7 births for women married under age 15, to 2.9 for those married at ages 22-24. This strong negative relationship between age at marriage and fertility is caused by the fact that the length of exposure to the risk of pregnancy decreases with increasing age at marriage.

A different picture, however, of the effect of age at marriage on fertility is shown by the figures in Table 3.6, which give the mean parities according to age at first marriage and years since first

marriage. The fallacy of considering the data for any age-at-marriage group or for the whole sample to be representations of a cohort's reproductive behaviour is to be avoided. Nevertheless, a steady increase is clear from any cohort to the one which preceded it in date of marriage. Clearly the women who have been married for 25, 30 or more years will have very high fertility. The coverage of the survey was confined to women under age 50. Thus, all women with 30 or more years of marital duration will have been married before age 20. A woman who married at age 25, say, must appear in a marriage cohort (or marital duration group) no greater than 20-24 years because after 24 years of marital duration she will be 50 years old and excluded from the sample.

Table 3.6 Mean number of children ever-born to ever-married women, by age at first marriage and by years since first marriage, QCHS 1987

Years since first marriage	Age at first marriage							Total	Number of women
	< 15	15-17	18-19	20-21	22-24	25-29	30-49		
< 15	1.0	1.0	1.0	1.0	1.1	1.0	0.7	1.0	706
5 - 9	2.4	2.7	2.7	2.4	2.5	2.4	3.5	2.6	857
10 - 14	4.2	4.2	3.9	3.5	3.4	2.9	2.1	3.8	801
15 - 19	5.4	5.6	4.9	4.4	3.5	3.4	1.5	5.0	599
20 - 24	7.3	6.4	5.6	4.8	4.1	4.3	-	6.2	472
25 - 29	8.4	7.2	6.9	4.6	3.1	-	-	7.2	279
30 +	8.7	7.8	5.9	-	-	-	-	8.2	204
Total	6.4	4.7	3.5	2.9	2.5	2.3	2.1	4.0	3918

One reason for mentioning these constraints is to caution against considering the mean parity of 8.2 for women with 30 or more years' marital duration to represent "completed" fertility better than the mean parity of 7.0 for women aged 45-49 discussed above. The very fertile women in the former group comprise a select group of women, most of

whom married before reaching age 15, and who for that reason alone are unrepresentative of Qatari women.

The figures in Table 3.6 show the absence of any strong relationship between age at marriage and fertility in the first ten years of marriage, and that the tempo of fertility is generally similar within this period no matter at what age a woman marries. The effect of age at marriage becomes apparent, however, at longer duration of marriage. But even for the cohort of women with 20-24 years marital duration, the effect of increasing age at first marriage on achieved fertility becomes evident only for those who married after their twentieth birthday.

3.3 CURRENT FERTILITY

So far attention has been focused on completed fertility, and on cumulative fertility for certain segments of the women's reproductive period. In this section attention will be focused on the pattern and level of current fertility, i.e., fertility in the 12-month period preceding the survey. This information is perhaps of most practical importance and relevance for planning and policy-making through its impact on current and future population growth. Three measures of current fertility will be presented; the proportion of women currently pregnant, age-specific fertility rates and total fertility rates.

3.3.1 Proportion of Women Currently Pregnant

The proportion of women reporting a current pregnancy is, in a sense, the most "current" measure of all since it actually anticipates the level of fertility during the next nine months or so. However, as a measure of current fertility, this proportion can be subject to

inaccurate reporting due to uncertainty, especially during the first trimester of pregnancy, deliberate concealment, or for other reason.

The percentage of currently married women reporting a current pregnancy is shown in Table 3.7 according to current age and background characteristics. Overall, 13 percent of currently married women were pregnant at the time of the survey. The percentage decline monotonically and rapidly with age from 27 percent for women under 20 years of age, to 11 percent for those aged 30-34 and to 7 and 4 percent for those at ages 35-39 and 40-44, respectively. Pregnancy was highly concentrated in the safer period of the childbearing ages, namely among women 20-34 years. However, one in twelve Qatari women in the high risk category of ages 15-19 and 35-49 years, was pregnant.

Table 3.7 Percentage of currently married women reporting a current pregnancy by current age, according to selected background characteristics, QCHS 1987

Variable	Current Age							Total
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	
NATIONALITY								
Qatari	27.1	26.5	19.8	10.3	8.8	3.9	0.7	14.4
Arab	34.6	28.2	20.4	10.4	6.9	3.2	1.2	14.5
Other	6.3	22.4	12.4	11.1	4.3	3.6	0.0	9.5
REGION								
Doha	29.3	25.6	17.4	8.8	6.3	2.8	0.6	11.9
Al-Rayyan	25.8	30.7	19.3	11.4	6.8	6.7	1.9	16.1
Al-Wakrah	(16.7)	11.1	17.2	15.0	11.5	0.0	0.0	11.5
Other	(33.3)	29.6	24.0	16.7	4.8	2.7	0.0	15.9
LITERACY								
Illiterate	34.3	29.2	21.1	14.8	10.4	4.8	1.1	13.4
Literate	25.2	25.9	17.9	9.4	4.9	2.6	0.0	13.3
Total	27.5	26.6	18.4	10.5	6.8	3.5	0.7	13.3

The distribution of current pregnancies according to the duration of pregnancy is shown in the Table 3.8. In spite of the possible effect of seasonality, and given that pregnancies in the early stages are largely undiscerned, it is obvious that pregnancies are under-reported at durations 4 and 6 months, and over reported at durations 5 and 7 months. The overall percentage of pregnancies at any time implies (5 x 0.133/0.75) = 0.89 live births per married woman during five years, where 0.75 years or 9 months is the average gestation period. This value is close to the mean number of children ever-born to women with marital duration of less than five years.

Table 3.8 Percent distribution of currently pregnant women by duration of pregnancy, QCHS 1987

Duration of pregnancy	Percent
2	12.2
3	12.2
4	10.4
5	15.4
6	10.2
7	14.0
8	12.2
9	13.4
All	100.0

3.3.2 Level of Current Fertility

Two measures of fertility of Qatari women in the three-year period preceding the survey are employed in this section : age-specific fertility rates and total fertility rates. An age-specific fertility rate (ASFR) is the ratio of births occurring to a group of women of a particular age in a specific time period, usually a year, and the total number of woman-years spent in that age group during the specific time interval. The total fertility rate (TFR) is the sum of age-specific

fertility rates over the childbearing ages. The TFR represents the number of live births that would occur to a woman if she were to experience throughout her reproductive years the level of childbearing represented by the schedule of age-specific fertility rates of a given period. The estimation of these rates from a retrospective sample survey could be subject to sampling fluctuations as well as non sampling errors resulting from omission of births or misstatement of ages and dates.

Age-specific marital fertility rates (ASMFR) are similar to ASFRs, except that the denominator is confined to women-years spent in the married state. The total marital fertility rate (TMFR) is the sum of age-specific marital fertility rates over the age range 20-49 years. It may be interpreted as the mean number of births to a woman who remained married during the age range 20-49 and who experienced the observed within-union fertility schedule.

The rates thus obtained from the 1987 QCHS are shown in Table 3.9. As may be seen, the QCHS data yield a total fertility rate of 4.49 live births per Qatari woman for 1985-87. The survey data also yield a crude birth rate for the Qatari population equivalent to 36 live births per 1000 persons for 12-month period before the survey.

The curve of age-specific fertility rates begins with a minimum somewhere around age 15, then sweeps upward forming a broad peak over the age range 20-34, with a maximum occurring at ages 25-29.

Both the total fertility rate and the age pattern of current fertility indicate that fertility in Qatar is relatively high. Nevertheless, current fertility of Qatari women as measured by the TFR is about 38 percent lower than the cumulative fertility of women currently at the end of the childbearing ages, as represented by the mean number of children ever born (CEB) to "all" Qatari women aged 40-49 (7.2 children). This

difference could signify a reduction in fertility, or it may be due to reporting errors. Commonly, errors in dating of the last live birth result in either an under or overestimate of current fertility according to whether the interval since the last live birth is over or understated.

Table 3.9 Age specific fertility rates and age specific marital fertility rates, per 1000 women, for three-year period before the survey, for Qatari nationals only, QCHS, 1987

Age	Age specific fertility rates (Qatari women only)	Age specific marital fertility rates (Qatari women only)
15 - 19	43	448
20 - 24	169	401
25 - 29	261	401
30 - 34	215	312
35 - 39	131	172
40 - 44	51	62
45 - 49	27	33
	Total Fertility Rate (TFR) Ages 15 - 49 4.49	Total Marital Fertility Rate (TMFR) Ages 20 - 49 6.91

Assuming that dating errors may well exist, and to resolve the discrepancy between completed and current fertility estimates and derive an adjusted estimate of current fertility, indirect techniques must be applied. One method of adjusting current fertility for dating errors is the P/F ratio technique. The procedure involves assuming that reported mean parities for women aged 20 to 34 years are reasonably accurate and that current live births are not differentially mis-reported by age. A correction factor is calculated and used as a rewieghting factor for the reported age-specific fertility rates. The technique assumes unchanging fertility, an assumption often violated if only as a direct consequence of increasing age at marriage.

The application of this technique yields an estimate of total fertility rate of 5.1 live births per woman. A comparison of the revised TFR estimate of 5.1 births with the measure of completed fertility size (CEB) of 7.2 births per woman suggests that, although fertility remains high in Qatar, there is evidence that it has declined significantly from the very high level prevailing in the past.

3.4 RECENT TRENDS IN FERTILITY

The data collected in the QCHS on the birth histories of Qatari women allow a more detailed examination of fertility trends during the 30 year period before the survey. The age-period fertility rates derived from the birth history data for Qatari women are shown in Table 3.10 for successive time periods preceding the survey by the mother's age at maternity.

To compute the numerator for these rates, births were classified by the segment of the time preceding the survey and by the age of the mother at the time of maternity. The denominator is the number of woman-years lived in the specific five-year age interval for each time segment. Data for the numerator was derived directly from individual maternal care survey while data for the denominator was derived from both the household survey and the maternal care survey. Due to the restriction of QCHS to women under 50 years of age at the time of interview, the age-period fertility rates in Table 3.10 become progressively more truncated from above as they apply further back in time.

Table 3.10 Age-period fertility rates, per 1000 women, for five-year periods since 1955, by age of mother at maternity, for Qatari women only, QCHS 1987

Age at maternity	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-87
10 - 14	40	62	32	19	6	2	0
15 - 19	(253)	264	273	243	132	58	43
20 - 24		(414)	374	348	309	211	169
25 - 29			(433)	367	354	271	261
30 - 34				(320)	244	230	215
35 - 39					(166)	144	131
40 - 44						(60)	51
45 - 49							(27)

Note: Figures in parentheses denote partially truncated rates.

Table 3.10 confirms the declining trend in fertility suggested in the preceding section. The age-period fertility rates for Qatari women fall consistently among all age groups of women between 1965-69 and 1985-87. Most of the decline took place during 1975-79 for women at ages 15-19, and during 1980-84 for older women. This decline is consistent with the trend toward delayed marriage and also the very large increase in the proportion of Qatari females enrolled at the secondary and higher education levels.

The overall effects of this decline in fertility is summarised in Table 3.11 in which two sets of cumulative fertility are presented. The first shows the cumulative fertility rate for women at ages 15-34. The second set shows the total fertility rate for women at ages 15-49. The usual total fertility rate cannot be calculated because of the truncation of the set of age-period fertility rates. Instead, they are constructed by assigning the values of the adjacent period to the missing fertility rates. Insofar as fertility has been declining, the total fertility rates calculated in this way are underestimates of the real level of fertility, and hence tend to understate the scale of the reduction.

Table 3.11 Cumulative fertility rates and total fertility rates for Qatari women, QCHS 1987

	Proximate time period				Percentage of implied decline (1970-87)
	1970-74	1975-79	1980-84	1985-87	
Cumulative fertility for women 15-34 years of Age	6.49	5.22	3.86	3.44	47
Total fertility rate	7.75	6.49	5.02	4.49	42

The cumulative fertility rate of Qatari women at ages 15-34 declined from 6.5 births for the period 1970-74, and to 3.9 and 3.4 births for the periods 1980-84 and 1985-87, respectively. Table 3.11 also indicates that total fertility of Qatari women fell from 7.8 births per woman in 1970-74 to 4.5 births in 1985-87. The steepest fall appears to have occurred between the early 1970's and the early 1980's.

3.5 DETERMINANTS OF FERTILITY

The 1987 QCHS results have demonstrated wide differentials in fertility behaviour among women with different characteristics. These differentials are influenced by demographic, socioeconomic and cultural factors and also by institutional and community-level factors.

In this section, a multivariate approach will be used to examine the effect of selected demographic and socio-economic factors on fertility in Qatar. While these variables may be interactive, our statistical analysis will focus on single equation models. The multivariate approach provides estimates of the net effects of particular variables on the number of children ever born. All of the regressions presented here use the entire survey sample of ever married women.

Other models may be estimated with the sub-sample of intact marriages. However, because 3621 women of the total 3770 ever-married women (96%) are currently married, the intact marriage regressions are not analysed separately and are expected to be broadly the same as those for the ever-married women sample.

3.5.1 Analytical Procedures

The basic multivariate model considered in this study assumes that a linear relationship exists between the children ever-born (CEB) as the dependent variable and a number of independent variables representing individual demographic-socio-economic characteristics of ever-married women. These characteristics are often considered proxies for a number of possible cultural, social, and economic factors which can not be directly measured. Accordingly, CEB is assumed to depend upon (1) the mother's characteristics (current age, age at first marriage, level of education, work status, blood relationship to her husband, and ever use of family planning), (2) the number of child deaths, (3) region of residence, and (4) nationality. Unfortunately, other variables proven to be important in the literature on determinants of fertility, such as husband's characteristics (e.g. education, occupation, etc.) and household's income and wealth, are not available and their impact on fertility can not be examined here. This is regrettable but unavoidable. The basic form of the model is:

$$\text{Children ever born} = b_o + \sum_{i-1}^{k} b_i \; x_i + \varepsilon$$

where b_o is the number of children ever born when all independent variable, x_i's , are equal to zero. For the categorical variables, namely, region of residence, nationality, level of education, work status, blood relation to husband, and ever use of family planning, a set of binary

indicators for each variable was created. Each binary indicator represents one category of the variable and depends on whether or not the respondent belongs to that category (1= in category, 0 = not in category). The indicator of the reference category is omitted from estimation. The regression coefficient b_i represents the effect on the number of children ever born (the dependent variable) of the membership in the corresponding category of the x_i explanatory (independent) variable compared to the reference category, adjusted for other variables in the equation, and ε is error term. Thus the following discussion of the multivariate results will be in terms of differences in number of children ever born between each category of the explanatory variable and the omitted reference category, net of other factors.

3.5.2 National Patterns

The analysis in this section is carried out in two stages. At the first stage, all demographic and socio-economic factors are controlled. At the second stage, controls for certain factors were eliminated in order to discuss and test specific hypotheses and issues. Categorical variables were entered into the equation as a set of dummy variables. For region of residence, Doha is the omitted reference category, with Al-Rayyan, Al-Wakrah, and other regions (namely, Um-salal, Al-Shamal, Al-Ghuwairiah, and Al-Jumialiah) as the other three categories. Qatari women category was defined as the reference category to be compared to non-Qatari Arab women and women from other nationalities. Illiterate women category is considered as the reference category for the women's level of education. Women not currently working for cash and women who never used family planning were the two reference categories for their respective variables. The results of the multivariate regressions are summarised in Table 3.12.

Table 3.12 Multivariate regressions for children ever born, ever married women, QCHS 1987

Variable	Model Number				
	(1)	(2)	(3)	(4)	(5)
AGE OF RESPONDENT					
Age	.6658**	.5770**	.7363**	.7126**	.6614**
Age at first marriage	-.2155**	-	-.2285**	-.2312**	-.3032**
REGION OF RESIDENCE					
Doha	Reference	Reference	-	-	-
Al-Rayyan	.3288**	.3273**	-	-	-
Al-Wakrah	-.0584	-.0117	-	-	-
Other regions	.2115+	.2062+	-	-	-
LEVEL OF EDUCATION					
Illiterate	Reference	Reference	Reference	Reference	-
Incomplete primary	-.3848**	-.3740**	-.3353**	-.3281**	-
Primary	-.6334**	-.8078**	-.5734**	-.5755**	-
Preparatory	-.8465**	-1.185**	-.7636**	-.7602**	-
Secondary	-1.351**	-2.115**	-1.269**	-1.351**	-
University	-1.410**	-2.615**	-1.310**	-1.478**	-
CURRENTLY WORKING FOR WAGE	-.2848**	-.4195**	-.2855**	-	-
EVER USE OF FAMILY PLANNING	.7620**	.9360**	-	-	-
RELATED TO HUSBAND	.2673**	.3617**	-	-	-
NATIONALITY					
Qatari	Reference	Reference	Reference	-	-
Arab	-.0266	-.2892**	.0166	-	-
Other nationalities	-.3432**	-.5013**	-.4899**	-	-
CHILD DEATHS	1.1553**	1.2876**	1.1557**	1.1659**	1.2644**
CONSTANT	-5.261**	-7.279**	-5.631**	-5.288**	-4.373**
R Square	0.630	0.571	0.613	0.608	0.581
Number of cases	3770	3770	3770	3770	3770

\+ statistically significant at 10% Level
* statistically significant at 5% Level
** statistically significant at 1% Level
\- Indicates variable not included in model

The partial regression coefficients presented in Table 3.12 are in general in line with expectations. Model 1, with all demographic and socio-economic factors considered, explains about 63% of the variations observed in the number of children ever born. This value is reasonably high for this type of data set and for the CEB. The overall relationship between the number of children ever born and the selected independent variables is highly significant.

It is useful first to take a general view across all factors, in order to assess which variables are truly important in determining fertility levels in Qatar. Apart from some region-of-residence and nationality variables, all other demographic and socio-economic variables which are posited as affecting the number of children ever born show significant effects. The largest net effects for marital fertility are the negative impacts of the respondent having a university degree (-1.41), and having a secondary certificate (- 1.35), and the positive effects of child deaths (1.16), and the negative impact of the respondent having a preparatory certificate (- 0.85).

It is clear that achieving an education level of at least a preparatory certificate and reducing the occurrence of child deaths are the most important fertility determinants, after controlling for various demographic and socio-economic factors.

For the demographic factors, the age variable is, as expected, statistically significant (at the 1% level). The CEB increases with age, but the rate of childbearing diminishes at older ages.

Age at first marriage has a large significant impact on CEB, a finding that is consistent with much of the demographic literature. For each year of marriage delayed, CEB decreases by 0.22 child.

The CEB is significantly higher in Al-Rayyan (4.4 children) and the "other" (namely, UM-Slal, Al-Khor, Al-Shamal, Al-Ghuwairiah, and Al-Jumailiah) regions (4.7 children) than in Doha (3.7 children) and Al-Wakrah (3.8 children) regions. The net effect, controlling for other demographic and socioeconomic factors, is 0.33 child more for women residing in Al-Rayyan region and 0.21 child more for women residing in the "other" regions compared to women residing in Doha. No significant differences in CEB were found between women who live in Doha and Al-Wakrah regions.

Number of child deaths is a highly significant determinant of CEB in Model 1. Higher occurrences of child deaths are expected to result in higher figures for CEB. For each child death avoided, CEB decreases by 1.16 children. However, there is spurious correlation in this relationship because fertility and child mortality can affect each other in different ways.

For the socioeconomic factors, women's education depicts a statistically negative impact on CEB, with increasing net effect for higher levels of education. Compared to illiterate women, the category of women with incomplete primary education have, on average, 0.38 less children. The difference increases systematically with increasing level of education, to 0.63 children for women with primary education, 0.85 children for women with preparatory education, 1.35 children for women with secondary education, and to 1.41 children for women with university education. The largest decrement occurs for women with secondary education, which suggests that a greater net effect on reducing the number of children ever born is achieved for women acquiring the secondary certificate.

With education and other demographic and socioeconomic factors present in the model, women currently working for cash still have fewer numbers of children ever born than non-working women. On

average, working women have 0.28 children less than non-working women.

The Qatari and Arab tradition and culture, in general, support and encourage marriage between first cousins and immediate relatives. Decisions about whom to marry traditionally were made by the parents and other family members of potential mates. The process of arranged marriage is under the control of the male members of the two families for whom spouse's blood relationship and family name, status, and wealth are of great importance. The effect of spouse's blood relationship was found to be a significant determinant of the age at first marriage in Egypt (Sokona and Casterline, 1988). To investigate the effect of this phenomenon on CEB, the model included a variable representing the relationship of the respondent to her husband. Model 1 shows that consanguineous couples tend to have, on average, 0.27 children more than unrelated couples.

The finding for the ever use of the family planning variable are interesting. Two measures of contraceptive use are available : women who have ever used contraceptive methods and those who are currently using contraceptives. Some researchers feel that the response reliability in survey data is greater for the current-use measure. But for some types of analysis, the CEB variable, for example, where ever born is the time frame, ever use of contraceptive methods may be the more appropriate variable to include in the model. Model 1 reveals a strong, highly significant positive impact of ever use of contraception on CEB. However, the exclusion of the family planning variable causes little reduction to the total variance of the model (R^2 decreases by only 2%), moreover, the remaining parameter estimates are largely unchanged.

Ever users have, on average, 0.76 children more than never users after controlling for other factors. These results apparently demonstrate reverse causation. A similar relationship was observed for rural Egypt (Kelly, Khalifa, and El- Khorazaty, 1982). The implication is that those women most likely to use contraceptive methods are those who already have achieved high parities. The results also imply that contraception is used mainly for stopping rather than spacing of children. The reverse causation problem may be compound by yet another factor. The positive impact of contraceptive use on CEB may be related to the relative efficiencies of alternative methods of contraception. For some families contraceptive methods may represent a substitute for extended breast-feeding as a means of family size control. However, unless modern contraceptives are used regularly and properly, the overall impact on CEB could be positive when the effect of reduced breast-feeding is accounted for. In addition, contraceptive methods may be used for short durations, which implies very low continuation rates. The data collected in the QCHS do not permit the investigation of this matter in detail. Accordingly, there is no evidence to support or refute these possibilities, but the issue looms as a critical area for future research.

Nationality was considered in model 1 and the results indicate that there is no significant difference between Qatari and Arab women with regard to the number of ever born children. However, women from other nationalities have significantly fewer number of children ever born. The partial regression coefficient of other nationalities is highly significant, and women from other nationalities have, on average, 0.34 children fewer than Qatari women, net of other factors included in the model.

At the second stage, several issues will be investigated for the entire GCHS sample. The first issue is the education / age-at-first marriage/CEB interaction. Age at first marriage may be delayed by

women who take advantage of higher levels of education. To discuss the education/age-at-first-marriage interaction, which is not controlled in the above models, an additional regression is presented. The new model estimated the basic CEB model without the age at first marriage variable (model 2). The value of R^2 decreased from 63% for Model 1, to 57% for Model 2. In Model 2, the education variables capture the impact on CEB of a delay in age at first marriage due to higher levels of education. the value of partial regression coefficients of education increased dramatically in Model 2, especially for higher level of education. The education effect revealed in Model 2 appears to be the result of pure education impacts, such as changes in the desire for large family size and in giving women the opportunity to participate in the labour force.

In addition, comparisons between the multiple regression coefficients for other socioeconomic variables, more specifically, currently working for cash, ever use of family planning, blood relationship of the respondent to her husband, and nationality terms calculated with (Model 1) and without the control of the age at first marriage (Model 2) were conducted. The results indicate roughly the extent to which the CEB differentials by these four sets of socioeconomic categories are due to differences in the age at first marriage variable. The magnitude of the regression coefficients in Model 2 are higher than the corresponding coefficients in Model 1 for the different categories of the four factors. The two dummy variables for nationality are somewhat more likely to be statistically significant at the 1% level in the model which does not control for ages at first marriage. As expected, adjustment for age at first marriage resulted in a reduction of the socioeconomic differentials. No significant changes were observed for the three region-of-residence terms.

Further investigation of the effect of education on the number of children ever born is conducted. Controlling only for demographic factors (i.e. age, age at first marriage, and child deaths) and nationality and women's work for cash, the five education dummy variables showed no significant changes in magnitude or direction, (see Model 3 in Table 3.12). Adjustments for region of residence, working for cash, and ever use of family planning factors resulted in similar education differentials. The same result is reached when the regression equation only controlled for demographic factors and level of education (Model 4). Models 3 and 4, as reduced forms of Model 1, with fewer numbers of independent variables, did not loose very much in their prediction power. The total explained variance of Models 3 and 4 is about 61% (a decrease of about 2% only). Moreover, the remaining parameter estimates are largely unchanged.

In Model 5, presented in Table 3.12, only demographic variables are controlled. Age, age at first marriage, and child deaths account for 58% of the total variations in the CEB. Comparison of Model 5 with Model 1, which controls also for various socioeconomic factors, reveals the extent to which the CEB differentials are due to differences in socioeconomic factors. As expected, without any socioeconomic controls (i.e. Model 5), the demographic variables showed larger net effects on the CEB than when adjustment for various subgroups of the socioeconomic factors were considered (Models 1, 3 and 4).

3.5.3 Region of Residence

It is suggested that important interactions exist between the region of residence and other variables included in children ever born models. Earlier results, without controlling for other factors, indicate that CEB values for Doha and Al-Wakrah are very close (3.7 and 3.8 children, respectively) and relatively lower than CEB values for other regions

(4.4 children for Al-Rayyan region and 4.7 children for the other five regions combined). Child deaths are lower in Doha and Al-Wakrah regions (0.18) than in the "other" regions (0.24). Multivariate regressions presented in section 3.5.2 show no statistically significant differences between Doha and Al-Wakrah regions, and significant differences between either Al-Rayyan or the other five regions and Doha, net of other factors. Thus, in this section, Doha and Al-Wakrah will be dealt with as one region and all other regions as one region.

The results of bivariate frequency tabulations, not adjusting for other demographic and socioeconomic factors, also indicate that almost 70% of the respondents in Doha and Al-Wakrah regions are non-Qatari, compared to only 43 % in all other regions combined. With respect to the blood relationship, about 59% are consanguineous couples in Doha and Al-Wakrah regions, compared to only 38% in the "other" regions. Ever use of family planning is 56% and 42% in the two regions, respectively.

High levels of education are observed in Doha and Al-Wakrah regions compared to all other regions. The results reveal that the percentage of respondents with at least a secondary certificate is 49% and 20%, respectively. Consequently, more women are working in Doha and Al-Wakrah regions (21%) than in all other regions (12%).

It is believed that there is a significant difference in the fertility of these two regions of residence. The mean CEB for Qatari women, as shown in Table 3.13, is about the same (4.6 children) in both regions, while for Arab women the CEB is about 3.4 and 4.1 children in Doha and Al-Wakrah regions and all other regions, respectively. The two figures for women of other nationalities are 3.1 and 5.1, respectively. In addition, women residing in Doha and Al-Wakrah regions have higher mean CEB than women residing in all other regions for all levels of education except for women with secondary and university

education. Table 3.13 shows that mean ages at first marriage for illiterate and literate women with no schooling in Doha and Al-Wakrah regions are lower than those in all other regions, and the relationship is reversed for women with higher levels of education.

Table 3.13 Mean number of children ever born by region of residence and nationality according to selected socio-economic factors, QCHS 1987

Selected socio-economic factors	REGION OF RESIDENCE				NATIONALITY			Total
	Doha	Al-Rayyan	Al-Wakrah	Others	Qatari	Arab	Other	
REGION OF RESIDENCE :								
Doha	-	-	-	-	4.59	3.31	3.16	3.66
Al-Rayyan	-	-	-	-	4.40	4.11	5.35	4.42
Al-Wakrah	-	-	-	-	5.05	3.80	2.61	3.79
Other regions	-	-	-	-	5.07	4.25	4.14	4.75
NATIONALITY :								
Qatari	4.59	4.40	5.05	5.07	-	-	-	4.63
Arab	3.31	4.11	3.80	4.25	-	-	-	3.57
Other nationalities	3.16	5.35	2.61	4.14	-	-	-	3.42
LEVEL OF EDUCATION :								
Illiterate	6.00	5.50	7.20	6.01	6.26	5.16	5.57	5.87
Literate no schooling	5.68	4.22	5.00	5.33	6.43	3.17	4.79	5.41
Incomplete primary	4.74	3.77	4.58	5.11	4.87	4.22	3.84	4.63
Primary	3.89	3.94	3.58	3.33	3.68	3.99	3.85	3.82
Preparatory	3.40	3.01	3.34	3.57	2.80	3.71	3.29	3.33
Secondary	2.50	2.91	2.40	2.92	1.91	2.97	2.21	2.56
University	2.21	2.73	2.02	3.05	1.92	2.58	2.10	2.30
CURRENTLY WORKING FOR CASH :								
Working	2.62	3.76	2.35	3.65	2.74	3.06	2.57	2.84
Not working	3,96	4.50	3.98	4.93	4.93	3.70	3.65	4.20
RELATED TO HUSBAND :								
Related	4.05	4.57	4.48	4.99	4.61	3.92	4.55	4.34
Unrelated	4.43	4.18	3.31	4.53	4.65	3.31	2.86	3.63
EVER USE OF FAMILY PLANNING :								
Ever users	4.01	5.34	4.20	5.23	5.48	4.02	3.27	4.37
Never users	3.20	3.82	3.31	4.31	3.94	2.85	3.54	3.50
TOTAL	3.66	4.42	3.79	4.75	4.63	3.57	3.42	3.95

In order to examine how fertility differs among various regions of residence in Qatar while controlling for demographic and socio-economic factors simultaneously, the basic model (Model 1) shown in Table 3.12 was applied (without a region of residence variable) for Doha and Al-Wakrah as one group and all other regions as one second group. Relevant regressions are presented in Table 3.14. Model 6 for Doha and Al-Wakrah regions and Model 7 for other regions, with all demographic and socioeconomic factors considered, explain about 63% of the total variance in the CEB. This is the same as the R^2 value for the total sample. Apart from one nationality variable (i.e. Qatari Vs Arab women), all other demographic and socioeconomic variables which are posited as affecting the CEB show highly significant effects, and the overall relationship is also highly significant. Comparison of the results of two regions indicate that for demographic factors (age, age at first marriage, and child deaths), the net impacts are very similar. However, the results for socioeconomic factors are different, with regard to their magnitude and/or direction, in the two models.

The effect of education on reducing the number of children ever born is more important for women living in Doha and Al-Wakrah regions than those in other regions. While the net effect of holding a university degree on CEB is about the same for both groups of regions (-1.48 for Doha and Al-Wakrah regions and -1.47 for other regions) the net effect of holding a secondary, preparatory, or primary certificate is much larger for women residing in Doha and Al-Wakrah regions. In fact, the adjusted effect of holding a preparatory certificate on CEB is not statistically significant for women residing on other regions.

Women working for cash have fewer numbers of children than non-working women in Doha and Al-Wakrah regions, while the opposite is true for other regions. Working mothers have larger family size,

though not significant, than non-working mothers residing in other regions, after controlling for various demographic and socio-economic factors.

Table 3.14 Multivariate regressions for children ever born by region of residence, QCHS 1987

Region and Model	Doha and Al-Wakrah regions	All other regions
	(6)	(7)
AGE OF RESPONDENT		
age	.6330**	.6823**
Age at First Marriage	-.2076**	-.2227**
LEVEL OF EDUCATION		
Illiterate	Reference	Reference
Literate no schooling and incomplete primary	-.3556**	-.4265**
Primary	-.7709**	-.4105**
Preparatory	-1.028**	-.3735**
Secondary	-1.456**	-1.143**
University	-1.480**	-1.471**
CURRENTLY WORKING FOR WAGE	-.3941	.1407
EVER USE OF FAMILY PLANNING	.6218	1.0369**
RELATED TO HUSBAND	.2483**	.3722**
NATIONALITY		
Qatari	Reference	Reference
Arab	-.1631+	.1247
Other nationalities	-.5834**	.3970*
CHILD DEATHS	1.1783**	1.0303**
CONSTANT	-4.327**	-6.008**
R Square	0.636	0.626
Number of cases	2541	1229

\+ statistically significant at 10% Level
* statistically significant at 5% Level
** statistically significant at 1% Level
\- Indicates variable not included in model

Ever use of family planning has a larger net positive effect on CEB for women living in other regions (1.04) than for women living in Doha and Al-Wakrah regions (0.62). As mentioned earlier, this positive impact might be a result of irregular and/or improper use of contraceptive methods, a practice that is more likely to occur in other region than in Doha and Al-Wakrah regions. As expected, being related to her husband, the net positive effect on CEB for a woman residing in other regions (0.37) is larger than that for a woman residing in Doha and Al-Wakrah regions (0.25).

While Arab women and women from other nationalities, residing in Doha and Al-Wakrah regions, have significantly fewer numbers of children ever born than Qatari women in the same regions, the opposite is true for women residing in other regions.

3.5.4 Nationality

The expatriate population in Qatar comprises a substantial proportion of the total population. the contribution of migrants to the labour force is even greater. The actual blend of nationalities working in Qatar depends on many factors. Non-nationals in the public sectors are virtually all Arabs in contrast to the private sector which dominated by non-Arabs. It is thus imperative to investigate determinants of fertility for different nationalities. As shown in section 3.5.2, no significant differences with respect to the number of children ever born are observed between the Qatari and Arab women. However, because of the interest in examining the Qatari women separately, the following analysis will compare fertility behaviour and its determinants for the three groups of the Qatari and Arab women, and women from the other nationalities.

The three groups of nationalities in the QCHS sample are different both demographically and socially. While 60% of the Qatari women in the sample were married before reaching 18 years of age, the figures are only 33% and 34% for Arab women and women from other nationalities, respectively. Mean age at first marriage is about 17.0 years for Qatari women, compared to 19.8 and 19.4 years for Arab women and women from other nationalities respectively. The mean age at first marriage is even lower for certain Qatari sub-populations. It is only 15.2 and 16.6 years for literate Qatari women with no schooling and those with incomplete primary education, respectively, about 16.6 years among ever users of contraceptive methods or non-working women, and 16.8 years for Qatari women residing in regions other than Doha and Al-Wakrah.

Qatari women experienced about 0.26 children deaths compared to only 0.17 and 0.14 children deaths for other nationalities, respectively. In addition, 53% of the Qatari couples are consanguineous, compared to only 43% and 33% for respondents from Arab and other nationalities, respectively. Ever use of family planning is about 45% among Qatari respondents as opposed to 62% and 46% for Arab and other nation-alities respondents, respectively.

Comparisons with respect to the level of education reveals that among Qatari respondents 46% are illiterate and only 19% received at least a secondary certificate. On the other hand, the two figures are 19% and 52%, respectively, for Arab women, and 27% and 51%, respectively, for women from other nationalities. As a result, only 14% of Qatari women are currently working for cash, compared to 21% for Arab women or women of other nationalities.

Mean numbers of children ever born presented in Table 3.13, demonstrate that at lower levels of education prior to the primary

certificate, Qatari women have higher mean CEB than Arabs or women from other nationalities. The situation is reversed for higher levels.

Blood relationship does not have any significant effect on the number of children ever born among Qatari women. The figures are 4.61 children for Qatari consanguineous couples, and 4.65 children for unrelated couples. However, consanguineous couples from Arab or other countries have higher mean CEB than unrelated couples.

While ever users of family planning have higher mean CEB than never users among Qatari and Arab women, the expected relationship is observed among women from other nationalities. The mean CEB for ever users is lower (3.27 children) than for never users (3.54 children), as indicated in Table 3.13. This might imply that women from other nationalities use modern contraceptive methods more properly and regularly, and for more prolonged periods of time with higher continuation rates than Qatari and Arab women.

These bivariate results, in which each factor is examined by nationality, are unadjusted for associations with other factors. In order to account for demographic and socioeconomic factors simultaneously, multivariate analysis was performed separately for each nationality group, as the childbearing process might be different among the three groups. Table 3.15 presents a summary of the results of the multivariate regressions by nationality.

The basic CEB model was applied (without nationality parameters) to the three nationality groups. The resulting three models are shown in Table 3.15. The models explain 68%, 58, and 60% of the total variations in the CEB, for Qatari, Arab, and other nationalities women, respectively. No significant differences in the net effect of region of residence on the CEB are found among Qatari women. The results for the other two groups of nationalities are somewhat inconsistent.

Table 3.15 Multivariate regressions for children ever born by nationality, QCHS, 1987

Nationality and model	Qatari women (8)	Arab women (9)	Other nationalities (10)
AGE OF RESPONDENT			
Age	.6163**	.6372**	.7938**
Age at first marriage	-.2657**	-.1797**	-.1505**
REGION OF RESIDENCE			
Doha	Reference	Reference	Reference
Al-Rayyan	.1696	.5502**	1.0345**
Al-Wakrah	.3771	.1513	-.3526+
Other regions	.2901+	.4861**	-.3424
LEVEL OF EDUCATION			
Illiterate	Reference	Reference	Reference
Literate no schooling and incomplete primary	-.2993+	-.3016	-.5487*
Primary	-.6008**	-.3725*	-.6499**
Preparatory	-.6848**	-.4640**	-1.049**
Secondary	-.7863**	-1.037**	-1.823**
University	-.7113**	-1.342**	-1.706**
CURRENTLY WORKING FOR CASH	-.5867**	-.1333	-.3528*
EVER USE OF FAMILY PLANNING	1.1081**	.6811**	.2871*
RELATED TO HUSBAND	.1372	.1959*	.4916**
CHILD DEATHS	1.0141**	1.0331**	1.4659**
CONSTANT	-4.239**	-5.627**	-7.794**
R Square	0.679	0.582	0.602
Number of cases	1477	1461	832

\+ statistically significant at 10% Level
* statistically significant at 5% Level
** statistically significant at 1% Level
\- Indicates variable not included in model

The net effect of the age at first marriage is highest among the Qatari respondents (-0.27), compared to only (-0.18) for Arab women, and (-0.15) for women from other nationalities. While the mean number

of child deaths is smaller among Arab respondents than among Qatari women, and smaller among respondents from other nationalities than Arab respondents, as indicated earlier, the net effect of child deaths on the CEB is smaller among Qatari women (1.01) than among Arab women (1.03), and the latter is much smaller than among women from other nationalities (1.47).

The net effect of education is the smallest among Qatari women than among non-Qatari women, especially for secondary and university levels. This situation is reversed for the work for wage parameter. Qatari women currently working for wage have, on average, a smaller number of children ever born than non-working women (-0.59). The net effect of education for Arab women and women from other nationalities is only -0.13 and -0.35 children, respectively.

Consanguineous Qatari couples have larger, but not significant, family size compared to unrelated couples. The insignificance of the difference in the number of children ever born might be a result of high levels of fertility for Qatari couples regardless of whether they are related or not.

The net effect of ever use of family planning is positive for Qatari women (1.11) and larger than that for Arab women (0.68) and women from other nationalities (0.29). Again, as mentioned earlier, this outcome could be a result of one of three possibilities: (1) improper or irregular use of contraceptives, (2) the use of birth control as a substitute for prolonged breast-feeding, or (3) contraceptive methods used for short periods of time, i.e., very low continuation rates.

3.5.5 Work, Consanguineous Marriage, and Family Planning

In the last two subsections, the multivariate analysis was performed for two factors, namely, nationality and region of residence. Other

factors that are acquired later in life, such as work, marriage to blood kin, and practice of birth control, will be examined in this subsection. While nationality is, to a great extent, not amenable to change, characteristics that are acquired through life are amenable to change either by the individual's conviction or as a result of peer and/or environmental pressures. These three factors, thus, are of critical importance if changes in the childbearing patterns are sought.

Let us first consider the bivariate results before tackling various demographic and socioeconomic factors simultaneously. The means and the patterns are consistent with expectations. There is a great disparity between working and non-working women. To begin with, the mean CEB is 4.2 children for non-working women, compared to only 2.8 children for working women, as shown in Table 3.13. In addition, while 61% of working women are ever users of family planning, only 49% of non-working women are ever users. More consanguineous couples are observed among non-working women (48%) than among working women (27%). And, of course, higher education levels are recorded among working than non-working women.

With respect to blood relationship, the QCHS results indicate that women of consanguineous couples, on average, have about 0.7 children more, marry 1.5 years younger, practice birth control less, and are less educated than women of unrelated couples.

Differentials between ever and never users of family planning are wide. While the mean CEB among ever users is higher than never users (4.4 Vs 3.6 children), never users marry about six months younger than ever users. About 48% of ever users have at least a secondary certificate, compared to only 30% among never users, and 23% of ever users are working, compared to only 13% of never users.

We turn now to the multivariate analysis. The basic regression equation (Model 1) was applied to the three factors. Models restricted to the sub-population of women currently working for cash (Model 11) or not working (Model 12), consanguineous couples (Model 13) or unrelated couples (Model 14), and ever users of family planning (Model 15) or never users (Model 16) are shown in Table 3.16. The childbearing process among these sub-populations are assumed to be different and warrant an investigation.

Comparison of the childbearing process for women currently working for cash or not (Models 11 and 12), reveals that education has a larger net negative on the number of children ever born among non-working mothers, especially in the two extreme levels of education (i.e., literate with no schooling or those with incomplete primary and those with university degree). The differences amount to about 0.4 children between working and non-working women for these two levels.

Consanguineous couples are expected to have a larger positive net effect of the CEB than unrelated couples if the wife is not working for cash (0.29) than in the case when the wife is working (0.14).

The net effect of a delayed age at first marriage is larger among non-working women (-0.23) than among working women (-0.14). Non-working females usually get married at very young ages. Thus, a delay in age at first marriage is expected to have a large impact on the number of children a woman has. No significant differences are observed between working and non-working women with respect to the net effects of child deaths or ever use of family planning.

The analysis of blood relationship among couples is represented by Models 13 and 14 shown in Table 3.16. While the net effect of delayed

Table 3.16 Multivariate regressions for children ever born by work, consanguineous marriage, and family planning, QCHS 1987

Characteristics and Model	Working (11)	Not working (12)	Consan. couples (13)	Unrelated couples (14)	Ever users (15)	Never users (16)
AGE OF RESPONDENT						
Age	.6483**	.6561**	.6840**	.6279**	.6843**	.6595**
Age at first Marriage	-.1366**	-.2332**	-.2074**	-.2159**	-.2059**	-.2592**
REGION OF RESIDENCE						
Doha	Reference	Reference	Reference	Reference	Reference	Reference
Al-Rayyan	.9957**	.2244*	.4100**	.3709**	.4910**	.1963
Al-Wakrah	-.0087	-.0832	-.2070	-.1424	.0625	-.1709
Other regions	.6068**	.1107	.4299**	.1022	.4944**	.0045
LEVEL OF EDUCATION						
Illiterate	Reference	Reference	Reference	Reference	Reference	Reference
Literate no schooling and incomplete Primary	.0348	-.3771**	-.5342**	-.1423	-.8176**	-.0565
Primary	-.6161+	-.5734**	-.6696**	-.5072**	-.9709**	-.4498**
Preparatory	-.5920+	-.7952**	-.5947**	-.9279**	-1.306**	-.4245*
Secondary	-1.211**	-1.264**	-1.127**	-1.332**	-1.709**	-1.071**
University	-1.185**	-1.549**	-1.376**	-1.277**	-1.891**	-.9279**
CURRENTLY WORKING FOR CASH	-	-	-.3812*	-.2350*	-.1421	-.5362**
EVER USE OF FAMILY PLANNING	.8944**	.7376**	.7509**	.7878**	-	-
RELATED TO HUSBAND	.1373	.2883**	-	-	.1846*	.3761**
NATIONALITY						
Qatari	Reference	Reference	Reference	Reference	Reference	Reference
Arab	.2736+	-.0529	-.0501	-.0478	-.2010*	.1213
Other Nationalitie	-.2238	-.2849**	.1572	-.5720**	-.8716**	.0802
CHILD DEATHS	1.2642**	1.1228**	1.0188**	1.2670**	1.1325**	1.1584**
CONSTANT	-6.483**	-4.895**	-5.952**	-4.386**	-4.546**	-5.381**
R Square	0.511	0.637	0.653	0.610	0.665	0.603
Number of cases	685	3085	1677	2093	1949	1821

\+ statistically significant at 10% Level
* statistically significant at 5% Level
** statistically significant at 1% Level
\- Indicates variable not included in model

age at first marriage is very similar in the two groups (-0.21), the net effect of child deaths on the CEB is larger among unrelated couples (1.27) with relatively lower rates of child mortality (one in six children) than among consanguineous couples (1.02) with higher rates of child mortality (one in four).

Comparison of the net effects of education and use of family planning showed either insignificant or inconsistent differences between consanguineous and unrelated couples. One exception that is worth mentioning is the net negative impact of women who are literate with no schooling or with incomplete primary education on the CEB among consanguineous couples is highly significant and larger (-0.53) than the net effect among unrelated couples (-0.14). Thus, the net effect of little education on the number of children ever born is larger couples who are blood related than couples who are not.

Acquiring education, working, and then eventually getting married, a woman is faced with the "choice" of practising birth control. There are no significant differences between ever users and never users of family planning with respect to the net effects of a delayed age at first marriage and child deaths on the CEB. The net positive effect of consanguineous marriage on the number of children ever born among never users (0.38) is double that among ever users (0.18).

The net negative impact of education on the CEB is much higher among ever users than never users, for all levels of education, especially at the lowest levels (i.e., literate women with no schooling or with incomplete primary education). Women currently working for cash who never used family planning are expected to have a larger and highly significant negative net effect on the CEB (-0.54) than ever users (-0.14), a result of a smaller impact of education on the CEB among never users.

CHAPTER 4

PATTERNS OF MATERNAL CARE

4.1 INTRODUCTION

The QCHS provides information which can be used to examine the care a mother receives during pregnancy, at the delivery and in the post-natal period. Regular ante-natal check-ups can mitigate the effects of, if not avoid altogether, those complications of pregnancy and delivery which may jeopardise survival chances of both the mother and the infant. Ensuring a mother's nutritional preparedness for pregnancy and childbirth provides an infant with adequate resources in the pre-natal period for optimal development both before and after the birth. It also helps provide a mother with the resources she requires to compensate for the depletion associated with pregnancy, childbirth, breast-feeding and caring for a young infant. Post-natal checks on a mother's full physical recovery helps ensure her preparedness for a subsequent pregnancy as well as her ability to care for her living children. Thus, adequate care before, during and after childbirth are crucial in reducing the risks of infant and maternal mortality, in promoting infant and maternal health and development and also indirectly in promoting the health and development of other living children as well as those yet to be born.

A series of questions pertaining to ante-natal care were asked in relation to current pregnancy and the last live birth where this had occurred five years or less prior to the survey. Information was collected in respect of 500 pregnant women and 2484 live births. The group of pregnant women comprised 12 percent who were in the first and second months, 38 percent in the third to fifth months and

50 percent in the sixth to ninth months of their pregnancy. Questions about care at the delivery and post-natal care also were asked of women whose last live birth had occurred five years or less prior to the survey.

In this chapter are explored in turn the most recent levels of, and variations in, maternal care before, during and after the birth.

4.2 ANTE-NATAL CARE

4.2.1 The Data and Its Interpretation

Pregnant women and those whose most recent live birth had occurred five years or less prior to the survey were asked whether they had a pregnancy check, and, if so, they were asked where it had taken place and who had carried it out.

Pregnant women were also asked how many pregnancy checks they had, the means of transport and how long it took to get to the place where they had the checks, and whether medicine had been administered at last check. Those pregnant women who had not had a pregnancy check were asked to give the most important reason why they had not.

Information derived from pregnant women should be more reliable than that based on the last live birth in that it relates to the present or the immediate past and is less liable, therefore, to recall errors. It also provides the best indicator of current service provision, and of deficiencies therein. Most importantly it is a guide to the timing of maternal care, a crucial component in determining its effectiveness. The more limited live birth information is used in this section as an indicator of care received by the end of the pregnancy. Representing

relatively large numbers of women, it is also used to support the results derived from pregnant women which, especially in the analysis of differentials, are often based on small numbers.

First are investigated the extent of ante-natal care, followed by the nature and accessibility of it, and finally are examined the reasons why pregnant women had not sought ante-natal care.

4.2.2 Ante-natal Care Coverage

About 84 percent of currently pregnant women were reported to have had a pregnancy check; 72 percent of women who were in their second month, 84 percent in their third to fifth months and 88 percent of women who were in their sixth to ninth months of pregnancy. These figures compare with 94 percent of women who had a pregnancy check by the end of the pregnancy relating to their last live birth, where this had occurred five years of less prior to the survey.

The two sets of figures are not strictly comparable. Live birth figures represent pregnancies which have a live birth outcome. Should there be an association, causal or otherwise, between ante-natal care and pregnancy outcome, then live birth figures for ante-natal care would be unrepresentative of the level of care for all pregnancies. The figures are, however, quite consistent and it can be assumed that any bias is minimal.

The likelihood of a pregnant women having had a pregnancy check is crucially dependent on pregnancy duration. Small numbers often preclude an analysis which takes duration of pregnancy into account. It is important, therefore, to ensure that differentials which are based on the figures for all pregnant women do not simply record differences in pregnancy duration rather than real differences in the level of ante-

natal care. This can be evaluated from Table 4.1, in which are presented the percent distribution of currently pregnant women by pregnancy duration, according to selected background characteristics. Older pregnant women, non-Arab women, those living in Al-Rayyan and those who were illiterate include slightly larger than average proportions who were in the later months of pregnancy. These differences do not appear, however, to be large or systematic enough to seriously distort the differentials, especially when they are supported by figures based on the most recent births.

Table 4.1 Percent distribution of currently pregnant women by duration of pregnancy, according to background characteristics, QCHS 1987

Variable	Duration of pregnancy			Total	Number of women
	< 3	3 - 5	6 +		
Mother's age					
< 20	10.5	42.1	47.4	100.0	38
20 - 24	13.0	42.2	44.8	100.0	154
25 - 29	13.8	34.0	52.2	100.0	159
30 - 34	12.5	35.2	52.3	100.0	88
35 - 39	2.3	40.9	56.8	100.0	44
40 +	17.6	35.3	47.1	100.0	17
Nationality					
Qatari	11.2	39.8	49.0	100.0	206
Arab	12.7	39.0	48.3	100.0	213
Other	13.6	30.9	55.5	100.0	81
Region					
Doha	14.9	40.8	44.3	100.0	262
Al-Rayyan	8.0	32.0	60.0	100.0	150
Other	11.4	39.8	48.8	100.0	88
Literacy					
Illiterate	8.6	37.4	54.0	100.0	139
Literate	13.9	38.0	48.1	100.0	361
Total	12.2	38.0	49.8	100.0	500

Table 4.2 shows the percentage of women who received ante-natal care among the currently pregnant and among those who had their most recent birth in the five years before the survey, according to woman's age. The figures convey a picture of a prompt incorporation into the ante-natal care programme for the majority of women. There appears to be some variation with age in the likelihood of a pregnancy check, though this is not entirely consistent between live births and current pregnancies, especially when the latter are broken down by pregnancy duration. There is some evidence that women aged 20 - 29 years have had an earlier than average first check while women in their thirties included a disproportionate number whose first check occurred at a very advanced stage of the pregnancy.

Table 4.2 Percentage of women who received ante-natal care among: (a) currently pregnant women, and (b) women who had their last child in the five years before the survey, according to woman's age, QCHS 1987

Age	Currently pregnant women					Last live births	
	Duration of pregnancy (Months)			All	Number of women	Percent	Number of women
	< 3	3 - 5	6 +				
< 20	(25)	69	94	76	38	94	66
20 - 24	80	89	83	85	154	92	456
25 - 29	86	83	87	85	159	96	747
30 - 34	55	84	91	85	88	93	656
35 - 39	-	78	96	86	44	94	385
40 - 44*	67	83	75	82	17	94	143
45 - 49	-	-	-	-	-	90	31
Total	72	84	88	84	500	94	2484

* For pregnant women, age group 40 +

The likelihood of a pregnancy check according to birth order varies within a narrow range, (Table 4.3). The birth order differentials in the likelihood of a pregnancy check have a narrower range among the most

Table 4.3 Percentage of women who received ante-natal care according to birth order, separately for current pregnancies and for women who had their last child in the five years before the survey, QCHS 1987

Birth order *	Currently pregnant Women		Last live births	
	Received ante-natal	Number of women	Received ante-natal	Number of women
1	83	89	94	350
2	86	107	95	504
3	84	91	94	442
4	79	63	94	329
5	83	41	92	210
6	93	28	93	188
7	88	25	95	127
8	94	16	92	119
9 +	83	40	91	215
Total	84	500	94	2484

* For current pregnancies, denotes birth order assuming a live birth outcome.

recent live births than among current pregnancies. This is indicative of differentials in the timing of the first check. Taking age and birth order together, it would seem that those women who start childbearing later, around their mid-twenties, who complete their childbearing earlier and have a lower than average fertility, are the ones most likely to seek ante-natal care, (Table 4.4).

Residence denotes differential access to ante-natal care, (Table 4.5). About 88 percent of pregnant women living in the Al-Rayyan had received a pregnancy check, 85 percent of those living in Doha, and the lowest likelihood, 77 percent, was to be found among pregnant women living in the "other" regions. The differentials in respect of the last live birth show different pattern; the percentage of women who

Table 4.4 Percentage of women who received ante-natal care according to current age and number of children ever born, separately for current pregnancies and for women who had their last child in the five years before the survey, QCHS 1987

Age	Children ever born										Total
	0	1	2	3	4	5	6	7	8	9+	
Pregnant women											
< 20	79	*	*								76
20 - 24	87	88	82	76	*	*					85
25 - 29	83	85	87	*	*	*	*	*	*	*	85
30 +	*	90	90	78	72	*	*	*	*	*	85
Total	83	86	84	79	82	93	88	*	*	*	84
Last live births											
< 20	-	94	92	*							94
20 - 24	-	93	93	88	92	93	83				92
25 - 29	-	98	96	95	98	93	90				96
30 - 34	-	90	97	95	91	93	91	94	92	87	93
35 - 39	-	*	100	98	89	90	100	92	96	93	94
40 - 44	-	*	*	*	*	*	*	*	88	95	94
45 - 49	-	*	*	*	*	*	*	*	91	90	90
Total	-	94	95	94	94	92	93	95	92	91	94

* Less than 20 cases

had received ante-natal care was highest in Doha, 96 percent, and this dropped to 91 percent and 90 percent, for women living in Al-Rayyan and the "other" regions, respectively.

Residence denotes differential access to ante-natal care, (Table 4.5). About 88 percent of pregnant women living in the Al-Rayyan had received a pregnancy check, 85 percent of those living in Doha, and the lowest likelihood, 77 percent, was to be found among pregnant women living in the "other" regions. The differentials in respect of the last live birth show different pattern; the percentage of women who had received ante-natal care was highest in Doha, 96 percent, and this dropped to 91 percent and 90 percent, for women living in Al-Rayyan and the "other" regions, respectively.

Table 4.5 Percentage of women who received ante-natal care, separately for currently pregnant women and for women who had their last child in the five years before the survey according to background characteristics, QCHS 1987

Variable	Currently pregnant women				Last live births
	Duration of pregnancy (months)			All	
	≤ 3	3 - 5	6 +		
Nationality					
Qatari	78	84	87	85	93
Arab	67	80	89	83	94
Other	(73)	96	84	86	95
Region					
Doha	69	86	89	85	96
Al-Rayyan	(75)	90	89	88	91
Other	(80)	71	81	77	90
Literacy					
Illiterate	(73)	81	87	83	88
Literate	72	85	88	85	96
Total	72	84	88	84	94

Figures in parentheses denote less than 20 cases

A narrower range in the likelihood of a pregnancy check for the last live birth than for pregnant women suggests regional differentials not only in the level but also in timing of ante-natal care. Separate figures by pregnancy duration support this; 90 percent of women in their third to fifth months who were living in Al-Rayyan, and 86 percent of those living in Doha had received an ante-natal check, compared with only 71 percent of those living in the "other" regions. In the sixth to ninth months of pregnancy, there were 89 percent of women who were living in Doha or Al-Rayyan who had received a pregnancy check, falling to 81 percent of those living in the "other" regions.

Thus it would seem that residence in Doha and Al-Rayyan features the greatest likelihood of ante-natal care and it is care that commences earlier in the pregnancy than in most other regions. The other regions are distinguished by the lowest likelihood of a pregnancy check. Moreover, women living in these regions are disproportionately likely to have their first check at an advanced stage of the pregnancy.

Literate women were more likely than illiterate women to have had a pregnancy check before their last live birth, 96 compared with 88 percent. Among pregnant women, those in their sixth to ninth months displayed no difference according to literacy. While in the third to fifth months there were 85 percent of literate women and 81 percent of illiterate women who reported a pregnancy check. These figures suggest that not only were illiterate women less likely than literate women to have a pregnancy check, they were a little more likely also to have a very late first check.

Thus has been demonstrated an effect of residence and literacy on the level and timing of ante-natal care. Regional differentials reflect differential access to facilities, which in turn reflect supply and demand factors; the extent of services, their profile and physical accessibility on the one hand and the awareness and articulated requirement for them on the other. Mother's education too reflects supply and demand factors, though less directly. On the supply side there are factors which simultaneously determine the provision of education and health services. In terms of the demand for the use of services, education, in itself or as a proxy for socio-economic status plays a role; it may denote a greater recognition of the need for the service, wider knowledge of the services available, and greater ability to make full use of them.

4.2.3 Number of Pregnancy Checks

The number of women who have a pregnancy check and the date of their first check are key indicators of the level of ante-natal care. Next is the number of pregnancy checks, which is of course dependent on the date of the first one. While the number of pregnancy checks not surprisingly rises with pregnancy duration, (Table 4.6), it is note-worthy that almost one in five women in their sixth to ninth months of pregnancy had received only one or two checks. At the other extreme were just over one in five women in their third to fifth months who had received four or more checks. Other than the group of women whose first check was late in the pregnancy, and the group with very frequent checks, the distribution of the number of checks is one that reflects a situation in which the majority of those women who receive ante-natal care do so on a regular basis after their first check.

Table 4.6 Percent distribution of currently pregnant women by number of pregnancy checks, according to duration of pregnancy, QCHS 1987

Duration of pregnancy (months)	Percent with no check	Of those who received ante-natal care, the percent by number of checks							Total
		1	2	3	4	5	6	7 +	
< 3	28	54	27	2	5	5	-	7	100
3 - 5	16	32	28	18	11	6	2	3	100
6 +	12	8	13	15	13	16	8	27	100
Total	16	22	20	15	12	11	5	15	100

The distribution of the number of checks according to selected background characteristics may be seen for all pregnancy durations in Table 4.7. Women under twenty years of age appear to have had the largest number of checks. This rather contradicts the finding of their being least likely to have had check, and to have had a later than

average first check. Other than that, there were no systematic differentials visible by age.

Table 4.7 Percent distribution of currently pregnant women by number of pregnancy checks, according to background characteristics, QCHS 1987

Variable	Percent with no check	Of those who received ante-natal care, the percent by number of checks				
		1 - 2	3 - 4	5 - 6	7 +	Total
Age						
< 20	24	36	22	25	17	100
20 - 24	15	40	27	18	15	100
25 - 29	15	48	21	14	17	100
30 - 34	15	43	34	13	10	100
35 +	15	38	29	15	18	100
Nationality						
Qatari	15	45	28	18	9	100
Arab	17	42	26	13	19	100
Other	14	39	23	17	21	100
Region						
Doha	15	41	28	15	16	100
Al-Rayyan	12	39	25	19	17	100
Other	23	54	24	13	9	100
Literacy						
Illiterate	17	42	30	15	13	100
Literate	15	43	25	16	16	100
Total	16	43	26	16	15	100

Residence and mother's literacy differentials in the number of checks conform to what would be expected from the differentials in the timing of the first visit, especially in relation to those women whose first visit was late in their pregnancy. Thus in respect of residence, 41 percent of pregnant women living in Doha had only one or two checks, compared with 39 and 54 percent of those living in AL-Rayyan

and the "other" regions, respectively. At the other extreme, the numbers who had seven or more checks ranged from more than 16 percent in Doha and Al-Rayyan, to nine percent in the "other" regions. In respect of mother's literacy, there were 42 percent of illiterate pregnant women and 43 percent of literate pregnant women who had one or two checks compared with 13 and 16 percent , respectively, who reported seven visits or more.

4.2.4 Nature of Ante-natal Care

Effectively all pregnancy checks were carried out by a doctor. Of 422 currently pregnant women who reported having had a pregnancy check, 408, or 96.7 percent, saw a doctor and three percent saw a trained nurse. Identical results were reported in respect of last live birth; 96.1 percent having been checked during the pregnancy by a doctor and the remaining four percent, were checked by a trained nurse.

About 92 percent of pregnant women went to a government health facility, and three percent to a private clinic for their pregnancy check, (Table 4.8)

Women under 20 years of age were less likely, than average, to have had their pregnancy checks in a government health facility, 86 percent of them compared with 14 percent whose checks took place in other facilities. The oldest women also were less likely than average to have used a government hospital or clinic, just over 84 percent. Thus it would seem that a lower likelihood of using government health facilities is associated with a lower likelihood of receiving ante-natal care among the youngest women.

Table 4.8 Percent distribution of currently pregnant women who received ante-natal care, by type of place providing care, according to background characteristics, QCHS 1987

Variable	Public hospital/clinic	Private hospital/clinic	Other	Total
Age				
< 20	86	-	14	100
20 - 24	91	5	4	100
25 - 29	95	1	4	100
30 - 34	92	5	3	100
35 - 39	94	3	3	100
40 +	84	8	8	100
Nationality				
Qatari	93	3	4	100
Arab	89	3	8	100
Other	97	3	-	100
Region				
Doha	95	1	4	100
Al-Rayyan	56	6	8	100
Other	94	4	2	100
Literacy				
Illiterate	92	3	5	100
Literate	92	3	5	100
Total	92	3	5	100

Women living in Al-Rayyan region, who were associated with the greatest likelihood of receiving ante-natal care, were also the least likely to have used government health facilities.

4.2.5 Accessibility of Ante-natal Care

Time and mode of transport to the health facility providing ante-natal care, according to nationality, residence and literacy, may be seen

in Table 4.9. Most women, nine out of ten, lived within 30 minutes of their health centre, and almost two third of them within 15 minutes. Only three percent of women required at least 45 minutes to get to their health centre. As for mode of transport to the health facility, one in twenty women walked, a similar number took a bus or taxi, and the majority, nine out of ten women, went by car.

Qatari women were the least advantaged in respect of time to the health centre, but a larger than average number of them travelled there by car. This is perhaps not surprising in view of the likely greater dispersion of Qatari nationals throughout the country. Non-Qatari women featured faster access and a greater likelihood of getting there by bus or taxi or on foot.

Table 4.9 Percent distribution of currently pregnant women who received ante-natal care by (a) duration of journey to facility providing care and (b) means of transportation to facility, according to background characteristics, QCHS 1987

Variable	Travel time (minutes)				Means of transport			
	< 15	15-30	30 +	Total	Car	Walk	Bus/Taxi/ other	Total
Nationality								
Qatari	58	28	14	100	96	3	1	100
Arab	68	25	7	100	85	7	8	100
Other	70	21	9	100	84	5	11	100
Region								
Doha	76	21	3	100	83	8	9	100
Al-Rayyan	52	36	12	100	95	2	3	100
Other	50	21	29	100	98	2	-	100
Literacy								
Illiterate	61	23	16	100	89	4	7	100
Literate	66	26	8	100	89	5	6	100
Total	64	25	11	100	89	5	6	100

Access was much faster in Doha than elsewhere; 76 percent of women in Doha lived within fifteen minutes of their health facility and only three percent lived 30 minutes or more away. Outside Doha, only around 50 percent lived less than fifteen minutes away and 12 percent of women living in Al-Rayyan and 29 percent of those living in the "other" regions took at least 30 minutes to travel to the place where they had their pregnancy check. Women living in Doha not only took the shortest time to get to their health centre, they were also more likely to walk or take a bus or taxi to the health centre and least likely to get there by car, 17 and 83 percent respectively. Outside Doha, where access to the health facility was slowest, 19 out of 20 women travelled there by car. There were small differences according to mother's literacy in the time it took to get to the health facility.

4.2.6 Medication During Pregnancy Check

Women were asked whether they had been given medicine at their last pregnancy check. Seventy-one percent of women said they had. As may be seen from Table 4.10, the rates were fairly high throughout pregnancy, ranging from 64 and 47 percent of women in their second and third months of pregnancy to between 73 and 80 percent of women at longer durations.

Women living in Doha, non-Qatari Arab women and literate women were more likely than otherwise to have medicine administered at their last pregnancy check, although this was not systematically so in respect of all pregnancy durations.

Table 4.10 Among currently pregnant women who received ante-natal care, the percentage given medication at last pregnancy check, according to background characteristics, QCHS 1987

	Percent		Percent
Duration of pregnancy (months)		Nationality	
2	64	Qatari	71
3	47	Arab	75
4	73	Other	61
5	75	Region	
6	80	Doha	73
7	77	Al-Rayyan	67
8	76	Other	71
9	73	Total	71
Literacy			
Illiterate	69		
Literate	72		

4.2.7 Reason For Not Having a Pregnancy Check

There were 16 percent of pregnant women who had not had a pregnancy check. They were asked about the most important reason why they had not. The percent distribution of their responses may be seen in Table 4.11.

The largest group, 33 percent, of women said that the reason for not having a pregnancy check was that they had not felt they needed one. This reason was given more frequently with pregnancy duration, rising from 29 percent of women in their second month, to 30 percent of women in their to fifth months, and 39 percent of those in their sixth to ninth months of pregnancy. This group is slightly ambiguous; it includes women for whom need is defined in respect of a definable stage in their pregnancy as well as those for whom need is defined in terms of something untoward happening. These denote different attitudes, expectations and behaviour in respect of formal maternal care.

Table 4.11 Percent distribution of currently pregnant women who did not receive ante-natal care by reason for not seeking a check-up, according to background characteristics, QCHS 1987

Variable	Had no complaints	Too early	Intends to	No facility/ Too far	Too busy	Husband too busy	Other	Total
Duration of pregnancy								
< 3	29	29	6	6	12	-	18	100
3 - 5	30	27	13	3	13	3	11	100
6 +	39	10	16	13	7	3	12	100
Nationality								
Qatari	45	13	16	7	7	-	12	100
Arab	31	25	8	6	14	3	13	100
Other	9	27	18	18	9	9	10	100
Region								
Doha	30	23	10	10	13	5	9	100
Al-Rayyan	33	11	28	6	17	-	5	100
Other	40	25	5	5	-	-	25	100
Literacy								
Illiterate	35	20	11	11	9	2	12	100
Literate	30	22	17	-	13	4	14	100
Total	33	21	13	8	10	3	12	100

Twenty-one percent of women replied that it was too early for a check. This reason was confined to the first months of pregnancy, 29 percent of women who were in their second month and 27 percent of women who were in their third to fifth months.

About 13 percent of women said that they intended to have a pregnancy check. This reason was more prominent in later than in earlier pregnancy, given by the six percent of women who were in their second month compared with 13 and 16 percent, respectively, of women who were in their third to fifth, and sixth to ninth months, of pregnancy.

Given the high level of maternal care in Qatar, it is perhaps not surprising that the majority of responses, 67 percent, given by women who had not had a check, were ones that allowed for the possibility that they would use the service at some stage. Inaccessibility on account of there being no-one to consult, or of the health facility being too far away, accounted for eight percent of all women who had not had a pregnancy check. Other responses given included, ten percent who had said that they themselves were too busy, and three percent who said that their husbands were too busy, presumably to take them, to have a pregnancy check.

Although based on small numbers it would seem that nationality and residence, associated with differences in the level, the timing and general accessibility of maternal care, also denote differences in attitudes towards it. Qatari women and those living outside Doha and Al-Rayyan were more likely than other women to respond that they had not felt the need for a check. Non-Arab women, those living in Al-Rayyan and literate women were more likely to give the replies associated with the first months of pregnancy. Thus, 45 percent of Qatari women responded that they had not felt the need for a pregnancy check, while 45 percent of non-Arab women and 39 percent of literate women responded that it was "too early", or that they "intended" to have a check. Thus are identified some differences in attitudes to ante-natal care according to nationality, region of residence and literacy. How much this reflects differences in availability of ante-natal care and/or differences in the profile of primary health care cannot be pursued here.

4.3 CARE AT THE DELIVERY

4.3.1 Place of Delivery

Women whose last child was born five years or less preceding the survey were asked about where the child was born and who attended

the birth. As may be seen from Table 4.12, the vast majority of women, 87 percent, gave birth to their most recent child in a hospital, two percent at home, and there were 11 percent of births that took place outside of Qatar.

Table 4.12 Percent distribution of last live births in the five years before the survey by place of delivery, according to mother's age and birth order, QCHS 1987

Variable	Public hospital	Home	Outside Qatar	Total	Number births
Mother's age					
< 20	92	2	6	100	66
20 - 24	86	2	12	100	456
25 - 29	87	2	11	100	747
30 - 34	93	2	15	100	656
35 - 39	91	1	8	100	385
40 - 44	92	1	7	100	143
45 - 49	93	7	-	100	31
Birth order					
1	80	1	19	100	350
2	80	2	18	100	504
3 +	91	2	7	100	1630
First births to mothers aged					
< 20	91	-	9	100	35
20 - 24	83	1	16	100	162
25 - 29	75	2	23	100	112
Second births to mothers aged					
20 - 24	85	3	12	100	155
25 - 29	82	1	17	100	178
30 - 34	69	2	29	100	117
Third births to mothers aged					
20 - 24	91	2	7	100	139
25 - 29	91	2	7	100	457
30 - 34	88	2	10	100	509
35 - 39	92	1	7	100	358
40 - 44	94	1	5	100	130
45 - 49	93	7	-	100	-
Total	87	2	11	100	2484

First and second births, and to a lesser extent birth to women aged 20-34 years, featured a greater than average likelihood of having been delivered outside of Qatar.

Table 4.13 shows that Qatari women were not surprisingly least likely to have delivered their most recent child outside of Qatar. The proportion of deliveries that took place outside of Qatar increased from three percent among Qatari women, to 14 percent among non-Qatari Arab women and 21 percent among women of other nationalities.

Table 4.13 Percent distribution of last live births in the five years before the survey by place of delivery, according to mother's age and birth order, QCHS 1987

Variable	Public hospital	Home	Outside Qatar	Total	Number of births
Nationality					
Qatar	96	1	3	100	942
Arab	84	2	14	100	1017
Other	78	1	21	100	525
Region					
Doha	83	1	16	100	1386
Al-Rayyan	95	2	3	1001	678
Other	88	3	9	100	420
Literacy					
Illiterate	93	3	4	100	655
Literate	85	1	14	100	1825
Total	**87**	**2**	**11**	**100**	**2484**

Doha featured a larger than average proportion of women who delivered their most recent child outside of Qatar, 16 percent, with only one percent of deliveries taking place at home. About 93 percent of illiterate women delivered their most recent child in a public hospital, three percent at home and four percent outside of Qatar. The corresponding figures for literate women were 85, one and 14 percent,

respectively. The majority of the very small number of births that took place at home were described as non-planned ones, attributed largely to prematurity, there being only half of this number that were described as home births out of preference. The figures denote a hospital delivery to be the preferred desired norm, that the few home births that do occur tend to be in the more traditional context, among illiterate women and those who live in areas with the lowest availability of health facilities.

The results also show that the vast majority of women use government facilities irrespective of residence, education or family building pattern.

4.3.2 Attendance at Delivery

About 59 percent of deliveries were attended by a doctor, 38 percent by a trained nurse, one percent by a traditional nurse, one percent by a relative and one percent by no-one, (Table 4.14). Thus almost all births, 97 percent, were attended by a doctor or trained nurse and out of every ten deliveries there were just under six attended by a doctor and just under four attended by a trained nurse.

Attendance by a doctor was slightly more likely than average among women living in Doha, 62 percent. Al-Rayyan featured an average likelihood of attendance by a doctor while a much lower than average figure, 47 percent, of deliveries to women living in the "other" regions had a doctor in attendance. Attendance by a trained nurse was correspondingly lower in Doha than elsewhere, 35 percent compared with 37 and 48 percent in Al-Rayyan and the "other" regions.

Births to women who were illiterate were less likely to be attended by a doctor than births to women who were literate, 54 compared with

61 percent, Figures for attendance by a trained nurse were 41 and 36 percent, respectively.

Table 4.14 Percent distribution of women who had their last child in the five years before the survey by type of assistance during delivery, according to background characteristics, QCHS 1987

Variable	Doctor	Nurse	Daya	Relative/ other	No one	Total
Nationality						
Qatari	55	42	1	1	1	100
Arab	60	37	2	1	-	100
Other	65	31	2	1	1	100
Region						
Doha	62	35	1	1	1	100
Al-Rayyan	60	37	1	1	1	100
Other	47	48	1	3	1	100
Literacy						
Illiterate	54	41	1	3	1	100
Literate	61	36	1	1	1	100
Total	59	38	1	1	1	100

The proportion of deliveries attended by neither a doctor nor a trained nurse was very small, reaching a maximum of five percent among illiterate women and those living outside of Doha and Al-Rayyan. While these are very small percentages, they are nevertheless perhaps unacceptably high in a relatively well-resourced primary health care context.

4.4 POST-NATAL CARE

Only 35 percent of women whose last child was born five years or less prior to the survey had a post-natal check-up. The likelihood of a post-natal check displays no systematic variation with parity, ranging around the average figure between first and seventh order births (Table

4.15). Women were thus more likely to have received ante-natal care than post-natal care in respect of their last live birth, 94 compared with 35 percent. It would thus appear that the special attention given to pregnancy checks and delivery is one confined to the infant and not followed through in respect of the mother's complete physical and nutritional recovery from her first birth.

Table 4.15 Among women who had their last child in the five years before the survey, the percentage who received : (a) ante-natal care, and (b) post-natal care, according to birth order, QCHS 1987

Percent received	Birth order									Total
	1	2	3	4	5	6	7	8	9 +	
Ante-natal	94	95	94	94	92	93	95	92	91	94
Post-natal	39	37	35	39	36	33	27	34	24	35

About 93 percent of post-natal checks were carried out by a doctor, compared with 59 percent of ante-natal checks. Thus, nearly 55 percent of all women received ante-natal checks carried out by a doctor and 32 percent of all women had a post-natal check carried out by a doctor.

Qatari and other Arab women displayed a slightly lower than average likelihood of having a post-natal check while women of other nationalities displayed a notably higher than average likelihood of a post-natal check, (Table 4.16).

Regional differentials in ante-natal care are not mirrored in respect of post-natal care. Thus women living in Doha were the ones most likely to report a post-natal check after their last live birth, 47 percent, falling significantly to 19 percent of women living in Al-Rayyan. The discrepancy between the numbers of women who had ante-natal and post-natal care was much smaller in Doha than elsewhere, 49 percent, rising to 63 percent in the "other" regions and 72 percent in Al-

Rayyan. Not only was a post-natal check more likely in Doha than elsewhere, it was also more likely to have been carried out by a doctor, 94 percent, compared with 92 and 89 percent in Al-Rayyan and the "other" regions.

Table 4.16 Among women who had their last child in the five years before the survey, the percentage who received ante-natal care, the percentage who received post-natal care, and the percentage of post-natal checks carried out by a doctor, according to background characteristics, QCHS 1987

Variable	Percentage who received		Percentage of post-natal checks carried out by a doctor
	Ante-natal care	Post-natal care	
Nationality			
Qatari	93	30	93
Arab	94	34	95
Other	95	49	89
Region			
Doha	96	47	94
Al-Rayyan	91	19	92
Other	90	27	89
Literacy			
Illiterate	88	24	87
Literate	96	39	94
Total	94	35	93

A similar picture emerges with respect to mother's literacy, there being 24 percent of illiterate women compared with 39 percent of literate women who reported a post-natal check after their last live birth. The difference is not so striking in respect of literacy as it was between residence in Doha and elsewhere.

Women living in Doha, and literate women, appear to be most consistently advantaged in respect of the likelihood of ante-natal care, carried out at a hospital, by a doctor, and with relatively fast access-

ibility to the health facility, of a hospital delivery and attendance by a doctor, and of a post-natal check again carried out by a doctor, while literate women and those living in areas outside of Doha and Al-Rayyan appear to be disadvantaged in these respects.

Thus, the QCHS results indicate there to be high levels of maternal care in Qatar. At the same time they highlight areas in which the service as a whole could be improved. In addition, the observed variations in maternal care according to residence and to mother's education, and to the family building patterns which tend to be associated with them, assist in identifying the most urgent gaps in service provision, and assessing the impact of, and need for expansion.

CHAPTER 5

BREAST-FEEDING AND WEANING PRACTICES

5.1 INTRODUCTION

Breast-feeding plays a very important role in child nutrition, health and development. An infant who is breastfed is provided with important immunities from infectious diseases as well as essential nutrients which sustain it through the first months of life. The mother's milk has been described as the biological true food for the infant. Apart from being highly nutritious, breast milk contains important biologically active substances that guard the infant against infection. The concentration of these substances is highest in the colostrum, the high protein fluid secreted in the first days post-partum, when the infant's immune system is still immature.

There are a number of immunologically protective agents in human milk, including immunoglobins, leukocytes and the bifidus factor which promotes the growth of bifid bacteria, which in turn prevent the growth of potentially harmful organisms. As a result, breastfed infants are less likely to develop gastrointestinal disease and viral respiratory infections.

An adequate supply of human breast milk satisfies virtually all nutritional needs of an infant for the first four to six months of life. After supplementary foods are introduced, breast milk can remain an important source of protein and other nutrients for many months.

The infant is not alone in benefiting from breast-feeding. There are advantages for the mother too. Not only does breast-feeding help to

establish a closer relationship between the mother and infant, it also helps to delay the return of 'fertility' or fecundity - and hence pregnancy - following delivery. This natural contraceptive mechanism, however, works best only when the infant is suckled frequently and breast milk remains the principal source of food for the infant. The suckling of the baby exerts pressure on the nipple which creates a neural stimulus that is received at the hypothalamus. Two of the hypothalamus responses are increased beta endorphin secretion and decreased production of gonadotropin releasing hormone (GnRH) and dopamine, which in turn suppresses gonadotropin secretion and ovarian activity while stimulating prolactin secretion. However, while on average breast-feeding postpones the return of ovulation, individual experience varies quite considerably and it can by no means be assumed to be a reliable form of contraception.

In the QCHS, women whose last live birth has occurred five years or less before the survey were asked a number of questions in relation to breast-feeding in the open interval. They were asked whether they had breastfed their last child and, if they had not, an attempt was made to ascertain the most important reason why not. Women whose last child had been breastfed were asked for the age at, and main reason for, weaning where appropriate, the number of feeds in the previous day, whether the child was bottle-fed in addition to breast-feeding and the age at supplementation with solids. Women were also asked whether they had received advice on feeding their most recent child. If so, the source of advice was ascertained.

In this chapter are examined in turn the prevalence and duration of breast-feeding, the pattern of feeding and supplementation and finally the reasons given for the behaviour described.

5.2 PREVALENCE AND DURATION OF BREASTFEEDING

5.2.1 Extent of Breast-feeding

Of 2,484 most recent live births which had taken place five years or less before the survey, 89 percent were reported to have been breastfed, (Table 5.1). This figure falls short of that which is both desirable and achievable in order to optimise the nutritional, immunological and emotional advantages of breast-feeding for infants in their first months of life.

Table 5.1 Percentage of last live-birth in the last five years preceding the survey who were breastfed according to mother's age, QCHS 1987

	Mother's age							Total
	< 20	20-24	25-29	30-34	35-39	40-44	45-49	
Percent ever breastfed	86.4	87.7	88.9	88.9	91.9	90.2	74.2	89.0
Number of live-births	66	456	747	656	385	143	31	2484

The likelihood of being breastfed increased gradually with mother's age, peaking among infants whose mothers were aged 35-39 years. Thus, 86.4 percent of infants whose mothers were under twenty years of age were ever breastfed, rising to 87.7 percent of those whose mothers were aged 20-24 years, 88.9 percent of those whose mothers were aged 25-34 years and 91.9 percent of those whose mothers were aged 35-39 years. The figure falls very slightly, to 90.2 percent, of those whose mothers were aged 40-44 years. The low figure, 74.2 percent, reported by mothers aged 45-49 years was based on only 31 live births and subject therefore to large sampling error.

First born infants were a little less likely than others to have been breastfed, 86.6 percent compared with 89.1 percent of second and 89.4 percent of third and higher order births, (Table 5.2). A lower figure for first births is consistent with the higher risks and lack of experience attendant on them. It is difficult to generalise though about all first births on the basis of such figures which are inherently biased. In particular lower order births disproportionately include women characterised by lower fertility and vice versa for higher order births. Eighty-seven percent of first-born infants for example had mothers who were literate, compared with 41 percent of seventh or higher order births. An apparent association between birth order and breastfeeding, therefore, may in part be due to the association between mother's education and breastfeeding.

Table 5.2 Percentage of live-births in the five years preceding the survey who were breastfed according to mother's age and birth order, QCHS 1987

Birth order	Mother's Age				Total
	< 25	25-34	35-44	45-49	
1	87.8	85.2	*	-	86.6
2	88.8	89.5	89.7	*	89.1
3-4	85.7	89.5	93.4	*	89.5
5-6	85.0	89.4	91.3	*	89.4
7 +	-	88.2	91.3	77.8	89.4
Total	87.5	88.9	91.5	74.2	89.0

* less than 20 live-births

Birth order and mother's age effects may additionally be confounded by the relation between the two; birth order and mother's age rise simultaneously so that there would be disproportionate overlap between the youngest mothers and lowest birth orders and likewise between the oldest mothers and highest birth orders. In order to disen-

tangle the two effects the percentage of children ever breastfed by both birth order and mother's age are presented in Table 5.2.

Birth order and mother's age effects each other become more rather than less visible as a result of separating the two. The figures for women aged between 25 and 45 years display a stronger relationship between birth order and breastfeeding than do those for women of other ages. They additionally suggest a slight decline in the likelihood of breastfeeding among higher order births. Among women aged less than 25 years, a much smaller difference separates first and second order births and there was a reduction to 85 percent ever breastfed of third and higher order births.

Separating mother's age and birth order also serves to disentangle the effect of biological factors from other effects. Thus, the low figure, 85.2 percent, breastfed of first births to women aged 25-34 years may denote a deliberate decline in breastfeeding by a group of women characterised by factors such as relatively late marriage and higher education. Likewise the low figure, 85 percent, for third and higher order births to women under 25 years may be related to their early start to childbearing and fast tempo of fertility, with attendant effects on the health and nutritional status of mother and infant.

5.2.2 Current Status

The percentage of children still being breastfed by age of the child may be seen in Table 5.3. The figure display a marked decline with age in the first six months of life, from 94 percent of those aged less than a month old, to 53 percent of infants aged five months. The largest fall was recorded between ages four and five months, there being about two thirds of infants aged four months who were still being breastfed compared with just over a half of those aged five months. The figures

Table 5.3 Percentage of last live births in the five years preceding the survey who were still breastfeeding according to age of child, QCHS 1987

Age of child (in months)	Percent still breastfeeding	Number of all children
< 1	93.8	48
1 -	88.9	81
2 -	79.2	72
3 -	72.7	66
4 -	66.7	78
5 -	53.1	64
6 -	47.6	63
7 -	51.3	78
8 -	52.6	76
9 -	50.8	61
10 -	44.8	67
11 -	43.5	62
12-23	25.0	711
24 +	3.6	943
All ages	29.1	2470

fluctuate around 50 percent among infants aged five to nine months, falling very slightly to around 44 percent of those aged ten and eleven months. There were 25 percent of children aged 12-23 months and four percent of those aged two years or more who were still being breastfed.

The figures suggest distinctive patterns of weaning. The first, representing about one half of the infants, features early weaning, before age six months. The plateau between ages five and nine months, followed by a slight fall towards the end of infancy suggests a second pattern, of gradual weaning starting around age one year.

The percentages of children still being breastfed by child's age according to mother's age and birth order may be seen in Table 5.4. Also shown are the age distributions of the most recent live births. The proportion of most recent born children aged under six months falls steadily from 36 percent of mothers aged under twenty years to eight percent of those aged forty years or more, while the proportion aged one year or more rises from 43 percent to 82 percent. The only effect in respect of birth order is a slightly higher proportion of first births aged 6-11 months, 20 compared with around 16 percent, and correspondingly lower proportion aged one year or more, 64 percent compared with around 67 percent.

Table 5.4 Percentage of children still breastfeeding by age according to mother's age and birth order, QCHS 1987

	Percent still breastfeeding Child's age(in months)			Percent distribution of all children Child's age (in months)			
	< 6	6-11	12 +	<6	6-11	12 +	Total
Mother's age							
Under 20	91	50	14	36	21	43	100
20 - 29	75	46	13	19	20	61	100
30 - 39	73	52	14	15	13	72	100
40 - 49	69	59	10	8	10	82	100
Birth order							
1	79	37	9	16	20	64	100
2	78	48	9	17	17	66	100
3 - 4	72	51	12	17	15	68	100
5 - 6	75	49	13	17	17	66	100
7 +	76	55	20	15	15	69	100

The proportion of infants under six months who were still breastfeeding declines with mother's age, from 90 percent for mothers under twenty years to 75 and 73 percent, respectively, for mothers aged 20-29 and 30-39 years. The low figure for mothers aged 40 years or more

is based on a small number of infants and liable, therefore, to the effect of large sampling errors. There appears to be little association between mother's age and the proportion still breastfed of children aged six months or more.

There also appears to be little association between birth order and the likelihood of still being breastfed among infants aged under six months. At older ages, the likelihood of being breastfed increased with birth order. In the age group 6-11 months it rose from 37 percent of first births to 48 percent of second births and 55 percent of seventh or higher order births. Among children aged one year or more the number still breastfed rose from nine percent of first and second births to around 12 percent of third to sixth and 20 percent of seventh or higher order births.

5.2.3 Early Weaning

It was shown earlier that children born to the youngest mothers, and first-born children were less likely than others to have enjoyed the benefits of their mothers' milk. Hence it may be seen that even those who did enjoy the benefits were less likely to drive the full nutritional advantage, on account of their being weaned early, before they were three months of age (Table 5.5).

Table 5.5 Among the children who stopped breastfeeding, the percentage who were weaned before age three months, according to mother's age and birth order, QCHS 1987

	Mother's age					birth order					All births
	< 20	20-24	25-29	30-39	40 +	1	2	3-4	5-6	7 +	
Of those weaned, the percentage weaned under three months	23	24	21	16	12	23	21	19	16	14	19

Among those who had stopped breastfeeding, the likelihood of having been weaned before age three months declined with mother's age, from 23 percent for mothers under 25 years to 16 percent for mothers aged 30-39 years and 12 percent for mothers aged 40 years or more. Likewise there was a decline in early weaning with birth order, there being 23 percent of those first-born infants, who had stopped breastfeeding, who were weaned before age three months, falling to 14 percent for seventh or later born infants.

5.2.4 Duration of Breastfeeding

A number of problems arise in estimating the average duration of breastfeeding from data on the open interval, each of the available measures being subject to some bias.

A median duration may be estimated from the current status data which was presented in Table 5.3. However, longer open intervals disproportionately include women with long breastfeeding durations and the result tends to be an overstatement of the time for which infants are breastfed.

An alternative measure is one which is commonly used in epidemiology. In this case the mean duration of an illness is approximated by dividing its prevalence by its incidence. In the application to breastfeeding, prevalence is defined as the number of children who are still being breastfed at the time of the survey. Incidence is defined as the average number of births per month. The number of births per month was estimated from the number of last live births in the year prior to the survey. A preferred estimate of incidence would have been one derived from births over several years, and one not based on retrospective reporting. Any underreporting of live births

in the year preceding the survey would overstate the duration of breastfeeding also.

The distinctive current status patterns identified in QCHS add to the problem of identifying a single measure to represent the average duration of breastfeeding. In this case, not only is each summary measure subject to inherent bias, but the attempt to average two such distinctive patterns results in a measure which represents neither. This can best be demonstrated with reference to the current status based estimate of the median duration of breastfeeding. The median is a figure which divides the cumulative distribution into two; in this case it is the age at which only 50 percent of infants were still being breastfed. With the exception of infants aged six months, the percentages for ages five to nine months fluctuate, hovering just above 50 percent. They fell permanently below 50 percent between ages nine and ten months, yielding an estimated median duration of breastfeeding equal to 9.6 months. In fact, almost 50 percent of infants aged five months and more than 50 percent of infants aged six months were not breastfeeding. Taking these months as the cut-off points yields a median of 6.1 months. Though the figure of 9.6 months conforms to the strict definition of the median, the figure of 6.1 months present a better portrayal of prevailing breastfeeding patterns.

The lower and upper quartiles provide an indicator of the spread of the distribution. The lower quartile, or the age by which 25 percent of infants had stopped breastfeeding, is 3.2 months, and the upper quartile, or age by which 75 percent had stopped breastfeeding is over a year.

The prevalence/incidence estimate of the duration of breastfeeding was 10.2 months.

An alternative measure is a mean based on the age at which children stopped breastfeeding, This has the disadvantage of over-representing short durations. The effect of this can be reduced by limiting the calculation to those aged 12 months or more who have stopped breastfeeding. This yields a mean of 8.9 months, rising to 9.3 months with the assumption that all those still breastfeeding stopped at age 12 months, and to 10.2 months on the assumption that those aged one year stopped at age 18 months and those aged two years or more stopped at age two years.

Whilst it has been demonstrated that, of the available measures, the median and lower and upper quartiles best describe the patterns of breastfeeding, the small numbers of children and consequent large fluctuations in the proportions stillbeing breastfed hinders their use-fullness at a sub-national level. Though it is recognised that they do not capture the pattern of breastfeeding, and possibly overstate the mean duration also, the prevalence/incidence estimates will be used in the analysis of differentials in the duration of breastfeeding.

Table 5.6 Prevalence/incidence estimates of the duration of breast-feeding in months, according to mother's age, QCHS 1987

Mother's Age	Duration of breastfeeding (Prevalence/incidence)
Under 20	9.5
20 - 24	8.8
25 - 29	9.7
30 - 34	10.9
35 - 39	12.7
40 - 49	12.8
Total	10.2

The prevalence/incidence estimates increased overall with mother's age, (Table 8.6). They rose from 8.8 months among children whose

mothers were aged 20-24 years, to 9.7 months among those whose mothers were aged 25-29 years, 10.9 months among those whose mothers were aged 30-34 years and around 12.7 months among children whose mothers were aged 35 years or more.

5.2.5 Differentials in Breastfeeding

Nationality, residence and mother's education are associated with differentials in the likelihood and duration of breastfeeding, as may be seen from Table 8.7. Arab children were most likely to have been breastfed, 90.7 percent, and Qatari children least likely, 87.5 percent, this being just below the figure of 88.4 percent for children of other nationalities.

Early weaning was least common among Arab children, there being 16 percent of those weaned who had stopped breastfeeding by age three months. the figure was only marginally higher among Qatari infants, 19 percent, and it was highest, 23 percent, among other children. Prevalence/incidence estimates of the mean duration of breast-feeding indicate that Qatari and other Arab children were weaned two and half months later on average than children of other nationalities, 10.7 months compared with 8.2 months.

Thus Qatari infants were characterised by the lowest proportion breastfed and by a marginally higher likelihood of early weaning, but the same mean duration of breastfeeding as Arab infants. These figures suggest that the distinctive patterns of breastfeeding were to be found among Qatari and Arab women and cannot be attributed to nationality.

Infants living in Al-Wakrah were most likely to have been breast-fed, 91.3 percent, falling to 90.1 percent in Al-Rayyan, 88.5 percent in Doha and 87.4 percent in the other regions.

Table 5.7 Percentage of last live-births in the five years preceding the survey who were ever breastfed, prevalence/incidence estimates of mean duration of breastfeeding, and the percentage weaned in the first three months of those who had stopped breastfeeding, according to background characteristics, QCHS 1987

Variable	Percentage who were ever breastfed	Mean duration of breastfeeding	Percent weaned under three months
Nationality			
Qatari	87.5	10.8	18.6
Arab	90.7	10.7	16.2
Other	88.4	8.2	23.1
Region			
Doha	88.5	9.5	20.2
Al-Rayyan	90.1	11.0	15.4
Al-Wakrah	91.3	11.0	16.7
Other	87.4	11.4	18.9
Education			
Illiterate	88.4	11.1	15.8
Incomplete Primary	87.4	11.7	19.4
Primary	86.2	9.8	19.1
Preparatory	90.3	9.6	21.2
Secondary	89.9	9.9	18.0
University	90.4	8.6	20.8
Total	**89.0**	**10.2**	**18.6**

Early weaning was most common in Doha, 20 percent weaned by age three months of those who had stopped breastfeeding, falling to 19 percent in other regions, 17 percent in Al-Wakrah and 15 percent in Al-Rayyan. The age at weaning was earliest in Doha, 9.5 months, rising to 11.0 months in Al-Rayyan and Al-Wakrah and 11.4 months in the other regions.

Infants in Doha thus featured a lower than average likelihood of being breastfed, they were most likely to have been weaned early and were weaned on average earlier than other infants. A higher proportion breastfed corresponded to a likelihood of early weaning and later weaning on average among infants living in Al-Rayyan and Al-Wakrah. Infants living in other regions were characterised by the lowest likelihood of being breastfed, a fairly high proportion weaned early but the latest age at weaning.

The likelihood of being breastfed fluctuated with mother's education. It fell from 88.4 percent among illiterate women to 86.2 percent in the case of women with a primary education; it then increased to around 90 percent of those with a preparatory or higher education.

Early weaning was least common among infants whose mothers were illiterate, there being 16 percent weaned before age three months of those who had stopped breastfeeding. The figures fluctuate thereafter with mother's education, around 19 percent of those with up to primary education, around 21 percent of those with a preparatory or university education and 18 percent of those with a secondary education. Mean duration of breastfeeding decreased overall with mother's education, from 11.1 and 11.7 months among those whose mothers were, respectively, illiterate or had less than a primary education to around 9.7 months among those with primary to secondary education and it was shortest, 8.6 months, among children whose mothers had a university education.

There was thus no consistent set of differentials in the extent and duration of breastfeeding according to mother's education. Infants whose mothers were illiterate displayed the lowest likelihood of early weaning and the longest duration of breastfeeding, but a just below

average likelihood of being breastfed. A higher than average likelihood of being breastfed was accompanied by a high proportion weaned early and the shortest duration of breastfeeding for infants whose mothers had a university education. Higher than average likelihood of breastfeeding and shorter than average duration of breastfeeding characterised mothers with preparatory and secondary education, in the former case a high proportion weaned early also. Low proportion breastfed, and shorter than average duration breastfed characterised mothers with primary education. Finally, mothers with less than primary education resembled those who were illiterate, though with a greater likelihood of weaning early.

The small numbers of infants involved may be the explanatory factor for the diversity on differentials of breastfeeding behaviour. It is , however, possible that the figures reflect ongoing changes; a gradual reduction in the extent of breastfeeding followed by an increase in early weaning and shorter duration of breastfeeding succeeded by a recognition of its advantages and hence an increase in the extent of breastfeeding, though with a view to keeping duration down to a minimum. While the greater likelihood of breastfeeding signifies important nutritional and immunological advantages for the infant, it neglects consideration of the potential nutritional and emotional disadvantages of early weaning.

5.3 PATTERNS OF FEEDINF AND SUPPLEMENTATION

The duration of breastfeeding is only one side of the nutritional, health and fertility equation; the other side includes the pattern of breastfeeding and supplementation. The contraceptive effects is associated with unsupplemented breastfeeding on demand. The nutritional, health and psychological effects of unsupplemented breast-

feeding are of most value in the first few months of life; thereafter appropriate supplementation is required.

5.3.1 Frequency of Breastfeeding

Mothers were asked how many times they breastfed the baby during the previous day and how many times at night. As may be seen from Table 5.8 four and five feeds during the day were most common, 21 percent each, tapering off on each side to around 15 percent who had three and six feeds, 11 percent who had one feed only, seven feeds, and eight feeds or more.

Table 5.8 Percent distribution of last live-births, in the five years preceding the survey, who were still breastfeeding, by number of feeds, QCHS 1987

	Number of feeds								Total
	1	2	3	4	5	6	7	8 +	
Day	6	11	15	21	22	16	4	5	100
Night	15	34	29	14	4	2	1	1	100
Yesterday	-	3	5	7	11	15	17	42	100

Two and three feeds during the night were most commonly reported accounting for 63 percent of children, and there were 85 percent altogether who had at least two feeds during the night. Hence almost one in two children were given eight feeds or more during the previous day and night, and three out of four were given six or more feeds.

5.3.2 Bottle Feeding and Supplementation With Solids

A pattern of early weaning has been described. In this section are examined the patterns of feeding in more detail, in particular bottle feeding and the introduction of solids. It was asked of each child who

had ever been breastfed whether they had been given powdered milk, animal milk and solids on a regular basis. If the answer was yes, it was ascertained for each type of food how old they were when they began to do so.

The extent of supplementation with other milk, mainly powdered milk, may be seen in Table 5.9 in which are depicted the percent distribution by age of the pattern of breast and bottle feeding. The figures refer to current feeding pattern in the case of children who were still breastfed and to the pattern prior to weaning otherwise. Those children who were never breastfed comprise the category "bottle only". The percentages of children still breastfeeding are indicated in the table to assist in evaluation.

Table 5.9 percent distribution of last live-births, in the five years before the survey by the pattern of feeding, according to age of child, QCHS 1987

Current or last pattern of feeding	Age of child (in months)							Total
	0-1	2-3	4-5	6-7	8-9	10-11	12 +	
Breast only	44	39	26	27	27	19	22	25
Breast and bottle	52	52	62	54	66	72	67	64
Bottle only	4	9	12	19	7	9	11	11
Total	100	100	100	100	100	100	100	100
Percent still breastfeeding	91	76	61	50	52	44	13	29

Infants less than two months of age comprise four percent who were never breastfed and fed by bottle only, 44 percent who were breastfed only and 52 percent whose feeding included breast and bottle. Fifty-six percent therefore of infants aged less than two months were being bottle-fed and more than half of those who had been breastfed had already been introduced to other milk. The figures for infants aged two and three months resembled those of the youngest age group, with

slightly fewer who were breastfed only. A fairly constant pattern characterises infants aged between four and nine months, around 27 percent who had not been introduced to a bottle, and around 60 percent who had been breastfed and introduced to a bottle . This fairly stable pattern corresponds to the plateau in the proportions still breasted that was observed between ages five and ten months.

The figures for children aged one year or more suggest that about twenty percent of children are weaned without the introduction of a bottle.

A prevalence/incidence estimate of the mean duration of breastfeeding unsupplemented regularly with other milk or solids can be obtained using the method already described; the number of women breastfeeding without supplementation replaces the number of women still breastfeeding in the numerator. It should be stressed that this measure is restricted to supplementation with alternative milk sources and solids, and only on a regular basis. It is a measure which refers to the child's essential diet and is not a measure of supplementation *per se*. Questions asked about food during the previous twenty four hours for children who were still breastfeeding indicate that water or other liquids were commonly given. The figures used here, therefore, understate the extent of ingesting food other than breast milk.

The prevalence/incidence estimate of the duration of unsupplemented breastfeeding is 2.0 months. The mean age at the introduction of solids, irrespective of whether the child was weaned, is 5.6 months according to reports for children aged one year or more.

An indication of the distribution around the mean age at supplementation with solids may be seen in Table 5.10. The distribution is one that rises sharply at the mean, remains fairly high in the following month, and tails off toward the older ages.

By far the most commonly selected age for the introduction of solids, accounting for almost 50 percent of children, was four and five months. Next most common was the age group six and seven months , representing around 25 percent. This applied irrespective of the child's current age, although as current age increased the age group six to seven months became relatively more likely. Altogether between sixty and seventy percent of children were introduced to solids in the age groups four to seven months.

Table 5.10 Percent distribution of last live-births, in the five years before the survey, who were breastfed, by age at supplementation with solids, according to age of child, QCHS 1987

Age at introduction of solids	Age of child (in months)						
	0-1	2-3	4-5	6-7	8-9	10-	12 +
No solids	99	90	43	27	11	8	4
0-1	1	4	1	3	0	0	1
2-3		6	22	6	6	18	10
4-5			34	40	52	45	40
6-7				24	25	21	29
8-9					6	6	8
10-11						2	1
12 +							7
Total	100	100	100	100	100	100	100

The pattern of feeding and age at supplementation according to mother's age may be seen in Table 5.11. The proportion of infants aged under three months who had been introduced to substitute milk rose with mother's age, from 36 percent of mothers aged under 20 years to 59 percent of those aged 20-29 years, 61 percent of those aged 30-39 years and 65 percent of those aged 40 years or more. There was no corresponding pattern with mother's age among infants aged 3-5

months. The numbers of infants in each of the two age groups were however very small, and it perhaps can only be concluded that there was an increase with mother's age among infants aged less than six months.

The mean age at regular supplementation with the bottle was around 1.9 months for women under thirty years, rising to 2.4 months for women aged 30-39 years. Solids were introduced on average at age 4.7 months by mothers under twenty years of age, rising to around 5.5 months for women aged between 20 and 40 years. It is interesting to note that among young infants, there was little correspondence between patterns of feeding by mother's age and age at supplementation .

Table 5.11 Among last live-births in the five years before the survey, the percentage of children who were both breastfed and bottle-fed by age of child, and mean ages at supplementation, according to age of mother, QCHS 1987

Percent of children breastfed and bottle-fed	Mother's age				Total
	< 20	20-29	30-39	40-49	
Child's age < 3 months	36	59	61	65	58
Child age 3-5 months	73	67	73	74	69
All children under 6 months	54	63	66	(69)	64
Mean age at introduction of the bottle	1.8	1.9	2.4	1.5	2.0
Mean age at introduction of solids for children aged 12 months or more	4.7	5.5	5.6	6.2	5.6

5.3.3 Differentials in Feeding Patterns

Patterns of feeding and supplementation according to nationality, residence and mother's education may be seen in Table 5.12 . Differentials in the mean age at weaning are mirrored in respect of the mean age at supplementation with solids. A greater number of Qatari

and other nationals than Arab infants aged under three months had been introduced to bottled milk, 65 and 60 percent compared with 51 percent. Qatari and "other" nationals were supplemented earlier than Arab children, at 1.9 compared with 2.4 months. However, Arab children were supplemented with solids earlier than Qatari and "other" children, at age 5.1 months compared with, respectively 5.7 and 6.4 months. This would suggest more widespread use of bottled milk by mothers of Qatari and "other" children.

Infants under three months and those aged 3-5 months who were living in Doha were more likely to have been introduced to substitute milk than those living in Al-Rayyan or Al-Wakrah; 63 percent compared with less than 50 percent in the case of those aged under three months, and 77 compared with less than 60 percent in the case of those aged 3-5 months.

Introduction of the bottle was earliest in Doha, at around 1.7 months, compared with 2.2 months in Al-Wakrah and 2.8 months in Al-Rayyan. Regular supplementation with solids was earliest in Doha and Al-Wakrah, 5.5 months, marginally higher, 5.7 months, in Al-Rayyan and it was 6 months for infants living in the "other" regions.

The likelihood for infants under six months of receiving substitute milk tended to increase with mother's education , from 56 percent of those whose mothers were illiterate and 50 percent of those with a primary education to around 70 percent of those with preparatory education or more.

The mean duration of unsupplemented breastfeeding tended to decline correspondingly with mother's education, from around 2.5 months for infants whose mothers had up to a primary education, to 2.1 months in the case of a preparatory education and 1.6 and 1.1 months, respectively, for those whose mothers had a secondary or

Table 5.12 Among last live-births in the five years before the survey, the percentage of children who were both breastfed and bottle-fed, and the mean duration of unsupplemented breast-feeding, according to background characteristics, QCHS 1987

	% ever breastfed and bottle-fed			Mean duration of unsupplemented breastfeeding	Mean age at introduction of solids*
	Age of child (in months)				
	< 3	3-5	< 6		
Nationality					
Qatari	65	72	69	1.9	5.7
Arab	51	63	57	2.4	5.1
Other	60	75	70	1.8	6.4
Region					
Doha	63	77	70	1.7	5.5
Al-Rayyan	47	59	52	2.8	5.7
Al-Wakrah	50	54	52	2.2	5.5
Other	76	67	71	1.6	6.0
Education					
Illiterate	50	60	56	2.5	6.2
Incomplete primary	64	84	74	2.7	5.7
Primary	59	41	51	2.5	6.0
Preparatory	53	83	68	2.1	5.3
Secondary	57	83	70	1.6	5.2
University	70	70	70	1.1	5.1
Total				2.0	5.6

* For children aged 12 months or more

university education. A fall with mother's education in the mean age at the introduction of solids was reported also, from around 6 months for those with primary education or less, to around 5.2 months for those with preparatory or more education.

5.4 REASONS FOR BREASTFEEDING BEHAVIOUR

5.4.1. Advice on Feeding

Just over one in two mothers received advice, other than from relatives or neighbours , on feeding, (Table 5.13) . The likelihood of getting advice declined with mother's age, from 65 percent of those

aged under twenty years to 55 and 52 percent , respectively, of those in their twenties and thirties and it was lowest, 42 percent in the case of mothers aged forty years or more.

Table 5.13 Percent distribution of last live-births, in the five years before the survey, by source of advice on feeding (other than from relatives and neighbours), according to age of mother, QCHS 1987

Source of advice	Mother's age				Total
	< 20	20-29	30-39	40-49	
All women					
No advice	35	45	48	58	47
Government health facility	20	29	30	23	29
Private health facility	12	7	5	5	6
Other	33	19	17	14	18
Total	100	100	100	100	100
Women who got advice					
Government health facility	31	52	58	54	54
Private health facility	19	13	10	12	12
Radio/Television	29	18	19	27	19
Other	21	17	13	7	15
Total	100	100	100	100	100

Just over a third of "all" women sought advice on feeding from a health facility 29 percent from a government facility and six percent from a private one. The figures ranged from 32 percent of women under twenty years of age to around 35 percent of those aged 20-39 years and 28 percent of those aged 40 years or more. The youngest women who sought advice from a health facility were less likely than others to have sought it from a government health establishment, and more likely to have sought it from a private health facility. Thus, 20 percent received advice from a government health facility compared with 30 percent of women aged 20-39, and 23 percent of those aged 40

years or more, and 12 percent received advice from a private health facility compared with seven percent or less of other women.

Within the group of women who did receive advice, 54 percent received it from a government health facility, 12 percent from a private health facility, 19 percent from radio or television and 15 percent from some other source.

A government health facility accounted for a smaller proportion of advice received by the youngest women, 31 percent, compared with more than 50 percent in the case of women aged 20 years or more. The youngest women were more likely than others to have received advice from each of the other sources. About 19 percent sought advice from a private health facility, compared with between 10 and 13 percent of other women. About 29 percent gleaned advice form radio or television, more or less the same as the figure for women aged forty years or more and compared with just under 20 percent of women aged 20-39 years. Advice from other sources declined with age, from 21 percent for women under twenty to seven percent for those aged forty years or more.

The figures indicate therefore that whilst a much larger proportion of the youngest women reported that they had received advice, this was advice received more broadly than in the case of other women. It reflects a great need for advice, and disguises the fact that it was the youngest women who were least likely to have utilised government health facilities.

5.4.2 Reasons For Not Breastfeeding

The most common single reason for not breastfeeding was that the mother had no milk. About 31 percent of mothers gave this as the most

important reason why they did not breastfed their last child, (Table 5.14). The mother being sick accounted for 19 percent of infants not breastfed, and the infant being sick for 12 percent, and in two percent of cases the infant had died. The infant's refusal was given as the reason in respect of 11 percent of infants who were not breastfed, and nipple problems were given as the reason in nine percent of cases. reasons other than those listed account for 16 percent of infants who were not breastfed.

Table 5.14 Percent distribution of last live-births, in the five years before the survey, who were not breastfed, by reason given for not breastfeeding, QCHS 1987

Reason given for not breastfeeding	Percent	Number
No milk	31	84
Mother sick	19	52
Child sick	12	33
Child refused	11	31
Nipple problems	9	25
Infant died	2	5
Other	16	44
Total	100	274

The reasons given for not breastfeeding were ones that indicated a wish and an intention to breastfed the infant, which had not been realisable. It would appear, therefore, that there is scope for raising breastfeeding levels through appropriate and vigilant advice and care before and after the delivery .

5.4.3 Reasons for Early Weaning

Among those children who had stopped breastfeeding by the time of the survey, 19 percent were less than three months of age when they were weaned. Mothers were asked what was the most important reason for weaning their most recent child. Their responses in respect of infants who stopped breastfeeding before they were three months of age are presented in Table 5.15.

About 53 percent of mothers said that the infant was weaned on account of there being insufficient milk. Without further questioning it is difficult to assess the extent to which this was involuntary . It may have derived from the pattern already described of early bottle-feeding which discouraged dependence on, and as a consequence the production of, breast-milk. This in itself could have been an intentional or unintentional part of the weaning process.

Table 5.15 Percent distribution of last live-births, in the five years before the survey, who were weaned in the first three months post-partum, according to reasons given for weaning, QCHS 1987

Reasons given for early weaning	Percent
No milk	53
Mother sick	9
Infant sick	6
Nipple problems	5
Milk upset infant	4
Mother pregnant	4
Infant old enough	3
Work	4
Other	12
Total	100

Poor health of mother accounted for nine percent of cases and the infant being sick for six percent. Nipple problems were given in respect of five percent of cases. A further four percent referred to " child upset by breast milk" as the main reason for weaning within three months post-partum. Four percent of mothers stopped breastfeeding the infant because they were pregnant. Taking these reasons together, it would seem that 28 percent of infants were weaned within three months post-partum on account of physiological factors over which there was perceived to be no control. This figure could rise to as high as 81 percent, depending on the extent to which weaning on account of there being insufficient milk was unintentional.

The figures in Table 5.15 also indicate that four percent of mothers who weaned their children within three months did so in order to return to work. In three percent of cases, mothers reported that the infants were old enough to be weaned. This is the only category which appears to represent a voluntary weaning. There were additionally 12 percent who gave reasons other than those listed.

The group of reasons including poor health of mother or infant, nipple problems, infant's refusal and " milk upset infant " accounted for 51 percent of infants not breastfed and 28 percent of those weaned early. Adding ,lack, or insufficient milk, brings the totals to 82 and 81 percent, respectively.

In both cases a minority or negligible proportion of the decisions appear to have been entirely voluntary and in both there appears to be scope for increasing levels of breastfeeding so as further to maximise the child's physical and emotional well-being.

A relationship between the likelihood of early weaning and mother's age and birth order was noted earlier, the younger the mother or the lower the birth order the more likely it was that the infant would have

been weaned in the first three months of life. Some of the reasons for weaning the infant within three months according to mother's age and birth order are shown in Table 5.16.

Table 5.16 Percent distribution of last live-births, in the five years before the survey, who were weaned in the first three months post-partum, by reason given for weaning, according to mother's age and birth order, QCHS 1987

	No milk	Infant or mother sick	Nipple problems / milk upsets infant	Child old enough	Desire to work	Mother pregnant	Other	Total
Mother's age								
Under 25	59	13	13	3	0	3	9	100
25 - 29	47	14	11	3	6	6	13	100
30 - 39	55	17	5	4	5	2	12	100
40 +	57	14	7	-	-	-	22	100
Birth order								
1	46	12	13	2	12	2	13	100
2	54	14	9	3	5	3	12	100
3 - 4	56	13	9	6	1	4	11	100
5 - 6	54	16	11	0	3	3	13	100
7+	56	22	0	3	-	6	13	100
Total	53	15	9	3	4	4	12	100

There was little variation by mother's age in reasons for weaning infants under three months. Nipple problems or milk upsetting the infant, as a reason for weaning, declined with mother's age from 13 percent of those aged under 25 years to 11 percent of those aged 25-29 years and five percent of those aged 30-39 years. None of the youngest women weaned the infant on account of a desire to return to work, compared with five percent of those aged between 25 and 39 years, and younger women were least likely to have cited reasons other than those listed.

First born infants were marginally less likely to have been weaned early on account of insufficient milk, 46 percent compared with around 55 percent of second and higher order births. Poor health of mother or infant as the reason for early weaning -increased with birth order, from around 13 percent of first to fourth births to 16 and 22 percent, respectively, of fifth or sixth and seventh and higher order births. The likelihood of being weaned early so that the mother could go to work fell with birth order, 12 percent of first births, and five percent of second births falling to three percent or less of third and higher order births. These figures display little coherence between levels and explanations for early weaning, though the concentration among younger mothers and lower order births would be consistent with a secular increase in early weaning .

5.4.4 Reasons For Weaning

Mothers who stopped breastfeeding their last child were asked to give the "most important reason for weaning the child". The responses are summarised in Table 5.17.

Insufficient milk was given as the reason for weaning one in three children who had been weaned. Its importance declined with age at weaning, from 50 percent of those weaned in the first six months, to 37 percent of those weaned at age 6-11 months, 19 percent of those weaned at 12-17 months, nine percent of those weaned at age 18-23 months and none of those who were two years or more when they weaned .

The poor health of mother and the poor health of child each accounted for five percent of children who were weaned, nipple problems for three percent and the child being upset by the milk for

two percent . These reasons were most common among child weaned in the first year of live, and in the case of mother being sick or nipple problems especially in the first six months. Together they accounted for 20 percent of infants weaned in the first six months, 15 percent of those weaned at age 6-11 months, eight percent at age 12-17 months, nine percent at age 18-23 months and four percent of those who were two aged years or more when they were weaned.

Table 5.17 Percent distribution of last live-births, in the five years before the survey, who have stopped breastfeeding, by reason given for weaning, according to age at weaning, QCHS 1987

Reason for weaning	Age at weaning (in months)					All ages
	Under 6	6-11	12-17	18-23	24 +	
No milk	50	37	19	9	-	35
Mother sick	7	4	3	5	1	5
Child sick	5	6	2	2	3	5
Nipple problems	5	2	2	1	-	3
Milk upsets child	3	3	1	1	-	2
Mother pregnant	5	10	8	6	4	7
Wants another child	-	-	1	-	-	0
Child old enough	5	19	53	70	90	27
Desire to work	5	5	3	2	-	4
Other	15	14	8	4	2	12
Total	100	100	100	100	100	100
Number of children	496	279	172	106	68	1121

Mother's pregnancy was given as the main reason in respect of seven percent of children who had been weaned. It rose from five percent of infants weaned under six months to a peak of ten percent of those aged 6-11 months when they were weaned. Thereafter it declined with age at weaning, eight, six and four percent, respectively, of those aged 12-17 months, 18-23 months and two years or more . Not only does this reason for weaning signify a short birth interval with its

attendant adverse effects on the mother and subsequent child, it also signifies a sudden weaning with possible detrimental effects on the breastfed child.

The mother's desire to return to work declined with age at weaning as a reason for weaning, from five percent of those weaned in infancy to three percent of those weaned at age 12-17 months, two percent at age 18-23 months and none of those aged two years or more .

The child being old enough was the second most common reason given for weaning the last live birth, accounting for 27 percent of those who had stopped breastfeeding. It was not surprisingly a factor that became increasingly important as the age at weaning increased. Hence this entirely voluntary reason accounted for five percent of those weaned before six months, rising to 19 percent of those aged 6-11 months, 53 percent of those aged 12-17 months, 70 percent of those aged 18-23 months and the vast majority, 95 percent, of children who were two years or more when they stopped breastfeeding .

The distribution of reasons for weaning by age conforms with the distribution of the age at weaning . They reflect a prevailing pattern of early weaning, caused or justified in large respect by insufficient milk brought about by the early introduction of substitute milk . The figures convey a feel for how the distinctive patterns of age at weaning have come about, in particular the hurried in the first six months, followed by a hiatus between ages six months and a year and a more relaxed and natural process thereafter.

5.4.5 Differentials in Reason For Weaning

The percent distributions of the reported most important reason for weaning according to nationality, residence and mother's education

may be seen in Table 5.18. On account of the observed differentials in age at weaning and the association between age at weaning and reason for weaning, it was necessary to control for age distribution at weaning of all children.

Insufficient milk was more commonly given by Qatari and other women as a reason for weaning, consistent with their earlier bottle - feeding. Qatari women were least likely to have said that they stopped breastfeeding because the infant was old enough, and other women were most likely. Qatari women were also less likely to have another pregnancy as the reason .

Infants living in Doha were more likely than others to have been weaned on account of the mother's desire to work. Together with those living in Al-Rayyan, they were less likely to have been weaned on account of their being insufficient milk or of reasons other than those listed. Another pregnancy was much more commonly the reason for weaning in Al- Rayyan and other regions than in Doha and Al-Wakrah.

Mother's desire to work, as the reason for weaning, increased with mother's education, whilst the poor health of mother or infant, or another pregnancy, decreased. Illiterate women and those with a university education were more likely than other women to have said that they stopped breastfeeding because the child was old enough, and together with those with less than a primary education on account of there being insufficient milk. It is interesting that the highest and lowest education levels resemble each other in respect of insufficient milk or the child being old enough. This seems to illustrate different views on a suitable age for weaning as well as differing likelihood of reasons for insufficient milk associated with ages at supplementation ,

Table 5.18 Percent distribution of last live-births, in the five years before the survey, who had stopped breastfeeding, by reason given for weaning, according to background characteristics, QCHS 1987

	No milk	Infant or mother sick	Nipple problems / milk upsets child	Child old enough	In order to work	Mother pregnant	Other	Total
Nationality								
Qatari	35	11	5	24	2	12	11	100
Arab	32	10	5	28	4	10	11	100
Other	39	9	3	31	4	6	8	100
Region								
Doha	34	10	5	27	4	8	12	100
Al-Rayyan	33	11	5	27	2	12	10	100
Al-Wakrah	41	8	7	29	0	9	6	100
Other	38	9	11	28	1	18	4	100
Education								
Illiterate	36	12	4	23	0	19	6	100
Incomplete primary	37	10	4	31	2	9	7	100
Primary	30	11	5	31	1	9	13	100
Preparatory	33	12	3	30	1	10	11	100
Secondary	33	9	7	30	4	5	12	100
University	36	9	4	25	8	6	12	100
Total	**35**	**10**	**5**	**27**	**4**	**7**	**12**	**100**

Note: Figures standardised to age distribution of all children weaned

It is interesting to note that even after controlling for age at weaning there remain differentials according to nationality, residence and to mother's education in the reasons for weaning which are consistent with differentials in feeding patterns.

CHAPTER 6

DETERMINANTS OF CONTRACEPTIVE USE

6.1 INTRODUCTION

The preceding analysis has illusterated that significant demographic and health changes have taken place in Qatar in the last two decades. The QCHS results indicate that the fertility of Qatari women has declined significantly from the very high level prevailing in the past. No Official family planning programmes are known to exist in Qatar, but contraceptive supplies are available commercially. Increase in contra-ceptive prevalence is seen as a means of increasing women's control over their own fertility behaviour, thus reducing the incidence of too many pregnancies, pregnancies at very young or very old ages, or at very short intervals. Therefore, fertility regulation is expected to have a major impact on the health of mothers and the well-being and survival of children. The purpose of this chapter is to discuss the demographic and socioeconomic factors associated with fertility regulation and contraceptive use in Qatar using the data collected in the 1987 Qatar Child Health Survey.

The 1987 QCHS results indicate that about 52 percent of ever-married women have ever used a contraceptive method to regulate their fertility, while 32 percent of currently married women are current users. The two figures for the Qatari women are 44 and 26 percent, respectively. The analysis of the determinants of fertility in Qatar, presented in chapter 3, revealed that ever use of contraception has a strong, highly significant net positive impact on the number of children ever born (CEB). This result was the same across various regions of residence (namely, Doha, Al-Rayyan, Al-Wakrah, and other regions),

nationality (namely, Qatari, non-Qatari Arabs, and other nationalities), work status, and consanguinity. Ever users of contraception have, on average, 0.76 child more than never users, after controlling for other demographic and socioeconomic factors.

As already pointed out, these results apparently demonstrate reverse causation. The implication is that those women most likely to use contraceptive methods are those who already have achieved high parities. Fertility regulation is practised mainly for stopping at higher parities or for spacing of children until the desired high parities are achieved. The QCHS findings suggest that with increasing levels of education and modernisation, a growing number of Qatari women will use contra-ception not only for spacing purposes but also as a method of fertility control at lower family sizes. The positive impact of contraceptive use on CEB may be related to the relative efficiencies of alternative modes of contraception. For some families, contraceptive methods may represent a substitute for extended breastfeeding as a means of family size control. However, unless modern contraceptives are used regularly and properly (especially when one notices that the pill comprises 41 percent of all current use), the overall impact on CEB could be positive when the effect of breastfeeding is accounted for. Another explanation for this reverse result might be the short duration of contraceptive use and accordingly, very low continuation rates, as will be discussed in detail in section 6.4.

The analysis presented in this chapter examines the influence of a selected set of demographic and socioeconomic determinants on contraceptive use. It seems appropriate to consider demographic and socioeconomic factors simultaneously. The multivariate approach provides estimates of the net effects of particular variables on contraceptive use. The analysis of ever use of contraception is applied to the entire survey sample of ever-married women, while the analysis of current use of contraception is restricted to currently married women.

6.2 ANALYTICAL PROCEDURES

The logistic regression model is used here to analyse contraceptive use (ever and current use of contraception) in Qatar. The model evaluates the effect of a select group of factors on the probability of use of contraceptive methods. The logistic model is appropriate because the dependent variable is dichotomous (Hosmer and Lemeshow, 1989) and the assumption of multivariate normality is not satisfied. The models employed are of the form :

$$P_i = 1 / [1 + \exp (- \Sigma \beta_i X_i)] \qquad (1)$$

which may be written as

$$\ln [P_i / (1 - P_i)] = \Sigma \beta_i X_i \qquad (2)$$

where $\ln [P_i / (1 - P_i)]$ is the log-odds ratio of contraception, sometimes called the "logit", X_i is a vector of explanatory demographic and socioeconomic variables, β_i ($i = 0, 1, ..., k$) is a vector of regression coefficients, and k is the number of independent variables. Regression coefficients can be used to calculate relative odds of contraceptive use ($\exp \beta_i$). The model is estimated using the stepwise logistic regression (LR) program of the 1988 BMDP statistical package (Dixon,1988). The maximum likelihood logistic-regression procedure is selected for estimation purposes. For each categorical explanatory variable, design variables were generated to allow the estimation of the odds ratio. Each category is contrasted with a reference category. The reference category for the design variables is assigned the value of zero, while for each of the other categories a single design variable is assigned the value of one. Exponentiation of the estimated regression coefficient estimates the odds ratio of a specific category relative to the reference

category. The odds ratio is a measure of association which approximates how much more likely it is for a woman to use contraceptive methods in the comparison group compared to the reference group.

The basic multivariate logistic regression model considered in this analysis assumes that a linear relationship exists between the natural logarithm of odds ratio of contraceptive use as the dependent variable and a number of independent variables representing individual demographic-socioeconomic characteristics of women. These characteristics are often considered proxies for a number of possible cultural, social, and economic factors which cannot be directly measured. Accordingly, the logit of contraception is assumed to depend upon (1) the mother's characteristics (current age, age at first marriage, level of education, current working status, relationship to her husband), (2) the number of children living (the difference between the number of children ever born and the number of child deaths), (3) nationality, and (4) region of residence. Other variables, which have shown significant impacts on contraceptive use, such as husband's characteristics (e.g., level of education, occupation, etc.) and household income and wealth, are not available in the data set. Each estimated regression coefficient provides an estimate of the log odds ratio adjusting for all other independent variables included in the model. The resulting adjusted odds ratio compares women with respect to contraceptive use when they differ only in the characteristic of interest (e.g., work status) and have the values of all other explanatory variables constant.

6.3 EVER USE OF CONTRACEPTION

The analysis in this section is carried out in two stages. In the first stage, descriptive statistics and univariate logistic regression models are discussed. The purpose of this section is to investigate the

relationship between each explanatory variable and contraceptive use in order to select those variables that result in a "best" model, which contains only those variables which significantly affect contraceptive use. In the second stage, multivariate logistic regression models are developed for the sample of ever-married women at the national level and separately according to nationality, regions of residence, work status, and consanguinity. The analyses are applied to the 3770 ever-married women interviewed in the 1987 QCHS sample.

6.3.1 Univariate and Bivariate Results

Bivariate results concerning the proportion of ever use of contraception among ever-married women interviewed in the 1987 QCHS are presented in Table 6.1. The table shows the percentage of ever use classified by nationality, region of residence, and selected demographic and socioeconomic variables. While for all ever-married women, 51.7 percent have used a method to regulate their fertility at some point in the past, the proportion reaches 61.9 percent among Arab non-Qatari women, and 56.7 percent in Doha, compared to only 44.6 percent among the Qatari women and 39.6 percent among women residing in Al-Rayyan region.

Ever use of contraception varies a great deal among demographic and socioeconomic groups within nationality and regions of residence. Differentials in ever use of contraception are more pronounced among non-Qatari Arab women than among Qatari women. For Arab women, about three in four have ever used family planning among those aged 30-34 years, married for 20-24 years, with 3-5 living children, with a university degree, or currently working for wage. For Qatari women, only one in two of these groups of women have ever used contraception.

Table 6.1 Ever use of family planning by region of residence and nationality according to selected demographic and socioeconomic factors among ever married women, QCHS 1987

Selected socio-economic factors	NATIONALITY			REGION OF RESIDENCE				TOTAL
	Qatari	Arabs	Other	Doha	Al-Rayyan	Al-Wakrah	Other	
I. DEMOGRAPHIC FACTORS								
CURRENT AGE								
< 20	22.73	3.85	18.75	17.24	11.67	0.00	30.00	14.93
20 - 24	30.43	33.04	41.67	37.78	23.98	31.25	36.73	33.16
25 - 29	51.04	63.02	47.25	58.04	46.45	65.00	50.00	54.96
30 - 34	53.93	74.55	48.66	65.38	48.99	53.33	56.63	60.74
35 - 39	50.48	72.59	50.00	64.45	45.74	62.90	50.75	59.17
40 - 44	49.38	74.21	43.81	61.24	49.48	58.82	48.65	57.28
45 - 49	34.32	65.17	41.46	49.21	35.71	38.89	35.29	44.48
AGE AT FIRST MARRIAGE								
< 15	49.01	49.61	41.07	53.17	38.86	52.78	44.83	47.76
15 - 17	45.55	52.86	40.70	54.86	37.25	52.86	36.52	47.26
18 - 19	48.02	64.71	47.40	59.11	37.86	50.82	73.91	54.82
20 - 21	38.98	63.98	43.18	54.05	41.38	51.16	50.00	50.83
22 - 24	40.00	70.79	51.41	61.38	48.27	61.76	53.33	58.78
25 +	23.19	67.15	55.83	57.48	49.02	60.71	47.83	56.06
YEARS SINCE FIRST MARRIAGE								
0 - 4	25.97	31.93	34.12	33.73	18.93	32.56	27.08	29.50
5 - 9	48.51	63.59	51.18	60.39	44.06	60.87	56.45	56.12
10 - 14	58.02	74.18	49.78	66.53	45.51	64.18	65.33	62.02
15 - 19	50.63	69.95	43.17	63.35	43.08	53.70	41.27	55.36
20 - 24	52.97	74.51	45.13	65.08	49.52	51.43	49.15	58.31
25 - 29	48.37	61.33	43.90	57.69	40.58	58.82	37.04	51.30
30 +	36.36	69.23	42.86	44.26	42.86	50.00	38.36	43.37
CHILDREN LIVING								
None	1.60	2.99	24.07	8.41	1.00	3.57	0.00	5.33
1	29.14	38.94	41.88	38.11	20.27	54.55	28.13	35.53
2	51.65	67.22	59.82	68.06	37.80	54.55	57.45	60.88
3	56.35	75.36	52.23	68.11	47.71	67.44	63.46	63.93
4	59.44	76.42	41.94	67.50	54.25	65.00	58.82	63.84
5	47.01	77.24	31.11	61.54	48.31	80.00	50.00	58.95
6 +	54.13	67.59	38.73	60.80	48.57	55.56	51.61	55.46
CHILDREN DEAD								
None	44.34	61.53	47.02	58.52	38.80	54.62	48.82	51.70
1	46.24	66.92	41.51	61.22	42.00	40.91	47.37	53.09
2	48.89	64.10	57.14	63.83	51.61	66.67	27.27	56.12
3 +	40.62	38.46	10.00	28.13	40.00	67.77	40.00	34.55
CHILDREN EVER BORN								
None	1.10	2.29	25.00	7.77	1.01	3.57	0.00	4.95
1	29.45	38.36	41.03	38.55	19.44	58.06	29.03	35.94
2	51.96	66.32	59.45	66.67	39.67	53.57	60.00	60.41
3	52.90	75.19	53.70	68.97	44.34	65.12	58.33	63.37
4	62.04	77.36	42.68	68.38	57.61	71.88	62.88	65.89
5	43.90	70.08	29.17	57.58	42.53	62.50	50.00	52.68
6 +	53.96	69.01	38.96	61.29	49.16	56.06	51.11	55.94

Table 6.1 (cont.) Ever use of family planning by region of residence and nationality according to selected demographic and socioeconomic factors among ever married women, QCHS 1987

Selected socio-economic factors	NATIONALITY			REGION OF RESIDENCE				TOTAL
	Qatari	Arabs	Other	Doha	Al-Rayyan	Al-Wakrah	Other	
II . SOCIOECONOMIC FACTORS								
NATIONALITY								
Qatari	-	-	-	52.66	35.92	40.23	39.73	44.62
Arabs	-	-	-	65.64	49.31	65.22	58.72	61.88
Other nationalities	-	-	-	46.84	30.28	55.91	67.86	46.39
REGION OF RESIDENCE								
Doha	52.66	65.64	46.84	-	-	-	-	56.68
Al-Rayyan	35.92	49.31	30.28	-	-	-	-	39.63
Al-Wakrah	40.23	65.22	55.91	-	-	-	-	54.04
Other regions	39.73	58.72	67.86	-	-	-	-	47.75
LEVEL OF EDUCATION								
Illiterate	36.74	39.26	30.53	41.30	30.09	45.00	33.13	36.12
Incomplete primary	49.21	58.59	50.98	56.52	42.17	47.62	54.90	52.21
Primary	54.26	53.62	38.24	56.11	40.00	51.52	52.50	51.27
Preparatory	47.45	63.49	52.73	59.20	45.57	62.07	52.17	56.17
Secondary	49.67	68.78	54.32	62.46	54.81	58.44	64.10	61.24
University	54.62	75.75	55.43	64.52	69.35	58.00	76.32	65.20
CURRENTLY WORKING FOR WAGE								
Working	55.12	75.58	55.93	63.94	70.79	58.06	61.54	64.38
Not working	42.02	58.29	43.82	54.56	36.10	53.53	45.39	48.88
RELATION TO HUSBAND								
Related	40.46	57.07	35.40	55.27	33.76	43.36	39.29	45.80
Unrelated	49.28	65.44	51.79	57.51	49.69	61.64	55.32	56.43
TOTAL	44.62	61.88	46.39	56.68	39.63	54.04	47.76	51.70

- not applicable

For Doha, about six out of ten ever-married women aged 25-44 years, married for 5-24 years, with at least two living children, with secondary education or above, or currently working for wage have ever used family planning. For women residing in Al-Rayyan region, about one in two ever-married women with these characteristics have ever practiced family planning. However, around 70 percent of women with a university degree or working women have ever used contraception in Al-Rayyan region. Higher education and participation in the labour force make a large effect on contraceptive use, especially in relatively less developed areas. Smallest proportions of ever use of contraception are observed among young women (under 25 years of age), women with one or no living children, women with at least three dead children,

and illiterate women. In general, differentials in ever use of contraception with respect to work status and consanguinity are less pronounced among ever-married women residing in Doha than among those residing in the other three regions.

To select those demographic and socioeconomic independent (explanatory) variables that demonstrate considerable importance in the multivariate logistic regression model, it is necessary to begin with a careful univariate logistic analysis of each independent variable. The propose is to minimise the number of variables in the model such that the resultant model is more likely to be numerically stable, and more easily generalised. "The more variables included in the model, the greater the estimated standard errors become, ... the more dependent the model becomes on the observed data ... , [and more likely to] produce numerically unstable estimates" (Hosmer and Lemeshow, 1989).

Two sets of explanatory variables are considered in the univariate logistic regression model for ever use of contraception. The first set includes those interval (continuous) variables. These variables are current age, age at first marriage, years since first marriage, and the number of children living, dead, and ever born. The second set includes categorical variables. These variables are current age and years since first marriage (both coded in five-year age groups), age at first marriage (coded in age intervals as shown in Tables 6.1 and 6.2), the number of children living, dead, and ever born, nationality, region of residence, level of education, work status, and consanguinity. Table 6.2 presents, for each independent variable in these two sets, the following information : (1) the estimated slope coefficient(s) for the univariate logistic regression model containing only this variable, (2) the estimated standard error of estimated slope coefficient, (3) the estimated odds ratio, which was obtained by exponentiating the estimated regression coefficient, (4) the 95 percent confidence

intervals for the odds ratio, (5) the value of the log-likelihood for the model, (6) the chi-square statistic to remove the variable from the model and test the hypothesis that the slope coefficient is zero (i.e., the model in this case includes only the constant term), (7) the p-value of the univariate model.

For the interval-scale (continuous) variables, with the exception of the number of dead children, there is some evidence that all other variables have some association with the ever use of family planning. This result is based on an inspection of the confidence interval estimates which either contain one or just barely do not. In addition, if the likelihood ratio test and chi-square values are considered, current age and the number of children ever born (living), when considered as continuous variables, are the most important factors affecting ever use of contraception in Qatar. On the other hand, as shown in Table 6.2, almost all categorical variables, with the exception of the four design variables for the number of dead children, have demonstrated high association with ever use of family planning, and the p-values were less than the 0.0001 level.

Women who marry at older ages 22-24 years are 56 percent more likely to ever use contraception than those who marry at younger ages under 18 years. Ever-married women with one living child are about 9 times as likely to have ever used contraception than ever-married women with no living children. Among socio-economic factors, mother's education exerts the most important association to ever use of contraception. Women with at least a secondary certificate are about three times as likely to ever use contraception than illiterate women, while mothers working for wage are about twice as likely to have used a family planning method to regulate their fertility at some point in the past than those who are not working.

Table 6.2 Univariate logistic regression models for ever use of family planning among ever-married women, QCHS 1987

Socioeconomic Characteristics	Reg. coeff.	Stand Error	Odds Ratio	95% conf. Interval	Log(Like-lihood)	Chi-square	d.f.	P-value*
I. INTERVAL (CONTINUOUS) VARIABLES								
Age	0.037	0.004	1.037	1.029,1.046	-2562.9	72.6	1	<.0001
Age at first marriage	-0.031	0.008	1.031	1.016,1.047	-2591.9	16.1	1	<.0001
Years since first marriage	0.021	0.004	1.021	1.014,1.029	-2584.7	30.6	1	<.0001
Children living	0.116	0.012	1.123	1.097,1.150	-2551.8	94.9	1	<.0001
Children dead	-0.068	0.054	0.936	0.842,1.040	-2599.2	1.5	1	0.2152
Children ever born	0.097	0.011	1.101	1.078,1.126	-2561.3	77.3	1	<.0001
II. CATEGORICAL VARIABLES								
CURRENT AGE								
< 20	-	-	1.000	-	-2490.3	217.8	6	<.0001
20 - 24	1.041	0.260	2.831	1.701, 4.714				
25 - 29	1.945	0.254	6.992	4.251, 11.51				
30 - 34	2.182	0.255	8.863	5.378, 14.61				
35 - 39	2.118	0.257	8.312	5.024, 13.76				
40 - 44	2.033	0.264	7.640	4.552, 12.81				
45 - 49	1.523	0.271	4.585	2.696, 7.800				
AGE AT FIRST MARRIAGE								
< 15	-	-	1.000	-	-2585.5	27.5	5	<.0001
15 - 17	-0.017	0.101	0.984	0.807, 1.198				
18 - 19	0.278	0.111	1.321	1.062, 1.641				
20 - 21	0.123	0.117	1.131	0.899, 1.422				
22 - 24	0.443	0.119	1.557	1.233, 1.966				
25 +	0.335	0.129	1.397	1.086, 1.800				
YEARS SINCE FIRST MARRIAGE								
0 - 4	-	-	1.000	-	-2501.7	195.1	6	<.0001
5 - 9	1.122	0.110	3.070	1.475, 3.810				
10 - 14	1.373	0.112	3.947	3.169, 4.916				
15 - 19	1.089	0.120	2.970	2.349, 3.759				
20 - 24	1.214	0.128	3.366	2.620, 4.327				
25 - 29	0.929	0.148	2.531	1.894, 3.384				
30 +	0.610	0.167	1.840	1.327, 2.553				
CHILDREN LIVING								
None	-	-	1.000	-	-2336.6	523.4	6	<.0001
1	2.214	0.247	9.150	5.640, 14.85				
2	3.260	0.238	26.06	16.34, 41.53				
3	3.394	0.241	29.77	18.57, 47.77				
4	3.377	0.246	29.29	18.08, 47.43				
5	3.099	0.253	22.18	13.51, 36.41				
6 +	3.042	0.235	20.94	13.22, 33.20				

Table 6.2 (cont.) Univariate logistic regression models for ever use of family planning among ever-married women, QCHS 1987

Socioeconomic Characteristics	Reg. coeff.	Stand Error	Odds Ratio	95% conf. Interval	Log(Like-lihood)	Chi-square	d.f.	P-value*
CHILDREN DEAD								
None	-	-	1.000	-	-2595.1	8.2	4	0.2230
1	0.056	0.112	1.058	0.849, 1.317				
2	0.178	0.207	1.195	0.796, 1.793				
3	-0.594	0.352	0.552	0.277, 1.101				
4 +	-0.915	0.489	0.351	0.154, 1.044				
CHILDREN EVER BORN								
None	-	-	1.000	-	-2115.1	309.5	6	<.0001
1	2.142	0.362	8.519	4.189, 17.31				
2	3.146	0.347	23.24	11.77, 45.88				
3	3.304	0.349	27.23	13.74, 53.95				
4	3.348	0.353	28.45	14.24, 56.82				
5	2.946	0.361	19.03	9.379, 38.61				
6 +	2.905	0.345	18.26	9.289. 35.92				
NATIONALITY								
Qatari	-	-	1.000	-	-2549.3	101.4	2	<.0001
Arabs	0.707	0.075	2.029	1.751, 2.349				
Other nationalities	0.078	0.087	1.081	0.912, 1.282				
REGION OF RESIDENCE								
Doha	-	-	1.000	-	-2561.4	77.1	3	<.0001
Al-Rayyan	-0.694	0.081	0.500	0.426, 0.586				
Al-Wakrah	-0.106	0.129	0.900	0.698, 1.158				
Other regions	-0.359	0.115	0.698	0.557, 0.875				
LEVEL OF EDUCATION								
Illiterate	-	-	1.000	-	-2502.4	195.2	5	<.0001
Literate no schooling and incomplete primary	0.659	0.125	1.932	1.513, 2.469				
Primary	0.621	0.118	1.860	1.477, 2.345				
Preparatory	0.818	0.120	2.266	1.791, 2.867				
Secondary	1.028	0.093	2.794	2.330, 3.354				
University	1.198	0.104	3.313	2.702, 4.063				
CURRENTLY WORKING FOR WAGE								
Not Working	-	-	1.000	-	-2572.4	53.7	1	<.0001
Working	0.632	0.088	1.881	1.583, 2.236				
RELATION TO HUSBAND								
Unrelated	-	-	1.000	-	-2579.2	41.6	1	<.0001
Related	-0.425	0.066	0.654	0.574, 0.744				

\- not applicable

* Chi-Square and the p-value are the statistics to remove the variable from the model.

Non-Qatari Arab women are twice as likely to have ever regulated their family size than Qatari women and women from other nations. Women residing in Al-Rayyan and "other" regions are about half as likely to have ever used family planning than those residing in Doha and Al-Wakrah regions. In addition, women living in consanguineous marriages are about one-third less likely to ever use family planning than women living in non-consanguineous marriages. This summary of results of the univariate logistic regression models does not adjust for the effects of other demographic and socioeconomic factors.

With all p-values for categorical variables, except the number of dead children, less than 0.0001, one would consider the log-likelihood values. The larger the log-likelihood value, the more important the variable in affecting ever use of contraception. From the results depicted in Table 6.2, one concludes that nationality, region of residence, current age, age at first marriage, number of living (or ever born) children, level of education, work status, and consanguinity are the demographic and socioeconomic variables that should demonstrate considerable importance in the multivariate logistic regression model for the ever use of family planning in Qatar.

6.3.2 Multivariate Results

In the previous section the interpretation of an estimated logistic regression coefficient in the case when there is a single variable in the fitted model was discussed. However, fitting a series of univariate models will rarely provide an adequate analysis of the data since the independent demographic and socioeconomic variables are usually not associated with one another and may have different distributions within levels of the ever use of contraception variable. Accordingly, a multivariate logistic regression analysis for a more comprehensive modelling

of the data should be considered. In this case, each estimated regression coefficient provides an estimate of the log odds ratio adjusting for all other variables included in the model, a more realistic situation.

On the basis of the results discussed in section 6.3.1, various multivariate logistic regression models are fitted. In addition to controlling for current age, age at first marriage, and the number of living children (all categorical) variables, Models 1-5 include nationality, region of residence, consanguinity, work status, or mother's level of education, respectively, as independent variables. Table 6.3 presents the results for this series of multivariate models.

For models 1-5, the design variables for nationality, region of residence, consanguinity, work status, and maternal level of education, controlling for her age, age at first marriage, and the number of living children, are all significant. The results for the three control variables in the five models are consistent with expectations. Ever use of contraception first increases with the increase of age and then declines at older age groups, while it increases with the increase in the number of living children and age at first marriage. Once maternal education is included in the model, the design variables of age at first marriage are no longer significant. Accordingly, fertility regulation responses to increases in ages at first marriage are in fact responses to increases in level of education. Women marries at later ages in order to pursue their education.

In addition, Models 6 and 7 show that once maternal education is accounted for, work status and region of residence are no longer significant in affecting fertility regulation. This is not the case with respect to nationality. Model 8, shows that both sets of design variables for maternal education and nationality, controlling for current

Table 6.3 Multivariate logistic regression models for ever use of family planning among ever-married women, QCHS 1987

A . Initial Models

Socioeconomic Characteristics	ESTIMATED COEFFICIENTS FOR THE MULTIVARIATE							
	1	2	3	4	5	6	7	8
CURRENT AGE								
(< 20)								
20 - 24	0.378	0.233	0.308	0.311	0.239	0.242	0.206	0.283
25 - 29	0.923*	0.638*	0.744*	0.709*	0.593*	0.581	0.533	0.711*
30 - 34	1.013*	0.624*	0.755*	0.742*	0.629*	0.610*	0.530	0.793*
35 - 39	0.863*	0.464	0.585	0.602	0.523	0.507	0.420	0.700*
40 - 44	0.833*	0.442	0.575	0.575	0.582	0.564	0.475	0.745*
45 - 49	0.354	-0.076	0.102	0.117	0.326	0.307	0.177	0.446
CHILDREN LIVING								
(None)								
1	2.243*	2.162*	2.170*	2.200*	2.139*	2.144*	2.120*	2.190*
2	3.180*	3.173*	3.137*	3.180*	3.186*	3.196*	3.195*	3.227*
3	3.271*	3.244*	3.310*	3.313*	3.343*	3.346*	3.362*	3.336*
4	3.287*	3.431	3.394*	3.410*	3.600*	3.607*	3.623*	3.548*
5	3.051*	3.272*	3.194*	3.208*	3.574*	3.582*	3.620*	3.486*
6 +	3.215*	3.424*	3.342*	3.356*	3.906*	3.921*	3.960*	3.834*
AGE AT FIRST MARRIAGE								
(< 15)								
15 - 17	0.050	0.136	0.137	0.124	-0.011	-0.007	0.005	-0.038
18 - 19	0.459*	0.511*	0.560*	0.535*	0.185	0.188	0.183	0.171
20 - 21	0.323*	0.431*	0.438*	0.405*	-0.089	-0.086	-0.069	-0.130
22 - 24	0.604*	0.731*	0.756*	0.673*	0.115	0.107	0.123	0.047
25 +	0.544*	0.720*	0.714*	0.599*	0.104	0.087	0.124	0.018
NATIONALITY								
(Qatari)								
Arabs	0.553*	-	-	-	-	-	-	0.271*
Other nationalities	-0.247*	-	-	-	-	-	-	-0.437*
REGION OF RESIDENCE								
(Doha)								
Al-Rayyan	-	-0.689*	-	-	-	-	-0.400*	-
Al-Wakrah	-	-0.121	-	-	-	-	-0.136	-
Other regions	-	-0.371*	-	-	-	-	-0.131	-
RELATION TO HUSBAND								
(Unrelated)								
Related	-	-	-0.390*	-	-	-	-	-
CURRENTLY WORKING FOR WAGE								
(Not Working)								
Working	-	-	-	0.564*	-	0.206	-	-
LEVEL OF EDUCATION								
(Illiterate)								
Incomplete primary	-	-	-	-	0.849*	0.837*	0.794*	0.808*
Primary	-	-	-	-	1.007*	0.995*	0.950*	0.973*
Preparatory	-	-	-	-	1.412*	1.393*	1.332*	1.323*
Secondary	-	-	-	-	1.745*	1.709*	1.645*	1.703*
University	-	-	-	-	1.832*	1.739*	1.737*	1.800*
INTERCEPT	-4.016*	-3.509*	-3.623*	-3.873*	-4.621*	-4.624	-4.400*	-4.667*
Log (Likelihood)	-2240	-2250	-2266	-2265	-2148	-2148	-2139	-2123
Chi-square	777	728	455	450	957	1216	1708	1680
Degree of freedom	572	637	417	393	852	1093	1522	1459
P-value	<.0001	0.007	0.095	0.025	0.007	0.005	0.001	<.0001

Note : Reference category in parentheses

- Variable not included in model.

age, age at first marriage, and the number of living children, are significant, and the model gives the best fit among these eight models presented in Table 6.3. The largest log-likelihood value is observed for model 8. Moreover, the design variables for current age and the number of living children are significant, while all those for the age-at-first-marriage factor are not significant.

In light of the above results, the age-at-first-marriage variable is dropped from the models to be fitted next. Only current age and the number of living children will be included in the following models as controlled variables. Table 6.4 shows the results for four final multivariate logistic models. Various subsets of the socioeconomic variables will be included in each model to test specific assumptions and hypotheses.

Model 9 shows that nationality, region of residence, and consanguinity, when considered together and controlling for age and the number of living children, are significant. However, when maternal education is included in the model, most of the design variables of region of residence and work status are insignificant, while nationality and consanguinity are significant as depicted in models 10, 11, and 12. Adjusted odds ratios indicate that ever use of contraception is doubled for ever-married women aged 20-44, compared to women under age 20 years, then declines for women at higher age groups afterwards. With respect to the number of living children, the likelihood of ever use of contraception increases systematically as the number of living children increases. Almost all regression coefficients for current age and all regression coefficients for the number of living children are significant at least at the 0.05 level. These results increases our faith and confidence in the reliability of the 1987 QCHS data.

Table 6.4 Multivariate logistic regression models for ever use of family planning among ever-married women, QCHS 1987

B . Final Models

Socioeconomic Characteristics	MODEL 9		MODEL 10		MODEL 11		MODEL 12	
	Reg. Coeff.	Odds Ratio	Reg. Coeff.	Odds Ratio	Reg. Coeff.	Odds Ratio	Reg. Coeff.	Odds Ratio
CURRENT AGE								
(< 20)								
20 - 24	0.447	1.563	0.234	1.264	0.306	1.358	0.258	1.295
25 - 29	0.935*	2.547*	0.541	1.719	0.697*	2.008*	0.659*	1.933*
30 - 34	0.924*	2.519*	0.511	1.667	0.731*	2.078*	0.698*	2.009*
35 - 39	0.788*	2.199*	0.400	1.492	0.630*	1.877*	0.606*	1.834*
40 - 44	0.747*	2.111*	0.451	1.570	0.674*	1.961*	0.639*	1.895*
45 - 49	0.211	1.235	0.151	1.163	0.366	1.443	0.285	1.330
CHILDREN LIVING								
(None)								
1	2.193*	8.961*	2.107*	8.221*	2.174*	8.797*	2.176*	8.808*
2	3.181*	24.07*	3.181*	24.08*	3.217*	24.96*	3.246*	25.68*
3	3.256*	25.93*	3.354*	28.61*	3.344*	28.33*	3.366*	28.97*
4	3.283*	26.64*	3.620*	37.35*	3.571*	35.56*	3.573*	35.61*
5	3.120*	22.66*	3.636*	37.93*	3.538*	34.40*	3.549*	34.76*
6 +	3.293*	26.92	3.970*	53.00*	3.893*	40.06*	3.884*	48.62*
NATIONALITY								
(Qatari)								
Arabs	0.552*	1.737*	-	-	0.283*	1.327*	0.240*	1.283*
Other nationalities	-0.354*	0.702*	-	-	-0.449*	0.638*	-0.501*	0.606*
REGION OF RESIDENCE								
(Doha)								
Al-Rayyan	-0.656*	0.519*	-0.370*	0.691*	-	-	-0.472*	0.624*
Al-Wakrah	0.002	1.002	-0.110	0.896	-	-	-0.078	0.925
Other regions	-0.399*	0.671*	-0.135	0.874	-	-	-0.211	0.810
RELATION TO HUSBAND								
(Unrelated)								
Related	-0.314*	0.731*	-0.223*	0.800*	-0.301*	0.740*	-	-
CURRENTLY WORKING FOR WAGE								
(Not working)								
Working	-	-	0.186	1.204	0.184	1.202	-	-
LEVEL OF EDUCATION								
(Illiterate)								
Incomplete primary	-	-	0.767*	2.154*	0.771*	2.162*	0.746*	2.108*
Primary	-	-	0.919*	2.508*	0.928*	2.530*	0.903*	2.466*
Preparatory	-	-	1.317*	3.731*	1.289*	3.629*	1.237*	3.444*
Secondary	-	-	1.610*	5.001*	1.634*	5.125*	1.601*	4.958*
University	-	-	1.642*	5.165*	1.654*	5.230*	1.692*	5.429*
INTERCEPT	-3.461*	0.031	-4.251*	0.014*	-4.487*	0.011*	-4.391*	0.012*
Log (Likelihood)	-2195		-2136		-2116		-2114	
Chi-square	1126		1339		1364		1324	
Degree of freedom	900		1207		1164		1149	
P-value	<.0001		.005		<.0001		<.0001	

Note : Reference category in parentheses

\- Variable not included in model

* Coefficients at least twice their standard errors

When each of the five socioeconomic (i.e., nationality, region, consanguinity, work status, and education) variables was considered in the model one at a time, their regression coefficients were significant at the 0.05 level (Table 6.3). The estimates of the regression coefficient of the design variables for nationality, region of residence, consanguinity, and work status are close to those of the univariate model containing only each one of these variables whether controlling or not for demographic variables. The results, which indicate that the estimates are numerically stable, imply that ever-married women in various regions have very similar distributions according to age and the number of living children. However, this is not the case for mother's levels of education. Estimates of the regression coefficients for education in the models shown in Tables 6.3 and 6.4 after controlling for demographic variables, are different from those of the univariate model containing only mother's education. The implications are that the distributions of ever-married women by age and number of living children are different for different levels of education. Accordingly, level of education may be considered as the most important socio-economic factor that demonstrates considerable effect on ever use of contraception in Qatar. This also is explained by a larger value of the log-likelihood for Model 5, compared to Models 1 - 4, or Models 10 - 12, compared to Model 9.

For Models 11 and 12, which are considered as the best fitted models to the QCHS data and include the most significant socio-economic variables. controlling for age and number of living children, the regression coefficients for the number of living children are higher than those of the univariate model. The net effect of the number of living children in Models 11, and 12 is much higher than in the univariate model, implying highly significant impact on mother's ever use of contraception, even when controlling for other demographic and socioeconomic variables.

The net effect of consanguinity on ever use of contraception in model 5 declined in comparison to the univariate model. In Model 11, the adjusted odds that an ever-married woman living in a consanguineous marriage would be ever user in Qatar are about 26 percent lower than a woman living in a non-consanguineous marriage, compared to 35 percent in the univariate model. Similarly, the adjusted odds that an ever-married working woman would be an ever user of contraception are about 20 percent more than for a non-working woman, compared to 88 percent increase in the univariate model.

On the other hand, adjusted odds ratios for the five design variables of mother's level of education in models 11 and 12, net of the other demographic and socioeconomic variables in the model, are higher than those in the univariate model. Maternal education exerts a more important role in affecting ever use of contraception among women in Qatar, even when other demographic and socioeconomic factors are considered, and in making distinction between ever and never users of family planning.

Interactions between nationality, region of residence, work status, or consanguinity and other variables included in the multivariate model with respect to ever use of contraception will be investigated next. Logistic regression models, in which the two demographic and the other four socioeconomic (other than the variable under consideration) variables are included, were applied for these subgroups separately. Relevant results are presented in Tables 6.5 and 6.6. The three nationality models show that while women at higher age groups have higher chances of ever use of contraception among non-Qatari Arab women and women from other nationalities, ever use decreases systematically with the advance of age among Qatari women. The probability of being an ever user for Qatari women aged 35-44 is about one-third that for young women under 20 years of age.

Table 6.5 Estimated odds ratio in multivariate logistic models for ever use of family planning among ever-married women by nationality and consanguineous marriage, QCHS 1987

Socioeconomic Characteristics	NATIONALITY			CONSANGUINITY	
	Qatari	Arabs	Other	Related	Unrelated
CURRENT AGE					
(< 20)	1.000	1.000	1.000	1.000	1.000
20 - 24	0.493	4.891*	1.787	1.035	1.702
25 - 29	0.529	9.423*	1.804	1.413	2.474*
30 - 35	0.443	12.72*	1.517	1.715	2.147
35 - 39	0.360*	9.546*	1.626	0.993	2.585*
40 - 44	0.375*	11.51*	1.322	1.444	1.070
45 - 49	0.205*	10.14*	1.306	1.127	1.322
CHILDREN LIVING					
(None)	1.000	1.000	1.000	1.000	1.000
1	16.75*	14.21*	1.912	16.26*	6.026*
2	69.23*	43.75*	4.006*	41.58*	19.32*
3	89.62*	61.10*	3.188*	44.45*	24.17*
4	148.00*	76.08*	2.841*	63.86*	28.20*
5	114.00*	102.30*	2.301	75.36*	23.95*
6 +	231.50*	79.21*	3.938*	89.89*	41.14*
NATIONALITY					
(Qatari)				1.000	1.000
Arabs	-	-	-	1.360*	1.236
Others nationalities	-	-	-	0.473*	0.640*
REGION OF RESIDENCE					
(Doha)	1.000	1.000	1.000	1.000	1.000
Al-Rayyan	0.528*	0.627*	0.858	0.472*	0.898
Al-Wakrah	0.586*	1.236	1.237	0.604*	1.185
Other regions	0.564*	1.006	2.724*	0.574*	1.018
RELATION TO HUSBAND					
(Unrelated)	1.000	1.000	1.000		
Related	0.781*	0.899	0.690	-	-
CURRENTLY WORKING FOR WAGE					
(Not Working)	1.000	1.000	1.000	1.000	1.000
Working	1.000	1.006	1.343	1.299	1.186
LEVEL OF EDUCATION					
(Illiterate)	1.000	1.000	1.000	1.000	1.000
Incomplete primary	1.671*	2.461*	2.441*	2.445*	1.740*
Primary	3.133*	2.163*	1.339	2.349*	2.385*
Preparatory	3.391*	4.504*	2.322*	3.556*	2.991*
Secondary	5.797*	5.276*	2.428*	3.610*	5.341*
University	6.633*	5.852*	2.250*	5.667*	4.529*
INTERCEPT	0.019*	0.002*	0.105	0.010	0.014
Log (Likelihood)	-793	-709	-530	-911	-1173
Chi-square	653	715	552	854	1168
Degree of freedom	650	721	408	790	1010
P-value	0.460	0.555	<.0001	0.057	<.0001

Note : Reference category in parentheses
- Variable not included in model
* Coefficients at least twice their standard errors

However, impacts of the increase in the number of living children and in the level of education on ever use of family planning among Qatari women are much higher than those for Arab women or women from other nationalities, especially at higher birth orders or at higher levels of education. Increases in the ever use of contraception due to work for wage are only significant among women from other nationalities. Being a working mother has no impact on fertility regulation among Qatari and other Arab women.

The adjusted odds ratio of ever use of family planning for women living in consanguineous marriages decreases for women residing in Al-Rayyan, Al-Wakrah, and "other" regions by about one-half than those residing in Doha, while for women living in non-consanguineous marriages the chances of being an ever user are about the same in all regions. Nationality and work status do not show significant interactions with consanguinity with respect to fertility regulation. the adjusted odds ratios of mother's education are very similar whether she lives in a consanguineous marriage or not. The only exception is that being literate with no schooling or with incomplete primary education increases the odds of ever use of family planning significantly by about 145 percent over those who are illiterate if a woman lives in a consanguineous marriage, compared to only 74 percent more if she lives in a non-consanguineous marriage.

Table 6.6 presents the modelling results for the four regions of residence and the two work status variables. For the multivariate models for regions of residence, adjusted odds indicate that consanguinity has a net negative impact on ever use of contraception in all regions except in Doha. Being related to her husband reduces the adjusted odds for a woman of ever use of contraception by about one-half in all regions except Doha in which there are no significant differences between consanguineous and non-consanguineous marriages

Table 6.6 Estimated odds ratio in multivariate logistic models for ever use of family planning among ever-married women by region of residence and work for wage, QCHS 1987

Socioeconomic Characteristics	REGION OF RESIDENCE				WORK FOR WAGE	
	Doha	Al-Rayyan	Al-Wakrah	Other	Working	Not working
CURRENT AGE						
(< 20)	1.000	1.000	1.000	1.000	1.000	1.000
20 - 24	1.273	1.258	14.45	1.604	0.835	1.302
25 - 29	1.929	1.685	33.25	1.174	1.038	1.917*
30 - 35	2.121	1.499	20.94	1.235	0.713	2.092*
35 - 39	2.036	1.368	26.27	0.703	0.825	1.767
40 - 44	1.832	1.815	20.67	1.047	0.868	1.831
45 - 49	1.350	1.038	17.15	0.623	0.612	1.270
CHILDREN LIVING						
(None)	1.000	1.000	1.000	1.000	1.000	1.000
1	6.859*	11.15*	24.36*	22.01*	4.374*	12.24*
2	23.38*	28.79*	16.36*	86.12*	13.25*	35.19*
3	23.40*	38.82*	35.92*	114.4*	14.71*	41.30*
4	27.77*	60.72*	39.53*	125.3*	20.20*	49.41*
5	24.47*	65.80*	150.0*	127.0*	19.27*	49.01*
6 +	35.63*	89.76*	53.31*	227.2*	32.14*	68.44*
NATIONALITY						
(Qatari)	1.000	1.000	1.000	1.000	1.000	1.000
Arabs	1.149	1.133	2.275*	1.715	1.843*	1.215
Others nationalities	0.479*	0.619	0.890	2.205	0.880	0.549*
REGION OF RESIDENCE						
(Doha)					1.000	1.000
Al-Rayyan	-	-	-	-	1.314	0.594*
Al-Wakrah	-	-	-	-	0.749	0.967
Other regions	-	-	-	-	0.682	0.824
RELATION TO HUSBAND						
(Unrelated)	1.000	1.000	1.000	1.000	1.000	1.000
Related	0.972	0.547*	0.407*	0.624	0.852	0.767*
CURRENTLY WORKING FOR WAGE						
(Not Working)	1.000	1.000	1.000	1.000		
Working	1.138	2.750*	1.003	0.618	-	-
LEVEL OF EDUCATION						
(Illiterate)	1.000	1.000	1.000	1.000	1.000	1.000
Incomplete primary	2.010*	2.396*	1.079	2.699*	2.609	2.005*
Primary	2.400*	1.846*	2.188	3.972*	2.841	2.365*
Preparatory	3.199*	3.539*	3.743*	2.939*	2.296	3.568*
Secondary	4.362*	4.994*	2.842	7.811*	4.511*	4.680*
University	4.291*	4.937*	2.392	12.12*	4.402*	5.046*
INTERCEPT	0.018*	0.008*	0.001*	0.004*	0.050*	0.011*
Log (Likelihood)	-1277	-458	-148	-188	-370	-1724
Chi-square	1099	437	216	243	464	1580
Degree of freedom	932	430	176	222	379	1421
P-value	<.0001	0.403	0.021	0.161	0.002	0.002

Note : Reference category in parentheses
- Variable not included in model
* Coefficients at least twice their standard errors

with respect to fertility regulation in Qatar. In the meantime, the odds of ever use of contraception for working mothers are significant and more than doubled compared to those for non-working mothers in Al-Rayyan region, while they are not significant in the other regions.

Maternal education increases the adjusted odds of ever use of contraception, especially for women with at least a primary certificate. Largest increases are observed for those women residing in the "other" region, while the increases are non-significant in Al-Wakrah region. In general, increases in the adjusted odds of ever use of family planning as a result of increasing education levels are much higher than those observed for the impact of work or living in non-consanguineous marriage in all four regions of residence.

The adjusted odds ratios for the two multivariate models for working and non-working mothers with respect to nationality, region of residence, consanguinity, and level of education do not show any significant interactions between work status and other socio-economic variables. The only exception is that working mothers are 31 percent more likely to be ever users of contraception if they reside in Al-Rayyan region when compared to Doha, while for non working mothers the situation is reversed. Non working mothers residing in Al-Rayyan are about 40 percent less likely to be ever users than those residing in Doha.

6.4 CURRENT USE OF CONTRACEPTION

Following the same methodology similar to that adopted for ever use of contraception in the previous section, we begin with a discussion of the univariate and bivariate results of current use of contraception to

be succeeded by the multivariate results. The analyses are applied to the 3621 currently married women interviewed in the 1987 QCHS sample.

6.4.1 Univariate and Bivariate Results

Table 6.7 shows the contraceptive prevalence rate among currently married women by nationality and region of residence according to selected demographic and socioeconomic variables. The percentage of contraceptive use becomes less favourable as one moves closer to the actual practice of family planning. Much lower rates of current use of contraception are observed compared to those of ever use. For all Qatar, About 32.4 percent of currently married women aged 25-49 years are currently practising family planning. By nationality, women from Arab countries (other than Qatar) have higher contraceptive prevalence rates (38.1 percent), than Qatari women (26.4 percent) or women from other nationalities (32.1 percent). Current use of contraception is about 37.0 percent among women residing in Doha, compared to 33.8 percent among those residing in Al-Wakrah region. The proportions for the other two regions are 22.3 and 25.6 percent for Al-Rayyan and "other" regions, respectively.

Highest prevalence rates are observed for currently married women aged 30-39 years, married at least at age 18 years, not related to their husbands, with 3-4 living children, with at least a secondary certificate, or currently working for wage. It seems that for a relatively less developed regions with socioeconomic characteristics unfavourable to fertility regulation, women's socioeconomic status have highly significant effect on contraceptive use, while in the case where the region is relatively more developed and its characteristics are favourable to fertility regulation, women's socioeconomic status does not have the same significant effect conducive to use of contraception as in

Table 6.7 Current use of family planning by region of residence and nationality according to selected demographic and socio-economic factors among currently married women, QCHS 1987

Selected Socio-economic Factors	NATIONALITY			REGION OF RESIDENCE				TOTAL
	Qatari	Arabs	Other	Doha	Al-Rayyan	Al-Wakrah	Other	
I DEMOGRAPHIC FACTORS								
CURRENT AGE								
< 20	16.92	3.85	12.50	13.79	6.78	0.00	30.00	11.28
20 - 24	17.77	17.83	22.62	22.68	10.43	25.00	14.58	18.53
25 - 29	28.08	33.04	35.71	36.13	22.06	35.00	25.71	31.74
30 - 34	32.93	50.90	35.75	45.52	34.51	32.20	30.26	41.15
35 - 39	32.63	48.83	37.43	44.97	30.71	41.67	33.33	40.65
40 - 44	31.72	51.92	25.71	42.17	28.57	42.42	27.27	37.93
45 - 49	16.90	26.51	15.38	22.99	12.77	18.75	11.11	19.70
AGE AT FIRST MARRIAGE								
< 15	31.16	31.20	27.03	35.20	23.60	29.41	27.40	30.39
15 - 17	25.17	31.30	26.32	33.20	21.31	35.29	13.46	27.59
18 - 19	31.31	39.47	32.68	39.29	17.16	40.68	44.19	35.07
20 - 21	21.08	38.56	31.06	35.59	24.56	23.26	21.62	31.27
22 - 24	23.42	43.07	36.17	40.53	21.54	32.35	33.33	36.99
25 +	12.31	45.15	40.68	39.58	33.33	39.29	31.82	38.30
YEARS SINCE FIRST MARRIAGE								
0 - 4	16.78	16.55	17.88	19.85	9.15	16.28	17.39	16.82
5 - 9	28.83	37.47	37.44	40.86	22.96	32.61	27.87	35.10
10 - 14	29.29	48.38	38.86	43.40	27.70	51.52	38.03	40.55
15 - 19	28.64	48.69	26.28	43.00	25.98	30.19	16.67	35.12
20 - 24	35.93	46.98	30.63	43.93	31.68	29.41	32.08	38.41
25 - 29	32.09	35.14	21.95	38.62	21.88	33.33	12.00	31.33
30 +	17.80	33.33	23.08	22.22	18.18	33.33	14.29	21.34
CHILDREN LIVING								
None	0.00	0.76	9.43	2.96	0.00	0.00	0.00	1.71
1	18.52	15.38	25.86	20.79	10.14	25.00	22.22	19.41
2	31.36	40.53	42.41	44.61	19.83	38.18	31.11	38.90
3	32.39	48.74	42.95	49.34	22.12	45.24	37.50	43.13
4	36.00	50.47	26.88	44.98	33.33	41.03	31.03	41.16
5	27.05	50.83	22.88	39.75	26.83	60.00	36.36	36.36
6 +	31.57	40.89	23.57	38.43	29.15	32.79	21.05	32.92
CHILDREN DEAD								
None	26.18	38.32	33.16	37.27	22.03	34.47	26.57	32.75
1	29.81	41.27	21.15	39.67	23.71	23.81	26.57	32.74
2	32.43	25.71	30.77	34.16	25.93	42.86	10.00	29.41
3 +	10.34	23.08	10.00	10.00	20.00	33.33	11.11	13.46
CHILDREN EVER BORN								
None	0.00	0.78	9.80	3.05	0.00	0.00	0.00	1.75
1	17.69	15.07	25.86	20.52	8.96	25.81	23.08	19.13
2	31.93	40.00	42.40	43.79	21.74	37.50	32.58	38.78
3	29.50	49.06	42.86	49.34	18.81	43.90	36.36	42.50
4	37.50	52.36	29.27	46.15	36.96	51.61	32.26	43.48
5	27.93	45.53	18.75	39.74	25.00	31.25	30.00	34.04
6 +	31.42	41.01	23.84	38.16	28.57	34.38	22.76	33.02

Table 6.7 (cont.) Current use of family planning by region of residence and nationality according to selected demographic and socioeconomic factors among currently married women, QCHS 1987

Selected Socio-economic Factors	NATIONALITY			REGION OF RESIDENCE				TOTAL
	Qatari	Arabs	Other	Doha	Al-Rayyan	Al-Wakrah	Other	
II SOCIOECONOMIC FACTORS								
NATIONALITY								
Qatari	-	-	-	33.91	20.09	23.53	17.37	26.44
Arabs	-	-	-	41.70	28.32	38.64	31.78	38.13
Other	-	-	-	32.83	15.50	38.71	59.26	32.08
REGION OF RESIDENCE								
Doha	33.91	41.70	32.83	-	-	-	-	37.03
Al-Rayyan	20.09	28.32	15.60	-	-	-	-	22.33
Al-Wakrah	23.53	38.64	38.71	-	-	-	-	33.83
Other regions	17.37	31.78	59.26	-	-	-	-	25.62
LEVEL OF EDUCATION								
Illiterate	20.76	19.77	17.04	25.04	14.80	33.33	11.72	19.76
Incomplete primary	26.44	26.53	33.33	30.73	18.75	20.00	34.09	27.55
Primary	34.88	33.82	25.00	36.32	26.32	31.25	29.73	32.71
Preparatory	31.75	39.04	40.00	39.92	29.73	41.38	18.18	36.68
Secondary	29.93	44.30	38.59	42.54	28.71	35.53	40.54	40.17
University	32.26	50.17	41.53	43.01	52.48	34.00	54.05	43.89
CURRENTLY WORKING FOR WAGE								
Working	32.80	51.51	39.43	42.89	45.24	46.67	38.30	43.03
Not working	25.43	34.64	30.11	35.31	19.76	32.20	23.47	30.02
RELATION TO HUSBAND								
Related	23.33	32.69	24.09	35.47	16.64	26.36	18.18	27.02
Unrelated	30.15	42.20	38.05	37.97	32.55	39.10	32.35	36.77
TOTAL	26.44	38.13	32.08	37.03	22.33	33.83	26.62	32.39

- not applicable

relatively less developed regions. Maternal education, work status, and consanguineous factors have more discriminating power with respect to contraceptive use in Al-Rayyan and "other" regions, compared to Al-Wakrah region and, especially to Doha region.

Another important dimension of family planning relates to the extent to which couples maintain their use of modern contraceptives over time, and measured in terms of "continuation rates". Variations in continuation can result in misleading comparisons of contraceptive prevalence rates among different sub-populations. For example,

relatively low prevalence rates associated with low discontinuation rates might represent a more desirable situation than higher prevalence rates associated with high discontinuation rates. The net outcome of prevalence rates and discontinuation rates is the woman/years protection by contraceptive use. It is the increase in this protection that is the objective of family planning practice. It is necessary to compile information on continuation rates as well.

A rough measure of continuation rates is the ratio of current to ever use of contraception. Table 6.8 shows the continuation rates of family planning by nationality and region of residence according to selected demographic and socioeconomic factors. The ratios indicate that the continuation rate for all Qatar is about 63 percent. The rate is higher for women from other nationalities (69.2 percent), compared to that for Qatari women (59.3 percent) and Arab women (61.6 percent). The continuation rate for Al-Rayyan and "other" regions is low (56.4 and 53.7 percent, respectively) compared to the other two regions (65.3 and 62.6 percent for Doha and Al-Wakrah regions, respectively).Thus, the gap between the percentages of woman/years protected in Al-Rayyan and "other" regions compared to the other two regions is even wider than the gap of prevalence rates alone.

In general, continuation rates are high for women in the age group 30-44 years, working women, women in non-consanguineous marriages, or women with at least a primary education. Reasons for contraception discontinuation may include unreliable or poorly accessible supply, non-existence of social or official support for users, beliefs about the danger of specific contraceptive methods, and cultural and religious beliefs and attitude. These finding suggest that with development and increasing levels of education and awareness, contraceptive prevalence rates will increase and discontinuation rates will decrease among women in Qatar, and fertility regulation will contribute to the health and well being of the mother and the child.

Table 6.8 Continuation rates of family planning by region of residence and nationality according to selected demographic and socioeconomic factors, QCHS 1987

Selected Socio-economic Factors	NATIONALITY			REGION OF RESIDENCE				TOTAL
	Qatari	Arabs	Other	Doha	Al-Rayyan	Al-Wakrah	Other	
I. DEMOGRAPHIC FACTORS								
CURRENT AGE								
< 20	74.44	100.00	66.57	79.99	58.10	-	100.00	75.55
20 - 24	58.40	53.96	54.28	60.03	43.49	80.00	39.70	55.88
25 - 29	55.02	52.43	75.58	62.25	47.49	53.85	51.42	57.75
30 - 34	61.06	68.28	73.47	69.62	70.44	60.38	53.43	67.75
35 - 39	64.64	67.27	74.86	69.78	67.14	66.25	65.67	68.70
40 - 44	64.24	69.96	58.69	68.86	57.74	72.12	58.05	66.22
45 - 49	49.24	40.68	37.10	46.72	35.76	48.21	31.48	44.29
AGE AT FIRST MARRIAGE								
< 15	63.58	62.89	65.81	66.20	60.73	55.72	61.12	63.63
15 - 17	55.26	59.21	64.67	60.52	57.21	66.76	36.86	58.38
18 - 19	65.20	61.00	68.95	66.47	45.32	80.05	59.79	63.97
20 - 21	54.08	60.27	71.93	65.85	59.35	45.47	43.24	61.52
22 - 24	58.55	60.84	70.36	66.03	46.55	52.38	62.50	62.93
25 +	53.08	67.24	72.86	68.86	67.99	64.72	66.53	68.32
YEARS SINCE FIRST MARRIAGE								
0 - 4	64.61	51.83	52.34	58.85	48.34	50.00	64.22	57.02
5 - 9	59.43	58.92	73.15	67.66	52.11	53.57	49.37	62.54
10 - 14	52.28	65.19	78.06	65.23	60.87	80.27	58.21	65.38
15 - 19	56.57	69.61	60.88	67.88	60.31	56.22	40.39	63.44
20 - 24	67.83	63.05	67.87	67.50	63.97	57.18	65.27	65.87
25 - 29	66.34	57.30	50.00	66.94	53.92	56.66	32.40	61.07
30 +	48.95	48.14	53.85	50.20	42.42	66.66	39.30	49.20
CHILDREN LIVING								
None	-	25.42	39.18	35.20	-	-	-	32.08
1	63.56	41.64	61.75	54.55	50.02	45.83	78.99	54.63
2	60.72	60.29	70.90	65.55	52.46	69.99	54.15	63.90
3	58.52	64.68	82.23	72.44	46.36	67.08	59.09	67.46
4	60.57	66.04	64.09	66.64	51.43	63.12	52.75	64.47
5	57.54	65.81	73.55	64.59	55.54	75.00	72.72	63.85
6 +	58.32	60.50	60.86	63.21	60.02	59.02	40.79	59.36
CHILDREN DEAD								
None	59.04	62.28	70.52	65.94	56.78	63.11	54.42	63.35
1	64.47	61.67	50.95	64.64	58.45	58.20	56.09	61.67
2	66.33	40.11	53.85	53.50	50.24	64.29	36.67	52.41
3 +	25.46	60.01	100.00	35.55	50.00	49.18	27.78	38.96
CHILDREN EVER BORN								
None	-	34.06	39.20	39.25	-	-	-	35.35
1	60.07	39.29	63.03	53.23	46.09	44.45	79.50	53.23
2	61.45	60.31	71.32	65.68	54.80	70.00	54.27	64.19
3	55.77	65.25	79.81	71.54	42.42	67.41	62.33	67.07
4	60.44	67.68	68.58	67.49	64.16	71.80	51.32	65.99
5	63.62	64.97	64.28	69.02	58.78	50.00	60.00	64.62
6 +	58.23	59.43	61.19	62.26	58.12	61.33	44.53	59.03

Table 6.8 (cont.) Continuation rates of family planning by region of residence and nationality according to selected demographic and socioeconomic factors, QCHS 1987

Selected Socio-economic Factors	NATIONALITY			REGION OF RESIDENCE				TOTAL
	Qatari	Arabs	Other	Doha	Al-Rayyan	Al-Wakrah	Other	
II. SOCIOECONOMIC FACTORS								
NATIONALITY								
Qatari	-	-	-	64.39	55.93	58.49	43.72	59.26
Arabs	-	-	-	63.53	57.43	59.25	54.12	61.62
Other	-	-	-	70.09	51.52	69.24	87.33	69.15
REGION OF RESIDENCE								
Doha	64.39	63.53	70.09	-	-	-	-	65.33
Al-Rayyan	55.93	57.43	51.52	-	-	-	-	56.35
Al-Wakrah	58.49	59.25	69.24	-	-	-	-	62.60
Other regions	43.72	54.1	87.33	-	-	-	-	53.65
LEVEL OF EDUCATION								
Illiterate	56.51	50.36	55.81	60.65	49.19	74.07	35.38	54.71
Incomplete primary	53.73	45.28	65.38	54.37	44.46	42.00	62.09	52.77
Primary	64.28	63.07	65.38	64.73	65.80	60.68	56.63	63.80
Preparatory	66.91	61.49	75.86	67.43	65.24	66.67	34.85	65.30
Secondary	60.26	64.41	71.04	68.11	52.38	60.80	63.24	65.59
University	59.06	66.23	74.92	66.66	75.65	58.62	70.82	67.32
CURRENTLY WORKING FOR WAGE								
Working	59.51	68.15	70.50	67.08	63.91	80.38	62.24	66.84
Not working	59.25	59.43	68.71	64.72	54.74	60.15	51.71	61.42
RELATION TO HUSBAND								
Related	57.66	57.28	68.05	64.18	49.29	60.79	46.27	59.00
Unrelated	61.18	64.49	69.61	66.02	65.51	63.43	58.48	65.16
TOTAL	59.26	61.62	69.15	65.33	58.35	62.60	53.65	62.65

- not applicable

Next, univariate logistic regression of each independent variable is conducted in order to select those demographic and socioeconomic variables that show considerable importance in the multivariate analysis. As in the case of ever use, univariate models for both continuous and categorical variables are applied. Table 6.9 shows the results of these models. Again, for continuous variables, the number of children dead and years since first marriage are not significant at the 0.001 level. Current age, age at first marriage, and number of living (ever born) children have shown some association with the current use of contraception.

Table 6.9 Univariate logistic regression models for current use of family planning among currently married women, QCHS 1987

Socioeconomic Characteristics	Reg. Coeff.	Stand. Error	Odds Ratio	95% Cont. Interval	Log(like-lihood)	Che-square	d.f.	P - P-value
I. INTERVAL (CONTINUOUS) VARIABLES								
Age	0.025	0.005	1.025	1.015, 1.035	-2306.4	29.7	1	<.0001
Age at first marriage	0.036	.00815	1.037	1.020, 1.053	-2311.6	19.3	1	<.0001
Years since first marriage	0.011	0.004	1.011	1.003, 1.019	-2317.8	7.0	1	<.0081
Children living	0.070	0.012	1.073	1.048, 1.098	-2305.1	32.4	1	<.0001
Children dead	-0.172	0.065	0.842	0.741, 0.956	-2317.5	7.6	1	<.0060
Children ever born	0.055	0.011	1.056	1.034, 1.080	-2310.0	22.6	1	<.0001
II. CATEGORICAL VARIABLES								
CURRENT AGE								
< 20	-	-	1.000	-	-2229.5	161.4	6	<.0001
20 - 24	0.611	0.303	1.843	1.017, 3.336				
25 - 29	1.336	0.292	3.804	2.146, 6.742				
30 - 34	1.711	0.291	5.536	3.129, 9.790				
35 - 39	1.705	0.294	5.502	3.092, 9.789				
40 - 44	1.556	0.300	4.737	2.633, 8.534				
45 - 49	0.590	0.321	1.805	0.962, 3.384				
AGE AT FIRST MARRIAGE								
< 15	-	-	1.000	-	-2306.5	29.7	5	<.0001
15 - 17	-0.086	0.114	0.918	0.734, 1.147				
18 - 19	0.270	0.121	1.310	1.033, 1.661				
20 - 21	0.112	0.128	1.119	0.870, 1.437				
22 - 24	0.386	0.127	1.470	1.147, 1.887				
25 +	0.423	0.136	1.526	1.169, 1.993				
YEARS SINCE FIRST MARRIAGE								
0 - 4	-	-	1.000	-	-2255.8	131.0	6	<.0001
5 - 9	0.977	0.127	2.658	2.071, 3.407				
10 - 14	0.210	0.127	3.354	2.615, 4.301				
15 - 19	0.954	0.137	2.595	1.985, 3.396				
20 - 24	0.080	0.143	2.944	2.225, 3.897				
25 - 29	0.740	0.170	2.096	1.502, 2.925				
30 +	0.133	0.214	1.142	0.142, 1.737				
CHILDREN LIVING								
None	-	-	1.000	-	-2147.8	324.9	6	<.0001
1	2.158	0.354	8.656	4.324, 17.32				
2	3.170	0.339	23.80	12.25, 46.27				
3	3.342	0.341	28.26	14.49, 55.17				
4	3.248	0.344	25.73	13.12, 50.51				
5	3.031	0.352	20.72	10.30, 41.30				
6 +	2.901	0.338	18.18	9.379, 35.29				

Table 6.9 (cont.) Univariate logistic regression models for current use of family planning among currently married women, QCHS, 1987

Socioeconomic Characteristics	Reg. Coeff.	Stand. Error	Odds Ratio	95% Cont. Interval	Log(like-lihood)	Che-square	d.f.	P - P-value
CHILDREN DEAD								
None	-	-	1.000	-	-2315.4	11.7	4	0.0197
1	-0.008	0.121	0.992	0.783, 1.258				
2	-0.211	0.238	0.809	0.508, 1.291				
3	-1.032	0.484	0.356	0.138, 0.920				
4 +	-1.433	0.745	0.239	0.055, 1.028				
CHILDREN EVER BORN								
None	-	-	1.000	-	-2115.1	309.5	6	<.0001
1	2.142	0.362	8.519	4.189, 17.33				
2	3.146	0.347	23.24	11.76, 45.91				
3	3.304	0.349	27.23	13.75, 53.95				
4	3.348	0.353	28.45	14.25, 56.79				
5	2.946	0.361	19.03	9.382, 38.61				
6 +	2.905	0.345	18.26	9.284, 35.93				
NATIONALITY								
Qatar	-	-	1.000	-	-2280.4	59.7	2	<.0001
Arabs	0.625	0.082	1.869	1.591, 2.194				
Other nationalities	0.357	0.097	1.429	1.182, 1.728				
REGION OF RESIDENCE								
Doha	-	-	1.000	-	-2272.5	75.5	3	<.0001
Al-Rayyan	-0.726	0.094	0.484	0.402, 0.582				
Al-Wakrah	-0.134	0.137	0.875	0.669, 1.144				
Other regions	-0.604	0.134	0.547	0.420, 0.711				
LEVEL OF EDUCATION								
Illiterate	-	-	1.000	-	-2225.7	168.9	5	<.0001
Incomplete primary	0.462	0.145	1.588	1.195, 2.109				
Primary	0.703	0.133	2.021	1.556, 2.621				
Preparatory	0.887	0.131	2.428	1.878, 3.139				
Secondary	1.057	0.103	2.877	2.352, 3.521				
University	1.217	0.111	3.376	2.717, 4.198				
CURRENTLY WORKING FOR WAGE								
Not working	-	-	1.000	-	-2290.4	39.7	1	<.0001
Working	0.559	0.088	1.748	1.472, 2.078				
RELATION TO HUSBAND								
Unrelated	-	-	1.000	-	-2291.5	37.3	1	<.0001
Related	-0.439	0.072	0.665	0.569, 0.742				

- not applicable

* Chi-square and p-value are the statistics to remove the variable from the model.

On the other hand, with the exception of the number of dead children, all categorical variables are highly associated with current use of family planning. The associations are very similar to those for the ever use of contraception. Still the number of ever born (living) children, level of education, nationality, region of residence, current age, and work status are key factors responsible for increasing the odds of contraception in Qatar. Noting that a higher model log likelihood reflect a better fit of the model to the data, the results suggests that univariate logistic regression models for current use of contraception show much better fit than those for ever use of contraception. One explanation for this is that ever use of contraception, especially among divorced and widowed women, was only for a short period of time with no great bearing on the socioeconomic and demographic differentials.

6.4.2 Multivariate Results

The results for current use of contraception are very similar to those of the ever use of contraception because the number of currently married women (3621 women) represent about 96 percent of the number of ever-married women (3770 women). The first step in building multivariate logistic regression models was to test the statistical significance of each of the five socioeconomic explanatory variables controlling for woman's current age and the number of living children (trivariate models 1-5). We tested the additional contribution of each socioeconomic variable to models containing the two controlled demographic variables. None of the five socioeconomic variables, i.e. nationality, region of residence, consanguinity, work status, or level of education, failed to pass this test. Almost all regression coefficients were significant at least at the 0.05 level, as shown in Table 6.10.

Table 6.10 Multivariate logistic regression models for current use of family planning among currently married women, QCHS 1987

A. PRELIMINARY INVESTIGATION

Characteristics	ESTIMATED COEFFICIENTS FOR THE MULTIVARIATE MODEL							
	1	2	3	4	5	6	7	8
CURRENT AGE								
(< 20)								
20 - 24	0.040	-0.771	0.019	0.014	-0.272	-0.327	-0.326	-0.326
25 - 29	0.498	0.299	0.429	0.367	-0.074	-0.159	-0.169	-0.169
30 - 34	0.815*	0.565	0.713*	0.664*	0.198	0.070	0.052	0.032
35 - 39	0.787*	0.542	0.675*	0.647*	0.184	0.052	0.035	-0.001
40 - 44	0.717*	0.457	0.613	0.570	0.164	0.017	-0.211	-0.031
45 - 49	0.165	-0.496	-0.288	-0.317	-0.548	-0.744*	-0.764*	-0.796*
CHILDREN LIVING								
(None)								
1	2.140*	2.091*	2.106*	2.133*	2.086*	2.060*	2.063*	2.045*
2	2.946*	2.963*	2.939*	2.984*	3.004*	3.006*	3.013*	2.993*
3	3.064*	3.131*	3.102*	3.118*	3.209*	3.232*	3.234*	3.234*
4	2.948*	3.062*	3.020*	3.058*	3.331*	3.364*	3.369*	3.377*
5	2.730*	2.874*	2.801*	2.846*	3.342*	3.402*	3.412*	3.427*
6 +	2.672*	2.813*	2.721*	2.776*	3.539*	3.616*	3.630*	3.655*
NATIONALITY								
(Qatari)								
Arabs	0.402*	-	-	-	-	-	-	-
Other nationalities	0.025	-	-	-	-	-	-	-
REGION OF RESIDENCE								
(Doha)								
Al-Rayyan	-	-0.710*	-	-	-	-0.464*	-0.465*	-0.428*
Al-Wakrah	-	-0.191	-	-	-	-0.173	-0.157	-0.170
Other regions	-	-0.590*	-	-	-	-0.393*	-0.396*	-0.391*
RELATION TO HUSBAND								
(Unrelated)								
Related	-	-	-0.400*	-	-	-	-	-0.243*
CURRENTLY WORKING FOR WAGE								
(Not working)								
Working	-	-	-	0.489*	-	-	0.133	-
LEVEL OF EDUCATION								
(Illiterate)								
Incomplete primary	-	-	-	-	0.489*	0.421*	0.411*	0.397*
Primary	-	-	-	-	0.919*	0.847*	0.839*	0.821*
Preparatory	-	-	-	-	1.221*	1.116*	1.104*	1.103*
Secondary	-	-	-	-	1.478*	1.256*	1.329*	1.327*
University	-	-	-	-	1.586*	1.483*	1.417*	1.442*
INTERCEPT	-4.103*	-3.670*	-3.705*	-3.970*	-4.679*	-4.381*	4.380*	0.428*
Log (Likelihood)	-2064	-2047	-2064	-2065	-1981	-1969	-1969	-1965
Chi-square	180	148	112	91	242	691	921	1037
Degree of freedom	122	158	78	76	224	619	812	959
P-value	0.001	0.697	0.007	0.109	0.199	0.023	0.005	0.040

Note : Reference category in parentheses
- Variable not included in model
* Coefficients at least twice their standard errors

Maternal education was found again to be the most important predictor of current use of contraception in Qatar. Highest log-likelihood value is observed for Model 5 which contains the five education design variables in addition to the two controlled demographic variables. The inclusion of level of education increases dramatically the relative odds of contracepting for higher order parities.

Models 6 to 8 combine several combinations of socioeconomic factors with the two controlled demographic variables into a single equation and show the odds of current use of family planning in Qatar. Comparisons of these models with the five trivariate models indicate that the differentials of region of residence, consanguinity, and work status are reduced most by controlling for mother's education. Largest increases in the adjusted odds of contraception were observed among women with higher parities of four or more living children. This means that part of the difference in current use of contraception among women with different family sizes is a feature of mother's level of education.

In the light of the above preliminary investigations, four final multivariate logistic models were fitted using various subsets of the socioeconomic variables controlling for current age and number of living children. The results presented in Table 6.11 allow for the discussion of several hypotheses.

Model 9 shows that once maternal education and consanguinity are considered, nationality and work status are not significant in affecting current contraceptive use in Qatar. This is not true for region of residence. Women residing in Al-Rayyan and "other" regions have lower contraception prevalence rates than women residing in Doha and Al-Wakrah regions, even after controlling for mother's level of

education and various combinations of nationality, consanguinity, and work status (Models 10,11, and 12). In addition, when consanguinity is not controlled, women from other nationalities have lower prevalence rates (Models 10 and 12).

Investigations of the interactions between nationality, region of residence, work status, or consanguinity and other variables with respect to current use of contraception are conducted. Logistic regression models, in which the two demographic and the other four socioeconomic (other than the variable under sub-consideration) variables are included, are fitted to each sub-population as shown in Tables 6.12 and 6.13. the results with respect to nationality are similar to those for ever use of contraception. Women at higher age groups have higher chances of current use of contraception among Arab women from other nationalities. In addition, the results indicate that current use decreases systematically with the advance of age among Qatari women. Qatari women aged under 20 years are almost three times as likely to use contraception than women ages 20-44 years.

Interactions between region of residence or work status and nationality with respect to current contraceptive use are evident. While Qatari and Arab women residing in Doha have higher prevalence rates than those residing in Al-Wakrah and "other" regions, the relationships are reversed among women from other nationalities. Similarly, working Qatari women have slightly lower prevalence rates than non-working Qatari women, while the opposite is true among Arab women and women from other nationalities. No significant interactions are observed between nationality and consanguinity or mother's level of education with respect to current contraceptive use in Qatar.

Table 6.11 Multivariate logistic regression models for current use of family planning among currently married women, QCHS 1987

B. FINAL MODELS

Socioeconomic Characteristics	MODEL 9		MODEL 10		MODEL 11		MODEL 12	
	Reg. Coeff.	Odds Ratio	Reg. Coeff.	Odds Ratio	Reg. Coeff.	Odds Ratio	Reg. Coeff.	Odds Ratio
CURRENT AGE								
(< 20)								
20 - 24	-0.255	0.775	-0.317	0.729	-0.325	0.722	-0.315	0.730
25 - 29	-0.575	0.944	-0.123	0.884	-0.177	0.838	-0.132	0.876
30 - 34	0.189	1.208	0.126	1.134	-0.019	1.019	0.109	1.115
35 - 39	0.165	1.179	0.116	1.123	-0.013	0.987	0.099	1.104
40 - 44	0.143	1.154	0.074	1.077	-0.045	0.956	0.055	1.056
45 - 49	-0.597	0.550	-0.714	0.490	-0.810*	0.445	-0.733*	0.481
CHILDREN LIVING								
(None)								
1	2.085*	8.045*	2.087*	8.058*	2.047*	7.746*	2.088*	8.069*
2	3.006*	20.20*	3.033*	20.76*	2.999*	20.06*	3.038*	20.87*
3	3.206*	24.67*	3.239*	25.51*	3.235*	25.41*	3.240*	25.53*
4	3.327*	27.85*	3.351*	28.53*	3.380*	29.38*	3.355*	28.64*
5	3.340*	28.21*	3.372*	29.13*	3.434*	30.99*	3.380*	29.38*
6 +	3.561*	35.19*	3.584*	36.00*	3.664*	39.03*	3.596*	36.47*
NATIONALITY								
(Qatari)								
Arabs	0.061	1.063	0.023	1.023	-	-	0.030	1.031
Other nationalities	-0.190	0.827	-0.252*	0.777*	-	-	-0.243*	0.784*
REGION OF RESIDENCE								
(Doha)								
Al-Rayyan	-	-	-0.496*	0.609*	-0.429*	0.651*	-0.495*	0.609*
Al-Wakrah	-	-	-0.147	0.863	-0.157	0.855	-0.132	0.876
Other regions	-	-	-0.431*	0.650*	-0.393*	0.675*	-0.433*	0.649*
RELATION TO HUSBAND								
(Unrelated)								
Related	-0.289*	0.749*	-	-	-0.237*	0.789*	-	-
CURRENTLY WORKING FOR WAGE								
(Not working)								
Working	0.094	1.099	-	-	0.108	1.114	0.125	1.134
LEVEL OF EDUCATION								
(Illiterate)								
Incomplete primary	0.431*	1.539*	0.397*	1.488*	0.390*	1.477*	0.388*	1.474*
Primary	0.863*	2.370*	0.830*	2.294*	0.816*	2.260*	0.821*	2.274*
Preparatory	1.155*	3.172*	1.082*	2.949*	1.093*	2.983*	1.068*	2.909*
Secondary	1.392*	4.023*	1.336*	3.803*	1.306*	3.690*	1.307*	3.697*
University	1.455*	4.284*	1.456*	4.289*	1.390*	4.016*	1.391*	4.020*
INTERCEPT	-4.490*	0.011*	-4.348*	0.013*	-4.246*	0.014*	-4.350*	0.013*
Log (Likelihood)	-1971		-1965		-1964		-1964	
Chi-square	1197		1200		1282		1465	
Degree of freedom	1137		1119		1171		1334	
P-value	0.104		0.046		0.013		0.007	

Note : Reference category in parentheses
- Variable not included in model
* Coefficients at least twice their standard errors

Table 6.12 Estimated odds ratio in multivariate logistic models for current use of family planning among currently married women by nationality and consanguineous marriage, QCHS 1987

Socioeconomic Characteristics	NATIONALITY			CONSANGUINITY	
	Qatari	Arabs	Other	Related	Unrelated
CURRENT AGE					
(< 20)	1.000	1.000	1.000	1.000	1.000
20 - 24	0.394*	1.747	1.084	0.469	1.114
25 - 29	0.360*	2.140	1.542	0.494	1.378
30 - 34	0.383*	3.542	1.207	0.572	1.811
35 - 39	0.384*	2.889	1.345	0.427	2.046
40 - 44	0.397*	3.339	0.775	0.498	1.734
45 - 49	0.169*	1.254	0.433	0.318*	0.588
CHILDREN LIVING					
(None)	(1)	1.000	1.000	1.000	1.000
1	(1)	7.450*	2.731	11.76*	5.955*
2	(1)	23.39*	5.909*	35.28*	14.72*
3	(1)	32.04*	6.472*	34.05*	20.78*
4	(1)	40.86*	4.344*	43.27*	23.62*
5	(1)	50.19*	4.808*	73.57*	16.43*
6 +	(1)	44.26*	6.425*	82.71*	23.16*
NATIONALITY					
Qatari	-	-	-	1.000	1.000
Arabs	-	-	-	1.027	1.010
Other nationalities	-	-	-	0.666*	0.797
REGION OF RESIDENCE					
(Doha)	1.000	1.000	1.000	1.000	1.000
Al-Rayyan	0.529*	0.677*	0.738	0.409*	0.972
Al-Wakrah	0.626	0.943	1.046	0.675	0.934
Other regions	0.399*	0.599	3.700*	0.424*	0.836
RELATION TO HUSBAND					
(Unrelated)	1.000	1.000	1.000	-	-
Related	0.806	0.816	0.755	-	-
CURRENTLY WORKING FOR WAGE					
(Not working)	1.000	1.000	1.000	1.000	1.000
Working	0.937	1.190	1.242	1.531*	0.971
LEVEL OF EDUCATION					
(Illiterate)	1.000	1.000	1.000	1.000	1.000
Incomplete primary	1.232	1.371	2.400*	1.541	1.429
Primary	2.558*	2.163*	1.578	2.231*	2.136*
Preparatory	2.800*	3.140*	2.957*	3.079*	2.534
Secondary	3.462*	3.720*	2.925*	3.338*	3.710*
University	3.895*	4.140*	2.927*	4.633*	3.572*
INTERCEPT	0.019*	0.004*	0.039*	0.014*	0.012*
Log (Likelihood)	-659	-792	-466	-793	-1143
Chi-square	594	770	482	791	1092
Degrees of freedom	605	712	405	777	966
P-value	0.620	0.066	0.005	0.355	0.003

Note : Reference category in parentheses

- Variable not included in model

* Coefficients at least twice their standard errors

(1) Odds ratios cannot be estimated since the reference category is equal to zero (i.e. the proportion of currently married women with no living children who are currently using contraception is equal to zero), as shown in Table A.2.

With respect to consanguinity, the two models show the existence of interactions between consanguinity and other variables with respect to fertility regulation in Qatar. While work status has no significant effect on current use of contraception among women living in non-consanguineous marriages, working women are about 53.1 percent more likely to be contracepting than non-working women if they are married to husbands with blood relationship. Among consanguineous couples, contraceptive use increases more dramatically with the increase in the number of living children than among non-consanguineous couples. Similar results hold for mother's level of education. The increases in prevalence rates with the increase in the level of education are more dramatic among women living in consanguineous marriages than among women living in non-consanguineous marriages. Again, women living in an environment characterised by conditions unfavourable to fertility regulation, consanguineous marriage in this case, are much more affected by improvement in their characteristics (e.g., education, work, number of living children, etc.,) than those living in an environment conducive to fertility regulation, non-consanguineous marriage in this case.

With respect to region of residence interactions with other variables with respect to current use of contraception, the results indicate that the effect of consanguinity on contraceptive prevalence rates, net of the effects of other variables in the model, is significant only among women residing in Al-Rayyan and Al-Wakrah regions. In the other regions there is no significant differences between the probabilities of contracepting for women in consanguineous and non-consanguineous marriages. Similar results hold for work status, as shown in Table 6.13. Only for Al-Wakrah region, are working women more than twice as likely as non-working women to be contracepting.

All design variables for mother's level of education in Al-Wakrah region are insignificant. However, the increase in the level of education in the other three regions, especially in Al-Rayyan and "other" regions, has significantly increased the adjusted odds of practising family planning among women in Qatar.

For interactions of work status with other variables with respect to current use of contraception, most variables have shown different levels of contraceptive prevalence in the two models. For the two controlled demographic variables, while the advancement of mother's age exerts a more important role in increasing prevalence rates among working women in Qatar, it is the number of living children which exerts a more important role among non working mothers.

For the socioeconomic factors, while the model for working mothers shows that Arab women have significantly higher contraceptive prevalence rates than Qatari women and women from other nationalities, the model for non working women shows that women from other nationalities have significantly lower prevalence rates than Qatari and Arab women. While all design variables of region of residence and consanguinity are insignificant among working women, the situation is different among non working women. The two odds ratios for Al-Rayyan and "other" regions are significantly lower than those for Doha and Al-Wakrah regions, and the one for consanguineous marriages is significantly lower than that for non-consanguineous marriages among non working women. Once a woman is working, the place where she lives and consanguinity have no significant effect on her probability of practicing family planning.

Among non working women, maternal education exerts a more important role in affecting current use of contraception than among working women at all levels of education. The interactions of work

Table 6.13 Estimated odds ratio in multivariate logistic models for current use of family planning among currently married women by region of residence and work for wage, QCHS 1987

Socioeconomic Characteristics	REGION OF RESIDENCE				WORK FOR WAGE	
	Doha	Al-Rayyan	Al-Wakrah	Other	Working	Not working
CURRENT AGE						
(< 20)	1.000	1.000	1.000	1.000	1.000	1.000
20 - 24	0.748	0.841	4.909	0.278	14.60	0.615
25 - 29	0.919	0.878	2.856	0.236	9.551	0.798
30 - 34	1.146	1.430	2.063	0.306	11.90	0.976
35 - 39	1.121	1.256	2.685	0.276	11.71	0.963
40 - 44	1.022	1.245	2.506	0.318	9.675	0.939
45 - 49	0.472	0.430	1.474	0.110	3.881	0.433*
CHILDREN LIVING						
(None)	1.000	1.000	1.000	1.000	1.000	1.000
1	7.265*	5.576	13.52	10.24	4.689*	10.43*
2	21.06*	13.59*	27.25*	12.69	15.71*	24.50*
3	26.08*	12.50*	50.86*	27.88*	16.43*	32.45*
4	26.01*	32.96*	50.22*	20.98	17.25*	36.63*
5	23.52*	27.43*	140.4*	55.18*	18.47*	37.41*
6 +	31.81	47.67*	48.83*	29.27*	28.53*	45.11*
NATIONALITY						
Qatari	1.000	1.000	1.000	1.000	1.000	1.000
Arabs	0.908	0.924	1.716	1.529	1.598*	0.931
Other nationalities	0.628*	0.562	1.621	5.773*	1.077	0.705*
REGION OF RESIDENCE						
(Doha)	-	-	-	-	1.000	1.000
Al-Rayyan	-	-	-	-	0.975	0.578*
Al-Wakrah	-	-	-	-	1.175	0.822
Other regions	-	-	-	-	0.700	0.635*
RELATION TO HUSBAND						
(Unrelated)	1.000	1.000	1.000	1.000	1.000	1.000
Related	0.954	0.438*	0.474*	0.621	1.068	0.734*
CURRENTLY WORKING FOR WAGE						
(Not working)	1.000	1.000	1.000	1.000	-	-
Working	1.052	1.449	2.544	0.770	-	-
LEVEL OF EDUCATION						
(Illiterate)	1.000	1.000	1.000	1.000	1.000	1.000
Incomplete primary	1.248	1.603	0.467	3.587*	0.657	1.517*
Primary	1.941*	2.430*	0.838	3.992*	1.396	2.269*
Preparatory	2.580*	4.506*	1.334	1.760	1.469	3.050*
Secondary	3.294*	3.583*	0.973	5.809*	2.072	3.705*
University	3.179*	9.634*	0.806	9.278*	2.239	4.102*
INTERCEPT	0.018*	0.011*	0.005*	0.020*	0.002*	0.015*
Log (Likelihood)	-1274	-349	-146	-143	-395	-1553
Chi-square	1029	371	207	229	443	1464
Degrees of freedom	911	415	171	206	361	1382
P-value	0.004	0.941	0.032	0.129	0.002	0.061

Note : Reference category in parentheses
- Variable not included in model
* Coefficients at least twice their standard errors

status with other demographic and socioeconomic variables with respect to family planning practice in Qatar are quite important. For working mothers, who usually live in an environment conducive to fertility regulation, prevalence rates increase dramatically with age. On the other hand, for non working mothers (who usually live in an environment hostile to fertility regulation), the number of living children, region of residence, consanguinity, and level of education play important roles in affecting contraceptive use.

CHAPTER 7

SUMMARY AND CONCLUSIONS

This study is concerned with an analysis of the bio-demographic determinants of reproductive patterns in Qatar. The main source of data for this study is the 1987 Qatar Child health Survey (QCHS). The determinants of age at first marriage and fertility are examined in chapters 2 and 3, respectively. There follows an analysis of patterns of maternal care (chapter 4), and of breastfeeding and weaning practices (chapter 5). In chapter 6, an attempt is made to investigate the determinants of contraceptive use. This final chapter provides a summary of the main findings of the study and identifies the main features of reproductive patterns in Qatar.

Qatar Child Health Survey

The Qatar Child Health Survey was conducted in 1987. A nationally representative probability sample of 3868 households irrespective of nationality was drawn from a multi-stage sampling design. The distribution of the sample households according to nationality was as follows : 1491 Qatari households, 1515 non-Qatari Arab households, and 862 non-Qatari non-Arab households.

Four questionnaires were used in the survey, namely : the household questionnaire, the household utilities module, the maternal care questionnaire, and the child health questionnaire.

Age at First Marriage

The data from the 1987 QCHS show significant shifts in the age pattern of first marriage among the more recent cohorts. A clear trend towards later marriage and a tendency for first marriages to become spread over a wider age range were observed. Thus, the median age at first marriage for Qatari women has risen from less than 17.0 years for the cohorts of women currently at ages 35 and over, to 18.0 years for women at ages 30-34, and to 21.4 years for women at ages 25-29.

A multivariate analysis of factors affecting age at first marriage revealed that education, nationality, work status and consanguinity are the main determinants of age at first marriage in Qatar. Thus, education, especially at higher levels, does exert a positive impact on age at first marriage. Women with primary education delay their marriages by an average of almost ten months, compared to illiterate women. Postponement of marriage increases steadily to 1.7, 4.1 and 6.5 years for women with preparatory, secondary and university education, respectively.

Arab women and women of non-Arab nationalities marry, on average, a year later than Qatari women. Women who marry to their relatives do so at younger ages (about six or seven months younger, on average) than those who marry to non-relatives.

Thus, it may be inferred that increasing educational opportunities for Qatari girls is largely responsible for the recent substantial decreases in the propensity of first marriage at teenages and the upward trend in age at marriage.

Fertility Patterns

According to the 1987 QCHS results, the average number of children ever born for all ever-married women is 4.0, and for those aged 45-49 is 7.0. About 10 percent of all ever-married women are childless; 29 percent have had one or two live births; 26 percent three or four; 15 percent five or six; 10 percent seven or eight, and the remaining 9 percent nine or more.

The QCHS data suggest that primary sterility is low (about 2 percent). Among women aged 45-49, one woman in 7 has had a family below replacement level (0,1 or 2 live births), but at the other extreme, one woman in two had had 8 or more children, and one woman in four had had 10 or more children.

The results also revealed the absence of any strong relationship between age at marriage and early fertility, and that the tempo of fertility is generally similar within the first ten years of marriage or so matter at what age a women marries. The effect of age at marriage becomes apparent, however, at longer durations of marriage.

The picture that emerges from the survey data indicates that fertility in Qatar is relatively high. There is, however, evidence that the fertility of Qatari women has declined significantly from the very high level prevailing in the past. Current fertility of Qatari women as measured by the total fertility rate for the period 1985-87 (4.5 births per woman) is about 38 percent lower that the cumulative fertility of women currently at the end of the childbearing ages, as represented by the mean number of children ever born to 'all' Qatari women aged 40-49 (7.2 children).

The data would suggest a larger initial fall among the youngest age groups of women, presumably associated with changes in age at marriage and the very rapid increase in educational opportunities for young females. However, the reduction in the fertility of Qatari women is not by any means confined to the younger age groups of women and a fall in marital fertility is also indicated.

A multivariate analysis of factors affecting fertility revealed that achieving an education level of at least a preparatory certificate and reducing the occurrence of child deaths are the most important determinants of fertility in Qatar. Age at first marriage has a large significant impact on achieved fertility. Women currently working for cash have fewer number of children than non-working women. Consanguineous couples tend to have more children than unrelated couples.

The analysis, however, shows a positive association between contraceptive use and achieved fertility. The implication of this reverse causation is that those women most likely to use contraceptive methods are those who already have achieved high parities. The results also imply that contraception is used mainly for stopping rather than spacing of children. On the other hand, contraceptive methods may be used for short durations, which implies very low continuation rates. Further, for some families, contraceptive methods may represent a substitute for extended breastfeeding as a means of family size control. The QCHS data do not allow the investigation of this matter which looms as a critical area for further research. The results, however, show that the net negative impact of education on cumulative fertility is much higher among ever users than never users, for all levels of education.

Maternal Care

The care a mother receives during pregnancy, parturition and in the post-natal period, affects the health and survival of both the mother and her child. The QCHS results indicate ante-natal care to be received in respect of nineteen out of twenty live births. Nearly 40 percent of pregnancies are checked in the first five months of the pregnancy. This leaves a considerable number of women whose first check is delayed until late in the pregnancy.

Effectively all pregnancy checks were carried out by a doctor. Nine in ten women went to a government health facility for their checks. Two in three women lived within fifteen minutes of the place where they had their pregnancy checks and one in four lived between fifteen and thirty minutes to get there. The vast majority of women, nine out of ten, travelled to their health facilities by car. Medicine was administered to about seven out ten women at their last pregnancy check, the likelihood increasing with pregnancy duration.

Of the 16 percent of pregnant women who had not sought ante-natal care, just over three in ten women replied that they had not felt the need for a pregnancy check. A similar number said it was 'too early' for a check-up or that they intended to have a check. Most of the remaining women gave inaccessibility, in terms of physical distance or of available time, as the reason for not having a pregnancy check.

The vast majority of women, 87 percent, gave birth to their most recent child in a hospital, two percent at home, and there were 11 percent of births that took place outside of Qatar.

Almost six in ten deliveries were attended by a doctor and less than four in ten by a trained nurse, leaving only three percent attended by a relative, a traditional nurse or no one. A doctor was thus much more likely to have carried out a pregnancy check than to have attended a delivery.

Only one in three women whose last child was born five or less years prior to the survey had received a post-natal check, substantially less than the number who had received ante-natal care.

Women living in Doha, and literate women, appear to be most consistently advantaged in respect of the likelihood of ante-natal care, carried out at a hospital, by a doctor, and with relatively fast accessibility to the health facility, of a hospital delivery and attendance by a doctor, and of a post-natal check again carried out by a doctor, while illiterate women and those living in areas outside of Doha and Al-Rayyan appear to be disadvantaged in these respects. These findings assist in identifying the most urgent gaps in service provision, and in assessing the impact of, and need for expansion.

Breast-feeding and Weaning Practices

About 89 percent of children were reported to have been breastfed. A pattern of early weaning was identified, with an estimated 25 percent of infants who stopped breastfeeding before reaching age three months, and fifty percent of infants who were weaned at age six months. Few infants were weaned between ages five and ten months, and thereafter was a more gradual weaning process. The two patterns of weaning combine to produce a prevalence/incidence estimate of the mean duration of breastfeeding equal to 10.2 months.

Substitute milk was introduced early. The introduction on a regular basis of either substitute milk or solids took place on average at age 2.0 months, and solids were introduced on average at age 5.6 months.

The reasons for not breastfeeding were primarily ones that indicated there to have been a wish and an intention to breastfeed the infant which in the event had not been realisable.

More than 50 percent of infants who were weaned early, before age three months, stopped breastfeeding on account of there being insufficient milk. More than one in four were weaned on account of what might be described as involuntary reasons, namely the mother or infant being sick, nipple problems, milk upsetting the infant or mother's pregnancy. Four percent of infants were weaned within three months in order that the mother could go to work. The reason for early weaning therefore include a large proportion which were avoidable.

Qatari infants were less likely to have been breastfed than Arab infants, and were introduced to bottled milk earlier, though Arab infants were younger on average at the introduction of solids. Infants of other nationalities were more likely to have been weaned early than other infants, with a shorter duration of breastfeeding.

The differentials in breastfeeding behaviour appear to reflect ongoing changes; a gradual reduction in the extent of breastfeeding, an increase in early weaning and shorter duration of breastfeeding succeeded by a recognition of the advantages, and rise in the extent of, breastfeeding, though with a view to keeping duration down to a minimum. The growing pattern of early supplementation with a bottle and early weaning has adverse implications for the health and nutritional status of infants and points to urgent health education needs.

Family Planning

The results of the QCHS indicate that about 52 percent of ever-married women have used a method to regulate their fertility at some point in their lives. Nationality and level of education are the characteristics most associated with ever-use. Non-Qatari Arab women show the highest level of ever-use, 62 percent, while the Qatari and women of other nationalities show lower rates, respectively 44 and 47 percent.

The percentage of current users among all currently married women is 32 percent. Almost all users rely on modern methods. The pill comprises 41 percent of all current use, followed by the IUD (27 percent), female sterilisation (14 percent) and other efficient methods (8 percent) while traditional methods account for the remaining 10 percent of all current use.

A multivariate analysis of QCHS data on family planning revealed that net of the effect of other demographic and socio-economic variables, maternal education is by far the most important predictor of family planning practice. Women in Qatar with at least a preparatory certificate are about three times as likely to be regulating their fertility, either through spacing or limiting, than illiterate women. The adjusted odds of current contraceptive use are about 50 percent more even for literate women with no schooling or those with incomplete primary certificate when compared to those for illiterate women. Nationality, region of residence, and consanguinity are secondary in importance in affecting the use of family planning. Qatari and Arab women have higher contraceptive prevalence rates than women from other nationalities after controlling for demographic and socio-economic factors. Residing in Doha has an inflating effect on the odds

of current use of contraception by 14 to 39 percent than those women residing in Al-Rayyan and "other" regions. The odds of current use are only about 14 percent less for women residing in Al-Wakrah region compared to those in Doha.

Level of education is an important and (statistically) significant determinant of current use of contraceptives in all regions, except in Al-Wakrah, for all nationalities, for non working women, and regardless of the spousal blood relationship. For the two relatively less developed regions, namely, Al-Rayyan and the "other" regions, mother's level of education exerts a more important role in affecting current use of contraception than in the other two relatively more developed regions, namely, Doha and Al-Wakrah regions. Women with a university degree in Al-Rayyan and the "other" regions are at least nine times as likely to be contracepting than illiterate women, net of the effect of other demographic and socioeconomic factors.

Consanguinity is significant only for women residing in Al-Rayyan and Al-Wakrah regions, in which contraceptive prevalence rates for consanguineous couples are at best half those for non-consanguineous couples. Consanguinity is also an important factor in depressing prevalence rates among non working mothers. The odds of contraceptive use, net of the effect of other variables, are about 53 percent more among working women than among non working women only if they live in consanguineous marriage.

The overall adjusted effect of working status is minor and not significant when all other demographic and socioeconomic factors are considered. However, the impacts are in the right direction. Women who are not working for wage are expected to be less contracepting only by about 10 percent than those who are working. However, work-specific models indicate that among non working women, region of residence plays an important and significant role in their decision to

regulate their fertility, in contrast to working women for whom region has no bearing on their decision. Among non-working women, the adjusted odds of current use of family planning for those residing in Al-Rayyan and "other" regions are at least one-third less than those residing in Doha.

The above summary suggests that the health and well-being of the family in Qatar, more specifically, mothers and children, depends a great deal on increasing maternal levels of education. Highly educated mothers will tend to regulate their fertility, by spacing and/or limiting the number of children, in a way that is consistent with health standards. Educated women will not, through regulating their fertility, have too many children, at very young or very old ages, or too close to each other in a manner that is detrimental to their health and well-being and to their children's health and survival.

Also of importance are the regional differences. Developed areas are characterised by conditions that are conducive to fertility regulation. For Doha, fertility regulation is a common practice, and consanguinity and work status have no significant effect on contraceptive use. However, this is not the case for the two relatively less developed regions, namely Al-Rayyan and Al-Wakrah regions in which consanguinity plays an important role in depressing fertility regulation. Accordingly, it seems appropriate that development efforts, while valid in their own right, promote an environment and characteristics that are favourable to fertility regulation, in particular, and to the welfare of the Qatari society, in general

Bibliography

Abdel-Aziz, A.; Anderson, J.; Moris, L.; Wingo, P.; and Shrydeh, B. 1986. Family planning in Jordan: 1983 Survey Data. Studies in Family Planning (USA).17(4): 199-206.

Abou-Gamrah, H. 1892. Fertility levels and differentials by mother's education in some countries of the ECWA region. In Determinants of Fertility in Some African and Asian Counties. Research Monograph Series no.10. Cairo, Egypt: Cairo Demographic Centre:76-78.

Acsadi, G.T., and Gwendolyn, Johnson-Acsadi. 1983. Demand for Children and Spacing in Sub-Sahara Africa. Nov. background paper for the report on population strategies for Sub-Saharan Africa.

Acsadi, G.; Jonhson-Acsadi, G. 1985. Health aspects of early marriage and reproductive patterns. IPPF Medical Bulletin.19(4):2-4.

Ahmad, S. 1985. Effect of education on marital fertility in four muslim populations. Genus(Italy),41(1-2):23-37.

Ahmad, S. 1985. Factors affecting fertility in four muslem population: a multivariate analysis. Journal of Biosocial Science.17(3):305-16.

Ahmad, S. 1986. Work status of women and marital fertility in four muslim populations. Demography India(India)15(2): 215-227.

Ahmad, S. 1986. Differentials in intermediate fertility variables in four muslim populations. Asian Profile(Hong-Kong),14(3):249-265.

Akin, J.; Bilsborrow, R.; Guilkey, D.; and Popkin, B. 1986. breast-feeding patterns and determinants in the Near East: an analysis for four countries. Population Studies (England), 40(2):247-261.

Akin, J.; Bilsborrow, R.; Guilkey, D.; and Popkin, B. 1986. Breastfeeding patterns and determinants in Jordan. Population Bulletin of ESCWA, (Iraq,UN).28:5-41.

Alam, I.; and Cleland, J. 1981. Illustrative analysis: recent fertility trends in Sri Lanka. WFS Scientific Reports, 25.

Alam, I.; and Casterline, J. 1984. Socio-economic differentials in recent fertility. WFS, Comparative Studies, 33, Cross National Summaries Voorburg, Netherlands: International Statistical Institute, No. 72.

Anderson, J.; and Cleland, J. 1984. The World Fertility Survey and Contraceptive Prevalence Surveys: a Comparison of Substantive Results. Studies in Family Planning. 15(1).

Andy, T.C. 1990 The Utilization of Primary Health Care Centre on an Isolated Island-cicia, Fiji. Cent-Dfr-J-Med; 36(10):246-250.

Ashurst, H.; Balkaran, S.; and Casterline, J. 1984. Socio-economic deferentials in recent fertility. WFS, Comparative Studies, 42. cross national summaries, revised edition. Voorburg, Netherland: International Statistical Institute, Dec.61.

Ashurst, H.; and Casterline, J. 1984. Socio-economic deferentials in current fertility. WFS, Comparative Studies: cross national summaries. Additional Tables.

Ata, A. 1984. Impact of westernization and other factors on the changing status of moslem women. Eastern Anthropologist (India),37(2):95-126.

Atrash, H. 1987. Family Planning Contraception and Health. Proceeding of a Symposium on: Jordan Husband's Fertility Survey. Amman, Jordan: Department of Statistics,:24.

Al-Awadi, S.; Naguib, K.; Mousaa, M.; Farag, T.; Teebi, A.; and El-Khalifa M. 1986. The Effect of Consanguineous Marriages on Reproductive Wastage. Clinical Genetics (Denmark),29:384-388.

Barker, D.J.; and Cemona, C. 1987. Inequalities in Health in Britain: Specific Explanations in Three Lancashire. Med-J-[Clin-Res] 294 (6574): 749-752.

Bayoumi, A.; and Moussa, M. 1985. Kuwait Nutritional Survey: comparison of the nutritional status of Kuwaiti children aged 0-5 with the NCHS/CDC Reference Population. Bulletin of the WHO (Switzerland) 63(3).

Benallegue, A.; and Kedji, F. 1984. Consanguinity and public health. Algerian study. Arch-Fr-Pediatr;41(6):435-440.

Bongaarts, J. 1978. A framework for analyzing the proximate determinants of fertility. Population and Development Review. 4(1).

Bongaarts, J.; and Potter, R. 1983. Fertility, Biology And Behaviour: An Analysis of the Proximate Determinants. New York: Academic Press.

Bongaarts, J. 1987. The proximate determinants of exceptionally high fertility. population and development review. (USA),13(1):133-139.(1987)

Bongaarts, J.; and Frank, O. 1988. Biological and behavioural determinants of exceptional fertility levels in Africa and West Asia. In proceedings of IUSSP, African Population Conference. Liege: International Union for the Scientific Study of Population, Chapter 2:1-13.

Bongaarts, J.; Frank, O.; and Lesthaeghe, R. 1984. The proximate determinants of fertility in Sub-saharan Africa. World Bank Report. 39:13.

Caldwell, J. 1980. Mass education as a determinant of the timing of the fertility decline. Population and Development Review. 6(2): 225-255.

Caldwell, J. 1982. Theory of Fertility Decline. London, Academic Press.

Caldwell, J.; Caldwell, P. 1982. Fertility transition with special reference to the ECWA region. In Population and Development in the Middle East, Baghdad, Iraq: UN, Economic Commission for Western Asia:97-118.

Cantrell, P. 1974. Is there is standard pattern of tropical mortality. In P. Cantrell, et.al. (editors) Population in African Development, Leige, IUSSP.

Carrasco, E. 1981. Contraceptive Practice. WFS, Comparative Studies. Cross National Summaries. No. 9, Voorburg: International Statistical Institute.

Casterline, J., et.al., 1983. The Proximate Determinants of Fertility. WFS, International Statistical Institute.

Cavanaugh, J. 1979. Is fertility declining in less developed countries? An evaluation analysis of data sources and population programme assistance. Population Studies (England),33(2): 283-293.

Chamie, J. 1986. Polygyny among Arabs. Population Studies (England), 40(1): 55-66.

Cho, L.; Arnold, F.; and Kwon, T. 1982. The Determinants of Fertility in the Republic of Korea. Committee on Population and Demography Report. No.14, Washington D.C., National Academy Press.

Cleland, J. 1985. Marital fertility decline in developing countries: theories and evidence. In Reproductive Change in Developing Countries: insights from the WFS, edited by Cleland, J. and Hobcraft, J. in collaboration with Dinesen, B. London: Oxford University Press.

Coale, A. 1973. The demographic transition. Proceedings of the International Population Conference, Liege: IUSSP.

Coale, A. 1979. The demographic transition: a summary, some lessons and some observations. In Cho, L.; Kobayashi, K. (ed.), Monograph of the Centre for South-East Asia Studies, Kyota University, English Language Series. No.13, University of Hawaii Press.

Cochrane, S.H. 1979. Fertility and Education: What Do We Really Know?. Baltimore, Maryland: The Johns Hopkins University Press.

Cochrane, S.H.; and Farid. S.M. 1985. Fertility in Sub-Saharan Africa, Analysis and Explanation. World Bank Discussion Papers. Washington, D.C.: The World Bank.

Cochrane, S.H. 1983. Effects of education and urbanization on fertility. In Determinants of Fertility: a Summary of the Knowledge. Washington, D.C. National Academy of Sciences.

Davis, K. 1973. The theory of change and response in modern demographic history. Population Index: 20.

Dept. of International Economic and Social Affairs, UN. 1981. Selected Factors Affecting Fertility and Fertility Preferences in Developing Countries. Dept. of International Economic and Social Affairs, UN, ST/ESA/SER.R/37: 1111.

Dixon, W. 1988. (ed.) BMDP Statistical Software. Berkeley, CA: University of California Press.

Dixon, R. 1971. Explanation of cross cultural variations in age of marriage and proportions never marrying. Population Studies.25.

Easterlin, R. 1980. Fertility and Development. Population Bulletin of ECWA (Lebanon, UN)18: 5-40.

Easterlin, R.; Crimmins, E.; and Ahmed, M. et al. 1988. The Impact of modernization on the motivation for fertility control, Egypt, 1979-1980. In Egypt: Demographic Responses to Modernization, edited by Hallouda, A.; and Farid, S. Cairo, Egypt: Central Agency for Public Mobilisation and Statistics.

Easterlin, R.; Crimmins, E.; and Khodair, I. 1988. Determinants of fertility control in Egypt, 1979-1980. In Egypt: Demographic Responses to Modernization, edited by Hallouda, A.; and Farid, S. Cairo, Egypt: Central Agency for Public Mobilisation and Statistics.

Ebanks, G.E.; Singh, S. 1984. Socio-economic Differentials in Age at Marriages. WFS Comparative Studies: Cross National Summaries.

El-Khorazaty, M. 1992. Estimation of fertility-inhibiting indices using vital registration data. GENUS 48(1-2):69-88.

El-Shalkani M.H. 1989. Estimation of fertility and mortality of the Kuwaiti population. J-Biosoc-Sci; Oct.:433-441.

Entwisle, B.; Hermalin, A.; and Mason, W. 1982. Socio-economic Determinants of Fertility Behaviour in Developing Nations: Theory and Initial Results. Committee on Population and Demography, Report no.17, Washington D.C., National Academy Press.

Faour, M. 1988. Fertility policies in the Arab World. Population Bulletin of ESCWA (Iraq, UN), 32: 55-74.

Farid, S. 1976. Cohort nuptiality in England and Wales. Population Studies, 30(1):137-151.

Farid, S. 1979. Reconstruction of cohort nuptiality histories from WFS data. IUSSP Seminar on Nuptiality and Fertility, Bruge:IUSSP.

Farid, S. 1984. Fertility patterns in the Arab region. International Family Planning Perspectives (USA),10(4):119-125.

Farid, S. 1986. Fertility and family planning in the Arab region. IPPF Medical Bulletin (England), 20(1): 1-3.

Farid, S. 1987. A review of the fertility situation in the Arab countries of western Asia and northern Africa." In: Fertility Behaviour in the Context of Development. United Nations: Population Studies No.100. New York: United Nations.

Farid, S. 1993. Family planning, health and family well-being in the Arab world. Proceedings of the Arab Population Conference. Amman: UN-ESCWA: 40.

Farrag, O.L. 1983.The status of child nutrition in the Gulf Arab States. Journal of Tropical Paediatrics: 325-329.

Fathalla, M.; Hammam, H.; El-Sherbini, A.; and Yassin, M. 1981. Family formation and maternal health: Egypt. In Family Formation Patterns and Health, Further Studies: an International Collaborative Study in Colombia, Egypt, Pakistan, and the Syrian Arab Republic, edited by Omran, A.; and Standly, C. Geneva: WHO: 282-287.

Favin. N.B.; Bradford; and Cebula. 1984. Improving Maternal Health in Developing Countries. Washington, D.C.: World Federation of Public Health Association.

Ferry, B.; and Smith, D. 1983. Breastfeeding Differentials. WFS, Comparative Studies: Cross National Summaries, 23.

Foster Parents Plan. 1987. Family Planning Policies and Guidelines. In Family Planning Within Primary Health Care, edited by Swezy, C. and Green, C. Washington, D.C.: National Council for International Health.

Freedman, R. 1979. Theories of fertility decline: a reappraisal. In P.M. Hauser (ed.), World Population and Development: Challenges and Prospects. Syracuse University Press.

Graaf, H. 1979. Literacy, education and fertility, past and present: a critical review. Population and Development Review 5(1).

Grebenik, E. 1981. The World Fertility Survey and its 1980 Conference. Voorburg: International Statistical Institute.

Guerra, Francisco. 1983. Health planning in the Islamic polity: anthropological and pharmaceutical context. International Conference on Science in Islamic Polity. Islamabad.

Gussler, J.; Woo-lun, M.; and Smith, N. 1984. The International Breastfeeding Compendium, Third edition, Vol.1: The Eastern Hemisphere. Columbus: Ross Laboratories.

Hajnal, J. 1953. Age at marriage and proportions single. Population Studies, 7:111-132.

Hajnal, J. 1965. European marriage patterns in perspective. In:Glass, D.V. and D.E.C. Eversley (Eds.) : Population in History. London.

Hijazi, S.; Abulaban, A.; and Waterlow, J. 1989. The duration for which exclusive breastfeeding is adequate. A study in Jordan. Acta Paediatrica Scandinavica (Sweden), 78(1):23-28.

Hill,A.; Brown, E.; and Isiugo-Abanihi, U., 1984. The demographic Situation in Sub-saharan Africa: A background paper. Background Paper for the Report on Population Strategies for Sub-Saharan Africa.

Hobcraft. J.; Casterlin, J. 1983. Speed of Reproduction. WFS, Comparative Studies. 25. Voorburg: International Statistical Institute.

Hodgson, M.; and Gibbs, J., 1980. Children Ever Born. WFS Comparative Studies: Cross National Summaries, 12.

Horne, A.; and El-Khorazaty, M. 1987. Childbearing indices in the Arab World. Population Bulletin of ESCWA (Iraq, UN), 31: 77-111.

Horne, A.; El-Khorazaty, M.; and Suchindran, C. 1986. Differentials in model childbearing measures in developing countries. In Proceedings of the Social Statistics Section. Washington, D.C.: American Statistical Association: 379-384.

Hosmer, D.; and Lemeshow, S. 1989. Applied Logistic Regression. New York: John Wiley.

Inayatullah, A. 1986. Child spacing, child survival and maternal health In: European Parliamentarians Forum on Child Survival, Women and Population: Integrated Strategies. The Hague.

International Planned Parenthood Federation (IPPF). 1979. Family life clinics for Gulf States: Bahrain FPA helps bring a family planning breakthrough. IPPF News (England), 4(4).

Islam, M.; and Sarma, R. 1982. Age pattern of childlessness and probability of first live birth. In Determinants of Fertility in Some African and Asian Countries. Research Monograph Series .10. Cairo: Cairo Demographic Centre:645-676.

Jain, A.; and Bongaarts, J. 1981. Breastfeeding: patterns, correlates, and fertility effects. Studies in Family Planning.12(3):79-99.

Jain, A.; and Bongaarts, J. 1980. Socio-biological factors in exposure to childbearing: breastfeeding and its fertility effects. WFS Conference, Voorburg: International Statistical Institute.

Jamison, E. 1983. Fertility Decline in Developing Countries. United States Bureau of the Census, the Annual Meeting of the Southern Regional Demographic Group, Little Rock, Arkansas, 14-16 October 1981. International Research Document, 9. Washington, D.C.: Bureau of the Census: 20.

Jelliffe., B; Jelliffe, E.; Sai, F.; and Senanayake, P. 1979. Lactation, Fertility, and the working Woman. Proceeding of the 1977 Joint IPPF/IUNS Conference, Bellagio, Italy: London: International Planned Parenthood Federation.

Johnson-Acsadi, G. 1986. Fertility and family planning. Population Bulletin of the United Nations.19: 44-62.

Kelly, A. C.; Khalifa, A.M.; and Al-Khorazaty, M.N. 1982. Population and Development in Rural Egypt. Durham, N.C.: Duke University Press.

Kent, M. 1981. Breast-feeding in the Developing World: Current Patterns and Implications for Future Trends. Reports on the WFS.2. Washington, D.C.,USA: Population Reference Bureau,43.

Kim F. R.; Collins, C.; and Tinker, A. 1990. Linkages Between Immunization and Breastfeeding Promotion Programs. J-Hum-Lact: 597-609.

Knodel, J.; Chamratrithorong, A.; Chayovan, N.; and Debavalya, N. 1982. Fertility in Thailand: Trends, Differentials and Proximate Determinants. Committee on Population and Demography Report no.13, Washington D.C., National Academy Press.

Kovar, M.G. 1982. Health status of U.S. children and use of medical care. Public-Health-Rep; 97 (1): 3-15

Kupinsky, S. (ed.) 1977. The Fertility of Working Women: a Synthesis of International Research. New York: Praeger.

Lightbourne, R. 1980. Urban-Rural Differentials in Contraceptive Use. WFS Comparative Studies: Cross National Summaries,10.

Little, R.; and Perera, S. 1981. Illustrative Analysis: Socio-economic Differentials in Cumulative Fertility in Sri Lanka, a Marriage Cohort Approach. WFS Scientific Reports. 12.

Mamlouk, M. 1982. Knowledge and Use of Contraception in Twenty Developing Countries. Reports on the WFS.3, Washington, D.C.: WFS.

Mason, K.; and Palan, V. 1981. Female employment and fertility in peninsular Malaysia: the maternal role incompatibility hypothesis reconsidered. Demography, 18(4).

Mauldin, W. 1965. Fertility studies: knowledge, attitude and practice. Studies in Family Planning, 7.

McCarthy, J. 1982. Differentials in Age at First Marriage. WFS Comparative Studies. Cross National Ssummaries. 19. Voorburg: International Statistical Institute, 49.

Mc Donald, O.; Ruzicka, L.; and Caldwell, J. 1980. Interrelations between nuptiality and fertility: the evidences from the WFSurvey. In WFS Conference 1980: Record of Proceedings, 2.

McDonald, P. 1981. Social change and age at marriage. International Population Conference, Manila, 3. Liege: IUSSP.

Meleis, A.; and Sorrell, L. 1981. Arab American women and their birth experiences. American Journal of Maternal Child Nursing(USA),6(3): 171-176.

Moris, L.; Lewis, G.; Powell, D.; Anderson, A.; Way, A.; Cushing, J.; and Lawless, G. 1981. Contraceptive Prevalence Survey: a New Source of Family Planning Data. Population Reports Series M,5, Population Information Programme, Johns Hopkins University, Baltimore.

Mroueh, A. 1987. Family planning programs for the Arab World. In High Risk Mothers and Newborns: Detection, Management and Prevention, Edited by Omran, A; Martin, J.; and Hamza, B. Thun, Switzerland: Ott Verlag: 257-267.

Myriam K. 1988. Consanguineous Marriage and reproduction in Beirut, Lebanon. Faculty of Health Sciences, American University of Beirut Am. J. Hum. Genetics 43: 188-196.

Nagi, M. 1983. Trends in moslem fertility and the application of the demographic transition model. Social Biology (USA),30(3):245-262.

Nagi, M.; and Stockwell, E. 1982. Moslem fertility: recent trends and future outlook. Journal of South Asian and Middle Eastern Studies (USA), 6(2): 48-70.

Notestein, F. 1945. Population: the long view. In Theodore W. Schultz (ed.), Food for the World, University of Chicago Press.

Omran, A. 1981. Review of the evidence: An update. In A.R.Omran and C.C.Standly (eds.): Further Studies on Family Formation, Patterns and Health. Geneva: WHO.

Omran, A. 1983. Contraception in the Arab World. In Long-Acting Contraception, Proceedings of the Symposium on Long-Acting Contraception, Alexandria, Egypt, November 3-4, 1983. Edited by, Goldsmith A.; and Toppozada M. Chicago: Northwestern University, Program for Applied Research in Fertility Regulation (PARFR): 1-7.

Page, H.; Lesthaeghe, R.; and Shah, H. 1982. Illustrative Analysis: Breastfeeding in Pakistan". WFS Scientific Reports, 73.

Popkin, B.; Bilsborrow, R.; and Akin, J. 1982. Breast-feeding patterns in low-income countries. Science (USA),218:1088-1093.

Rodriguez, G.; and Gleland, J. 1980. Socio-economic determinants of marital fertility in twenty countries: a multivariate analysis. WFS Conference, London. Substantive Findings. Voorburg. International Statistical Institute: 237-414.

Rodriguez, G.; and Gleland, J. 1988. Modelling marital fertility by age and duration: an empirical appraisal of the page model. Population Studies (England), 42 (2): 241-257.

Rodriguez, G.; and Gleland, J. 1981. The effects of socio-economic characteristics on fertility in 20 countries. International Family Planning Perspectives (USA),7(3):93-101.

Salman, A.; Al-Jaber, K.; and Farid, S.(eds.). 1991. Qatar Child Health Survey 1987: Principle Report. Doha: Ministry of Health.

Sathar, Z.; and Chidambaram, V. 1984. Differentials in Contraceptive Use. WFS Comparative Studies,36.

Sherris, J.; London, K.; Moore, S.; Pile, J.; and Watson, W. 1985. The Impact of Family Planning Programs on Fertility. Population Reports, Series J: Family Planning Programs (USA),29:733-771.

Singh, S.; and Casterline, J. 1985. "The Socio-economic determinants of fertility" In Cleland, J. and Hobcraft, J. (eds.): Reproductive Change in Developing Countries. London: Oxford University Press.

Smith, D. 1980. Age at First Marriage. WFS, Comparative Studies, Voorburg: Netherlands: International Statistical Iinstitute, 18.

Sokona, O.; and Casterline, J. 1988. Socio-economic differentials in age at marriage. In Hallouda, A.M.; Farid,S.M.; and Cochrane, S.H. (eds.) Egypt: Demographic Responses to Modernization. Cairo: Central Agency for Public Mobilization and Statistics.

Trussell, J.; Bloom, D. 1983. Estimating the co-variates of age at marriage and first birth. Population Studies, 37(3):403-416.

United Nations, Department of International Economic and Social Affairs, Population Division. 1986. Contraceptive Practice: Selected Findings from the WFS data. New York: United Nations.

United Nations, Department of International Economic and Social Affairs, Population Division. 1985. Levels and Trends in fertility: Selected Findings from the World Fertility Survey Data. New York: United Nations.

United Nations, Department of International Economic and Social Affairs, Population Division. 1987. Fertility Behaviour in the Context of Development: Evidence from the World Fertility Survey. Population Studies,100. New York: United Nations.

United Nations, Department of International Economic and Social Affairs, Population Division. 1982. Evaluation of the Impact of Family Planning Programmes on Fertility: Source of Variance. Population Studies, 76. New York: United Nations.

United Nations, Department of International Economic and Social Affairs, Population Division. 1981. Variations in the Incidence of Knowledge and Use of Contraception: A Comparative Analysis of WFS Results for Twenty Developing Countries. New York: United Nations.

United Nations, Department of International Economic and Social Affairs, Population Division. 1983. Fertility Levels and trends as Assessed from Twenty World Fertility Surveys. New York: United Nations.

United Nations, Department of International Economic and Social Affairs, Population Division. 1984. Socio-economic Development in Relation to Fertility Decline: A Review of Methodological Developments and Recent Empirical Studies. In Information Series .2. New York: United Nations.

United Nations, Department of International Economic and Social Affairs, Population Division. 1979. Factors Affecting the Use and Non-use of Contraception: Findings from a Comparative Analysis of Selected KAP Surveys. Population Studies, 69. New York: United Nations.

United Nations. 1988. First Marriage: Patterns and Determinants. New York: United Nations.

Vaessen, M. 1980. Knowledge of Contraceptive Methods. WFS Comparative Studies: Cross National Summaries,8.

Vaessen, M. 1984. Childlessness and Infecundity. WFS Comparative Studies: Cross National Summaries, 31. Voorburg: International Statistical Institute.

Weller, R. 1984. The gainful employment of females and fertility, with special reference to rural areas of developing countries. In Rural Development and Human Fertility. Edited by Schutjer, W; and Stokes, S. New York: Macmillan.

World Health Organization, Division of Family Health. 1985. Coverage of Maternity Care: A Tabulation of Available Inform-ation. (FHE/85.1) Geneva: WHO.

Youssef, N. 1982. The interrelationship between the division of labour in the household, women's roles and their impact on fertility. In Women's Roles and Population Trends in the Third World. Edited by Anker, R.; Buvinic, M.; and Youssef, N. London: Croom Helm.

Zayid. M. 1979. Family Planning in Islam. People (England), 6(4): 8-10.

Zurayk, H. 1987. An overview of the development of studies on fertility. Population Bulletin of ESCWA (Iraq, UN), 31: 65-76.