BIOCULTURAL MECHANISMS OF HIGH FERTILITY AND INEFFECTIVE FAMILY PLANNING PRACTICES IN A RURAL ARAB COMMUNITY OF SOUTH JORDAN: A POPULATION-ECOLOGICAL APPROACH

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CONTENTS

List of Tables

List of Figures

List of Abbreviations

ASMFR	Age-specific marital fertility rate
CPR	Contraceptive prevalence rate
FC	First-cousin
IMR	Infant mortality rate
MCH	Maternal and child health
MSE	Mean square error
NCG	Non-consanguineous
SC	Second-cousin
TFR	Total fertility rate
TMFR	Total marital fertility rate

I . Background

Health and population, which are closely interacted, have direct and indirect influences on development of human societies (Taylor et al., 1976; Easterlin, 1980; Hefnawi & Ahmed, 1982; Blackburn & Cipriani, 1998). Historically, reduction in morbidity and mortality owing to modern health and medical services has been recognized as the major cause of population increase. However, much evidence has shown that high fertility, or frequent pregnancies and childbirths, raises health risks of mothers and their children (Boerma, 1987; Lloyd & Ivanov, 1988; Isaacs & Fincancioglu, 1989; Rutstein, 2000); in particular, high population increase rate, which has still been observed in developing countries, leads to ill health in association with poverty (Fong, 1985; Kibirige, 1997; Ashorn et al., 2000; Brockerhoff & Hewett, 2000).

As suggested by many studies, the inter-population variations in fertility and the intra-population changes in fertility in the process from traditional to modern regimes are closely associated with socioeconomic or sociocultural conditions (e.g., Notestein, 1953; Miah, 1992; Sonko, 1994). For instance, the comparative analyses of fertility levels in different countries or regions disclosed that social interactions, defined as spatial and/or social proximity, played decisive roles on fertility transition (Knodel & Van de Walle, 1979; Cleland & Wilson, 1987; Bongaarts & Watkins, 1996).

On the other hand, the biological and behavioral dimensions of fertility have been analyzed, using a set of proximate determinants or intermediate variables such as proportion of the married, the onset of permanent sterility, postpartum infecundity, frequency of sexual intercourses, use and effectiveness of contraception, spontaneous intrauterine mortality and induced abortion (Bongaarts & Potter, 1983). The proximate determinant analysis has contributed to elucidation of specific factors which

have caused differences in fertility among populations and changes in fertility in the same population.

Nonetheless, most fieldwork-based studies on fertility have focused on either socioeconomic/sociocultural aspects or biological/behavioral aspects. The author has judged that the proximate determinant analysis, which treats mostly the biological and behavioral factors, provides vigorous data but detailed analysis of the sociocultural factors is also indispensable in the studies for some societies in developing countries, including Arab countries, where traditional norms strongly affect reproductive behavior of the inhabitants.

In Arab region as a whole, the total fertility rate (TFR) declined from 7.3 in 1960 to 4.0 in 1995, though the onset of fertility transition varied from country to country: before 1950 in Lebanon, in 1965-70 in Tunisia, in 1970-75 in Morocco, and in 1985-90 in most other countries (Courbage, 1999). It was also pointed out that the fertility transition pattern in Arab region differed from that in other regions of developing world; in various Arab countries, the fertility levels were weakly but positively correlated with the socioeconomic development indicators (Nagi, 1984). Such Arab-specific features have been attributed to the influences of Islam traditions, especially women's low social status (Obermeyer, 1992) and men's dominance in decision-making of childbirths (Coombs, 1981; Riley, 1997; Greene & Biddlecom, 2000).

In Jordan as a whole, the TFR decreased from 7.4 in 1976 to 4.4 in 1997. However, the average annual population increase rate in the period between 1979 and 1994 was 4.4% due to the influx of immigrants from the West Bank and the Gaza Strip from the late 1960s and a large number of Jordanian returnees (about 300,000) during the Gulf War in 1990. As the results, the population increased from 2.1 million in 1979 to 4.1 million in 1994, and it is expected to reach 5.9 million in the year 2005

(Department of Statistics & Macro International, 1998).

More important is marked difference in fertility among the regions within the country, represented by lower TFR, i.e., 6.0 for the year 1976 and 4.1 for the year 1997, in the central region, including the capital city of Amman, and higher TFR, i.e., 8.4 in 1976 and 4.8 in 1997, in the south region, including the South Ghor district where the present study was conducted, mostly because the inhabitants in the latter have been socioculturally conservative and adherent to the traditional customs (Courbage, 1997; Department of Statistics & Macro International, 1979, 1998).

One of the traditional Arab customs, which may have profoundly affected fertility, is marriage system, represented by consanguineous marriages and polygynous marriages. The numbers of consanguineous and polygynous marriages have declined worldwide, although their prevalences considerably vary from population to population for various reasons such as cultural heritage and the degree of sociocultural isolation (Ahmed, 1986; Shaikh et al., 1987; Bittles, 1988; Tuncbilek & Koc, 1994; Wahab & Ahmad, 1996; Naidu & Mascie-Taylor, 1997; Dodoo, 1998; Hussain & Bittles, 1999; Peterson, 1999). In Arab societies with Muslim traditions, reproductive success is recognized as the basic function of marriage (Fargues, 1989) and first-cousin marriages, particularly the patrilateral parallel-cousin marriages, have been favored (Klat & Khudr, 1983; Al-Awadi et al., 1985; Al-Salem & Rawashdeh, 1993) and polygynous marriages have prevailed (Chamie, 1986; Grassivaro & Florio, 1993).

To sum up the findings of previous studies, consanguinity tends to trigger early-age marriages and early-age childbirths of females, leading to high fertility, even though mortality rate of their offspring is high (Bittles et al., 1991; Reddy & Modell, 1995; Sureender et al., 1998; Hussain & Bittles, 1999). On the other hand, polygyny tends to decrease fertility due to lower coital frequency, longer postpartum abstinence,

higher prevalence of venereal diseases, and lower male fecundity (Bean & Mineau, 1986; Shaikh et al., 1987; Garenne & Van de Walle, 1989; Pebley & Mbugua, 1989). Nonetheless, few studies have simultaneously examined the effects of consanguinity and polygyny on fertility.

For fully understanding the fertility pattern in rural Arab societies, the demographic term, natural fertility, should be considered. Natural fertility is defined as fertility in the absence of deliberate birth control (Henly, 1961) and, in practice, it is recognized to occur when induced abortion and contraceptive practices are not performed (Bongaarts & Potter, 1983). Many Arab countries, including Jordan, had natural fertility regime until the 1970s and since then the fertility has rapidly declined owing to increase in modern contraceptive practices (Nagi, 1984). However, the level of contraceptive prevalence varies markedly from country to country and from population to population (Mauldin & Segal, 1988; Kamal et al., 1999; Feyisetan & Casterline, 2000; Westoff & Bankole, 2000). It is also important that the continued duration of contraceptive practice plays a significant role in fertility decline (Farley, 1986; Jain, 1989; Ross & Frankenberg, 1993; Ali & Cleland, 1999; Khan, 2001). According to Wood (1994), the most relevant factors are psychosocial and moral acceptability by the target society and/or its members, accessibility to effective contraceptive devices and parity of the married couples.

Ⅱ. Purposes

In order to elucidate the fertility pattern and its causes in the South Ghor population, this study has three major purposes. The first purpose is to clarify the

effects of Arab marriage customs, particularly consanguineous and polygynous marriages, on fertility. This aspect is important since only a few previous studies related such sociocultural norms to fertility patterns; even in such studies, the data collected were scarce and unsystematic (Al-Qudsi, 1998).

The second purpose is to reveal contraceptive prevalence and its continued duration by women's ages and to analyze their effects on fertility. This aspect is also important because of shortage of detailed analysis on such effects among populations under early stage of fertility transition. The final purpose is to find possible ways of reducing fertility in Arab societies, paying attention to their culture and/or traditions, especially their gender inequality on the one hand and, on the other, the reproductive health/rights.

This study is expected to contribute to development of microdemographic methodologies for fertility transition and to offer possible solutions for declining high fertility in Arab countries not only in the Middle East but also in North Africa, where fertility-related problems on health and survival have been critical (El-Hallak, 1986; El-Khorazaty, 1993; Zurayk et al., 1997; Shawky & Milaat, 2001).

Ⅲ. Subjects and Methods

1. Subjects and their habitat

The South Ghor district, which administratively belongs to the Karak Governorate and consists of six villages, i.e., Hadieth, Mazra'a, Ithrah, Al Safi, Fifa and Mamoura, is located along the eastern coast of the Dead Sea at the southern end of the

agricultural band of the Jordan Valley, 60 km apart from Karak City and 150 km apart from Amman (Figure 1). This district is situated at 392 m below sea level (at the water surface of the Dead Sea) and is very arid with a yearly rainfall of 150 mm and an average annual temperature of 25.5°C (Royal Jordanian Geographic Center, 1986). The land area of this district is 659 km^2: 10 km^2 for residential area, 57 km^2 for cultivated area, and 342 km^2 for rock plain desert called *hammada*.

According to the 1996 Statistical Yearbook (Department of Statistics, 1997), 30,100 inhabitants of the South Ghor district accounted for only 16.5% of the total population of the Karak Governorate. However, the rate of population increase in this district has been the highest in Jordan, as represented by more than a threefold increase from 1977 to 1997, mostly due to natural increase. According to the Civil Passport Department in Al Safi, the total indigenous population in this district was estimated to be over 24,000. The estimated population density was 45.7 persons per km^2, being much higher than that of the south region of Jordan as a whole, i.e., 9.7 persons per km^2 (Department of Statistics, 1997).

Regarding subsistence patterns, the South Ghor people have depended on growing date palm and indigo for export to Jericho and Jerusalem in Israel via the Dead Sea since the 19th century. In addition, cultivation of vegetables such as tomato, watermelon, cucumber and eggplant by drip irrigation method has been the main source of cash income in recent years. In the Jordan Valley, including the study area, the overall irrigation efficiency (the net amount of water added to the root zone divided by the amount of water taken from other sources) was high, i.e., 57% in 1994 and 68% in 1995, due to improvements in the irrigation system. However, about 16% of the total agricultural area was not regularly supplied with irrigation water because of operational problems and water shortage (Ministry of Water & Irrigation, 1997b). In

1983, the Potash Company for production of agricultural fertilizers was established in Ithrah village (Figure 1); this company, one of the largest enterprises in Jordan, has employed a considerable number of local people. The government has also provided some employment opportunities. However, most people have still lived in farming communities.

2. Data collection

The interview survey was conducted over eight weeks from December 1997 to January 1998. For collection of the data, nine females aged 22-25 years, who were assistant nurses or social workers in the South Ghor district, collaborated as the research assistants after a two-week workshop on methodologies organized by the author's group under the "Family planning and women in development" project with implementation of the Japan International Cooperation Agency (JICA).

According to the Civil Affairs Law No. 34 legislated in 1973, all births, deaths and marriages of Jordanians have been recorded in the "family book" (an official family document) at the Civil Passport Department in each district. Based on the family book kept at the Civil Passport Department of Ghor, 750 women were randomly selected from 3,056 women who were 15-49 years old and had ever married; in the case that two or more women were married to the same husband, one of them was chosen. Nomadic Bedouins also inhabited the study area but they were excluded because they accounted for less than 2% of the total population. The dates of births, deaths and marriages, which were obtained by the author's interview, scarcely differed from those recorded in the family book, though the dates of stillbirths and miscarriages occasionally differed to some extents. Of the 750 women selected, 103 had migrated to large cities such as

Karak, Amman, Aquaba and Zarqa, according to the neighbors and 33 were unidentified. Of the remaining 614 women, six incompletely replied to the questionnaire and thus the 608 women, including 574 currently married women, were the subjects for analyses. For recruitment of the subject women in this survey, the author and his assistants explained the purpose and the interview contents in detail to each woman and her husband and also stated that she was able to decide the participation by herself, and, if she denied, she was not given any disadvantage treatments. All subject women fully agreed to participate in this study.

3. Data analyses

The data analyzed were (1) the birth date (in months) of the subject woman and her offspring, (2) the date(s) (in months) of her marriage(s), (3) kinship relations with her spouse(s) for three generations back, (4) the number of her co-wives, if any, and their order of marriages, (5) her sociocultural backgrounds, i.e., birthplace and education experience, and (6) her lifetime reproductive histories, including the contraceptive methods used, the inception time and the duration (in months) in each occasion.

Based on the kinship relations with their husbands, the women were divided into three groups: those who married with a first-cousin (FC), those who married with a second-cousin (SC), and the remainders who were regarded as a non-consanguineous (NCG) group. For the marriage type, the subject women were categorized into three, following Pebley & Mbugua (1989): (1) monogamous wives, (2) senior polygynous wives, who married with a husband when he was a bachelor, and (3) junior polygynous wives, who married with a husband who already had a wife or wives.

The age-specific marital fertility rate (ASMFR) is an appropriate measure of fertility in microdemographic studies because this rate is not influenced by nuptiality rate (e.g., Umezaki & Ohtsuka, 1998). In this study, the ASMFRs were compared among the NCG, FC and SC wives and among the monogamous, senior polygynous and junior polygynous wives, using the Chi-square test. In addition, dummy variable regression analysis, in which the total number of live births was the dependent variable, was performed to determine the effects of consanguinity and polygyny on fertility.

The Coale & Trussell's (1974, 1978) fertility model was applied to estimate the degree of voluntary fertility restriction. Their model takes the form of $\ln [r(a)/n(a)] = \ln M + mv(a)$, where $r(a)$ is marital fertility rate, the parameter M is a scale factor, the parameter m indicates the degree of voluntary fertility restriction, and the 5-year values of $n(a)$ and $v(a)$ are, respectively, 0.460 and 0.000 for the 20-24 age group, 0.431 and –0.279 for the 25-29 age group and 0.395 and –0.667 for the 30-34 age group. The standard schedule of marital fertility rate and the standard pattern of the effect of contraception are derived from empirical data which are assumed to be invariant over time in any population (Coale & Trussell, 1974, 1978). Coale & Trussell (1974, 1978) also suggested that M and m can be estimated by ordinary least-squares regression, since when $\ln [r(a)/n(a)]$ is Y and $v(a)$ is X, the equation reduces to $Y = \alpha + \beta X$, where α equals $\ln M$ and β equals m; this equation was used in this study.

The subject women were divided into seven age groups of 5-year interval, i.e., 15-19, 20-24 .... 45-49. The proportion of the contraceptive users was examined by the age groups and the mean number of live births was compared between the users and the nonusers, using t-test. For the duration of contraceptive use, the cumulative 12- and 24-month probabilities of discontinuation determined by the life-table method, following the Kaplan-Meier product-limit estimate, were calculated:

$$\hat{F}(t) = 1 - \prod_{j:t_j<t} \frac{(n_i - d_i)}{n_i}$$

where t_j is the ordered distinct uncensored time, n_i is the number of women at risk just prior to t_j, and d_i is the number of terminations at t_j (Kaplan & Meier, 1958; Karia et al., 1998). In this analysis, the subject women were divided into three age groups, i.e., 15-29, 30-39 and 40-49.—

All statistical tests were performed, using the SAS program, and a p-value of 0.05 was the cut-off point for statistical significance.

Ⅳ. Results

Table 1 shows the percent distribution of the subject women who were divided into five age groups by 5-year interval for ages 25-39 and, due to smaller sample sizes, by 10-year interval for the remaining ages, according to consanguinity and marriage type. The prevalence of consanguineous (FC and SC) marriages exceeded 50% in all age groups, being particularly high, i.e., 74.8%, in the 40-49 age group. When the consanguineous women were divided into the FC and SC groups, the prevalence of the latter was relatively constant in all age groups; in other words, FC marriage was more prevalent (48.6%) in the 40-49 age group. It was also revealed that the proportion of patrilateral parallel-cousin marriages was much higher than that of other types in the FC group.

Regarding marriage type, the monogamous wives accounted for more than 70% in the 25-29, 30-34 and 40-49 age groups, although a relatively lower prevalence (56.3%) was found in the 35-39 age group. A particularly high prevalence (88.2%) in the 15-24

age group was largely attributable to the recent change of marriage formation; however, there are high possibilities that some of the unmarried women in this age group, who were not recruited in this study, would marry as junior polygynous wives and that some of the currently monogamous wives and junior polygynous wives would become senior polygynous wives due to their husband's additional marriages.

The mean coefficient of inbreeding (up to the second cousins) was calculated for the subjects according to the formula, $\alpha=\Sigma P_i F_i$, where P_i is the proportion of married couples belonging to each marriage type and F_i is a coefficient of inbreeding (chance of homozygosity): F=1/64 for SC marriages and F=1/16 for FC marriages. As the result, the mean inbreeding coefficient (α) was 0.0251 while the coefficient derived from the FC marriages only was 0.0214.

Table 2 shows the prevalence rates of consanguinity and polygyny among the subject women in relation to the birthplace, educational experience and age at first marriage. The majority were born in the South Ghor district, although this proportion was significantly lower in the NCG wives than in the FC wives ($p<0.05$) and the SC wives ($p<0.01$). Regarding the education experience, the number of women with no schooling was lower in the monogamous wives than in the senior polygynous wives ($p<0.01$) and the junior polygynous wives ($p<0.05$) but there was no significant difference between the NCG wives and the FC or SC wives. The percent distribution of the women for each marriage type according to age at first marriage demonstrated that the proportion of women aged less than 16 years was higher in the monogamous group than in the junior polygynous group ($p<0.01$), reflecting the marriage patterns whereby women who married at older ages tended to become junior polygynous wives more often than monogamous wives. It is also important to note that the age at first marriage of the subjects women was low; 82.2% of them married before 20 years old.

Table 3 shows the ASMFRs, together with the total marital duration (in person-years), in which the women are broken down by consanguinity and marriage type. The ASMFRs were higher in the monogamous wives than in the polygynous wives, with significant differences between the monogamous wives and the senior polygynous wives in the 20-24 age group and between the monogamous wives and the junior polygynous wives in the 20-24 and 35-39 age groups. In contrast, the ASMFR did not significantly differ among the NCG, FC and SC groups. The total marital fertility rate (TMFR) was higher in the monogamous wives (10.5) than in the senior polygynous wives (8.1) and the junior polygynous wives (8.6), though there were no significant differences.

Table 4 gives the results of the dummy variable regression analysis, with the total number of childbirths as the dependent variable, and age, consanguinity and marriage type as the independent variables. It was demonstrated that both of the senior and junior polygynous wives had significantly smaller number of children than the monogamous wives, being consistent with the above-mentioned results.

Table 5 shows the calculated ASMFRs, i.e., $r(a)$, and the estimated M and m in the Coale & Trussell's model for the study population; the values of $n(a)$ and $v(a)$ are also given. According to the Coale & Trussell's (1978) definitions whereby an $m>0.2$ is critical for voluntary fertility control and the mean square error (MSE) indicates a perfect fit at 0, a mediocre fit at 0.005 and a poor fit at 0.01, the results, i.e., -0.082 for m and 0.0028 for the MSE, demonstrated negligible effects of contraception on fertility.

Table 6 shows the number of contraceptive users at present and the total person-times of uses in the past. The current contraceptive prevalence rate (CPR) was 19.7%, consisting of 5.4% with traditional methods such as breastfeeding, withdrawal and periodic abstinence and 14.3% with modern methods. Due to questionable effects

of the traditional methods (Bledsoe et al., 1994), the modern methods were exclusively treated in this study. Among the current users, IUD (6.4%) was the most common reversible method, followed by oral contraceptive pill (2.4%) and injectable (1.2%), while sterilization was undergone by 3.7%; induced abortion has not been practiced in the study population. Of the contraceptives in the past (108 person-times), pill (50 person-times) and IUD (48 person-times) were used frequently.

The modern contraceptive users, numbering 147 in total, were categorized into six types according to the current use/nonuse and the number of uses in the past (Table 7). Of the 82 current users, 21 were sterilized. The remaining 61 users were the subjects for the analysis of discontinuation probabilities, though three of them, whose age was 40 or higher at the first contraceptive use, were excluded due to the small number. For the contraceptive use in the past, the 108 cases (person-times) were also used for the analysis of discontinuation probabilities.

The 147 contraceptive users of any methods and the 21 sterilized women were divided into three age groups, i.e., 15-29, 30-39 and 40-49, to compare their cumulative proportions by age at the first use. As illustrated in Figure 2, age of the youngest woman at use of any methods in the 19-29, 30-39 and 40-49 age groups was, respectively, 16, 19 and 25 years. The cumulative proportion of the users in the three age groups was, respectively, 29.7% (76/256), 22.6% (49/217) and 21.8% (22/101), showing higher in younger groups, particularly when compared in the same chronological ages. On the other hand, sterilization was undergone not by the women of the 15-29 age group but by those of the remaining groups, mostly in their 30s and 40s.

Table 8 compares the number of live births between the women who had used modern contraceptive methods and those who had not, separately for the seven age groups. The mean number was larger in the former than in the latter, except the 40-44

and 45-49 age groups, with significant differences in the 20-24, 25-29 and 35-39 age groups. Similarly, the numbers of live births between the women who intended to use modern methods in the future and those who did not was compared, though there were 112 women who had not decided yet (Table 9). The mean number was again larger in the former than in the latter for all age groups, with significant differences in the 20-24, 25-29 and 35-39 age groups.

Based on the duration of use of modern contraceptive methods (except sterilization), the cumulative 12- and 24-month probabilities of discontinuation were calculated. Since there were only three contraceptive users who began after 40 years of age, the analysis was conducted for five 5-year age ranges at use, from 15-19 to 35-39 years. As mentioned previously, the total cases amounted to 166, consisting of 58 current contraceptive users and 108 person-times of contraceptive use in the past; the former were treated as censored data and the latter as non-censored data (Table 10). As the results, the cumulative 12- and 24-month discontinuation probabilities decreased according to the increase in age at use, with exception of a slightly lower 12-month probability in the women of 15-19 years than in those of 20-24 years. This analysis highlighted high discontinuation probabilities among the women who did contraception in young ages, represented by almost 90% 24-month probabilities in 15-19 and 20-24 years.

V. Discussion

1. Natural fertility and fertility transition

Discussion begins with implications of natural fertility since the low m value (-0.082) of the study population ascertained negligible effects of contraception on fertility. According to Campbell & Wood (1988), TFR of natural fertility populations in early stage of fertility transition varied from 4 to 8, with the mean of about 6. The author estimated the TFR of the study population at 7.2, based on the ASMFRs and the nuptiality rate, which was high, represented by the fact that 82.2% of the subject women married before their 20th birthday.

Short duration of postpartum infecundity also played a significant role in increase of fertility, as revealed by a few studies for Arab countries, including Jordan, under the natural fertility regime in the 1970s (Nagi, 1984) and by many studies for other developing countries (or populations in them) in early stage of modernization, where biological and cultural restrictions on fecundity have been weakened but their own reproduction norms have still inhibited contraceptive practices (Romaniuk, 1980; Jejeebhoy, 1983; Van de Walle & Omideyi, 1988; Felt et al., 1990; Ohtsuka, 1990; Umezaki & Ohtsuka, 1998; Polo et al., 2000). For Jordanians, Department of Statistics & Macro International (1998) reported that the median durations of postpartum abstinence and postpartum amenorrhea due to breastfeeding practices in 1997 were, respectively, 1.7 and 3.8 months, with little regional variations. It was also disclosed that the mean duration of postpartum infecundity or breastfeeding was shorter in Jordan than in other Muslim countries (Akin et al., 1986; Ahmed, 1987). To sum up, high fertility of the South Ghor population has been caused by high nuptiality

and short postpartum infecundity, based on the sociocultural norms of Arab societies, especially in Jordan.

It has been widely recognized that fertility transition from natural fertility in Arab countries occurred when the use of modern contraceptives, except sterilization, was sanctioned and that the fertility transition in Jordan as a whole began in 1985-90. However, this study revealed its delay in the South Ghor population, represented by the fact that the TFR of the study population (7.2) was considerably higher than the national level (4.2) in 1997, the former being almost identical to the national level (7.4) in 1976 (Department of Statistics & Macro International, 1998); such inter-population variations were also observed in other developing countries (Yusuf & Retherford, 1981; Basu et al., 1988; Bailey & Serow, 1991). As emphasized by Mason (1997), it is important to recognize that sociocultural norms have markedly varied among populations to produce difference in the numbers of childbirths before the onset of fertility transition, leading to differences in fertility level in the post-transitional period. Thus, microdemographic analyses of the mechanisms of high fertility in populations, in which fertility transition has not begun, have been needed. The present study has contributed to this need, with sufficient data. Bongaarts & Watkins (1996) also pointed out the importance of analyses of their local institutional and sociocultural conditions in relation to the fertility transition; such discussion will be made in the following sections.

2. Polygyny and consanguinity and their effects on fertility

The high proportion of consanguineous marriages, i.e., 58.1%, or 34.2% for the FC marriages and 23.8% for the SC marriages, and the high proportion of polygynous

marriages, i.e., 28.0%, in the South Ghor population can be compared with those reported in the literature (Table 12), showing that the both proportions of the study population were within the ranges but were higher than those in most Arab and other populations. In general, consanguineous marriages are favored when most marriages are organized within geographical boundaries of the population concerned (Pedez & Abade, 1995; Naidu & Mascie-Taylor, 1997); 94.4% of the subject women in this study were born in the South Ghor district. A high prevalence of polygyny is possible only under the condition that there are marked age differences between spouses. Fargues (1989) reported that the ages at marriage were 4.1-7.9 years older in the husbands than in the wives in many Arab countries. In the study population, the average age difference between the husbands and the wives was 8.4 years, exceeding the above range.

The high rates of consanguineous and polygynous marriages are associated with various sociocultural norms. In the study population, the most relevant influence derived from Muslim interpretations of the scriptures such as the Qur'an (the Islamic sacred book), the Hadith (the collection of traditions relating to Muhammad) and the Sunna (a portion of Muslim law, based on Muhammad's words or acts), as pointed out by Obermeyer (1992). Among such norms, females' young age at marriage, low education level, limited freedom in choosing marriage and divorce, and subordinate position in the family have been considered as the significant factors affecting marriages and childbirths (Nagi, 1984; Obermeyer, 1992). These traditional patterns have been weakened as increase in influence of Western culture (Bittles et al., 1991) mostly because secularization, in which the religion retreats to more remote spheres of life so that most decisions on reproduction are no longer based on the religious beliefs and practices, has been progressing in the Third World, including Arab societies (Caldwell &

Caldwell, 1987). However, such changes have seldom been observed in the study population, even though the young women have tended to hesitate about consanguineous and especially polygynous marriages.

The most important findings of this study were higher fertility rate in the monogamous wives than in the polygynous wives and insignificant differences in fertility between the NCG wives and the FC or SC wives. The latter finding is not in agreement with the results reported from some populations, in which consanguineously married women had higher fertility to compensate high postnatal mortality rate of their offspring (Sureender et al., 1998; Hussain & Bittles, 1999). This difference is explained by low infant mortality rate (IMR) for the children of any of the FC, SC and NCG mothers in the study population; the IMR for a 10-year period preceding the present survey was 28.4 per 1,000 births for the FC and SC wives and 26.5 for the NCG wives, according to the baseline research of the "Family planning and women in development" project, which was undertaken by the author's group in 1997.

A possible reason for the low IMR in the study population compared to many high-fertility populations was low prevalence rates of diarrhea and acute respiratory infection of Jordanian children under 5 years, i.e., respectively, 15.9% and 7.9% in the south region, 17.8% and 10.6% in the central region, and 18.9% and 9.8% in the north region. Furthermore, the immunization coverage rate of polio, DPT and measles vaccinations for Jordanian children aged 12-23 months was high, i.e., 79.0% in the south region, 84.2% in the central region and 90.2% in the north region in 1997 (Department of Statistics & Macro International, 1998). As reported by Obermeyer et al. (1993), this rate was high even in the early 1980s, causing decline in child mortality rate than that in fertility rate (Nur, 1985). Thus, these outstanding health indices for infants and children resulted in the negligible difference in mortality between the NCG

wives and the FC or SC wives. In addition, the repetition of consanguineous marriages for many generations may have attributed to the negligible difference, as observed in an Indian population (Reddy & Modell, 1995).

The present analysis revealed much higher fertility in the monogamous wives than in the polygynous wives, as exemplified by the former group's higher TMFR by more than two births; the TMFR was slightly higher in the junior polygynous wives than in the senior polynynous wives. In traditional Arab societies, the husband tends to have a plural number of wives when his first wife is infecund or sub-fecund (Chamie, 1986) and such tendency is particularly manifest among Jordanian husbands in rural areas (Warren et al., 1990). Since the polygynous marriage causes change of marital status of a monogamous wife to a senior polygynous wife and makes a newly married woman a junior polygynous wife. Thus, there was a high possibility that low fertility of the senior polygynous wives, as reflected in the TMFR or the ASMFR, was caused by their physiologically low reproductive abilities, i.e., infecundity or sub-fecundity. However, the fact that the TMFR or ASMFR of the junior polygynous wives was low implies the significant effect of the polygynous husbands' low reproductive abilities. It is thus likely that the infecund or sub-fecund senior polygynous wives might have had the similar number of children if they had remained as monogamous wives, suggesting less effects of marital pattern on fertility of the whole population.

The age of men at marriage has been considered as another plausible reason for fertility difference between the monogamous and polygynous wives. For instance, in a Senegalese population, Garenne & Van de Walle (1989) observed that the fertility rate of women aged 15-29 years, who married with their husbands aged 40-49 years, 50-59 years, and over 60 years, was, respectively, 7.8%, 30.7% and 62.2% lower than that of women who married with their husbands aged less than 40 years. According to

the baseline research of the "Family planning and women in development" project, the proportion of women who married with their husbands aged over 40 years (N=463) was only 1.1% among the monogamous wives and 3.0% among the senior polygynous wives whereas the proportion of the junior polygynous wives who married with their husbands aged 40-49 years and 50 years or older was, respectively, 22.7% and 10.2%. This may have induced low fertility rate in the junior polygynous wives. However, small difference in the TMFR between the junior and senior polygynous wives suggest higher proportion of infecund or sub-fecund individuals among the senior polygynous wives.

In summary, consanguineous (cousin) marriages did not have marked effects on fertility and only the marital age of husbands with their junior polygynous wives affected fertility, implying that decrease in marital age of the polygynous husbands tends to elevate fertility.

3. Ineffective contraceptive use and its causes

The study population has still maintained a natural fertility regime despite that the CPR for modern methods reached nearly 15% mainly due to higher acceptance by the young women. This study revealed three major reasons for their negligible effects on fertility. Firstly, sterilization as the most effective means has been used mostly by the women aged 30 years or higher; the mean (±SD) age at sterilization among the 21 women concerned was 36.2 (±4.9) years. Furthermore, the mean number of live births (±SD) for the 21 women at the time of sterilization was 9.0 (±2.6), implying that only the women who had reached an "obligatory" number of children based on their traditional sociocultural beliefs (Underwood, 2000) tended to undergo

sterilization.

Secondly, the women who had used modern contraceptives had larger numbers of children than those who had not, particularly among the most fertile 20-24 and 25-29 age groups. The same pattern was observed between the women who intended to use contraceptives in the future and those who did not. The more fertile the women the higher rate of acceptance of contraceptive practices. It is thus recognized that the South Ghor women avoided contraceptive practices unless the women, in particular, and their husbands judged to have had an "enough" number of children for their age.

Finally, the cumulative probabilities of discontinuation of contraception were high in the young and high-fertile age groups, resulting in weak effects on the overall fertility. Though such age-related discontinuation pattern was observed in several populations (Teachman et al., 1980; Narkavonnakit et al., 1982; Potter, 1984), it was extremely high among the South Ghor women; in particular, the 24-month probabilities were about 90% in 15-19 and 20-24 years.

The effects of contraception on fertility among the South Ghor women are thus summarized as follows. Despite that the cumulative proportion of modern contraceptive users was about 30% in the 15-29 age group and about 20% in the remaining groups, the effect was negligible mostly due to more frequent contraceptive practices by the women who had larger numbers of children and higher discontinuation rates of the young users.

4. Acceptability of family planning

Since 1985, when the project, entitled "Population policy in relation to development strategy," organized by the Department of Statistics & Ministry of Health

in Jordan was launched, family planning services have been available at approximately 100 maternal and child health (MCH) centers throughout the country. In the South Ghor district, such services have been conducted by two MCH centers since the late 1980s. To determine the reasons for relatively low CPR (or cumulative proportion of contraceptive users) in this population, it is necessary to investigate the inhabitants' views on childbearing. In the above-mentioned baseline research, "Family planning and women in development" project, both married men (N=463) and women (N=608) in the South Ghor district were asked about their ideal number of children; all subject women of this study participated to the baseline research. The most striking result was that two-thirds of the men answered "as many as possible" (Table 13). When the similar answer, "up to God," was added, about 70% of them wanted as many children as possible. This proportion reduced to about 30% in the women. Comparing between the men and women who answered ideal number of children, the mean (±SD) was 7.5 (±3.4) for the former and 4.4 (±2.0) for the latter, with significant difference. Thus, it is plausible that such procreative attitude of men induces high proportion of polygynous marriages and high fertility in this study population.

Underwood (2000) pointed out that Jordanian women have judged to maintain the potential of childbearing until their menopause not to contravene the will of God, even if they would like to prevent pregnancy. Such psychosocial reproductive norms have been predominant among the South Ghor women. From the results of this study, however, the husbands have played more significant roles in determining childbearing strategies or acceptance of family planning; the husbands' dominance was also reported from other traditional Arab societies (Oheneba-Sakyi & Takyi, 1997; Petro-Nustas, 1999). In order to decrease fertility of the South Ghor population who have been adherent to the traditional sociocultural norms and other populations under the similar

conditions, the efforts for increase of contraceptive prevalence should target the men rather than the women.

5. Sociocultural norms and reproductive health/rights in relation to family planning

Decrease of fertility has been recognized as one of the most important means for release from poverty among high-fertility populations in developing countries (Fong, 1985; Kibirige, 1997). Furthermore, the South Ghor population, similarly to many other populations in the adjacent areas, has faced serious environmental problems; the most serious is extreme aridity, represented by less than 200 mm of annual precipitation, which causes critical water shortage for irrigation to agricultural fields and sanitation of the inhabitants. Noin & Clarke (1998) pointed out that (1) 64% of human populations who inhabit arid regions in the world are Muslims and their population numbers have still been rapidly increasing due to high fertility rates, (2) the arid environment has generated frequent mobility and has accelerated urbanization, and (3) aridity has restricted, and will restricts, survival of human populations. It has also been emphasized by Roudi-Fahimi et al. (2002) that the amount of annual renewable freshwater per capita in the Middle East decreased from 3,645 m^3 in 1970 to 1,640 m^3 in 2001. In Jordan, the Ministry of Water & Irrigation (1997a, 1997b) estimated decrease of this amount from 175 m^3 in 1996 to 160 m^3 in 2000, being less than one-third of the widely recognized "water poverty line" of 500 m^3 per capita per year.

It is thus an urgent need to decline fertility in the study population. For this purpose, it is needed to consider about the inhabitants' sociocultural norms and

reproductive health/rights in relation to family planning practices.

As mentioned previously, the study population has scarcely adopted Western norms, including secularization. In other words, their behaviors have still been based on the Arab sociocultural norms, most of which originated in Islam, and they are particularly concerned with marriage and childbirth (Obermeyer, 1992). The most relevant sociocultural norm is the belief that children are gifts of Allah, in addition to the dominant position of men over women and women's young age at marriage, low education level and limited freedom in choosing either marriage or divorce (Nagi, 1984).

Nonetheless, it is also important to understand that Islam has no clergy and no central authority to proclaim any matters so that different interpretations of the scriptures are accepted, suggesting possible changes in the reproductive judgments (Sachedina, 1990). The equality among the believers of this religion regardless of gender and the women's relative economic independence are possible, as emphasized by Omran (1992). In fact, some Arab countries that have experienced rapid fertility decline have improved women's status in the course of transition from the traditional to modern interpretations of the Muslim scriptures. In this course, the roles of the religious leaders have been important since their judgments have been respected in the Muslim communities (Underwood, 2000)

Health problems among Arab women have been considered in the sociocultural contexts (Kane et al., 1992; Okojie, 1994; Zurayk et al., 1997), though these problems, at least in Jordan, have not been related to an idea of reproductive health/rights (Hardee et al., 1999), which was approved in the International Conference of Population and Development held in Cairo in 1994 (United Nations Secretariat, 1995). From the discussion points mentioned previously, this study concludes that reduction of gender discrepancies in association with sociocultural changes is needed not only to improve

health and welfare of the women but also to decrease fertility, which contributes to the long-term sustainable development of the population. For this purpose, it is recommended for the health officers and health workers to understand the sociocultural norms of the inhabitants, to target both of the males and females in family planning and health promotion programs, and to cooperate with not only the local inhabitants but also the religious leaders.

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Table 1. Percent distributions of the subject women divided into five age groups by consanguinity and marriage type

		Age group (years)				
	Total	15−24 (n=110)	25−29 (n=154)	30−34 (n=134)	35−39 (n=103)	40−49 (n=107)
Consanguinity#						
Non-consanguineous*	41.9	48.2	46.8	40.3	47.6	25.2
Consanguineous: first-cousin	34.2	31.0	31.1	32.1	30.1	48.6
Patrilateral, parallel	(23.0)	(16.4)	(22.1)	(17.9)	(21.4)	(39.3)
Matrilateral, parallel	(4.1)	(6.4)	(2.6)	(6.0)	(1.9)	(3.7)
Patrilateral, cross	(3.3)	(6.4)	(1.9)	(3.7)	(1.9)	(2.8)
Matrilateral, cross	(3.8)	(1.8)	(4.5)	(4.5)	(4.9)	(2.8)
Consanguineous: second-cousin	23.8	20.9	22.1	27.6	22.3	26.2
Marriage type						
Monogamous**	72.0	88.2	70.8	70.9	56.3	73.8
Polygynous						
Senior	9.4	2.7	9.1	7.5	16.5	12.1
Junior	18.6	9.1	20.1	21.6	27.2	14.0

Note: The percentages of first cousins broken down into four marriage types are shown in parentheses.

The mean inbreeding coefficient was 0.0251.

*, ** Significantly different by age groups at $p < 0.05$ and $p < 0.01$.

Table 2. Percent distributions of the subject women by selected characteristics of marital relationships

		Consanguinity			Marriage type		
		Non-consanguineous	Consanguineous		Monogamous	Polygynous	
			First	Second		Senior	Junior
	Total	(n=255)	(n=208)	(n=145)	(n=438)	(n=57)	(n=113)
Birthplace							
South Ghor	94.4	91.0	96.2*	97.9**	94.3	96.5	93.8
Other areas	5.6	9.0	3.8	2.1	5.7	3.5	6.2
Educational level							
No schooling	59.2	56.5	59.1	64.1	53.9	84.2****	67.3***
Basic schooling (1−5 years)	32.2	33.3	32.2	30.3	35.8	12.3	28.3
Secondary+ (6+ years)	8.6	10.2	8.7	5.5	10.3	3.5	4.4
Age at first marriage							
< 16	39.8	36.5	40.4	42.8	42.0	42.1	30.1****
16−17	27.3	26.7	31.7	26.9	29.0	15.8	26.5
18−19	15.1	16.9	12.5	12.4	14.6	15.8	16.8
20+	17.8	20.0	15.4	17.9	14.4	26.3	26.5

Note: χ^2 test was used for all comparisons.

*,** Significantly different from non-consanguineous wives at $p < 0.05$ and $p < 0.01$.

,* Significantly different from monogamous wives at $p < 0.05$ and $p < 0.01$.

Table 3. Age-specific marital fertility rates and the total marital period (in person-years) for the subject women by marriage type and consanguinity

	Consanguinity						Marriage type					
			Consanguineous					Polygynous				
	Non-consanguineous		First-cousin		Second-cousin		Monogamous		Senior		Junior	
15−19	0.357	(724.5)	0.351	(646.3)	0.356	(444.4)	0.370	(1371.9)	0.269	(156.0)	0.327	(287.3)
20−24	0.416	(1003.8)	0.426	(904.5)	0.382	(599.9)	0.436	(1826.8)	0.326*	(242.3)	0.355*	(439.2)
25−29	0.386	(832.3)	0.423	(775.8)	0.389	(501.5)	0.419	(1461.8)	0.354	(228.8)	0.360	(419.1)
30−34	0.326	(515.0)	0.349	(530.2)	0.319	(364.2)	0.346	(942.5)	0.276	(177.4)	0.325	(289.4)
35−39	0.275	(246.8)	0.326	(334.6)	0.278	(198.1)	0.329	(550.8)	0.246	(105.7)	0.203*	(123.1)
40−44	0.151	(85.8)	0.159	(169.5)	0.216	(97.0)	0.195	(256.2)	0.085	(47.2)	0.143	(49.0)
45−49	0.000	(20.5)	0.022	(45.8)	0.000	(24.8)	0.000	(63.3)	0.066	(15.2)	0.000	(12.6)
TMFR#	9.564		10.278		9.694		10.475		8.111		8.568	

Notes: The marital periods (in person-years) are shown in parentheses. The χ^2 test was used for all comparisons, except for the 45−49 age group.

Total marital fertility rate; the total marital fertility rate as a whole was 9.9.

* Significantly different from monogamous wives at $p < 0.05$.

Table 4. Results of dummy variable regression for the number of live births

	B	β	t-value
Intercept	−3.92		−9.67*
Age (years)#1	0.30	0.71	24.49*
Consanguinity			
Non-consanguineous#2	−	−	−
Consanguineous, first-cousins	0.32	0.05	1.50*
Consanguineous, second-cousins	−0.08	−0.01	−0.34*
Marriage type			
Monogamous#2	−	−	−
Polygynous, senior	−1.59	−0.15	−5.08*
Polygynous, junior	−1.24	−0.15	−5.19*
Adjusted R^2 (%)		51.5	

#1 For reference purposes only.

#2 Non-consanguineous and Monogamous are reference categories.

* $p < 0.01$.

Table 5. The South Ghor women's age-specific marital fertility rates and the estimated of M and m in the Coale and Trussell's model

	Coale and Trussell's model		South Ghor
Age group (years)	$n(a)$	$v(a)$	$r(a)$
20−24	0.460	0.000	0.411
25−29	0.431	−0.279	0.400
30−34	0.395	−0.667	0.333
35−39	0.322	−1.042	0.298
40−44	0.167	−1.414	0.173
M			0.873
m			−0.082
MSE#			0.0028

MSE=Mean square error.

Table 6. The number of contraceptive users by methods at present and in the past

	Contraceptive use	
	Present#	Total person-times in the past
Any method	113 (19.7)	171
Modern methods		
IUD	37 (6.4)	48
Pill	14 (2.4)	50
Injectable	7 (1.2)	7
Vaginal	2 (0.3)	2
Condom	1 (0.2)	1
Sterilization	21 (3.7)	—
Sub-total	82 (14.3)	108
Traditional methods		
Breastfeeding	24 (4.2)	56
Withdrawal	6 (1.0)	4
Periodic abstinence	1 (0.2)	3
Sub-total	31 (5.4)	63

The number of women with percent to the total subjects (N=574) in parentheses.

Table 7. The modern contraceptive users broken down into six types according to the use/nonuse at present and the number of uses in the past

Type	Current use#1	Past use#2	No. of women	No. of sterilized women	No. of current users except sterilization	Total no. of person-times in the past
1	0	1	51	–	–	51
2	0	2	12	–	–	24
3	0	3	2	–	–	6
4	1	0	57	19	38	–
5	1	1	23	1	22	23
6	1	2	2	1	1	4
Total			147	21	61	108

#1 0: Nonuse, 1: Use.

#2 The number of uses.

Table 8. The mean number of live births for women who had, and had not, used modern contraceptive methods

Age group (years)	Experience of contraceptive use			
	Had used		Had not used	
	n	Mean ± SD	*n*	Mean ± SD
15−19	1	2.0	12	1.6 ± 1.0
20−24	26	3.3 ± 0.9**	70	2.5 ± 1.3
25−29	49	4.9 ± 1.5**	98	3.6 ± 1.9
30−34	33	6.7 ± 2.1	92	6.0 ± 2.2
35−39	16	8.4 ± 2.1*	76	6.9 ± 2.8
40−44	11	9.1 ± 2.4	50	10.0 ± 2.2
45−49	11	8.7 ± 2.6	29	8.8 ± 2.8

*,** Significantly different between the two groups at $p < 0.05$ and $p < 0.01$.

Table 9. The mean number of live births for women who intended, and did not intend, to use modern contraceptive methods in the future

Age group (years)	Intention of contraceptive use			
	Intended to use		Did not intend to use	
	n	Mean ± SD	*n*	Mean ± SD
15−19	2	2.0 ± 0.0	9	1.4 ± 1.1
20−24	31	3.1 ± 1.2**	48	2.3 ± 1.3
25−29	46	4.5 ± 1.9*	66	3.5 ± 2.1
30−34	34	6.6 ± 1.8	70	6.1 ± 2.5
35−39	17	8.1 ± 1.9*	59	6.7 ± 3.0
40−44	10	9.7 ± 1.8	39	9.3 ± 2.5
45−49	1	9.0	30	8.8 ± 2.8

Note: 112 women are excluded because they had not decided.

*,** Significantly different between the two groups at $p < 0.05$ and $p < 0.01$.

Table 10. Cumulative 12- and 24-month probabilities of discontinuation of modern contraceptives except sterilization among the users by their age at use

Age at use (years)#1	Cumulative probability (%)		
	n#2	12-month*	24-month*
15－19	17 (3:14)	41.7	91.9
20－24	64 (12:52)	50.8	88.2
25－29	55 (27:28)	35.7	63.0
30－34	21 (13: 8)	24.4	46.0
35－39	9 (3: 6)	23.8	23.8

#1 Three women whose age at use was 40 years or higher were excluded from analysis.

#2 The numbers in parentheses are censored cases (i.e., the current users) in the left and non-censored cases (i.e., the person-times in the past) in the right.

* Significantly different among the five age groups at $p < 0.01$.

Table 11. Prevalences of consanguineous and polygynous marriages in previous studies

Population	Sample size (*n*)	Consanguineous marriage (%)	Polygynous marriage (%)	Reference
Consanguinity				
Arab countries				
Beirut, Lebanon	2,250	26.0		Klat & Khudr (1983)
United Arab Emirates	2,200	50.5		Al-Gazali et al. (1997)
Saudi Arabia	1,307	52.3		Al-Abdulkareem & Ballal (1998)
Kuwait	5,007	54.3		Al-Awadi et al. (1985)
Jordan (north)	880	63.7		Al-Salem & Rawashdeh (1993)
Other countries				
Turkey	5,414	21.1		Tuncbilek & Koc (1994)
Kotia, India	211	27.5		Naidu & Mascie-Taylor (1997)
Karnakata, India	65,492	33.1		Bittles (1988)
Swat, Pakistan	2,037	40.7–44.1		Wahab & Ahmad (1996)
Karachi, Pakistan	1,011	58.7		Hussain & Bittles (1999)
Polygyny				
Arab countries				
Lebanon#1	—#3		3.7	Chamie (1986)
United Arab Emirates#1	—#3		6.0	Chamie (1986)
Jordan (east bank)#1	—#3		3.8	Chamie (1986)
Kuwait#1	—#3		11.7	Chamie (1986)
Algeria	239		11.1–19.1	Grassivaro & Florio (1993)
Other countries				
Matlab, Bangladesh	17,684		4.9	Shaikh et al. (1987)
Kenya#2	1,154		15.0	Dodoo (1998)
Ghana#2	528		22.7	Dodoo (1998)
Niger#2	1,740		29.4	Peterson (1999)
Yoruba, Nigeria	5,874		45.8	Ahmed (1986)

#1 The prevalence rate was calculated based on male subjects.

#2 The data cited from the Demographic and Health Survey.

#3 Sample size was not mentioned.

Table 12. Percent distributions of the men and women in the South Ghor district according to the ideal number of children

	Distribution (%)	
	Men (n=463)	Women (n=608)
Non-numeric response		
Up to God	2.8	25.0
As many as possible	67.2	5.1
Others	1.1	2.5
Numeric response		
< 3	1.7	13.8
3−5	7.8	35.4
6+	19.4	18.3
Mean ± SD#	7.5 ± 3.4*	4.2 ± 2.0

The subjects with numerical response only.

* Significantly different between men and women at $p < 0.01$.

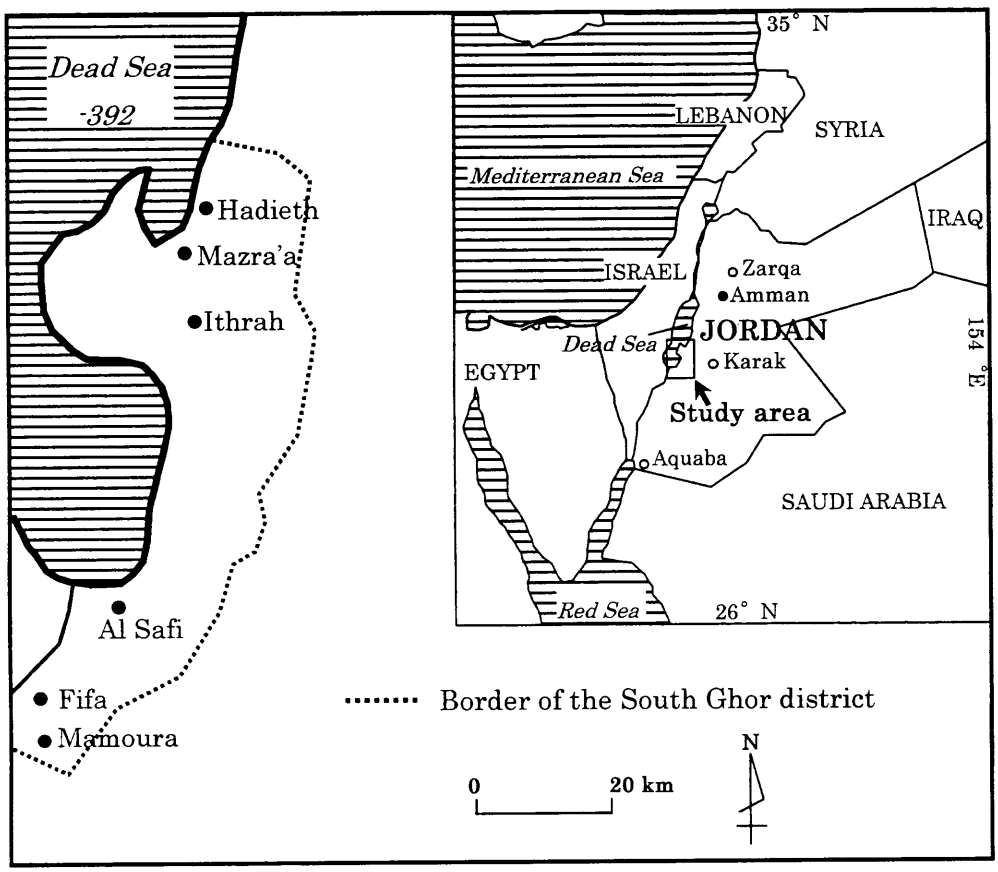

Figure 1. Map of the Middle East and the South Ghor district. The South Ghor district is administratively divided into six villages.

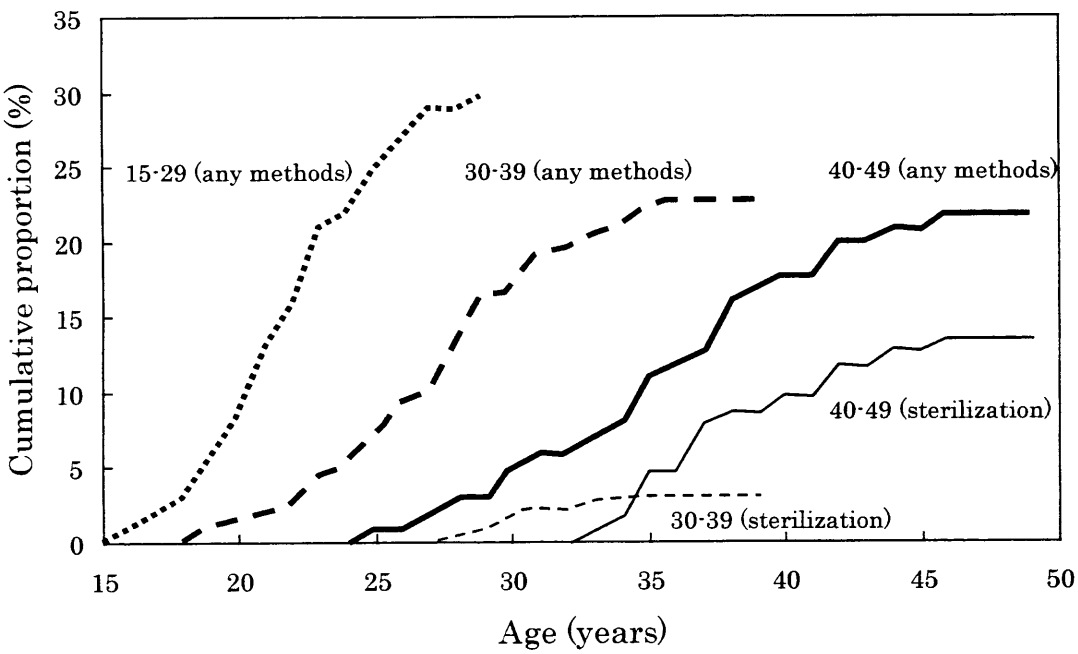

Figure 2. Cumulative proportion of modern contraceptive users by the age groups according age at the first use.

Appendix: Questionnaire

IDENTIFICATION				
HOUSEHOLD NUMBER.....				
NAME OF HOUSEHOLD HEAD				
NAME OF WOMAN INTERVIWED				
INTERVIWER VISITS				
	1	2	3	FINAL VISIT
NAME OF INTERVIWER				
DATE				
TIME				
RESULT*				
NEXT VISIT			TOTAL NO. OF VISITS.....	

* RESULT CODES: 1 COMPLETED 2 NOT AT HOME 3 POSTPONED 4 REFUSED
5 PARTLY COMPLETED 6 INCAPACITATED 7 OTHER_____(SPECIFY)

1. BACKGROUND

NO.	QUESTIONS AND FILTERS	CATEGORIES	SKIP
101	First I would like to ask some questions about your background. In what month and year were you born? CHECK THE "FAMILY BOOK".	Month..... Don't know month.....9 Year.....19 Don't know year.....99	
102	Where were you born?	_____ (name of place)	
103	Have you ever attended school?	Yes..... 1 No..... 2	 106
104	What is the highest level of schooling you attended: basic, secondary, institute, or higher studies?	Basic..... 1 Secondary..... 2 Institute..... 3 Higher studies..... 4	
105	What is the highest (grade/form/year) you completed at that level?	Grade.....	
106	Can you read and understand a letter or newspaper easily, with difficulty, or not at all?	Easily..... 1 With difficulty..... 2 Not at all..... 3	 108
107	How often do you read a newspaper or a magazine? Would you say: every day, 3-5 times a week, once or twice a week, once a month, few times a year, or never?	Every day..... 1 3-5 times a week..... 2 Once or twice a week..... 3 Once a month..... 4 Few times a year..... 5 Never..... 6 Don't know..... 7	

2. MARRIAGE

NO.	QUESTIONS AND FILTERS	CATEGORIES	SKIP
201	What is your marital status now: are you married, divorced, separated or widowed?	Married..... 1 Divorced..... 2 Separated..... 3 Widowed..... 4	
202	Have you been married only once or more than once?	Once..... 1 More than once..... 2	
203	I would like to ask some questions about marital condition between you and your husband during your life. CHECK THE "FAMILY BOOK".		

CHECK 202. RECORD MARRIED MORE THAN ONCE ON SEPARATE LINE. (NAME OF HUSBAND)	203-1 In what month and year did you start living with (HUSBAND)? And how old were you when you started living him? CONSUMMATE MARRIAGE.	203-2 What is (was) the type of relationship between you and (HUSBAND)?	203-3 Does (did) (HUSBAND) have another wife (other wives) besides you?	203-4 How many?	203-5 What is (was) your order in wives of (HUSBAND)? SPECIFY MARITAL ORDER. CHECK 203-4.
1st	Month.....____ D.K. month.....9 Year.....19____ D.K. year.....99 Age.....____ (in years)	First cousin from both father's side..... 1 First cousin from both mother's side..... 2 First cousin from mother's side and father's side... 3 First cousin from father's side and mother's side... 4 Second cousin (father's side)..... 5 Second cousin (mother's side)..... 6 No relation..... 7 Don't know..... 8	Yes..... 1 No..... 2 ↓ 301	One..... 1 Two..... 2 Three... 3	First..... 1 Second... 2 Third.... 3 Fourth... 4
2nd	Month.....____ D.K. month.....9 Year.....19____ D.K. year.....99 Age.....____ (in years)	First cousin from both father's side..... 1 First cousin from both mother's side..... 2 First cousin from mother's side and father's side... 3 First cousin from father's side and mother's side... 4 Second cousin (father's side)..... 5 Second cousin (mother's side)..... 6 No relation..... 7 Don't know..... 8	Yes..... 1 No..... 2 ↓ 301	One..... 1 Two..... 2 Three... 3	First..... 1 Second... 2 Third.... 3 Fourth... 4
3rd	Month.....____ D.K. month.....9 Year.....19____ D.K. year.....99 Age.....____ (in years)	First cousin from both father's side..... 1 First cousin from both mother's side..... 2 First cousin from mother's side and father's side... 3 First cousin from father's side and mother's side... 4 Second cousin (father's side)..... 5 Second cousin (mother's side)..... 6 No relation..... 7 Don't know..... 8	Yes..... 1 No..... 2 ↓ 301	One..... 1 Two..... 2 Three... 3	First..... 1 Second... 2 Third.... 3 Fourth... 4

3. LIVE BIRTH

NO.	QUESTIONS AND FILTERS	CATEGORIES	SKIP
301	Now I would like to ask about all the births you have had during your life. Have you ever given birth?	Yes..... 1 No..... 2	 306
302	Do you have any sons or daughters to whom you have given birth who are now living with you?	Yes..... 1 No..... 2	 304
303	How many sons live with you? And how many daughters live with you? IF NONE, RECORD "00".	Sons at home....._____ Daughters at home....._____	
304	Do you have any sons or daughters to whom you have given birth who are alive but do not live with you?	Yes..... 1 No..... 2	 306
305	How many sons are alive but do not live with you? And how many daughters are alive but do not live with you? IF NONE, RECORD "00".	Sons elsewhere....._____ Daughters elsewhere....._____	
306	Have you ever given birth to a boy or a girl who was born alive but later died? IF NO, PROBE: Any baby who cried or showed signs of life but survived only a few hours or days?	Yes..... 1 No..... 2	 308
307	How many boys have died? And how many girls have died? IF NONE, RECORD "00".	Boys dead....._____ Girls dead....._____	
308	SUM ANSERS TO 303, 305, AND 307, AND ENTER TOTAL. IF NONE, RECORD "00".	Total....._____	
309	CHECK 308: Just to make sure that I have this right: you have had in TOTAL_____births during your life. Is that correct?	Yes..... 1 No..... 2 PROBE AND CORRECT 301-308 AS NECESSARY. NO BIRTH	 401

310	I would like to record the names of all your births, whether still alive or not, starting the first one you had. RECORD NAMES OF ALL BIRTHS IN 310-1. RECORD TWINS AND TRIPLETS ON SEPARATE LINES. CHECK THE "FAMILY BOOK".

310-1 What name was given to your (first/ next) baby? (NAME)	310-2 Were any of these births twins?	310-3 Is (NAME) a boy or a girl?	310-4 In what month and year was (NAME) born? PROVE: What is his/her birthday?	310-5 Is (NAME) still alive?	310-6 IF ALIVE: How old was (NAME) at his/her last birthday?	310-7 IF ALIVE: Is (NAME) living with you?	310-8 IF DEAD: How old was (NAME) when he/she died? IF 1YR., PROBE: How many months old was (NAME)? RECORD DAYS IF LESS THAN ONE MONTH; MONTH IF LESS THAN TWO YEARS; OR YEARS.	310-9 FROM YEAR OF BIRTH OF (NAME) SUBTRACT YEAR OF PREVIOUS BIRTH. IS THE DIFFERENCE 4 OR MORE?	310-10 Were there any other live births between (NAME OF PREVIOUS BIRTH) and (NAME)?
1	Sing....1 Mult...2	Boy...1 Girl...2	Mon.___ Yr. 19__	Yes....1 No.....2 ↓ 310-8	Age_____ (in years)	Yes....1 No.....2 ↓ Next birth	Days.....____ Months...____ Years..... ____		
2	Sing....1 Mult...2	Boy...1 Girl...2	Mon.___ Yr. 19__	Yes....1 No.....2 ↓ 310-8	Age_____ (in years)	Yes....1 No.....2 ↓ Next birth	Days.....____ Months...____ Years..... ____	Yes...1 No.....2 ↓ Next birth	Yes...1 No.....2
3	Sing....1 Mult...2	Boy...1 Girl...2	Mon.___ Yr. 19__	Yes....1 No.....2 ↓ 310-8	Age_____ (in years)	Yes....1 No.....2 ↓ Next birth	Days.....____ Months...____ Years..... ____	Yes...1 No.....2 ↓ Next birth	Yes...1 No.....2
4	Sing....1 Mult...2	Boy...1 Girl...2	Mon.___ Yr. 19__	Yes....1 No.....2 ↓ 310-8	Age_____ (in years)	Yes....1 No.....2 ↓ Next birth	Days.....____ Months...____ Years..... ____	Yes...1 No.....2 ↓ Next birth	Yes...1 No.....2
5	Sing....1 Mult...2	Boy...1 Girl...2	Mon.___ Yr. 19__	Yes....1 No.....2 ↓ 310-8	Age_____ (in years)	Yes....1 No.....2 ↓ Next birth	Days.....____ Months...____ Years..... ____	Yes...1 No.....2 ↓ Next birth	Yes...1 No.....2
6	Sing....1 Mult...2	Boy...1 Girl...2	Mon.___ Yr. 19__	Yes....1 No.....2 ↓ 310-8	Age_____ (in years)	Yes....1 No.....2 ↓ Next birth	Days.....____ Months...____ Years..... ____	Yes...1 No.....2 ↓ Next birth	Yes...1 No.....2
7	Sing....1 Mult...2	Boy...1 Girl...2	Mon.___ Yr. 19__	Yes....1 No.....2 ↓ 310-8	Age_____ (in years)	Yes....1 No.....2 ↓ Next birth	Days.....____ Months...____ Years..... ____	Yes...1 No.....2 ↓ Next birth	Yes...1 No.....2
8	Sing....1 Mult...2	Boy...1 Girl...2	Mon.___ Yr. 19__	Yes....1 No.....2 ↓ 310-8	Age_____ (in years)	Yes....1 No.....2 ↓ Next birth	Days.....____ Months...____ Years..... ____	Yes...1 No.....2 ↓ Next birth	Yes...1 No.....2

9	Sing....1 Mult...2	Boy...1 Girl...2	Mon.___ Yr. 19__	Yes....1 No.....2 ↓ 310-8	Age_____ (in years)	Yes....1 No.....2 ↓ Next birth	Days.....____ Months...____ Years..... ____	Yes....1 No.....2 ↓ Next birth	Yes....1 No.....2
10	Sing....1 Mult...2	Boy...1 Girl...2	Mon.___ Yr. 19__	Yes....1 No.....2 ↓ 310-8	Age_____ (in years)	Yes....1 No.....2 ↓ Next birth	Days.....____ Months...____ Years..... ____	Yes....1 No.....2 ↓ Next birth	Yes....1 No.....2
11	Sing....1 Mult...2	Boy...1 Girl...2	Mon.___ Yr. 19__	Yes....1 No.....2 ↓ 310-8	Age_____ (in years)	Yes....1 No.....2 ↓ Next birth	Days.....____ Months...____ Years..... ____	Yes....1 No.....2 ↓ Next birth	Yes....1 No.....2
12	Sing....1 Mult...2	Boy...1 Girl...2	Mon.___ Yr. 19__	Yes....1 No.....2 ↓ 310-8	Age_____ (in years)	Yes....1 No.....2 ↓ Next birth	Days.....____ Months...____ Years..... ____	Yes....1 No.....2 ↓ Next birth	Yes....1 No.....2
13	Sing....1 Mult...2	Boy...1 Girl...2	Mon.___ Yr. 19__	Yes....1 No.....2 ↓ 310-8	Age_____ (in years)	Yes....1 No.....2 ↓ Next birth	Days.....____ Months...____ Years..... ____	Yes....1 No.....2 ↓ Next birth	Yes....1 No.....2
14	Sing....1 Mult...2	Boy...1 Girl...2	Mon.___ Yr. 19__	Yes....1 No.....2 ↓ 310-8	Age_____ (in years)	Yes....1 No.....2 ↓ Next birth	Days.....____ Months...____ Years..... ____	Yes....1 No.....2 ↓ Next birth	Yes....1 No.....2
15	Sing....1 Mult...2	Boy...1 Girl...2	Mon.___ Yr. 19__	Yes....1 No.....2 ↓ 310-8	Age_____ (in years)	Yes....1 No.....2 ↓ Next birth	Days.....____ Months...____ Years..... ____	Yes....1 No.....2 ↓ Next birth	Yes....1 No.....2

4. FAMILY PLANNING

401 Now I would like to talk about family planning, the various ways or methods that a couple can use to delay or avoid a pregnancy.

CIRCLE CODE 1 IN 401-1 FOR EACH METHOD MENTIONED SPONTANEOUSLY. THEN PROCEED DOWN COLUM 401-2, READING THE NAME AND DESCRIPTION OF EACH METHOD NOT MENTIONED SPONTANEOUSLY. CIRCLE CODE 2 IF METHOD IS RECOGNIZED, AND CODE 3 IF NOT RECOGNIZED. THEN, FOR EACH METHOD WITH CODE 1 OR 2 CIRCLED IN 401-1 OR 401-2, ASK 401-3.

	401-1 Which ways or methods have you heard about?	401-2 Have you ever heard of (METHOD)? SPONTANEOUS Yes	PROBED Yes	PROBED No	401-3 Have you ever used (METHOD)?
1	PILL: Women can take a pill every day.	1	2	3	Yes..... 1 No..... 2
2	IUD: Women can have a loop or coil placed inside them by a doctor or a nurse.	1	2	3	Yes..... 1 No..... 2
3	INJECTIONS: Women can have an injection by a doctor or nurse which stops them from becoming pregnant for several months.	1	2	3	Yes..... 1 No..... 2
4	IMPLANTS: Women can have several small rods placed in their upper arm by a doctor, nurse which can prevent pregnancy for several years.	1	2	3	Yes..... 1 No..... 2
5	DIAPHRAGM: Women can place a sponge, diaphragm, jelly, or cream inside themselves before intercourse.	1	2	3	Yes..... 1 No..... 2
6	CONDOM: Men can put a rubber sheath on their penis during sexual intercourse.	1	2	3	Yes..... 1 No..... 2
7	STERILIZATION (FEMALE): Women can have an operation to avoid having any more children.	1	2	3	Have you ever had an operation to avoid having any more children? Yes..... 1 No..... 2
8	STERILIZATION (MALE): Men can have an operation to avoid having any more children.	1	2	3	Have you ever had a husband who had an operation to avoid having children? Yes..... 1 No..... 2
9	PERIODIC ABSTINENCE: Every month that a women is sexually active she can avoid having sexual intercourse on the days of the month she is most likely to get pregnant.	1	2	3	Yes..... 1 No..... 2
10	WITHDRAWAL: Men can be careful and pull out before climax.	1	2	3	Yes..... 1 No..... 2
11	PROLONGED BREASTFEEDING: Women can breastfeed for longer period to avoid getting pregnant.	1	2	3	Yes..... 1 No..... 2
12	Have you heard of any other ways or methods that women or men can use to avoid pregnancy?	1 _____ (specify)		3	Yes..... 1 No..... 2

402	CHECK 401-2.	AT LEAST ONE "YES"	404
		NOT A SINGLE "YES"	410
403	CHECK 401-3.	AT LEAST ONE "YES" (EVER USED)	
		NOT A SINGLE "YES" (NEVER USED)	406

NO.	QUESTIONS AND FILTERS	CATEGORIES		SKIP
404	Have you ever used anything or tried in any way to delay or avoid getting pregnant? CORRECT 401-1 AND 401-2 (AND 401-3 IF NECESSARY).	Yes.....	1	
		No.....	2	406

405 I would like to ask you about the methods and the times that you or your partner have used to avoid getting pregnant, and the reason why you stopped using the methods.

	405-1 What was the 1st (2nd, 3rd, 4th, 5th, if any) method* you ever used? CHECK 401-3.	405-2 How many living children did you have at that time, if any? CHECK 310. IF NONE, RECORD "00".	405-3 When did you start using the (METHOD)? SPECIFY THE DATE OR THE TIMING OF USE BETWEEN BIRTHS.	405-4 When did you stop using the (METHOD)? How long did you use the (METHOD) then? SPECIFY THE DATE OR THE PERIOD.	405-5 Why did you stop using the (METHOD)? Did you become pregnant while using the (METHOD), or did you stop to get pregnant, or did you stop for some other reason? SPECIFY THE REASON.
1st	_____	No.....____	_____	_____	_____
2nd	_____	No.....____	_____	_____	_____
3rd	_____	No.....____	_____	_____	_____
4th	_____	No.....____	_____	_____	_____
5th	_____	No.....____	_____	_____	_____

*METHOD CODES: 1 PILL; 2 IUD; 3 INJECTIONS; 4 IMPLANTS; 5 DIAPHRAGM; 6 CONDOM; 7 STERILIZATION (MALE); 8 STERILIZATION (FEMALE); 9 PERIODIC ABSTINENCE; 10 WITHDRAWAL; 11 PROLONGED BREASTFEEDING; 12 OTHER_____(SPECIFY)

406	Are you currently doing something or using any method to delay or avoid getting pregnant?	Yes.....	1	
		No.....	2	409
407	Which method are you using? CHECK 401-3.	Pill.....	1	
		IUD.....	2	
		Injections.....	3	
		Implants.....	4	
		Diaphragm.....	5	
		Condom.....	6	
		Sterilization (male).....	7	
		Sterilization (female).....	8	
		Periodic abstinence.....	9	
		Withdrawal.....	10	
		Prolonged breastfeeding.....	11	
		Other _____(specify)	12	

408	When did you start using the (METHOD)? SPECIFY THE DATE OR THE TIMING OF USE.	_____ (specify)		
409	Do you intend to use method(s) to delay or avoid a pregnancy in the future?	Yes	1	411
		No	2	END
		Don't know	3	END
410	If you can avoid or delay a pregnancy by using a way or a method, do you intend to use it in the future?	Yes	1	END
		No	2	END
		Don't know	3	END
411	Which method(s) would you prefer to use? MULTIPLE ANSWERS.	Pill	1	
		IUD	2	
		Injections	3	
		Implants	4	
		Diaphragm	5	
		Condom	6	
		Sterilization (male)	7	
		Sterilization (female)	8	
		Periodic abstinence	9	
		Withdrawal	10	
		Prolonged breastfeeding	11	
		Other _____(specify)	12	
		Don't know	13	END