NATURAL FERTILITY AND ASSOCIATED INTERMEDIATE VARIABLES IN SOME ARAB COUNTRIES

By

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INTRODUCTION

Although many developing countries are undergoing contraceptive revolutions and modern methods of contraception are increasingly available to those who wish to space child births or limit family size, vast areas of the world are still subject to natural fertility. Those are areas where (fertility... exists or has existed in the absence of deliberate birth control) (Henry, 1961 and 1977). How these populations maintain current levels of fertility, which are known to vary considerably form one traditional society to another, and how different patterns of behavior which determine natural fertility levels will be modified once modern contraception is available and people become motivated to use it are questions of both considerable theoretical and practical importance.This paper will discuss the factors which affect natural fertility in the Middle East and North Africa based on data collected recently in selected countries of the region. First, however, it will consider conceptual approaches to the study of the intermediate ferility variables and problems in applying the concept of natural fertilty to contemporary populations.

APPROACHES TO THE ANALYSIS OF FERTILITY

Numerous conceptual frameworks have been proposed in the attempt to specify and analyze the factors which determine fertility levels and trends (Davis and Blake, 1956, Hill, Stycos and Back, 1959, Freedman, 1967, and the World Fertility Survey, 1977). In the past, studies of the causes of fertility often tried to measure directly the impact of socioeconomic factors on fertility(education, literacy, religion, ethnic origin, income, occupational status, etc.). Increasingly researchers are focussing on the specific mechanisms by which socioeconomic factors operate (Bongaarts, 1978, Cantrelle and Ferry, 1977). For example, Bongaarts points out that (the level of education of a woman is a socioeconomic indicator that is frequently found to be negatively related to fertility. A more detailed analysis may show that among educated women marriage is relatively late or the use of contraception more frequent, thus clarifying the relationship between education and fertility) 1978,p.105). The specific mechanisms more direclty related to fertility than socioeconomic, cultural, or environmental variables are called intermediate fertility variables. They are biological and behavioral factors such as :
(1) the proportions in the population married or in union, (2) the number of women using contraception,(3) the prevalence of induced abortion, (4) the extent of lactational infecundability, (5) the frequency of intercourse,

(6) sterility (7) spontaneous intrauterine mortality,and (8) the duration of the fertile period. Bongaarts found that variation in four factors-marriage, contraception, lactation and induced abortion-are (the primary proximary proximate causes of fertility differences among populations) (1978, p. 125).

PROBLEMS IN THE QUANTIFICATION OF THE INTERMEDIATE VARIABLES

Although the importance of studying the effects of intermediate variables on fertility has been increasingly recognized since the Blake and Davis formulation first appeared in 1956, until Bongaarts,recent effort only highly complex reproductive models have been proposed, Bongaarts' contribution is to propose a simple, quantitative, comprehensive model which can be used to analyze the relationships between intermediate fertility variables and levels and trends in fertility. Undoubtedly a considerable amount of testing and application to different data sets collected through various methods will be necessary before the adequacy of the approach can be judged and improvements made. However, at the outset a few questions should be raised concerning the quantification of the variables and the application of the model.

1. Proportions Married

This variable has received considerable attention in the last two decades in regard to the regularity of patterns and their direct impact on fretility (Coale, 1967 and 1971), the implications of early and universal marriage schedules for fertility in general and for the grouth of populations in particular (Lesthaeghe, 1971), cross-cultural variations in age at marriage and proportions never marrying(Dixon , 1971 and 1978) and, more recently, the role of changing nuptiality patterns in fertility decline in LDCs, and the possibility of influencing nuptiality patterns through policy (Duza and Baldwin, 1977).

Bongaarts uses the index Cm to give the proportion by which the total fertility rate is smaller than the total marital fertility rate as a result of nonmarriage(Bongaarts, p. 109). Since most childbearing generally takes place within marriage in Arab populations, this index is a useful indicator of how marriage influences fertility. However, many Arab countries have a large number of males (many of them married) who work abroad and leave their wives unexposed to risk of pregnancy for considerable periods. This is true in Morocco, Algeria and Tunisia, where the movement is toward Europe,especially France, in Egypt where there are important numbers of male workers in Libya, in North Yemen, Jordan, and Lebanon, and for the Palestinians.

In addition in some countries internal migration might cause separations long enough to have significant impacts on fertility. Some adjustment to the index for spousal separation will have to be found in studying many Arab populations. Further, as efforts are made to study the factors which determine the number of women married, it should be kept in mind that migration plays an important role in determining the availability of males, one of the intervening variables the social structure and marriage patterns (Dixon,1971,pp. 221-222).

2. Contraception

The index of noncontraception, Cc, attempts to what degree actual marital fertility is smaller than it would be under conditions of natural fertility. It is estimated by looking at the average proportion of married women currently using contraception (average of age-specific use rates, u) and the average contraceptive effectiveness (average of use-effectiveness levels by age and method,e) Bongaarts suggests that (in the absence of age-specific use rates... the proportion of all married women of reproductive age that currently uses contraception...can be employed as an estimated for u.) (p.111). He also suggests that since comparative data on the effectiveness of different contraceptive methods are available only for the United States, these figures can be used. While he admits that

(US figures can serve only as rough estimates for other populations) (P.111), it seems very questionable whether this approach is satisfactory. It would be surprising, indeed, if the effectiveness of methods like the pill, the IUD, and even traditional methods were similar to the United States in populations of largely illiterate women in rural areas of the Arab States. Motivational factors are certainly important, and also simply knowing how to use methods correctly. For example, Zurayk points out for an area in South Lebanon that (many pill acceptors... do not use the pill regularly. Besides forgetting some days to take the pill women interrupt their use of it to take 'periods of rest' extending from one week to a couple of months) (p.7). Effectiveness of methods such as the IUD may be influenced by nutrition and health of the women, and motivation to practice traditional methods such as withdrawal may be very different among couples where communication patterns differ substantially from those that exist in developed nations (Chamie, 1977).

3. Lactational Infecundability

It has been demonstrated in a number of studies that (lactation has an inhibitory effect on ovulation and thus increases the birth interval and reduces natural fertility) (Bongaarts, p. 115). A quantitive estimation of the fertility reducing effect of lactation is proposed in Ci, the index of

lactational infecundability. It is derived from L,the duration of lactational amenorrhoea, and I, duration of breastfeeding. If information on the timing of the return of menses or ovulation after birth, i, is unknown, it(can be estimated from the mean duration(in months) of lactation.L, with the following equation: i = 1.5 0.56L. (Bongaarts, p 121). Using this formula, originally developed by Corsini, seems a questionable procedure. Research on the duration of amenorrhea and its relationship to breastfeeding increasingly suggests that it is not only the duration of breastfeeding that plays a role in determining duration of post-partum amenorrhea but also the quality of breastfeeding (on demand versus at fixed hours), the intensity of sucking (related to whether other foods are given to the child and his nutritional status), when other foods are introduced, and to a certain degree the nutritional status of the mother (Wray , 1978).

As Winikoff points out after reviewing research:

(The duration of post partum amenorrhea has long known to differ widely between various groups of lactating women... while explanations of this phenomenon used to focus on the nutritional status of the mother, it now appears that ,... much of the difference in length of amenorrhea can probably be ascribed to the pattern of nursing itself... (there is a) need to attend to the pattern of nursing rather than mere

presence or absence of nursing in predicting effects on fertility) (Winikoff, 1978,p.897).

Similarly, Bernard (197 7) notes: (There is sufficient evidence in the literature to show that lactation gives some measure of protection against contraception, but the mechanism whereby this is achieved remains to be clarified. Although this protection may be substantial during the phase of lactational amenorrhea, unacceptably high rates of pregnancy (up to 10 percent during this phase have been reported, with a marked increase following the return of menstruation but before weaning... The duration of protection can thus only be measured in broad terms and cannot be predicted with certainty)(P.117) .

Jain et al. (1970) found in Taiwan that (age affects amenrrhea both directly and through lactation) and that (education and place of residence affect amenorrhea mainly through the cultural variations in the practice of breastfeeding) (p. 225).

One might well expect different populations with the same mean and median durations of breastfeeding to have different durations of post partum amenorrhea. Even within the same population there are differences in the index of lactational infecundability estimated by the proportions amenorrheic at the time of interview compared with the

estimate based on using the mean duration of breastfeeding (calulated on either the closed birth or pregnancy interval or the open interval from last birth or pregnancy). For example, Zurayk estimated the mean duration of post amenorrhea in South Lebanon at 8.34 months using the formula provided by Corsini but at 7.08 months using data on women still amenorrheic at time of interview, or a difference of about 18 percent (pp. 11-12).

R. Lesthaeghe and H.J. Page have done recent work attempting to develop standard schedules of breastfeeding and amenorrhea based on different sources of data. They conclude that (only prospective studies seem to yield data that are accurate enough to pursue detailed analysis for example on the physiological limits between breastfeeding and amenorrhea. If,however, one is primarily interested in evaluating the general demographic impact of changes in post partum variables on overall fertility patterns. a combination of retrospectively collected and current status data, appropriately adjusted, is probably adequate) (1978, p. 34).

What exactly is (appropriate adjustment) needs to be explored. Since (it may be that patterns of breastfeeding change long before the practice of breastfeeding is abandoned wholesale by a population) (Winikoff, 1978, p. 898), looking only at mean durations of breastfeeding

might seriously bias findings in populations, such as those of many of the Arab States, where fertility related behavior is changing.

4. Abortion

Bongaarts proposes the index Ca to equal (the proportion by which fertility is reduced as the consequence of the practice of induced abortion) (p, 114)

$$Ca = + \frac{TFR}{TFR \quad A}$$

Since accurate data on abortion are rare, (a crude estimate of the total induced abortion rate (TA) can be obtained by multiplying the number of induced abortions per women aged 15-44 by 30 (with 30 years being the duration of the reproductive span from 15 to 44) (p.114).

It would seem very difficult to get accurate information through survey research on induced abortion from most populations in the Arab countries. Simply ignoring corrections for induced abortion as Bongaarts does for all but three countries (p. 114) and Zurayk does for her study in South Lebanon is of course a simple way to avoid the problem. But can this approach really be considered to be more than saying one does not know what the effect is

Research in the region suggests that induced abortion may play an important role in the fertility of some of the populations. For example, Rizk, in summarizing information from the 1972 Jordan Fertility Survey on attitudes toward abortion, notes that (56.5 persent of total respondents approved of abortion. 42,6 percent disapproved, and 0.9 percent did not have a definite opinion... Of the 2,947 respondents who approved of abortion, only 10 percent(298) had attempted an abortion, 122 had succeeded and 176 had failed in their attempt) (1978,p.123). Abortion was approved by 78 percent of the Christians in the sample and 54 percent of the Muslims. In Egypt, Lippman (1978) cited Bindary as estimating (that 9 percent of all Egyptian pregnancies end in abortion which, although illegal, is tolerated) (p.A15, and Kamal etaal., N.D.).

Nazer, in reviewing studies presented by medical researchers from the region, concluded that (illegally induced abortion is a widespread problem in the area and is particularly prevalent among married women who are practicing contraception or attempting in some way to have smaller famillies) (1972,p.2) Larsen felt that widespread abortion was still localized (a problem of certain areas of a country and or certain socio-economic groups.) However, (induced abortion could quickly become everybody,s problem, if a general fertility decline sets in) (Nazer, p.98).

A major problem in assessing the impact of induced obortion in the Middle East, now or in the future, is the fact that, as Omran points out,(statistics on the performance of abortion (and its consequences) are in many places incomplete and unreliable-particularly in countries with stringent abortion laws) (Nazer,P.23).

5.Other Intermediate Variales,i.e. Intrauterine Mortality. Sterility and the Duration or the Fertile Period

Concerning the other intermediate variables influencing fertility Bongaarts perhaps too easily discounts factors that may play consequential roles in Arab Populations. For example, he believes that (age at menarche is ... of little demographic significance because childbearing usually starts several years after menarche) (P.119). However, in some of the more traditional, isolated Arab countries(North Yemen, Oman,parts of the Sudan, etc.) Marriage may take place very close to age at puberty and changes in age at menarche may thus have a direct effect on when childbearing begins,the total duration of reproductive life, and fertility. possible relationships are discussed in a paper by Alauddin,Chowdhury et al. (1977) using data from rural Bangladesh,but no research has been done on this question in the Middle East to my knowledge.

A few studies of the factors related to age at menarche have been conducted in the region. Attallah (1978) found that age of menarche was 12.59 years among well-off Cairo girls, 13.09 for middle-class girls in Cairo, and 13.89 for girls from rural agricultural areas. Shakir (1971 and 1974) reported a mean age of menarche in Baghadad of 13.6 for the well-off and 14.0 for the poor. Neyzi et al. (1975) reported average age at menarche at 12.36 years for girls from Istanbul with variations by social classes. Wadsworth and Emmani reported 13.3 years in Iran(Urban), and Bourtourline-Young (both cited in Attallah, 1978) found 13.8 years for well-off girls in Tunisia. Hill notes based on work conducted by Hathout and Selim that:

> although the legal age for marriage according to Islamic law is the age at menarche, the decline in the age of menarche in Kuwait has not been accompanied by a fall in the age of marriage. A recent survey of school girls Showed that their mean age at menarche was just 12.7 years,while the mean age for their teachers was 12.9 years (Hill,1978 P.103).

Rather than simply discounting the possible role of other intermediate variables in determining fertility levels and trends, it seems necessary to gather at least some data and explore possible relationships.

Only with the application of the model to various data sets,in different populations and over time, will the shortcomings and needed improvements become clear. Since Zurayk

(1978) has applied the model to data one Arab population, it is useful to look at some of her conclusions.

Using the Bongaarts indices on data from South Lebanon, Zurayk notes the (combined effect of the three important intermediate variables - proportions married, non-contraception and lactational infecundability - is bringing fertility down to a quarter of its expected natural level) (P.17) However, she goes on to note that the total fertility rate in 1976 can be estimated at 4.68, which is (much lower than the average number of 8.82 children ever born reported by women in the sample 40 to 44 years of age) (P.18) In fact, TFR in 1976 is over 50 percent lower than average number of children ever born to older women in the sample, or twice the 25 percent reduction found in analyzing the intermediate variables indices. Thus the Bongaarts approach accounts for only about half of the apparent 50 percent fertility reduction in the area of South Lebanon under study. What accounts for the other half ?

APPLYING THE CONCEPT OF NATURAL TO FERTILITY TO CONTEMPORARY POPULATIONS

Until recently almost all discussion of natural fertilty was based on historical research on European populations. The need to gather data on contemporary populations was

recognized(Bourgeois-Pichat,1965),and Nag (1968),reviewing anthropological studies, found great variations in levels of natural fertility in contemporary social groups as did Henry among historical populations. But until just the last few years little effort was made to understand the determinants of fertility in non-contracepting population using the concept of natural fertility. Increasingly,empirical studies of contemporary populations using survey research techniques which incorporate a range of intermediate variables are under-way. Inaddition,efforts have been made to clarify the concept of natural fertility as it applies to contemporary populations.

Leridon defines a natural system of fertility as one

> in which neither of the individuals nor the couple jointly conciously attempts to regulate the number and spacing of their children.According to this definition,behavior which is imposed on the couple and is not a reflection of individual choice does not alter the (natural)quality of a system of fertility. This is often the case with matrimonial customs... Breastfeeding... and sexual taboos.In this sense there is certainly not one natural fertility,but many systems of natural fertility, which reflect the influence of socio-cultural factors(Leridon 1975,P.128).

This definition extends the concept of natural fertility beyond that proposed by Henry, Who (did not include in his distinction between natural and controlled fertility,situation in which couples <u>deliberately</u> attempt to space their children but are unconcerned with the number that are

ultimately born(Knodel, 1977a,p. 220). Recent research in populations where post partum abstinence is practiced indicates that this is done (as a deliberate attempt to space births for the benefit of both the child›s and mother's health even when most couples are not attempting to limit the final family size.)K Knodel concludes that (to the extent that such spacing practices, even if interntional, are not parity specific, they can be considered consistent with a regime of natural fertility in the sense that they should have little effect on the age pattern of the natural fertility function) (P.220).

efforts to disaggregate the effect of intermediate variables influenced by socio-cultural factors in populations which have a natural system of fertility are increasingly drawing the attention of researchers (Cantrelle and Ferry,1977,Pool,1977). In addition, those attempting to understand the fertility transition in non-European regions of the world are inevitably compelled to consider the situation in the region before contraceptive use became widespread (Knodel,1977a, and Debavalya,1978).

Most contemporary studies using the concept of natural fertility are based on data from African and South Asian Populations. In these societies there is a great deal of cultural diversity. In spite of similarly high levels of

fertility, the means of attaining these levels differ greatly, Marriage patterns, duration of breastfeeding, post-partum sexual abstinence and traditional methods of contraception often vary considerably from region to region and among contiguous social groups (Cantrelle and Ferry,1977).

In the Middle East and North Africa one might expect more cultural homogeneity compared with the diversity of African and Asian Societies. While the concept of the Middle East as a cultural area has come under criticism(Keddie, 1973), nevertheless Islamic law and traditional norms and values widespread throughout the region set the broad guidelines within which the biomedical and behavioral intermediate variables affecting fertility operate. For example, all Middle East and North African societies stress early and universal marriage and the integration of women into male dominated family units (Fernea and Bezirgan,1978, Beck and Keddie, 1978), all prescribe prolonged breastfeeding with an infant being en titlrd to two years of breastfeeding according to Islamic law. Post-partum abstinence is required for at least 40 days after childbirth. Abortion is condemned. Finally, in spite of some initial misunderstanding,(it is now clear that virtually all Muslim scholare and religious leaders actively endorse responsible planned parenthood within marriage and accept the modern methods of contraception) (IPPF, 1978,PP. 48-49).

As examples of an approach to studying natural fertility in the Middle East we will look at data from Jordan and Algeria.

Jordan

Although still an underdeveloped country with important segments of the rural living at a low standard of living (Abu Jaber et al. 1978), Jordan has made important efforts at socioeconomic development. Per capita income is estimated at $ 460 in 1975 (World Bank, 1977). With a crude birth rate of 48 per 1,000 and a crude death rate of 13, the growth rate is a high 3,4 percent, life expectancy is 53 years and infant mortality around 100 per thousand(population Reference Bureau, 1978). The Population of the East Bank is estimated at slightly over 2 million in 1979.

Estimates of fertility can be derived from the 1972 National Fertility Survey (Rizk,1978) and the 1976 Multi-Purpose Household Survey conducted as part of the World Fertility Survey in Jordan (El Asad and Khalifa, 1977) . Table. Table 1 gives a comparison of the average number of live births per ever-married women in Jordan in 1972 and 1976.

There does not appear to be much of a difference between fertility levels in 1972 and 1976. If anything there seems to be an increase in fertility for the 15-19 and 45-49 year olds. These seeming increases may, however, be attributable to better data collection and less memory error in the 1976 survey. By the end of childbearing period the average Jordan women has had a large numbers of live births- 8.16 in 1972 and 8.6 in 1976. By the time a women is in the 35-39 year age group, she has had 7.5 live births on the average.

The 1976 survey included a retrospective question on the number of live births during the 12 months preceding the survey. Using a technique developed by Brass to estimate the age-specific fertility rates and total fertility rates, El Asad and Khalifa found the results provided in Table 2.

As points of comparison, estimates of age specific fertility rates and total fertility rates made by USAID and the UN are provided in Table 3. Once again, the data in the two tables suggest that fertility in Jordan is high. However, a comparison of the 1976 estimate with those of 1961 and 1974 suggests a decline in TFRS. In addition the total fertility rate(for all women) of 6.55 in 1976 contrasts with reported completed fertility of over eight

births for the older (over 40) ever-married women in 1976 (Table 2), which is estimated at 8.63, it appears that the total marital fertility rate is currently higher than completed fertility of older women. This suggests that the current lower total fertility rate of 6.55 is closely dependent on changes in nuptiality patterns, paticularly the fact that Jordanian women are postponing marriage and lower proportions were married in 1976 than in the past.Nuptiality patterns have apparently changed in Jordan, as we can see from Table 4, which indicates proportions married in 1961, 1972, and 1974.

Bongaart's approach to the quantification of the intermediate fertility variables provides several ways of estimating the impact of marriage patterns on fertility. For example, the index of proportion married, Cm,can be derived by dividing the TFR by the age specific marital fertility rate, TM provided in Table 2.

$$Cm = \frac{TFR}{TM} = \frac{6.55}{9.02} = .726$$

In addition to the effect marriage patterns have on reducing fertility it is of interest to consider whether fertility within marriage is being controlled. One indication of this is contraceptive use, which we will discuss later. Another indirect measure is to compare age specific marital

fertility rates with those of populations known to be experiencing natural fertility. This done is done in Table 5.

The key age groups to consider in the study of the age pattern of natural fertility populations are those over age 20 and under 40. As Knodel (1977a) note,(fertility rates below ages 20-24 are not considered,because premarital conceptions and teen-age sub-fecundity have a large and irregular impact on teen-age fertility in a number of populations)(p.221). Further, deviations at ages 45-49 (tell us little about the extent of (fertility) control extrol exercised ... rather, they reflect the extreme differences in fertility levels, since fertility is very low at this age even in the absence of birth control. These rates are likely to be particularly variable when based on small populations or samples, or when estimated from faulty data) (p.221). Bearing these caveats in mind,Table 5 Indicates that Jordanian women 20 and 40 have considerably lower fertility than the natural fertility standard-between 22-25 percent lower for each age group. This suggests that fertility regulation is currently practiced for all four age groups.

Although there is no national family planning program in Jordan and private groups have not been very active on

the East Bank, Knowledge and use of contraception appears remarkably high. The 1972 survey found that (almost all respondents knew one or more of the conventional methods of birth control.) The pill seemed to be the best known and most used method . Of the total women interviewed,94 percent knew of one or more methods of family planning, 28.3 percent had used any method in the past, and 21.1 percent of the wives living with husbands were current users.

Large number of women in Jordan may be ready to begin controlling their fertility and to limit family size. Rizk found when he asked whether the women in his sample wished to have additional children that (46 percent of respondents did not wish to have additional children)(p. 129). For those who did, (it was clear that the desire for additional children was due mainly to son preference) (p.129).

Using Bongaart,s index of noncontraception, Cc:

$$Cc = 1 - 1.18\ ue$$

where u = average proportion of married women currently using contraception

e = average contraceptive effectiveness

$$Cc = 1 - 1.18\ (.211)\ (.85)$$

$$Cc = 1 - .2116$$
$$= .7884$$

Lactational Infecundability

Jordan is a country where breastfeeding is prolonged. The Jordan pediatric Study found that (practically no childred were completly (Weaned,at 8 months, 15 percent, at 12 months, 25 percent, but not until the sixteenth month had 50 percent of the children been weaned. Ten percent of the children were still receiving some breastfeeding at 26 months. (Pharaon et al., 1965,P.21). Data from the 1076 Jordan Fertility Survey, which should be available in 1979, will indicate whether changes are taking place.

Using 15 months as an approximate mean duration of breastfeeding the index of lactational infecundability Ci is calculated:

$$Ci = \frac{20}{18.5 + i}$$

where i = average duration (in months) of infecundability from birth to the first post partum ovulation (menses)

i can be estimated if the duration of breastfeeding is know by the formula

$$i = 1.5 + 0.56\ L$$

$$L = 15 \text{ months in Jordan}$$

$$i = 1.5 + 0.56\ (15)$$

$$= 9.9$$

$$Ci = \frac{20}{18.5 + 9.9}$$

$$= .704$$

Abortion

Abortion is clearly a factor in determining fertility levels in Jordan since Rizk found that 10 percent of the women interviewed in his sample had attempted an abortion and over 50 percent said they approved of abortion(p.128). Unfortunately data suitable for estimating the index of induced abortion, Ca, are not available so one must discount this factor in estimating the fertility reducing impact of the intermediate variables in Jordan.

Summary

1. The total fertility rate of 6.55 contrasts with the reported completed fertility of over 8 births for older women. This evidence implies more than a 20 percent decline in fertility. Fertility is highest at ages 25-29, probably reflecting a decline in the early pattern of marriage in Jordan.

2. The lower TFR is due to a large extent to changes in early marriage and the proportions married. According to the Bongaarts index of proportion married, Cm, fertility in Jordan would be over 25 percent higher than it is if all women married at 15 and remained married throughout their reproductive years.

3. In addition to the fertility reducing effect of changing nuptiality patterns, looking at fertility within marriage suggests declines. Comparing marital fertility in Jordan with a standard schedule of nutural fertility populations indicates that women between ages 25 and 39 have almost 25 percent less fertility than the standard. Younger women similarly seem to be reducing fertility. This phenomenon is reflected in the relatively high rates of contraceptive knowledge and use recorded in the 1972 Fertility Survey.

4. Although Jordan may be on the threshold of rapid fertility declines, it should be stressed that current rates are still very high and rapid population growth is in store for the country in the years ahead.

5. Additional analysis of demographic data is needed before policy implications of the current fertility patterns can be discussed in a definitive way. However, given the incipient fertility declince indicated, and

the high knowledge and approval of contraception in spite of the fact that there is no national family program and only minor private initiatives, a reasonable hypothesis is that efforts at imporving contraceptive services among women in Jordan might have a dramatic impact on accelerating fertility reduction in the immediate future.

Algeria

Since independence, Algeria has made impressive progress in socioeconomic development. But the vast area of the country and the sizable population (over 18 million in 1978) pose formidable challenges to the government's efforts to improve the well being of its population. Unemployment is still high, a large proportion of the labor force is working abroad, the agricultural reform has had limited impact, and the new industry is largely capital intensively small unmbers of workers compared with the population unemployed and underemployed in the agricultural sector. But in spite of current problems Algeria faces a future of growth and development based on substantial investements in an industrial infrastructure and important natural resources, especially oil and gas.

According to Vallin (with a crude birth rate of over 50 per 1,000 women and an average of eight children per women, Algeria has one of the highest fertility rates in the world) (Vallin, 1978, P. 131). Algeria,s population is estimated at 18.4 million in 1978. The crude birth rate is around 48 per thousand, the crude death rate 14 per thousand, and the rate of natural increase is 3.4 percent per anum. Life expectancy at birth is around 53 years and infant mortality is 145 per thousand (Population Reference Bureau, 1978). Based on data from the 1969-71 Multiround Demographic Survey, Table 6 indicates the average number of children ever born to Algerian women by age group in 1970.

Although not as high as Jordan's Algerian fertilily levels are very high. Ever-married women between 40 and 49 have had over seven children and those still in first marriage over eight children.

The estimates of age specific fertility rates in 1964-65 and 1969-71 (Table 7) suggest that fertility increased somewhat between the two periods, due primarily to increase in fertility of women over age 25. The total fertility rate for 1969-71 indicates that if current trends continue younger women will match the fertility of older women.

Table 8 and 9 show that marital fertility is very high, neither urban nor rural marital age specific fertility rates differ greatly from the standard schedule, indicating little use of fertility regulation.

Using the Bongaarts index of proportions married, Cm, for Algeria in 1969 we find

$$Cm = \frac{TFR}{TM}$$

$$= \frac{7.17}{10.53}$$

$$= .680$$

In trying to explain the high levels of fertility, Vallin notes that (age at first marriage for Algerian Women... has dropped considerably since World War II... it passed from an average of 20.1 years in 1948 to 18.4 years in 1966) (P. 134). Age at marriage in Algeria varies in urban and rural areas, but the most important factor associated with later age at marriage is a woman,s education. Husband,s occupation and education are also associated with differentials, but the most important factor likely to change the deep rooted custom of early marriage, according to Vallin, seems to be increasing levels of education for women beyond primary school (Vallin,1973, PP.1176-1177).

Using 14 months as an approximate mean duration of breastfeeding the index of lactational infecundability, Ci, is calculated by first estimating i, average duration of fecundability.

$$i = 1.5 - 0.56\ L$$

$$i = 1.5 - 0.56\ (14)$$

$$i = 1.5 - 8.4$$

$$i = 9.3$$

Then :

$$Ci = \frac{20}{18.5 - 9.3}$$

$$= .719$$

Other Factors Influencing Fertility

Contraceptive use is limited primarily to a small elite group of women in major urban areas,. Vallin believes that (although they only form a marginal fringe of society, and although differences are only slight these groups may point to a new evolution in Algerian society) 1978,p.151) .Since data are not available on contraceptive use or abortion, it is not possible to estimate these indices.

In spite of substantial male migration to Europe and especially to France, the deficit of working age males in the 20-40 age groups has apparently not had an important effect on lowering age at marriage or dramatically reducing fertility. It may be that if emigrants are able to r return at least once a year for a month or so, the exposure to risk of conception is sufficient so as not to radically reduce birth intervals over the reproductive years.

Summary

1. A comparison of the mean number of children ever born to ever - married women over 40 (range 6.9 - 7.5) with the current TFR (7.17) suggests that there has not a decline in fertility in Algeria. If current fertility rates remain constant, women in the younger cohorts will have as many children at the end of their reproductive careers as women over 40 in 1970.

2. In spite of high fertility rates, the index of proportions married .68, indicates that if the trend toward earlier ages at marriage were to continue, fertility could increase. Current nuptiality patterns do play a role in reducing fertility, the Algeria index is lower than in Jordan, where itiis about .73.

3. Compatisons with a standard fertility schedule suggest that Algeria is still a natural fertility population and, assof 1970, there was no indication of the spread of fertility regualtion.

CONCLUSIONS

Bongaarts' approach to the measurement of the intermediate fertility variables is certainly a valuable contribution to better understanding of the determinants of fertility. But before efforts are made in applying the method and going on to building a causal model that will consider (1) the social, economic, and family health determinants. (2)the intermediate variables and (3) fertility itself, a few things should be born in mind.

1. Generally, the adequacy of data on levels and trends in the Middle East and North African countries is subject to question. Important efforts at data evaluation will have to be made before we can have confidence in the measurement of fertility in most countries. This is especially true if the major sources of data are WFS surveys, which are not ideal methods for obtaining current levels of fertility nor for measuring trends. Data on fertility levels and trends will have to be subjected to evaluation of the type currently

being done on WFS data by Brass and Potter. This should include comparisons of different types of measures of fertility, comparisons of different data sets, use of indirect methods, and a comparison with standard schedules.

2. After we have more information on fertility levels it would be useful to focus on whether the populations of the region are under a natural fertility regime and, if not, in what ways changes are taking place. Are women who begin limiting family size generally older? Are they using modern or traditional contraceptive methods? Do younger women also begin fertility regulation when modern methods become available?

3. More research in the region on contraceptive use and effectiveness, breastfeeding patterns, and the prevalence of abortion will be needed before precise estimates from the Bongaarts approach can be derived. In the immediate future data from Asian, Latin American, and developed countries will probably yield more accurate estimate than data from countries of the Middle East .

Table 1

CUMULATIVE AVERAGE NUMBER OF LIVE BIRTHS BY 5 YEAR AGE GROUP FOR EVER MARRIED WOMEN IN JORDAN, 1972 and 1976

Age	1972	1976
15-19	.80	.95
20-24	2.41	2.48
25-29	4.36	4.16
30-34	6.08	5.98
35-39	7.46	7.50
40-44	8.29	8.38
45-49	8.16	8.60
All Ages	5.12	5.55

Source: S. El Asad and A.M. Khalifa, 1977, p. 21.

Table 2

ESTIMATES OF AGE SPECIFIC FERTILITY RATES AND TOTAL FERTILITY RATE IN JORDAN IN 1976 FOR EVER MARRIED, CURRENTLY MARRIED, AND ALL WOMEN BY BRASS METHOD

	Age Specific Fertility Rates per Thousand		
Age Group	Ever-Married Women	Currently Married Women	All Women
15-19	291.1	298.3	56.8
20-24	360.7	366.2	231.6
25-29	335.0	341.1	292.8
30-34	289.3	297.6	275.7
35-39	233.2	243.7	226.9
40-44	143.1	156.1	140.2
45-49	87.0	101.0	85.5
Total Fertility Rate	8.63	9.02	6.55

Source: S. El Asad and A.M. Khalifa, 1977, p. 22.

Table 3

ESTIMATES OF AGE SPECIFIC FERTILITY RATES AND TOTAL FERTILITY RATE IN JORDAN IN 1961 AND 1974 FOR ALL WOMEN

Age Specific Fertility Rates per Thousand		
Age Group	In 1961	In 1974
15-19	122.6	73.5
20-24	309.7	250.7
25-29	363.7	363.2
30-34	335.7	309.2
35-39	206.8	288.7
40-44	63.4	101.1
45-49	16.6	31.1
Total Fertility Rate	7.093	7.088

Source: Office of Population, U.S. Agency for International Development, Washington, D.C.,World Fertility Patterns, November, 1977.

Table 4

PORPORTION OF FEMALE POPULATION OF EAST BANK OF JORDAN BY AGE AND MARITAL STATUS IN 1961, 1972 and 1974

Age Group	Single	Married	Divorced	Widowed	Total
		1 9 6 1			
15-19	72.0	27.6	0.3	.1	100.0
20-24	26.7	71.9	0.9	.5	100.0
25-29	11.2	86.8	0.9	1.1	100.0
30-34	5.6	90.6	0.9	2.9	100.0
35-39	3.1	90.8	0.8	5.3	100.0
40-44	2.8	86.0	0.9	10.3	100.0
45-49	2.8	80.3	1.0	15.9	100.0
50-54	2.8	69.5	1.3	26.4	100.0
55-59	3.3	63.9	1.2	31.6	100.0
60-64	2.8	48.6	1.5	47.1	100.0
65 +	3.1	27.9	1.4	67.6	100.0
TOTAL	21.5	65.3	0.9	12.3	100.0
		1 9 7 2			
15-19	85.4	14.4	0.1	0.1	100.0
20-24	44.5	54.6	0.4	0.5	100.0
25-29	17.2	81.4	0.5	0.9	100.0
30-34	7.7	89.7	0.4	2.2	100.0
35-39	4.9	91.2	0.3	3.6	100.0
40-44	3.7	88.7	0.4	7.2	100.0
45-49	3.7	84.6	0.2	11.5	100.0
50-54	3.3	75.1	0.7	20.9	100.0
55-59	3.0	72.6	0.1	24.3	100.0
60-64	2.8	58.4	0.4	42.9	100.0
65+	3.7	34.1	0.5	61.7	100.0
TOTAL	28.3	63.4	0.4	7.9	100.0
		1 9 7 4			
15-19	84.2	15.5	0.2	.1	100.0
20-24	43.0	56.0	0.5	.5	100.0
25-29	17.9	80.2	0.5	1.4	100.0
30-34	7.7	89.5	0.6	2.2	100.0
35-39	4.4	91.3	0.6	3.7	100.0
40-44	3.7	88.7	0.3	7.3	100.0
45-49	2.5	85.6	0.2	11.7	100.0
50-54	3.6	74.3	0.5	21.6	100.0
55-59	2.0	71.5	0.2	26.3	100.0
60-64	2.0	55.8	-	42.2	100.0
65 +	3.5	31.1	3.2	62.2	100.0
TOTAL*	28.2	62.8	0.4	8.6	100.0

*Proportion for population aged 15 years and over.

Source: I.M. Eid, Nuptiality Indicators in the East Bank of Jordan, 1968-1975. Paper presented at the Seminar on Marriage and Family in Some Arab and African Countries, Cairo Demographic Center, 18-23 December 1976, p. 22.

Table 5

FERTILITY OF JORDANIANS COMPARED

WITH MODEL SCHEDULE

Age Group	ASMFR (1976)	Model Schedule[a]	Proportions of Model Rates
15-19	298.3	411	.73
20-24	366.2	469	.78
25-29	341.1	442	.77
30-34	297.6	399	.75
35-39	243.7	323	.75
40-44	156.1	167	.93
45-49	101.0	25	4.04
Total Fertility	9.02	11.18	.81

[a]The model schedule is the average of a number of observed schedules known to be experiencing natural fertility. See Coale et al.,1975 and Hill, 1978, p. 99.

Source: S. El Asad and A. M. Khalifa, 1977, p. 22.

Table 6

MEAN NUMBER OF CHILDREN PER WOMAN STILL IN FIRST MARRIAGE AND EVER MARRIED, ACCORDING TO AGE, ALGERIA, 1970

Age Group	Women Still in First Marriage	All Ever-Married Women
15-19	0.6	0.6
20-24	2.1	2.0
25-29	4.1	3.8
30-34	5.6	5.2
35-39	7.1	6.3
40-44	8.0	7.2
45-49	8.5	7.5
50-54	7.7	6.9

Source: J. Vallin, 1978, p. 136.

Table 7

ESTIMATES OF AGE SPECIFIC FERTILITY RATES AND TOTAL FERTILITY RATES FOR WOMEN, ALGERIA 1964-65 and 1969-71

Age Specific Fertility Rates for all women		
Age Group	1964-1965	1969-1971
15-19	114	102
20-24	317	296
25-29	316	326
30-34	272	301
35-39	207	240
40-44	125	135
45-49	37	37
Total Fertility Rate	6.940	7.170

Source: Office of Population, U.S. Agency for International Development, Washington, D.C., World Fertility Patterns, November 1977.

Table 8

AGE SPECIFIC MARITAL FERTILITY, URBAN AND RURAL NORTH ALGERIA

1969

Age Group	North Algeria	Urban	Rural
15-19	363	435	344
20-24	429	477	408
25-29	401	409	397
30-34	373	382	368
35-39	306	282	317
40-44	185	160	196
45-49	49	28	59
Total Marital Fertility Rate	10.53	10.87	10.45

Source: La Population de l'Algerie. Paris, C.I.C.R.E.D. 1974, p. 31

Table 9

FERTILITY OF ALGERIAN WOMEN (in 1969)
AS PROPORTION OF MODEL SCHEDULE

Age Group	Model Schedule[a]	Proportion of Model Schedule		
		North Algeria	Urban	Rural
15-19	411	.88	1.06	.84
20-24	469	.91	1.02	.87
25-29	442	.91	.96	.90
30-34	399	.93	.96	.92
35-39	323	.95	.87	.98
40-44	167	1.11	.96	1.17
45-49	25	1.96	1.12	2.36
Total Marital Fertility Rate	11.18	.94	.97	.93

[a]The model schedule is the average of a number of observed schedules known to be experiencing natural fertility. See Coale et al., 1975 and Hill, 1978, p. 99.

Source: La Population de l'Algerie. Paris, C.I.C.R.E.D. 1974, p. 31.

Table 10

MEAN LENGTH OF BREAST-FEEDING FOR NEXT-TO-LAST LIVE-BORN CHILD, ACCORDING TO AGE OF MOTHER, IN ALGERIA, 1970 (IN MONTHS)

Age	Urban	Rural	Total
20-24	8.6	12.2	11.1
25-29	10.3	13.8	12.7
30-34	11.1	14.8	13.7
35-39	12.0	14.7	13.8
40-44	12.5	15.4	14.5
45-49	12.2	16.1	14.7
50-54	14.4	15.2	14.9

Source: J. Vallin, 1978, p. 135.

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