THE PATTERN OF FAMILY FORMATION IN SUDAN

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Introduction

The process of family building may by viewed as the movement of women through a series of reproductive stages. Marriage is considered as the starting point and each interval is studied seperately as the women move from each parity to the next. A natural approach to the study of birth intervals is to consider the proportion of women at each parity who will move to the next parity and also the time taken to make the transition. These two aspects of study are referred to as the "quantum" and "tempo" of fertility. The seperation of these two components of the family formation process is essential for the understanding of the pattern of reproductive behaviour of a population and provides insight into the type and timing of its fertility transition. In addition, it allows for the analysis of the factors affecting the quantum and tempo of fertility by using standard techniques e.g cross-tabulation and regression analysis.

This analysis of the family formation process is easy when the complete maternity histories of women who have reached the end of their reproductive life is available. Parity progression ratios may be calculated directly, as well as the distribution of the intervals between successive births. However, this approach cannot be adopted when dealing with incomplete cross-sectional data of the type collected in most fertility surveys.

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Œnsoring problems arise since, at the date of the survey, young women are still engaged in reproduction. Selectivity biases are also present because of using women who achieved a specific parity to study the transition to the next parity when those women do not represent the whole population but were selected for their rapid reproduction. However, censored data can be handeled by using life table techiques and the effects of selectivity can be overcome by using proper demographic controls(Rodrigues and Hoboraft,1980). The parity cohort concept is analogus to birth cohorts in which women of parity enter the population. They leave by having an (i+1) the birth i.e moving to a higher (the next) parity. The interbirth interval is thus analogus to age (x) i.e the time in months after which a woman leaves the cohort (Feeney,1983).

In this paper we examine birth intervals in Sudan(north) using life table analysis. For each birth interval i.e parity cohort, we use the birth function B(x) to summarise the specific birth interval life table. B(x) is the cummulative proportion of women having a subsequent birth, by months of duration (x) since the previous birth (or marriage in case of the first birth interval). The birth function B(x) corresponds to 1-l(x) in ordinary life table notation which is the proportion of"non-survivals" i.e those who leave the specific parity cohort at certain durations (x). They do so by moving to the next parity. Since parity progression ratios cannot be calculated for cross-sectional data, we may use B(60) as a natural substitute. This is considered as a reasonable measure of the quantum of fertility (Rodriguez and Hobcraft,1980) and is referred to as the

quantum (Q). It refers to the proportion of women who move to a subsequent parity within five years of the previous one. When the birth function is standardized such that B(x)=1, the quartiles of the distribution can be calculated. The quartiles q_1, q_2,q_3 are used to calculate Tukey's (1977) trimean, $T=(q_1+2q_2+q_3)/4$ which is used as a robust measure of location and can be interpreted in terms of the tempo of fertility since it is the mean of the duration of time taken by the women in the specific parity cohort to move to the next parity.

The data used for this study is from the Sudan Fertility Survey, conducted in 1979 by the Department of Statistics of the Government of Sudan in collaboration with the World Fertility Survey (World Fertility Survey, 1982). The birth function summary values for all birth intervals, calculated by constructing life table are presented in Comparative Studies No.28 (World Fertility Survey,1984).

AGE AT THE START OF THE INTERVAL

Because of the importance of age in the analysis of fertility especially in connection with the early years of marriage, we study the effect of age alone on the quantum and tempo of fertility. Life tables were constructed seperately for four categories of age of women, The age groups were determined by the quartiles of the distribution of age at the beginning of the birth interval and the quartiles were rounded to the nearest completed year. For example, the age groups for the first birth interval distribution are: less than 14,14-15,16-18, and 19+. This means that for that specific birth interval and at the time it started

(marriage in this case) 25 percent of the moment were less than 14,50 percent less than 15 and 75 percent less than 19. In table 1 we present summary measures (quantum Q, and trimean T) for each birth function.

In the first five years of marriage, the wife's age is clearly associated with both the quantity and tempo of fertility. Women who marry at very young ages(less than 14) are cleary different than the others. By the end of five years of marriage, only 72 percent of them have had a first birth. On the orther hand we find that women who marry at age ninteen or more enjoy a higher probability(85%) of delivery within the same period of time. Those women who did have a first delivery within the first five years of marriage, did so at extremely different durations.While brides who married old(19+) took 17.2 months on average to deliver their first baby young brides (married under 15) took twenty months on average or more reaching 23.1 months for the youngest brides. The slow rate of reproduction and low quintum experienced by the young women is due to teenage subfecundity.

For the second until the fifth birth intervals we find that age has little effect on the quantum and tempo of fertility.The quintum being in the neighborhood of 90 percent which means that on the average-ninty percent of the women move to a higher parity within five years of the previous birth,regardless of their age. This reflects a lack of contraceptive fertility control at that stage of family formation. However, we note that women in the oldest age groups at the beginming of the interval are.slightly less probable to move to the higher parity. This differential

Table 1

Quantum and Tempo of Birth Interval by Birth order and age of woman at the begining of each interval

Birth order	Summary measure	Age at begining of birth interval				
		q_1	q_1-q_2	q_2-q_3	q_3+	all
1	Age	14	14-15	16-18	19+	
	Q	.72	.82	.83	.85	.80
	T	23.1	19.6	18.4	17.2	19.6
2	Age	17	17-18	19-21	22+	
	Q	.90	.93	.91	.86	.90
	T	24.0	24.4	24.2	25.5	24.4
3	Age	19	19-20	21-23	24+	
	Q	.90	.89	.90	.82	.88
	T	24.9	25.1	25.8	25.6	25.3
4	Age	21	21-22	23-25	26+	
	Q	.92	.90	.89	.80	.89
	T	25.5	25.0	25.4	26.4	25.5
5	Age	23	23-24	25-27	28+	
	Q	.90	.91	.88	.81	.88
	T	25.5	25.0	25.4	26.4	25.5
6	Age	24	24-26	27-29	30+	
	Q	.91	.93	.86	.82	.88
	T	24.6	25.8	26.1	26.8	25.7
7	Age	26	26-28	29-31	32+	
	Q	.85	.85	.83	.77	.83
	T	24.7	26.2	26.0	26.7	25.9
8	Age	28	28-30	31-33	34+	
	Q	.89	.84	.75	.58	.79
	T	26.3	27.4	27.0	26.2	26.8

becomes more clear as we move to higher birth orders. For example, the quantum for the fourth birth is about 90 percent for women who had their third child at ages below 26 and is 80 percent only for women who did so at 26 or older. This suggests that family planning may be practiced by older women at these parities.

Table 1 also shows that differences in the timing of acheivement of next parity, for those women who do., are slightly (if not at all) related to the woman's age at the beginning of the interval. In all cases the transition to a higher parity took an average about 25 months. ranging from 24.0 to 26.6. The little differentiation by the age of mother shows no differences in the duration of breastfeeding for young and older women which would mean similar periods of infecundity after birth.

Starting from the sixth birth interval, the woman's age becomes a determinant of the quantum of fertility. Among women who reached parity 5 at age 27 or older (median age) about 85 percent only proceeded to the sixth birth. The drop in quantum is not accompanied by a significant delay in the timing of the sixth delivery. The effect of age on the quantity of fertility increases as women move to higher stages of family formation, while the effect on the tempo of fertility remains insignificant. The reduction in quantum for older women reflect the natural drop in fecundability and increase in the rate of foetal wastage rates. It may also reflect possible reduction in coital frequency as marriage duration increases. However, we find that women who manage to move to higher parities do so

at nearly similar durations of time regardless of their age at the previous event of their parity.

The last column of table I reveals a striking general feature of the Sudanese pattern of family formation The birth function is characterised by the extrememly high proportion of women-at each parity-who proceed to the next stage even in the oldest age groups. The Probability of delivery within a period of of five years since the last event does not drop below 85% before parity seven. The mean interbirth interval is almost (about 25 months) irrespective of birth order or age of woman until parity seven. However, an exception is noted for the first birth interval when only 80 percent of the brides succeed to deliver within five years of the marriage. Those who do so take about twenty months. This is considered a long time since the first birth interval differs from other birth intervals in the absence of a period of temporary infecundity following marriage. Therefore it consists of two components only, waiting time to conception and gestation time. As mentioned before this is due to teenage subfecundity.

Period effect

In order to examine changes in fertility over time, we use the birth function by birth order and period of time during which the interval started. The analysis covers the periods of time : before 1958, 1958-1962,1963-1967,1968-1972,1972-1979. The values for Q and T are presented in table 2.

Table 2

Quantum and tempo of fertility by birth order and period(for selected birth intervals).

Birth Order	Summary measure	Calender Period before 58	58-62	1963-67	1968-72	.1973-79
1	Q	.68	.79	.83	.88	.91
	T	22.0	19.5	19.2	18.6	18.8
2	Q	.88	.90	.90	.91	.93
	T	24.0	23.3	23.8	24.8	26.7
4	Q	.85	.90	.89	.89	.91
	T	24.2	24.1	24.6	23.9	28.3
6	Q	.95	.90	.92	.88	.88
	T	22.5	23.5	24.0	24.8	30.6

The proportion of brides having a first birth during five years of marriage rises from 68 percent for women married before 58 to 91 percent for those recently married in 1973-1979. Also the trimean drops from 22 months to 18.8. This means that first births are becoming more frequent and quicker. The trend towards shorter first birth intervals may be associated with trends in higher age at marriage and improvement in general health conditions. For the second and subsequent birth intervals we find no evidence for period differences in quantum of fertility which ranges from 88 percent to 95 percent. However, the period 1973-79 in characterised by a sudden increase in the trimean. Comparing with the

period 1968-72 we find that the trimean for the second,fourth, sixth birth intervals have risen by 1.9,4.4 5.8 months respectively. Although the quantum of fertility remains unchanged there is indication of recent slowing down of the tempo of fertility, the effect being more apparent at high parities. It seems that fertility control is being practiced recently by women for the propose of delaying births especially at parity fo four and above.

Discussion

The life table approach adopted here enabled us to divide the family formation process into a series of events and to study the transition from each parity to the next in terms of summary measures of the birth function (Q and T). The analysis showed the following features of the process of family formation among sudanese women:

(1) A very high proportion of women proceed to the next parity regardless of the age or parity. The quantum is higher than 85 percent in all cases and does not fall until parity seven . However, it is noted that the quantum of fertility at the first birth interval is relatively low.

(2) The tempo of fertility is almost constant regardless of parity. However, older women take longer time to deliver their next birth due to - mainly-biological reasons, as well as some fertility control at higher parity. This also shows the absence of differentials in the pattern of breastfeeding in connection with the woman's age and - order of the newborn. Also, we note that the first birth interval is charac-

terised by a relatively long trimean reflecting delay in the first delivery.

(3) When the period effect is considered, differentials in the process of family building appears. In recent years (since 1973) women have started to use family planning. The effect of this practice is not significant as far as the quantity of fertility is concerned. It only affects the timing of the births which is reflected in the rise of the trimean for the recent period. This proves that family planning, practiced recently in Sudan, is used for the purpose of spacing births and has no effect on reducing the number of total births per woman, as they tend to move to the next parity regardless of their age at the begining of the interval. And this attitude continues until they reach parity seven. However, there is little indication that family planning may be used for limiting the number of children among older women(aged 30+) who reached high parities.

References

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