

الأبعاد المؤثرة على التحول لإنجاب المولود الثاني والثالث في الأردن

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ملخص: تبحث هذه الدراسة في المراحل البنائية المبكرة للعائلة الأردنية (الانتقالية إلى مرحلة إنجاب الطفل الثاني والثالث). وبالتحديد فإن هذه الدراسة تحاول أن تبحث الاتجاهات والفوارق في سرعة الانتقال لإنجاب الطفل الثاني والثالث، وفي تفسير أثر العوامل الاجتماعية الاقتصادية والديموغرافية والثقافية على سرعة الانتقال إلى هذه المراحل الإنجابية.

اعتمدت هذه الدراسة بصورة أساسية على تحليل بيانات مسح السكان والصحة الأسرية لعام 2002، الذي أعد من قبل دائرة الإحصاءات العامة ووزارة الصحة، مستعينة بنموذج التحليل المتعدد المتغيرات (نموذج الخطر Hazard Model) لتقويم تأثير كل متغير مستقل على سرعة الانتقال لإنجاب الطفل الثاني والثالث. هذا، وقد أظهرت الدراسة أن لبعض المتغيرات التي أدخلت في التحليل علاقة مهمة مع سرعة الانتقال لإنجاب الطفل الثاني والثالث، وتمثلت هذه المتغيرات في: مستوى تعليم الزوجة، ومكان الإقامة في الأصل، والعمر الحالي للزوجة، وعمرها عند الزواج، ووفيات الطفل السابق، وحجم الأسرة المرغوب فيه، والحالة العملية للمرأة، واستخدام موانع الحمل.

المصطلحات الأساسية: الانتقال لإنجاب الطفل الثاني، الانتقال لإنجاب الطفل الثالث، المتغيرات الاجتماعية، المتغيرات الديموغرافية، مرحلة التكوين الأسري، المبادعة بين المواليد.

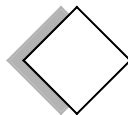
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ever observed in the national population. Very short birth interval have been found to be associated with elevated risks of infant mortality and impaired child health. In fact, the effect of cultural factors on the hazard of having a subsequent birth persistent present significant effects on likelihood transition to second and third parities. Therefore, these factors have a substantial effect on the risk to progression to a subsequent birth.

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factors, in addition to cultural factors would contribute the move rapid occurrence of second births.

The relative risks of having a third birth are associated with one unit of change in the covariates, as well as the estimated probability of having third birth by selecting covariates. The result of the third birth is similar to those for second births, with a few exceptions. The effect of child mortality on the likelihood of having a third child was somewhat stronger than it was on having a second child. The factor that varied most in its effect on the progression to second and third births was the gender of the second birth. Having daughters in the second interval had much greater influence on the progression to have a third birth. In general, our results support other previous studies that found a persistent strong son preference in Jordan in the recent years and the important impact of other factors (education, childhood place of residence, religion, length of previous birth, and infant mortality) on going on to having a third childbirth. As observed from Table (1), the variable with the most important effect on the relative hazard having third birth seems to be the education of women, in which the risk of having a third birth is negative and significant statistically. The husband's level of education is compared with the wives education on second and third birth intervals. Moreover, the findings suggest that the majority of cultural factors are unimportant for second and third childbirth, excluding the religion factor, when the other factors are controlled. At these stages of family building, other determinants of demographic and socio-economic factors are particularly important in fertility. Childhood urban residence seems to present an interesting finding at third birth interval. This is due to the existence of a negative and significant effect of cities and town's childhood place of residence at this stage of family building. Thus, we observe from the results that the pattern effect of these variables is weaker in the second interval but it returns to have negative significance effects on the third birth interval. Considering influence of the other variables like age at marriage, it appears that all these variables have significance on the risk to go to have the third birth. Increasing age at marriage has a positive effect on the risk of having a second and third childbirth, probably the fact that this variable captures latent variables with effects "fecundability catch up effects".

In addition, average birth spacing in Jordan is among the shortest

2.16. Cohort

The findings in Table (1) suggested that all female cohort categories are remarkably homogenous with respect to their pattern of family building at this early stage. Though insignificant statistically of cohort women younger than 29 years at the second and third birth intervals, there is a positive and insignificant relative hazard for transition to second and third birth intervals among much older cohorts (30-34) and above. This may be explained by the fact that older cohorts are more influenced by traditions and norms to continue their reproduction and have second and third births. This trend is attributed to the fact that children are of considerable economic support to aging parents and also render prestige values for their parents by carrying on the family line, particularly in agricultural areas, where the size of labor force in each family is a most important factor in family prosperity.⁽¹⁰⁾

2.17. Watching Television:

The mass media in general enhance personal modernity promoting the adoption of a small family size. Despite the fact that this variable has presented insignificant effects among women who make transition to second or third birth intervals as seen from Table (1), this result is clearly in contradiction with our previous hypothesis.

Summary

The results, of hazard analysis shown in Table (1) indicate that couples' socioeconomic characteristics measured by their level of education, occupation and rural -urban residence have significant effect on the timing of the lowest parities (second and third intervals). Higher hazard of second births is very clear in Jordan. The selective rapidity of second births can be associated with several possible causes. There is evidence that younger women breast-feed for shorter a duration on average, which would bring about shorter periods of infecundity. After the first birth, Fecundity is somewhat higher at younger ages. These

(10) The result by the current age of women at the time of the survey represents a cross-section of the experienceness of women of reproductive age. Thus the cohort effects in our model can be interpreted to summarize the effects of secular changes other than increased education, later age at marriage and urbanization which can lead to substantial effects in the fertility behavior.

As shown from Table 1, the length of interval between marriage and first birth has a strong correlate with relative risk to transition to second birth. In the second intervals the risk of the short subsequent birth intervals among women who have previous child duration (24-35 months) is (0.755) more than among women who have last child in 24 months and less (baseline function). Thus, it is not surprising that women who have shorter previous intervals are more likely to have relatively lower hazard rates and, in other words they tend to have a short interval. This result is somewhat consistent with the findings of (Gilks, 1986). In general, those women who had a first interval in less than 24 months reproduce more rapidly at all durations than do women whose previous interval at less than 24 months.

For women who have the first birth interval in interval less than 36-48 months, the risk of having the second birth has increased to (1.090), while women who have higher previous birth interval (48 months and above) have a lower risk to have second birth. At third birth interval, women who experienced a previous interval of over 42 months are far less likely to proceed to a subsequent birth. Hence women who have a second birth interval in longer duration (36-48 and above) have higher relative hazard to go on to have a third birth.

2.15. Use of Contraceptives

In Jordan there is little attempt by couples to postpone the birth by use of contraceptives unless they had at least one or two children. Women who didn't experience contraceptive use display a lower relative risk to transition to second and third childbirth. It is expected that the length of the first and second birth interval depends mainly on fecundity and coital frequency⁽⁹⁾ (Gilks, 1986). All these trends may be explained by the higher characteristics of women who use contraceptives such as higher level of education, cities as childhood place of residence, higher age at marriage, more discussion about the size of desired family (Anderson et al., 1985; Carrasco, 1981).

(9) Contraceptive use is associated with longer waiting time to conception but short postpartum amenorrhea. In short, the effect of modestly increasing contraceptive use for spacing is producing offset changes in breastfeeding practices.

2.11. Number sons wanted:

Since there is an insignificant effect of this variable on the second childbirth, this effect remains insignificant among women who make progress to the third childbirth. Those women who prefer a greater number of male sons in the family tend to have marginal and undifferential hazard to have second or third childbirths compared with those who prefer less than three male sons baseline function. It is (significant that) women continue childbearing after first and second births regardless of the number of sons wanted.

2.12. Desired family size:

This variable shows insignificant statistical effects on hazards of having second childbirths. The same variable appears to have stronger effects among women who go on to have a third birth. For example women who indicated that they wanted a large family ($6 >$ children) tend to have positive significant statistical relative risks (1.180 time) compared with baseline function. In other words, women who prefer more children tend to have higher hazard rates than those who prefer less children (that is, the stronger the preference of more sons, the shorter the duration of spacing). This finding supports our expectation and other previous studies which indicated that the couples who want to have a large family tend to have shorter length intervals between births (Gilks, 1986).

2.13. Age at start of previous interval:

Table (1) shows that all age categories at the beginning of the previous birth have an insignificant statistical hazard effect to go on to have second and third birth intervals. Moreover, women's age at the beginning of the previous interval is an inconsistent predictor compared with transition rate between the second and third intervals. After the second birth, the hazard for women who start the interval at an older age ($23 >$) decreases gradually, though with statistically insignificant effects.

2.14. Length of previous birth interval

Another variable which partially captures fecundity, but also includes effects of breastfeeding and contraceptive behavior, is the length of the previous birth interval (Gilks, 1986), which means that our analysis could only begin with the transition from first to second birth. The first birth interval is divided into fourth categories (mentioned in the Table 1).

of a subsequent birth. The death of an only child would leave parents with no living offspring. Thus, those parents who lose a first child would try harder to have another than those who do not experience such event. Meanwhile, women whose first child survived were less likely to have a shorter interval between the first and second birth⁽⁸⁾. The timing of the second child in Jordan, as mentioned previously, is influenced by the survival status of the first birth. The pressure, which emanates from a strong pronatalism in Jordan is culture bound i.e. to have children may have forced women who have lost one of their children to conceive as quickly as possible (Rodriguez, 1984). Moreover, the effect of the death of a second child on the length of the subsequent birth interval through its effect on breast-feeding was expected to be very significant. (Almasarweh, 1991)

The relative risks among women who have first or second previous birth death are much higher to have second or third births where the relative hazards are (1.245 and 1.451) respectively. As noted, previous child mortality has a substantial effect on progression to a second or third child. It is much stronger with the death of the third child compared to that of the second child.

In many parts of Jordan women continue to marry earlier and have their first children during their teen years. Their inexperience in caring for their children combined with lower education and lower family income may contribute to increase first infant deaths. Nonetheless, cultural factors may also contribute to reduce the mortality of first births in Jordan. The first child is very important for Jordanian families. Grandmothers generally play a very important role in taking care of their grandchildren, especially in small cities and rural areas. Their participation, advice, and supervision can overcome some of the disadvantages that face first birth experience such as difficult labor and possible concomitant illness, as well as mothers' lack of previous child care experience. (Rizk, 1978) Thereby, one of the significant covariates for predicting a second and third birth was the death of the previous child.

(8) Given the persistence of the pronatalist values in Jordanian society, couples whose first child died were under a strong pressure to produce another child as soon as possible.

that the sex composition of the previous child has an extremely significant effect on the likelihood of having a second birth for women whose first child is a girl where the relative risk is (1.076) time, while the hazard of having a third for women whose second child is girls was (1.122) times than for women whose second child is a boy. This may be explained by the fact that couples whose first or second child is a female are expected to be even more likely in favor of having a subsequent child as quickly as possible for fear of losing another chance to conceive a son.

Therefore, women whose first child was a girl were more likely to hasten the timing of their second and third birth. This alternative explains that these trends may be due to the fact that sons are not only allegedly advantageous to their natal family line, but they are also an important source of labor and can provide protection against destitution in old age (Caldwell, & Caldwell, 1987). The birth of daughters, nonetheless, cannot enhance the status of mothers within the family. Only after the birth of a son, is the mother accepted as a full-fledged member of the husband's family (Caldwell & Caldwell, 1987). However, the birth of sons has a negative effect on subsequent fertility by suppressing ovulation through intensive or extended breastfeeding and by diminishing the desire to have another child soon. As a result, this study is supported by other previous studies which indicate that the interval following the birth of a boy is less likely to be short, although the coefficient does not quite attain statistical significance (Cleland et al., 1983; Rindfuss et al., 1987).

2.10.The death of previous birth:

We study here the interval from one to the next birth according to the survival of a previous child. The death of a previous birth can affect the likelihood of having subsequent births for both social and biological reasons. Some couples may respond to the death of a child by trying to conceive again as quickly as possible by avoiding contraception and increasing coital frequency. Biologically, the death of an infant terminates the contraceptive effects of breast-feeding and insurance motive (Rodriguez, 1984). Because a review of past literature suggests a strong positive relationship between infant mortality and fertility we included the survival status of the previous child because we hypothesized that the death of the previous child would increase the probability

probability of having a second birth does not differ substantially by religion although this probability appears significantly different at the third interval where the relative hazard of having a third birth among Christians is greater. The coefficient corresponding to Christian women who make a transition to the third childbirth is 0.653. Our expectations about the role of religion are ambiguous. Christianity is the religion of a minority (3% in JFHS 1990) (Department of Statistics, 1992), and has introduced new ideas on the family and new views on the use of contraceptives (Yousef, 1971). As women opportunities outside the household increase, breastfeeding decline and contraceptive use increases. Results from hazard models show that there is consistency between Christians and Muslims about the length of the lower parities (first two children) but exhibited a negative effect at the third birth interval.

2.7. Kinship between couples:

The relative hazards among related couples, i.e. first cousins, are statistically insignificant to having second and third births. Thus, the baseline function was found not significant related to the women who marry outside the family (exogamy). This result is in contradiction with our previous hypothesis which indicated that the pressure which emanates from parents and the Jordan culture i.e. to have at least one child soon and continue to having a second child, may have forced women who marry inside their families to conceive quickly. Therefore all the above trends as we assumed previously were enhanced when the marriage occurred inside the family.

In general, despite the above results, kinship remains a fundamental element of social organization in Jordan and reproductive behavior appears to be strong by family structure and household composition and we can understand this importance for this variable in correlation with other socioeconomic, cultural and proximate variables (Rizk, 1978).

2.8. Gender of Previous Birth:

In some cultures, there exists a preference for sons, who consequently attract positive discrimination (Cleland et al., 1983). To test for son-preference, we included the sex of the previous child in the hazard models.

One of the interesting findings that could be noted from Table (1) is

“second birth” decisions because previous working experience may motivate a woman to press for continuing her working career which may, in turn, delay her childbearing. In other words, housewives (non-working women) are more likely than others to have second children because of the relatively lower costs and high benefits of having children. While working experience for women, particularly if in the modern wage sector, may be expected to absorb a mother’s time, raise the costs of bringing up children, delay marriage, and reduce lifetime fertility. Thus mothers’ work represents both a constraint on their rearing as well as on the productive resources for their support (Lloyd, 1991)

These marginal effects of women’s working status on fertility behavior suggest that a small part of this impact might work through delays in marriage. Non working women had insignificantly relative hazard on third interval. Moreover it’s important to mention here that the changes in attitude towards work have led to motivate mothers of even young children to participate in the labor force. These changes have been brought about by the public sensitizing and support women to continue their education and have a more effective role in the Jordanian society. We believe that these developments are best understood as reflecting comprehensive changes in women’s roles and personal values which have had a profound impact on family situation and would lead to the emergence of the fertility decline behavior (Hoem, & Hoem, 1989). In this context, we can observe that once a woman has married, the working status is somewhat less important in determining when she has her first but not second birth.

Therefore, we hypothesize that in Jordan, a women’s occupation has a significant effect on her reproductive behavior particularly at lower parities. As women’s opportunities outside the household increase, breastfeeding declines and contraceptive use increases. However, the positive effect of non-working women on the second birth spacing is evident. In general, in Jordan a woman’s occupation determines her status within and outside her family, her social environment, the values that she is subject to, and the principal source of her support in old age.

2.6.Religion of couples:

As shown from Table (1) religion attitudes have insignificant effect on the timing of the second birth. Both Muslims and Christians have a similar risk in having second births. As evident from the above table, the

respectively. Women with the highest education are likely to be the more broad minded and tend to make the largest investments in their children (Sahawneh, & Karadsheh, 1994). Thus highly educated parents may be more likely to desire a small number of children and a longer spacing between them. At third interval, the most common tendency we observed was that the relative risks being lower with increasing education. This pattern partly reflects stronger fertility control among the more educated women. After the second interval more educated women exhibit lower propensities to have an addition birth.

The result here is a common tendency that is consistent with other previous studies which indicated that higher education has a significant negative effect on the risk of pregnancy (Abdel - Aziz, 1983; Anderson et, al., 1985; Hoem, & Hoem, 1989; Rizk, 1978). In short, it's interesting to note here that the third childbirth is planned in Jordan. This result supports our previous expectation.

2.4. Husband's Education:

Women whose husbands have more than primary school education are more likely to progress quickly to the third birth with relative hazard of 1.054 and 1.196 respectively. There is, however, a remarkable positive effect of the level of education of husband on the second and third birth intervals. This result conflicts with path effect of women's level of education at the same stage of family building (second and third birth intervals). This result may reflect a strong desire to have a big family in Jordan and is consistent with previous studies (Warren et al., 1990).

2.5. Women's labor force participation

Work often presents a conflict between a woman's role as mother and wife and her role as a career woman. Once a woman is married, the working status she holds becomes somewhat less important in determining when she has her first pregnancy and quite often she may wish to catching up with 'lost time'. (Sahawneh, & Karadsheh, 1991).

Results from Table (1) show that women outside labor force have higher, though insignificant, relative risk of transition to the second stage of family building compared with currently working women (Baseline function). The relative hazard among non-working women who progress to the second birth is about 1.185. This means that employment status may have some influence on wives at earlier stages of family building and

fertility behavior among cities and towns childhood place of residence after bearing the second birth in Jordan can be explained by the fact that women who spent their childhood in cities are more likely to adopt forms of behavior that have opposite effect on the progress of the third birth. They are less likely to breastfeed and at the same time they use contraception to reduce fertility (Rindfuss *et al.*, 1984). Cities, which include the capital city, are highly urbanized with a relatively high literacy rate and a lower infant and child mortality than rural areas and also have easier access to birth control methods which could lead to lower fertility in these areas (Rodriguez. & Cleland 1981; Lindert, 1980). Therefore, it would not be surprising to see negative effect of urban residence on a third birth.

However, compared with women in urban areas, women in rural areas were more likely to have a short interval at second and third birth interval. This finding seems to be consistent with demographic transition theory (Easterlin, 1983): higher risks of fertility are closely associated with low socio economic development and are strongly affected by social background in rural areas. Hence, childhood place of residence proved to be a broad indicator of the type of environment in which the respondent spent her formation years. Thus it's expected to have a clear effect on the subsequent reproductive behavior.

2.3. Educational level of women:

Women's educational level seems to have a positive though insignificant effect on the baseline function at the second birth interval. The lack of statistical significance for women who have the highest educational level is probably associated with their preference to have a second child sooner than women with other educational levels. Moreover, this tendency is generally explained by the fact that fertility increases the effects of shorter breastfeeding by more educated women not being fully offset by the increased contraceptive use at this earlier stage of family building with increasing educational level (Casterline & Trussell, 1980).

The estimated relative risk over the third interval confirms the importance of women's educational level on the fertility behavior. A rather surprising finding is the clear and negative significant effect of higher educated women on the likelihood to progress to the third childbirth. The relative risk for more educated women (primary and more than primary school) at this family processing stage are 0.771 and, 0.754)

The hazard rates for women who marry at an older age are higher than these of women who marry at a younger age of 19 or less. Late marriages may speed up the process of family formation in order to catch up with their peers in terms of the life cycle stage. However, woman's age at first marriage has a high significant effect on the length of second and third intervals in Jordan⁽⁶⁾. Women who marry at a later age (20-24, 25 and above) have shorter third birth intervals than do those who marry earlier age. The relative hazard rate among women aged 20-23 is (1.770 and 1.39) respectively. Therefore, these results confirms our previous hypothesis and studies (Abdel- Aziz, 1983; Anderson *et al.*, 1985), that marriage at a later age was associated with a higher hazard rate to transition to subsequent births⁽⁷⁾.

2.2. Childhood place of residence:

Table (1) shows that there is a marginal and insignificant regional variation in the length of the second birth interval in Jordan. This variable seems that women who spent their adolescence in towns have a risk of a second birth higher than of other women who spent their adolescence in rural areas(baseline function) where the relative hazard is about (1.059)- though of insignificant statistical effect. While women in cities have more negative and insignificant effects on the second birth interval than those in rural areas where relative hazard = 949, this shift to the negative effect of hazard having second birth among women who grew up in cities at this earlier stage of family building (though of insignificant effects) is an interesting finding and may be attributed to the link between the socioeconomic development in the cities in Jordan.

Moreover, these effects become stronger and significant at the third interval among all city and town childhood residence, where the relative hazard is about (0.858 and 0,984) respectively .The interesting finding here is that there exists a negative and significant effect of towns and cities childhood place of residence on the third interval. This shift in the

(6) The effects of age at marriage on the hazard of having a second birth indicated that there was a catch-up. Women who married late (e.g. at 24 or older were also more likely to have a short interval between the first and second births.

(7) However, age effect should be interpreted with caution for age at marriage may represent a number of unmeasured variables more directly related to other determinant variable (Bumass, Rindfus & Palmore 1986).

A.	Variables	Second Birth Interval.		Third Birth Interval	
		Risk Ratio	Pr > Chi-square (sig)	Risk Ratio	Pr > Chi-square (sig)
	Intermediate Variables				
	3 = Not Relative	1.04	0.082	0.460	0.280
7.	Gender Composition of Previous Birth**				
	1 = Male (Baseline)	B	B	B	B
	2 = Female	1.076*	0.000	1.122*	0.000
8.	Death of Previous Birth**				
	Yes	B	B	B	B
	No	1.245*	0.000	1.451*	0.000
9.	Number of Sons Wanted **				
	1 = $\leq$ (2 sons (Baseline)	B	B	B	B
	2 = 3 Sons	1.129*	0.030	0.58*	0.05
	3 = 4 + $\geq$ sons	1.051	0.20	0.52	0.35
10.	Number of children Wanted **				
	1 = $\leq$ 3 (Baseline)	B	B	B	B
	2 = (4-5)	0.49	0.20	1.143	0.07
	3 = 6 $\geq$	0.55	0.150	1.80*	0.003
11.	Age at Start of the Previous Interval **				
	1 = $\leq$ 19 (Baseline)	B	B	B	B
	2 = 20-22	0.971	0.170	0.992	0.088
	3 = 23 $\geq$	0.990	0.90	0.909	0.092
12.	Length of Previous Birth Interval**				
	0 = 12-23	B	B	B	B
	1 = 24-35	0.755*	0.033		
	2 = 36-47	1.090*	0.002		
	3 = 48 +	0.88	0.11	0.98*	0.001
13.	Cohort**				
	1 = $\leq$ 19	0.886	0.240	0.739	0.30
	2 = 20-24	0.950	0.142	1.00	0.088
	3 = 25-29	0.964	0.062	0.881	0.150
	4 = 30-34	1.52	0.08	1.023*	0.21
	5 = 35-39	1.025	0.12	1.109	0.092
	6 = 40-44	1.014	0.22	1.042	0.28
	7 = 45 +	B	B	B	B
14.	Watching Television****				
	0 = (Rarely, Sometimes)	B	B	B	B
	1 Frequently	0.716	0.278	1.097	0.084

B = Baseline, *Significant Variables, ** = Demographic Variables,

*** = Socioeconomic Variables, **** = cultural Variable

childbearing late tend to make a conscious attempt to catch up through relatively rapid childbearing (Omran, & Roudi, 1993). These trends are more evident among higher age at marriage. Thus, these women may have a strong reason not to take contraceptives since they are at the end of their childbearing careers and want to have children quickly (Carrasco, 1981).

Table (1)
Results of the Hazard Model

A.	Variables	Second Birth Interval.		Third Birth Interval	
		Risk Ratio	Pr > Chi-square (sig)	Risk Ratio	Pr > Chi-square (sig)
	Intermediate Variables				
1.	Woman's Age at Marriage **				
	O = ≤ (19 (Baseline)	B	B	B	B
	1 = 20-23	1.585*	0.000	1.770*	0.000
	2 = 25 ≥	1.274*	0.000	1.389*	0.000
2.	Contraceptive use **				
	O = Used	B	B	B	B
	= Not Used	0.855**	0.002	1.389*	0.000
B.	Scio- Economic Variables				
1.	Woman's Education Level***				
	1 = No Education (Baseline)	B	B	B	B
	2 = Primary Education	1.143		-0.771*	0.000
	3 = More than primary	1.063		-0.754*	0.001
2.	Childhood Place of Residence***				
	1 = Rural	B	B	B	B
	2 = Other urban	1.059	0.08-	0.984*	0.001
	3 = Large cities	-0.949	0.220	-0.858*	0.001
3.	Husband Education Level ***				
	1 = No Education	B	B	B	B
	2 = Primary Education	0.876	-	1.170	
	3 = Higher than Primary	1.054*	-	1.196*	
4.	Woman's Working Status ***				
	1. Working (baseline)	B	B	B	B
	2. Other Conditions	1.185	0.120	0.650	
5.	Religion ****				
	1 = Muslim (Baseline)	B	B	B	B
	2 = Christian	0.511	0.37	-0.653	0.18
6.	Kinship****				
	1 = First Cousins	B	B	B	B
	2 = Second Cousins	0.983	0.090	0.610	0.170

calculated data from 16296 households, and an individual questionnaire that calculated data from 6461 for every- married woman aged 15-49. The results of the household survey and individual surveys indicated a high response rate for household interview (96.9) and a lower rate for the individual interview (89,2%) (Department of Statistics, 2003)

2. Results of Hazard Model: Second and Third birth intervals

Unlike first birth intervals, the likelihood of going on to have a second or a third birth is not only affected by demographic variables, but is also influenced by the pattern of the previous birth interval and its characteristics.

Variables such as the level of the couple's education, childhood, place of residence, amount of T.V watching, cohort, age at start of the second interval, miscarriage, religion, and over-all cultural factors do not have any statistical effect on the hazard of having second birth. Moreover variables as women's working status, cohort, age at start of the previous interval, miscarriage, and almost all of the cultural variables except (desired family size, marriage more than once) were also dropped from the final model because they don't have any significant effect statistically on the hazard transition to the third birth interval⁽⁵⁾.

Finally, estimates from the all-main effects models are shown in table (1) since all effects are simultaneous, they reflect the impact of each factor while the others are controlled.

We will be looking at the following variables and begin our analysis of these stages of family building according to the following:

2.1. Age at marriage:

This variable shows a substantial increase in relation to the hazard of having a second birth, in which the relative risk among women aged 20-24 at marriage, and those aged 25 or older who go to have a second birth was about (1.585, and 1.274) respectively. This means that women who married at later ages tended to have higher hazard rates on the Hazard Model than ahid these than who married at earlier ages of 19 or below. In other words, the later the age at marriage, the shorter the duration of birth spacing at second birth interval. This can be explained by the fact that, as age at marriage increases, most women are in their peak fecundity period i.e., when their second birth occurs. Yet women who marry later, and thereby begin

(5) Moreover, non-proportion assumption was tested and shows that several variables have non-proportion problems at progression to second and third birth intervals. Thus, as mentioned previously, we used simple forms of the validity of the proportional hazard assumption taking into consideration that the hazard changes with time. These variables are: -age at marriage, length of previous birth, women's educational level, husband's educational level, watching TV, cohort, and previous sex composition.

covariate indicates a shorter duration of birth spacing and the negative effect of a longer duration.⁽⁴⁾

The aims behind regrouping these two birth intervals are on the one hand, to avoid presentation of too much detail and to organize the presentation of the results of the analysis in a way that helps to facilitate studying and analyzing the importance of various factors that contribute to the process of family formation at these two stages, and to help increase our understanding of the relationship between the independent variables and the intervals between second and third birth order. On the other hand, there is a consistent pattern of effects of the variables of this study on birth interval length at specific rank of birth order because these different factors were likely to be important at specific stages of family formation.

The hazard function t is assumed to take a proportion hazard form $H_i(t, z_i(t)) = h_0(t) \exp(z_i(t) B')$.

Where $h_0(t)$ is an unknown baseline hazard at time t , $Z(t)$ is a vector of time varying explanatory variables and B' is the corresponding parameter vector which is unknown.

Using hazard models, we estimate the effects of the covariates. We assumed that all variables would have unchanging values and proportional effects on the likelihood of having second and third births, meaning that one unit of change in the variable would change the probability of progression to the next birth by raising the logarithm of the odds by a constant factor at all duration since the last birth.

1.3. Society and implementation

The 2002 Jordan Population and Family Health Survey (JPFHS) was conducted by the Department of Statistics and Ministry of Health, within the frame work of the Demographic Health Survey (DHS), a program of macro international statistics. The primary objective of (JPFHS) sample design was to provide reliable estimates of the fertility and mortality rates, and the use of contraceptive methods at the national level for major subgroups, namely large cities, and other urban areas. Two types of questionnaires were used: a household questionnaire that

(4) changes with time the proportion hazard model assumption is invalid. Simple forms of departure from the proportion hazards model can be investigated with time-dependent explanatory variable. The assumption of proportionality was tested analyzing the plots of the $\text{Ln}(-\text{Ln}S(t,x))$ function for categories of each covariate of the model. We examined first birth interval and then analyzed the timing of subsequent birth intervals since our interest is to estimate the overall effects of the various independent variables on birth spacing by birth order.

central concern. Factors related to the husband are also important because of their effect on coital frequency between couples, contraceptive choice, and desire for having children.

1.2. Methodology of Measurement

Cox's hazard regression model with time-dependent covariates (Cox, 1972) is used to estimate the relative effects of various covariates on the hazard or the instantaneous probability for a woman to go on to have a second and third birth. The statistical package SAS is used in this analysis⁽²⁾.

In our analysis we used the hazard model which has become common in investigation of simultaneous effects of several factors on events selected for study. The basic time in our model is the number of months elapsed since the last previous birth at each stage. For any given birth, order intensity of childbearing is expressed as function of time and, a number of covariates (regression). The analysis refers to the second and third birth intervals.

We have opted to present three different models including and excluding insignificant variables in order to assess the set role of these variables on the pattern of interval between birth intervals by birth order. The methodological strategy chosen will allow us to differentiate the determinants of variables, which have significant or insignificant effects on relative risk by birth order.

The study includes the full set of explanatory variables. The second equation is obtained by dropping all non-insignificant variables.⁽³⁾ Table 1 shows the results of the proportion hazard model to the data with the covariates. The model is used separately for the second and third intervals. Compared with the reference categories, the positive effect of a

(2) The only constraint is that the hazard functions in the life tables for each category must be proportional with the same proportionality factor at each duration. The proportion hazard method estimates the effect of independent variables on the hazard rate under the assumption to be that the effects of explanatory variables remain constant throughout the duration of time interval being analyzed (The proportion, assumption).

(3) We employed Cox's model with stepwise regression to ensure that the insignificant variables could jointly be dropped from the model) while giving special attention to non-eliminate, some variable are considered to have a more important effect on the birth interval as (women education level, women childhood place of residence and cohorts age at marriage). Most of our covariates are fixed e.g. social background, cultural and demographic factors.

1. Previous studies:

In his study, *Progression to Second and Third Births in China: Patterns and Covariates in six Provinces*, Cheoe *et al* (1992) indicates that the death of a previous child, place of residence and sex preference have a strong positive effect on likelihood of having a subsequent birth.

In a study entitled *The Impact of Women's Employment on Second and Third Births in Modern Sweden*, it was found that most women continued to want children, and that most of them wanted two children and achieved that aim. Moreover, the study found that the education level, current employment status of woman, and age at first birth have a strong effect on likelihood of having second and third births in Sweden (Hoem, 1989). In a similar study (Choe *et al.*, 1991) found that the mortality of previous children and the lack of a son to be the most important factors determining progression to the second and third birth intervals. Along with this conclusion, Larsen (1990) found that the probability of having a second or third birth is much higher, especially in rural areas, and among couples with no sons.

In Jordan, other important determinants of fertility were found to pertain to women's education, income level, urban or rural residence, sex preference and contraceptive use (Anderson *et al.*, 1985). Another study conducted by Arnold and Liu (1986) shows that couples without a son are less likely to use contraception than those with a son. Other important determinants of fertility were found to be a woman education level, income level, urban or rural residence ethnicity, and government family planning programs (Bumpass *et al.*, 1986; Hobcraft & McDonald, 1984).

1.Data and Methodology

1.1. Variables of the study

The explanatory variables included in this study are mainly women's and the family's demographic and socioeconomic characteristics. The dependent variable in this study is the length of the birth interval (second and third birth order). The main independent variables used in the hazard model were selected based on a preliminary exploratory analysis of the data, with reference to the result of some past studies (Warren. *et. al*, 1990; Rodriguez, 1984). These variables are classified into four categories: demographic, socioeconomic, cultural, and proximate variables (see table 1). Since the mother is the person most concerned with, and usually the key decision maker in infant feeding, the choice of most forms of contraception used in family, and factors relating to her are of

Main Objectives of the study:

Early fertility analyses were primarily concerned with the determinants of total family size. Such determinants were likely to be important at various stages of family formation. What determines the length of time between marriage and the first birth might be quite different from the determinants of the interval period between, say, the second and fourth births. Hence, it is natural that attention has shifted more to the determinants of the various components of the length of parity transitions (Rindfuss. *et al*, 1984).

As mentioned above, there are different factors which are deemed important at different stages of family building, and which attempt to understand and identify factors that more likely lead to higher parities than others.

In short, the main objective of this study is to examine:

1. The likelihood of progressing to second and third birth interval in Jordan.
2. Factors more likely to make women progress to a second and third birth interval. Thereby, this study will assess the effect of the socioeconomic, cultural, and demographic factors on the second and third birth interval.
3. The relative importance of various contributing factors to the fertility decline, as well as other facts that create obstacles to future fertility reduction. Therefore, by focusing on those births through examining the covariates associated with second and third birth, we sought to determine how the interplay between individuals take place.

The questions addressed in this study are as follows:

1. Is there any relationship between demographic factors such as (Women's age at marriage, contraceptive use, death of previous births, woman's age of the previous interval, length of previous interval, cohort, desired family size), and the likelihood to progress to second and third birth interval in Jordan?
2. Is there any relationship between socioeconomic factors such as (spouses' education level, childhood place of residence, woman's working status), and the likelihood to progress to second and third birth intervals in Jordan?
3. Is there any relationship between cultural factors such as (religion, kinship, number of children wanted, watching television) and the likelihood to progress to second and third birth intervals in Jordan?
4. What is the relative importance of various factors that contribute to progress to second and third birth intervals in Jordan.

The Importance of the Study

Generally, Jordanian new couples try or think of using contraceptives after getting their first or second child. Using⁽¹⁾ contraceptives indicates a lower relative risk to transition to second and third childbirth. It is argued that the length of the first and second birth interval depends mainly on fecundity and coital frequency (Anderson *et al.*, 1985; Gilks, 1986; Rodriguez *et al.*, 1984). This interval also depends on the characteristics of women themselves such as their educational level, childhood, place of residence, age at marriage, and desired family size (Anderson *et al.*, 1985; Department of Statistics, 1998; Department of Statistics 1992; Sahawneh & Karadsheh, 1992)

Despite substantial changes which occur in both the individual and the household backgrounds, the traditional family structure and attitudes in Jordan (such as family ties, continuity of family line, parents security in older age, enhancement of status and security of Women) remain very strong (Sahawneh & Karadsheh, 1992). Therefore, an examination of the relationship between the order-specific birth interval length and the various socioeconomic, cultural and demographic variables at the individual level may shed some light on the relative, importance of factors that contribute to fertility decline as well as factors that create obstacles in furthering fertility reduction (Gilks, 1986; Rodriguez *et al.*, 1984).

In short, this part of the study will pay special attention to the likelihood of progressing to a “second and third birth order stage”. Moreover, it will seek to understand the overall changes in women’s roles and personal values which have had a profound impact on the situation of families and have led to a continuation to a second and third birth or more. Most married women in Jordan, especially women of certain groups, still prefer more than two or even four children. However, no study, to our knowledge, has so far tried to assess the impact of variance factors on possible transition to second and third birth.

(1) Contraceptive use is associated with longer waiting time to conception but short postpartum amenorrhea. In short, the effect of modestly increasing contraceptive use for spacing is of responsible for fast changes in breastfeeding practices

known as “Trans-Jordan” in 1923. In 1950, Trans Jordan and the West Bank were united and assumed the current name of the Hashemite Kingdom of Jordan. In 1967 the occupation of the West Bank and the Gaza strip by Israeli forces caused a massive influx of refugees to the East Bank of Jordan. In 1988, in accordance with the desires of the Arab States and the Palestinian national authority, the West Bank was administratively disengaged from the kingdom to facilitate the establishment of the Palestinian State (Department of Statistics, 1982).

Historically, rural-urban migration as well as the influx of migration from outside the country has contributed to a rapid urban growth (Department of Statistics, 1982). The urban population increased by 9% between 1980 and 1994 (reaching 79%). The first population census in Jordan was carried out in 1961. The population then totaled 901.000. As a result of the Arab-Israeli wars in 1948 and 1967 and subsequent Israeli occupation of the West Bank and the Gaza Strip, a large number of Palestinians moved into the East Bank. In 1979 the population numbered 2.13 million and it nearly doubled to 4.14 million in 1994. In 2004 the population was estimated to be 5.6 million. It was expected to reach 5.9 million in the years 2005 (World population Data Sheet, 2004).

Fertility has been declining in Jordan since the mid-1970s. Studies have found that the total fertility rate declined from 7.4 children per woman in 1976 to 5.6 in 1990 then 4.6 in 1994 and to 2.7 in 2004. These figures indicated a decline of about four children, or 38% between 1976 and 1994 and two less children since 1994. This decline was caused by a decrease in the crude birth rate, which dropped from 50 per thousand in 1972 to 35 in 1990 and to 28 in 2004. Mortality has also been declining in Jordan, at a rate even faster than fertility. The crude death rate, estimated at 18 per thousand in the early 1960s had declined to 12 in the early 1980s (Anderson, et. al, 1985). In 1990 the crude death rate was estimated at seven per thousand and by 1994 it had dropped to five, which is the same at present (June 2004). The infant mortality rate also declined from 82 per thousand in 1976, to 34 in 1990, to 32 in 1994, and to 22 in 2004. In 2004 life expectancy was estimated at 71.5 years for both sexes (World population Data Sheet, 2004).

Factors Determining Family Decisions on Second and Third Child Intervals in Jordan

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Abstract: This study focuses on the second and third stage of family formation in Jordan. The analysis adopted describes recent trends and differentials in the time of second and third births; it also explores the role of socioeconomic, demographic, and cultural factors on second and third birth interval dynamics. Data obtained from the Jordan Population and Family Health Survey (JPFHS) (2002) conducted by the Department of Statistics and the Ministry of Health was used. Multivariate “Coxs Hazard” analysis was also used to evaluate the effect of each independent variable on these birth intervals. The study showed that some of the variables used in the analysis had a positive relationship with the timing and speed of the birth intervals. These variables are as follows: wifes level of education, original place of residence, wifes current age, womans age at marriage, previous child mortality, desired family size, womans working status, and the use of contraceptives.

Keywords: Transition to the Second Birth, Transition to the Third Birth, Social variables, Demographic variables, Stage of Family Formation, Birth interval.

Introduction

Jordan was part of the Ottoman Empire until 1921 when it gained independence. The country was declared a political entity and became

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