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Relative Risk on the Determinants of Birth Spacing

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ABSTRACT

In this investigation 1480 eligible women having two live births in Manipur were considered. Multistage sampling was applied to collect the data via a questionnaire; Cox's regression model was used to detect the most risks factors in the birth spacing. For descriptive and analytical data analysis, SPSS software was used.

Key words: *Preference of son, Lactation, Religion, Death of previous child.*

INTRODUCTION

According to the latest United Nations estimated population is 1,360,493,908. India population is equivalent to 17.74% of the total world population. This is only 2.4 per cent out of the land mass in the world. It is the second largest population next to China. However it may be the rank number one by 2025 sharing 17.74 per cent of the total world population. The estimated birth rate is 19 per 1000 population and death rate is 7.3 per 1000 population. The infant mortality rate is 39.1 per 1000 live births in India. The infant mortality rate in Manipur according to National Family Health Survey (NFHS 4) 2015-16 is 16 against the NFHS(3) 30.Mohammadreza*et al.*[5], reveals in their study the role of education, especially among women and its influence on fertility rate have been demonstrated in different studies. In their study, a total of 20.8% of women were university students before they got married and accordingly failed to have children. Different studies show that educated women postpone marriage for such reasons as involvement in education. Consequently, they give birth to their first child at a longer time and have fewer children.

Birth spacing refers to the spacing between two consecutive live births. Sometimes the spacing may be less than 18 months, it causes preterm birth, neonatal morbidity and low birth. It is influenced by various factors like socio-demographic factors, physiological and behaviouralfactors. A scientific investigation of fertility becomes a paramount importance for the population control as it is influenced by a series of factors. In order to investigate the nature of human fertility there is a number of methods and one of them is to study the nature of birth spacing. The problem of studying birth spacing is similar to the problem of studying the number of births that occur to a woman in a period of time. No extensive work has so far been taken up in this area.

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In this view, the present paper is proposed to initiate in order to investigate the socio-demographic factors, physiological and behavioural factorson the birth spacing.

OBJECTIVE

The objective of the research is to investigate the determinants of birth spacing of Manipuri women with adjusted effects of various demographic, behavioral, physiological and socio-economic factors. It is also to obtain the best set of covariates determining the closed birth spacing in the study population.

MATERIAL AND METHODS

The study design is a cross sectional by setting on community base in Manipur valley. It is based on1480eligible women having two live births. Multistage sampling design is applied to collect the data *via* a questionnaire. A pre tested semi- structural interview schedule is used as tool for getting information through the personal method to fulfil the objectives. The endogenous variable is birth spacing (i.e., spacing between two consecutive live births) denoted by CBI. In this analysis, the considered CBI is the spacing between the last but one live birth and last live birth. The birth spacing is exactly recorded through birth records. The exogenous variables are age at menarche-AME, marriage age of husband-AMH, marriage age of wife-AMW, separate room-SR, preference of daughter(s) by husband-DDH, preference of daughter(s) by wife-DDW, preference of son(s) by husband-DSH, preference of son(s) by wife-DSW, duration of marriage-DOM, educational level of husband-EDH, educational level of wife-EDW, death of previous child during infancy-DPC (1, if yes, 0 if otherwise), income of the family-INC, duration of breast feeding (in month)-LAC, Employment status of Husband-ESH, Employment status of Wife-ESW, number of living sons at present-NS, number of living daughters at present-ND, religion-RELH (1, if Hindu, 0 if otherwise), religion-RELI (1, if Islam, 0 if otherwise), sex of the previous child-SEX (1, if male, 0 if otherwise) and use of contraceptive devices-UCD (1, if used, 0 if otherwise). For the purpose of analysis, a well-known model $h(t, Z) = h_o(t) \exp(\beta^{/}, Z)$, introduced by Cox so called Cox's proportional hazard model is carried out. The simple form of the model is $h(t, Z) = h_o(t)\psi(Z)$, where $h_o(t)$ is the baseline failure rate or typical hazard and $\psi(Z)$ is a parametric link function bringing in the covariates. It satisfies $\psi(0) = 1$ and $\psi(Z) > 0$ for all Z. The commonly used form of ψ is $\psi(Z) = \psi(Z, \beta) = \exp(\beta^{/}, Z)$ known as the "log linear form". Thus for the individual with covariate vector Z, the hazard function h(t, Z) can be represented as, $h(t, Z) = h_o(t)\exp(\beta^{/}, Z)$ so that the ratio: $h(t, Z)/h_o(t) = \exp(\beta^{/}, Z)$ represents the relative risk of failure. Further, $\log [h(t, Z)/h_o(t)] = (\beta^{/}, Z)$ is the usual of a linear regression model and hence the name "log linear model". Since the regression coefficients are constants and covariates are fixed, then the hazards h(t, Z) and $h_o(t)$ are proportional and hence the name Proportional Hazards. The results are expressed in terms of β coefficient, standard error (SE), p-value and relative risk (exp-β) with 95% confidence interval (CI). Since the present work is based on primary data of complete type (no censoring), the spacing is recorded for each eligible woman. Thus, the single value is utilized as status variable in the analysis. For continuous co-variates, the parameter β denotes the effect of a unit change in the independent covariate on the log of the hazard rate after adjustment of the other covariates. β represents deviation of a specified group from the hazard of the reference group of the covariates in these categorical covariates. A proportion of the base line hazard in the exponential of the coefficient, exp (β) allows expressing the hazard of a specific group.

RESULTS AND DISCUSSION

When we control the effects of other factors at a time, we get sixteen regression coefficient (β) of ten exogenous variables. These values are quantified by p-value of test statistic and adjusted odd ratio (exp (β) or so called relative risk). Income of family is statistically significant and other four that is, death of previous child during infancy, desired number of son(s) by wife and duration of breast feeding are highly significant factors influencing the birth spacing. The death of previous child during infancy shows a significant contribution in reducing closed birth spacing. The mortality status explores that it has more risk in shortening birth spacing than when the child is alive.

Applying the Proportional Hazard model and after controlling the effects of other variables, only DPC, DSW, INC and LAC are found significant factors influencing birth spacing. Death of previous child during infancy is the most influencing factor for reducing the birth spacing. The preference of son by wife has more contribution of being short birth spacing than her counterpart husband. The value of RR, 1.5154interprets the fact that each increase in preference of son by wife gives 51% more risk of short birth spacing leading to high fertility level. The duration of breastfeeding lengthens the birth spacing. This finding suggests that one moth increases the duration of breast feeding can increase 30 per cent increase in birth spacing.

Table 1: Cox's regression analysis (adjusted)

Sl. No.	Factors	β -coeff. (SE)	P-values	Exp (β) with 95% CI
1	AME	0.0233(0.0241)	0.3735	1.0225:0.9736-1.0744
2	AMH	0.0069(0.0083)	0.3935	1.0081: 0.9896-1.0268
3	AMW	0.0629(0.0396)	0.1162	1.0658: 0.9872-1.1519
4	ASR	0.0052(0.0865)	0.9630	1.0050:0.8473-0.1919
5	DDH	-0.0429(0.0855)	0.6259	0.9581: 0.8105-1.1325
6	DDW	0.0227(0.0813)	0.7672	1.0231: 0.8741-1.1975
7	DOM	0.0463(0.0389)	0.2342	1.0474:0.9704-1.1305
8	DPC	1.2922**(0.2449)	0.0000	3.6407: 2.2530-5.8832
9	DSH	-0.1002(0.1133)	0.3764	0.9046: 0.7245-1.1296
10	DSW	0.3403**(0.1204)	0.0047	1.5154: 1.1101-1.7794
11	EDH	0.0052(0.0121)	0.6662	1.0052: 0.9816-1.0294
12	EDW	0.0174(0.0107)	0.1049	1.0175: 0.9964-1.0391
13	ESH	0.0757(0.1208)	0.5307	1.0787:0.8513-1.3668
14	ESW	0.1578(0.3143)	0.6155	1.171:0.6324-2.1682
15	INC	-0.0048*(0.0020)	0.0162	0.9952: 0.9914-0.9991
16	LAC	-0.0357**(0.0027)	0.0000	0.9649: 0.9598-0.9700
17	NS	0.0335(0.0872)	0.7322	1.0351:0.8547-1.2512
18	ND	0.0680(0.0977)	0.4866	1.0704:0.8839-1.2963
19	RELH	-0.2237(0.1231)	0.0679	0.7974: 0.6280-1.0175
20	RELI	0.1674(0.1813)	0.3557	1.1823: 0.8287-1.6866
21	SEX	-0.1320(0.0875)	0.1314	08763: 0.7382-1.0403.
22	UCD	0.0919(0.0918)	0.2622	1.0953: 0.9349-1.2860

* Significance at 5% probability level, ** Significance at 1% probability level

Table 2: Cox's regression analysis (Stepwise method)

Steps	Factors	β -coeff. (SE)	P-values	Exp (β) with 95% CI
1.	LAC	-0.0342*** (0.0015)	0.0000	0.9654: 0.9606-0.9712
2.	DPC	1.2977*** (0.2301)	0.0000	3.6618: 2.3312-5.7465
	LAC	-0.0344*** (0.0024)	0.0000	0.9663: 0.9624-0.9714
3.	DPC	1.3235*** (0.2305)	0.0000	3.7568: 2.3917-5.9011
	LAC	-0.0359*** (0.0025)	0.0000	0.9667: 0.9619-0.9715
	RELH	-0.2422** (0.0917)	0.0082	0.7851: 0.6561-0.9394
4.	DPC	1.3086**** (0.2315)	0.0000	3.7019: 2.3554-5.8145
	DSW	0.2419* (0.1026)	0.0183	1.2738: 1.0420-1.5571
	LAC	-0.0350*** (0.0026)	0.0001	0.9657: 0.9605-0.9703
	RELH	-0.2181* (0.0924)	0.0182	0.8040: 0.6709-0.9636
5.	AMW	0.0209* (0.0089)	0.0168	1.0211: 1.0038-1.0388
	DPC	1.3156*** (0.2305)	0.0001	2.7270: 2.3725-5.8548
	DSW	0.2689** (0.1043)	0.0098	1.3085: 1.0668-1.6049
	LAC	-0.0348*** (0.0027)	0.0001	0.9655: 0.9610-0.9706
	RELH	-0.2406** (0.0928)	0.0093	0.7861: 0.6556-0.9428

* Significance at 5% probability level, ** Significance at 1% probability level,
*** Significance at 0.01% probability level

Duration of breast feeding (LAC) is found to be the most influential factor on birth spacing. One of the possible ways is that the duration of breast feeding can lengthen the post partum amenorrhea. Breast feeding seems to have suppressed the ovulatory cycle and acts as a major form of protection against conception. Dissanyake[1] suggests that this is not only due to direct hormonal and other biological effects but also the effect of lactation on ovulation is further enhanced by the prolonged sexual abstinence observed during the nursing period. The death of previous child during infancy shortens the duration of birth spacing through emotional feeling of the couple. The possible cause is that the behavior of child replacement effect involves a deliberate decision by the couples to compensate the dead child which results into short birth spacing. Perhaps the couples unintentionally have their next conception quickly as infant's death ends breast feeding practice which results in the women returning to menses and resuming ovulation sooner. This view is incorporated with the findings of Gyimah[2].

Religious differences cause a considerable impact on the dynamics of birth spacing in the present analysis. Here the significance is observed in Hindu group. It is mainly caused by the fact that the Islamic religion is under reference category. In the study population, most Islamic couples do not practice post partum sexual abstinence. The length of such abstinence can exceed the length of post partum amenorrhea. This may help women in delaying their next conception. The Population Reports[6] supports this view. On the other hand, Islamic couples have low status in educational level which associates with less use of contraceptive devices. They still adhere to the orthodox belief in the religious restriction on the use of contraceptive devices. Desired number of son(s) by wife has a very significant impact on the regulation of birth spacing. Couples prefer to go in for more number of children in order to achieve the desired number of sons. Perhaps, whenever there is a female child and if the couples intend to go in for more birth it exerts a psychological and emotional pressure to have the next birth of the desired sex quickly and hence leading to shortening the birth spacing. One of the most debatable findings here is that the wife's desired number of son(s) has more significant impact on the duration of birth spacing than that of their husband counterpart.

CONCLUSION

It is seen that in order to achieve an adequate length of birth spacing, it is required to reduce the fertility level. Government may practice to formulate, execute and implement the measures-duration of breast feeding be lengthen in order to increase the birth spacing, educational qualification may be increased in order to reduce the death of previous child, among the religious also, Hindu birth spacing somewhat better than Islamic groups, qualification of Islamic women may be increased. These findings may be treated as baseline information. It is suggested to increase the age at marriage, educational qualification of the spouse in order to increase the birth spacing as well as a good society. The findings may be immense value particularly in population planning and health policy through which an attempt may also be made to improve the socio economic status of rural community resulting into better way of life.

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