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Determinant of Second Waiting Time- A case Study in an Agrarian Coastal Village of South India

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ABSTRACT

Second waiting-time is an important pre-requisit of the wellbeing of the mother and family. Present paper analyses for the determinant of the length of second waiting-time and the time-specific rate of second birth using multiple regression analysis and proportional hazard model respectively. Out of 11 independent variables, six of them failed the condition suggested by Tabachnick and Fidell (2001) and the other five independent variables failed the test for proportionality. R square of regression analysis indicates that the type of house, age of wife, education of wife and occupation of wife explain much of the variation of the second waiting time. All independent variables failed in test for proportionality indicating that probability of second birth is not related to the characteristics of the couples.

KEYWORDS: Waiting time, Fecundability, Education of wife, Determinants, Occupation

INTRODUCTION

With the widespread knowledge of family planning methods, number of children per couple reduced around two even in the remote villages of India. In low fertility societies, the timing of birth is an important prerequisite for the health and welfare of families. A growing number of studies suggest that family wellbeing is conditioned by how soon childbearing is begun and how soon it proceeds (Larry L. Bumpass, Ronald R. Rindfuss and Richard B. Janosik, 1978). As Gordon C S Smith, Jill Pell and Richard Dobbie, (2003) pointed out, a short inter-pregnancy interval is an independent risk factor for preterm delivery and neonatal death in second birth.

Present study tries to find out the impact of prominent predator variables on the waiting-time for second birth in the agrarian coastal village. Waiting-time for second birth is defined as the time after the first live birth terminated by either a second live birth or the date of interview of data collection.

DATA AND METHODS

The sample of the study consists of 250 ever-married women having age below 45 years, residing in rural areas of Nagapattinam district in Tamil Nadu, India. Nagapattinam is a coastal district 326 K.M. south of State capital. Tourism, agriculture and fishing along with para marine activity constitute the major economy for the district. In 2006 the Ministry of Panchayati Raj named Nagapattinam one of the country's 250 most backward districts (out of a total of 640). It is one of the six districts in Tamil Nadu currently receiving funds from the Backward Regions Grant Fund Programme (Ministry of Panchayati Raj, 2009). There are a total of 890 elementary schools, 185 middle schools, 83 high schools and 79 higher secondary schools in the district.

As per the Census of India 2011, 77.46 per cent of population of Nagapattinam district lives in rural areas with population density of 520.69 per KM. The child population comprises 9.84 per cent of total rural population. In the rural area, the expectation of life at birth for males and females are 59 and 60 years respectively. The sex ratio is 1021 females per 1000 males and child sex ratio is 963. Literacy rate are 89.31 and 75.96 per cent for females and males respectively. Birth rate, death rate and infant mortality rate per 1000 are 19.90, 8.20 35.00 respectively.

As the major objective of this study is to find out the impact of significant socio-economic and demographic predators on the waiting-time for second birth, the dependent variable selected is interval between first and second live births. The study hypothesized that second waiting-time of the agrarian coastal rural population is determined by their socio-economic and demographic variables.

The lengths of the second waiting-time can also be affected by biological variation in the ability to conceive and, having conceive, the ability to have a live birth. Unfortunately, it is not possible to obtain individual measures of fecundability; but it should be noted that, since the population of interest here has experienced at least one live birth, variation in fecundability will be less than that found in the general population (Larry L. Bumpass, Ronad R. Rindfuss and Richard B. Janosik, 1978).

As the data were collected through a cross-sectional survey, the waiting times for second birth consist of closed and open. Closed waiting-time is the one which terminates with a live birth and the open waiting-time is the one which terminates with the time of interview. So, the data was right-censored.

The methods used for analysis were multiple regression models and the multivariate life table procedure known as proportional hazard model. Multiple regression model was used for analyzing the impact of important socio-economic and demographical predictor variables on the length of waiting-time for second birth and proportional hazard model was used for assessing the effect of predictor variables on the hazard function known as the time-specific hazard rate which represents probability of having a second birth per woman per unit of time. In proportional hazard models the hazard is not only a function of time but also a function of specified predictor variables. Thus the proportional hazard model allows for certain amount of heterogeneity (Robert D Retherford and Minja Kim Choe, 1993).

The selected predictor variables were age, age at marriage of wife, education of husband, occupation of husband, education of wife, occupation of wife, gender of the first child, age of wife at first birth, family income per month, community and the nature of house. As the relationship between the response variable and predictor variables was studied with multiple regressions, the predictor variables were tested for the conditions suggested by Tabachnick and Fidell (2001). The suggested conditions related to sample size, multicollinearity, outliers and assumptions of normality, linearity and homoscedasticity.

The sample size of the study was 250 which is greater than 138 ($N > 50 + 8m$) a condition sugessted by Tabachnick and Fidell (2001), where N is the sample size and m is the number of predictor variable used. The test of multicollinearity is an inbuilt facility in the statistical software used for analysis. Other assumptions were tested with the histogram of standardized residuals, and residuals scatterplots. Community, gender of first child, age of husband and age at marriage of husbands and wives were failed in the test. So, they were removed from the list of independent variables. Five retained independent variables were used for further analysis.

CHARACTERISTIC OF THE SAMPLE

Fifty one per cent of the sample belong to scheduled castes/scheduled tribe communities, 47 per cent belong to backward community, and the other two per cent belong to forward community. Forty seven per cent live in temporary houses, 44 per cent live in semi-permanent house and nine per cent live in permanent building. The mean family income per month was 3720 with a standard deviation of 674.

The mean age of wives was 37.6 years with a standard deviation of 5.7 and their age at first delivery was 22.08 years with a standard deviation of 2.8. Fifty six per cent of husbands and 19 per cent of wives have high school education. Thirty per cent husbands and 74 per cent wives have below high school education. Fourteen per cent of husbands and seven per cent of wives have above high school education. Seventy one per cent of husbands were agricultural labors, 20 per cent were skilled labores or having white color job and nine per cent are engaged in cultivation or trade or commerce. Fifty five per cent of wives were workers and 45 per cent were housewives.

Mean waiting-time was found to be 352.84 weeks (51 months or 4 years). Median and mode of waiting-time were 209.09 and 160.23 weeks respectively. The waiting-time varied with a standard deviation of 434.12 which is greater than its mean value. The distribution of waiting-time is positively skewed with a magnitude of 3.10 and leptokurtic with a magnitude of 10.59 in the range between 6.82 weeks and 2461.82 weeks. Twenty five per cent of the couples have waiting-time below 150.51 weeks. Half and three quarter of the sample have waiting-time up to 209.09 and 340.68 respectively.

RESULT AND DISCUSSION

Present study focuses on the variations of the length of second waiting-time and the probability of getting a second birth with respect to the significant socio-economic and demographic characteristics of the sample couples.

LENGTH OF WAITING TIME

As the sample was cross-sectional, couples include those with closed waiting-time and open waiting time. The open waiting-time was assumed to be truncated by the date of data collection and so a minor reduction is expecting in estimate of regression model for second waiting time. Backward selection method was used to regression. The R2 of the final model was 0.399 which indicates that the selected predictor variables represent 39.9 per cent of variation of waiting time. The multiple regression models was found to be well fit to the sample data as the F was 26.833 which was significant at one per cent level. Equation (1) represents the estimated model for predicting waiting time.

T = -1168.9 + 36.2 H + 163.8 Aw + 128.1 Oh + 276.0 Ow - 191.4 Ew ……..(1)

Where T = second waiting-time in weeks, H = type of house (1 if permanent, 0 otherwise), Aw = age of wife, Oh = occupation of husband (1 if agriculture labor, 0 otherwise), Ow = occupation of wife (1 if housewife, 0 otherwise) and Ew = Education of wife (1 if below high school, 0 otherwise).

All independent variables, except education of wife, have positive impact on the waiting time. Among the predictor variables, occupational status of wife exerts maximum impact on waiting time. Compared to working women, housewives have waiting-time higher by an average of 276.0 weeks. Couples living in temporary structure have higher waiting-time compared to those living in permanent structures by 163.8 weeks. Women with husbands in agricultural laborer force had the relatively higher waiting-time of 128.1 weeks than women with husbands having other occupation. Women with education below high school level have 191.4 lower waiting-time compared to those women with higher education.

The regression model was adapted of to multiple classification analysis (MCA) model and result is presented in Table 1. Table 1 shows the impact and effect of type of house, age of wife, occupation of husband and wife, and education of wife on the dependent variable, waiting time. The table contains two sets of results, unadjusted and adjusted. 'Unadjusted' waiting-time means waiting-time without control of other independent variables and 'adjusted' waiting-time means waiting-time with control of other independent variables.

TABLE 1. MCA Table of the Effect of type of residence, family income, age of wife, occupation of husband and wife.

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Predictor variables			n	Unadjusted			Adjusted			
		Waiting Time			R	Waiting time		R		
		Value	Effect			Value	Effect			
Type of house							0.28			0.22
	Temporary		118	222.90	-129.94			266.35	-86.49	
	Permanent		132	469.00	116.16			430.16	77.32	
Age of wife							0.39			0.46
	30			126.74	-226.10			76.91	-275.93	
	35			275.02	-77.82			257.87	-94.97	
	40			423.31	70.47			438.83	85.99	
	45			571.59	218.75			619.79	266.95	
Occupation of husband							0.04			0.12
	Agriculture labor		178	342.09	-10.75			389.74	36.90	
	Cultivators		72	379.42	26.58			261.62	-91.22	
Occupation of wife							0.30			0.26
	Housewife		113	494.00	141.16			504.07	151.23	
	Working women		137	236.41	-116.43			228.11	-124.73	
Education of wife							0.13			-0.19
	Below high school		186	319.29	-33.55			303.84	-49.00	
	Above high school		64	450.36	97.52			495.24	142.40	

Unadjusted	Residence	$T = 222.9 + 246.1H$
		(0.000)
	Age of wife	$T = -763.0 + 29.7\ Aw$
		(0.000)
	Occupation of husband	$T = 379.4 – 37.3Oh$
		(0.539)
	Occupation of wife	$T = 236.4 + 257.6Ow$
		(0.000)
	Education of wife	$T = 450.4 -131.1\ Ew$
		(0.037)
Adjusted	$T = -1168.9 + 36.2\ H + 163.8\ Aw + 128.1\ Oh + 276.0\ Ow - 191.4\ Ew$	
	(0.000) (0.000) (0.000) (0.000) (0.000)	

Numbers in the parentheses under coefficients are p values. The adjusted effects of all variables are statistically significant at the maximum level. The unadjusted effect of education of wife is significant at 5 per cent level. Unadjusted effect of occupation of husband is not significant at 5 per cent level. The adjusted effect of occupation of husband is explained away by type of house, age of wife, occupation of wife and education of wife. All predictor variables have mostly independent effects on second waiting time, insofar as the adjusted length of waiting-time by predictor variables are affected very little by the introduction of controls. The R values are sufficiently higher, indicating that the predictor variables explain much of the variation of waiting time.

TIME-SPECIFIC RATE OF SECOND BIRTH

Time-specific rate of second birth can be computed by proportional hazard model. Independent variables selected for proportional hazard model are those selected by the backward selection method of multiple regression analysis. The independent variables retained in the final regression model were type of house, age of wife, education of wife and occupation of wife.

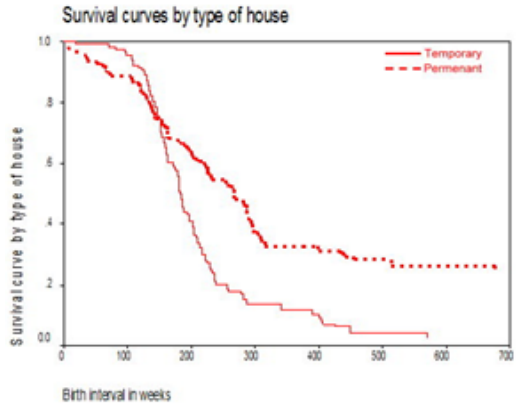
TEST FOR PROPORTIONALITY

The first step, before fitting the model, is to test for proportionality. All predictor variables except age of wife are dummy variables. So, the sample was also divided into two according to age of wife (1 if less or equal to 38, 0 otherwise). Thirty eight is the rounded number of the mean of age of wife = 37.62 years with SD., 37.62. All independent variables have failed in the test for proportionality. Figure 1 presents the result of graphical test for proportionality of independent variables.

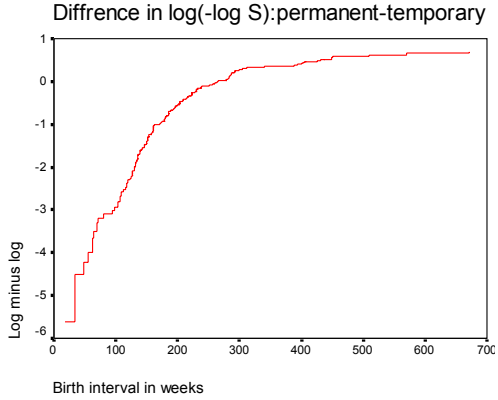
In Figure 1.a.i, shows that the survival curves for 'temporary' type of house and 'permanent' type of house cross over at each other. Couples from permanent type of house evidently have higher hazard rates than couples from temporary type of house at short durations but have lower hazard rates at higher durations. The survival curve crosses over at about 150 weeks at which time it is about 7.5.

a. Type of house

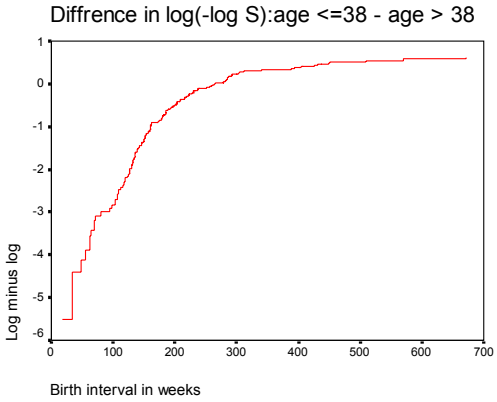
i. Survival curve



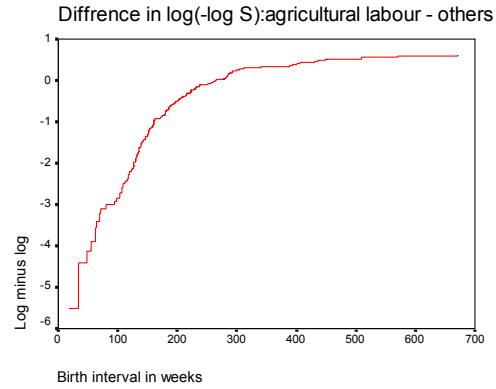
ii. Log(-log S) curve



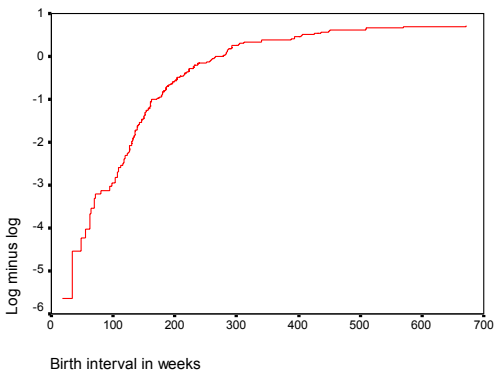
b. Age of wife



c. Occupation of husband



d. Occupation of wife



e. Education of wife

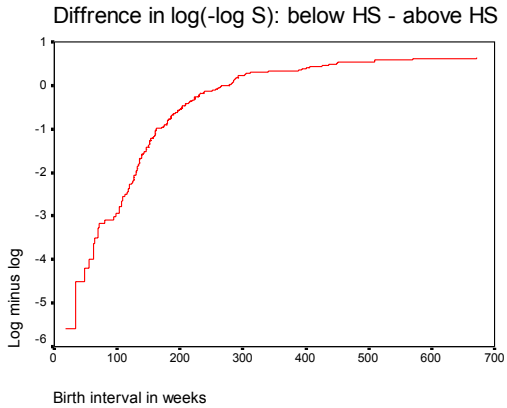


Figure 1. Graphical test for proportionality of independent variables

The crossover of survival curves is reflected in a major departure from horizontal linearity in the plot of permanent type of house and temporary type of house difference in log[-log S(t)] in Figure 1.a.ii. The plot turns convex up to concave up at about 150 weeks at which time it is near about 0.7. The plots of other independent variables are presented in Figure 1. The plot of log[-log S(t)] of all independent variables are similar and do not indicate linear proportionality.

CONCLUSION

The sample of the study is from the agrarian costal population having basic knowledge about family planning and widespread use of condom. The second length of second waiting-time of the sample is determined by type of house, age of wife, education of wife and occupation of wife. Probability for second birth is not related to the characteristics of the couples.

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REFERENCES

i)John Fox (2002), "Cox Proportional-Hazard Regression for Survival Data,"2 | ii)Gordon C S Smith, Jill P Pell, Richard Dobbie (2003), "Inerpregnancy Intreval and Risk of Preterm Birth and Neonatal Death: Retrospective Cohort Study," Archives of Disease in Childhood: 2 | iii) Larry L. Bumpass, Ronald R. Rindfuss, Richard B. Jansik (1978), "Age and Marital Status at First Birth and the Pace of Subsequent Fertility," Demography, Vol. 15: 1 | iv)Robert D. Retherford and Minja Kim Choe (1993), Statistical Models for Casual Analysis.New York, John Wiley & Sons, Inc. | v) Tabachnick and Fidell (2001) | vi)Ministry of Panchayati Raj (September 8, 2009). "A Note on the Backward Regions Grant Fund Programme". National Institute of Rural Development. Retrieved September 27, 2011. | vii)Census of India 2001. |