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MODELLING THE CONTRACEPTIVE BEHAVIOUR OF MARRIED FEMALES

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The study objectives were to examine the relative significance of socio-economic and cultural factors in relation to reproductive behaviour and classify 1100 respondents (users and non-users) into their exact categories. Logistic regression analysis technique was applied to investigate research objectives. The analysis indicated that women education, family size preference, media exposure, number of living children, family income and religious beliefs are the important predictor variables in predicting contraceptive behaviour. Overall 76.45% respondents were correctly classified.

Key words: contraceptive behaviour, logistic regression analysis

INTRODUCTION

Today, the world is striving hard to improve the socio-economic conditions of masses. The socio-economic and environmental conditions and ineffective strategies create severe hindrance in controlling the current drastic increase in population in Pakistan. The rapid growth of population has not only adversely influenced the standards of living but it also seems a great threat to the process of development.

According to 1998 census, the population size is 130 million and population growth rate per annum is 2.8%. At the present growth rate, the population is expected to double every 24 years, Thus by 2022, the population would grow to a size of 260 million. Today, it is difficult to feed 130 million, what will be the scenario of food supply when there will be 260 million people in 2022? It is thus a matter of great concern for the policy makers.'

Although a number of approaches and strategies have been adopted to promote the concept of small family norms and encourage the use of effective methods of family planning, but these programmes have not been adequately effective in generating widespread demand for the adoption of contraceptives. Formulation of an effective population policy is essentially required to achieve desired development goals. Many researchers identified the significance of socio-economic and cultural factors in explaining the contraceptive and fertility behaviour. Dyson and Moore (1983) view the importance of early age at marriage, social segregation, boy preference, women's restricted physical movement, spousal communication, constraints from seeking out family planning services are the factors that lead to high fertility in developing countries. Sathar (1984) argued that for fertility decline or greater use of family planning practices, nine years female schooling is an essential factor. But in traditional societies, higher level of education is required to achieve the said objectives. Sathar also stated that women status is an important determinant of fertility decline. Fort (1989) viewed that bearing and rearing of the children is prime responsibility of Peruvian women and those having children are respected by the society indicating the significance of cultural factors in determining reproductive goals. He also viewed that Peruvian society considered the women using contraception as unfaithful to their husbands. The same cultural and social conditions appear to have a strong hold in Pakistan too, which may lead to high fertility. Zafar et al. (1995) argued that beliefs and values regarding family life in terms of religiosity, conservative attitude, family size and sex preference, exposure to mass media, and spousal communication are significant factors in predicting fertility and contraceptive behaviour. Zafar (1996) pointed out that the explanations of reproductive behaviour were consistent with modern attitude and behaviour towards family life. They viewed that women age at marriage, women education and their participation in the decision-making process as well as their husband's participation in domestic chores have established their significance in explaining fertility behaviour independent of material circumstances.

MATERIAL AND METHODS

The data were collected from 1100 respondents from two major urban centers of Punjab Province i.e. Lahore and Faisalabad including 400 users and 700 non-users of contraception. A multistage cluster systematic sampling technique was used for sample

selection. Three localities were randomly selected from each city, where family planning clinics or family welfare ccnters or both were functioning. Bazars and main streets constituted as cluster and number of households as basic sampling-unit. A number of characteristics were recorded from each respondent. The independent variables used in this paper were age at marriage (AGAMA), husband's education (HUSEDU), women's education (WOEDU l, sex preference (SEXPREF1, family size preference (SIZEPREF), religious belief (NEED), exposure to mass media (TV), number of living children (LCHILDl, family income (INCOME) and contraceptive behaviour (STATUS) as binary dependent variable. Normally, the multiple regression is used to identify the relative significance of predictor variables, but this technique can be used if the response variable is of continuous type. In case of binary dependent variable i.e. (users, non-users), the appropriate technique suggested by the authors is logistic regression instead of multiple regression to identify the set of predictor variables which best explain the reproductive behaviour and to find the correct classification of objects (users, non-users) according to their known group membership.

Logistic Regression: The main interest in an academic discipline as well as in the real world is to predict whether an event will or will not occur and also to identify the set of variables useful for making prediction e.g. why do some people develop coronary heart disease and others not? Similarly, why do some people use contraceptives and others not?

There is a variety of multivariate statistical techniques that can be used for this purpose. Although commonly used technique is multiple regression, yet when the dependent variable is binary, this technique poses some difficulties. **In** such a situation, there is another appropriate multivari ate statistical technique known as logistic regression which can be used for estimating the predicted probabilities.

The logistic regression equation for the probability of contraceptive user for a single independent variable can be written as

$$\text{Prob (event)} = \frac{e^{\sim o + \sim IX}}{1 + e^{(\sim O + \sim IX)}}$$

or

$$\text{Prob (event)} = \frac{1}{1 + e^{-(\sim o + \sim IX)}} \qquad (1)$$

where ~o and ~1 are the coefficients estimated from the data set, e is the base of natural logarithms, approximately 2.7183 and X is the independent variable. For p independent variables the equation (1) can be written as

$$\text{Prob (event)} = \frac{e^{z}}{1+e^{z}} \quad \text{or} \quad \frac{1}{1+e^{-z}}$$

where $Z = \sim o + \sim IX1 + \sim 2X2 + \sim;IX:i + \sim 4X4 + \cdots\cdots + \sim pXp$ is the linear combination of the p independent variables.

The probability of the event not occurring can be estimated as Probability (no event) = I-Probability (event). The relationship between independent variable and the Probability is non-linear and the parameters of the model are estimated using the maximum likelihood method. Since the logistic regression model is non-linear, an iterative algorithm is necessary for parameters estimation. Also the probability estimates will always be between 0 and 1 regardless of the values of Z (Hosmer and Lemeshow, 1989).

RESULTS AND DISCUSSION

Table 1 gives the estimated coefficients and related statistics for the logistic regression model that predicts users's behaviour. The variable TV is an indicator variable coded 1 or 2, the value one (1) for variable TV indicates that the respondent had a television set and the value two (2) indicates that the respondent did not have a television set. Using these coefficients, the logistic regression for the probability of contraceptive users can be written as

$$\text{Probability (users)} = \frac{1}{1+e^{-z}}$$

where Z = 4.6971 + 0.0604(AGAMA) -0.0238 (HUSEDU) + 0.0485(WOEDU) -0.0442(SEXPREF) - 1.1394 (SIZEPREF) + 0.2455 (NEED) - 1.146(TV) + 0.2886 (LCHILD) - 0.2542 (INCOME)

Now by substituting the values of the independent variables, the value of Z is calculated and consequently, the probability of users. If the estimated probability of the event (contraceptive users) is less than 0.5, the repondent is predicted as a contraceptive non-user. If, however, the

Table I. Logistic regression coefficients and related statistics.

Variables	Variables in the equation						
	B	SE	Wald	df	Sig	R	Exp (B)
AGAMA	.0604	.0309	3.8110	1	.0509	.0354	1.0623
HUSEDU	-.0238	.0200	1.4132	1	.2345	.0000	.9765
WOEDU	.0485	.0236	4.2376	1	0.396	.0394	1.04·97
SEXPREF	-.0422	.0809	.2727	1	.6015	.0000	.9586
SIZEPREF	-1.1394	.0984	148.7669	1	.0000	-.3190	.3200
NEED	.241)5	.0609	16.2402	1	.0001	.0994	1.2783
TV	-1.1469	.229:5	24.9812	1	.0000	-.1262	.3176
LCHILD	.2886	.0534	29.22:30	1	.0000	.1374	1.3346
INCOME	-0.2542	.0644	15.5863	1	.0001	-.0971	.7755
Constants	4.6971	.9640	23.7412	1	.0000		

Table 2. Classification table for STATUSusing model as given in Table 1

Observed		Predicted		Correct (fir,)
		N	U	
Non-user	N	606	94	86.57
User	U	165	235	58.75
		Overall		76.45

Table 3. Estimated logistic coefficicuts and their significance of categorical as well as **indicator variables**

Yariables	B	SE	Wald	df	Sig	R	Exp (B)
INCOME			12.3609	2	.0021	.0761	
INCOME (1)	.3836	.1095	12.2688	1	.0005	.0844	1.4676
INCOME (2)	-.2006	.1305	2.3621	1	.1243	-.0158	.8182
WOEDU			27.4061	2	.0000	.1274	
WOEDU (1)	-.1139	.1201	.8996	1	.3429	.0000	.8923
WOEDU(2)	-.4722	.1180	16.0060	1	.0001	-.0986	.6237
LCHILD	.7633	.1873	16.6109	1	.0000	.1007	2.1454
SIZEPREF			143.4946	2	.0000	.3110	
SIZEPREF (1)	1.2710	.3534	12.9336	1	.0003	.0871	3.5645
SIZEPREF (2)	.3257	.1912	2.9001	1	.0886	.0250	1.3849
SEXPREF			11.6378	2	.0030	.0728	
SEXPREF (1)	.3676	.4023	.8353	1	.3608	.0000	1.4443
SEXPREF(2)	.2653	.2750	.9304	1	.3348	.0000	1.3038
NEED	.9262	.1828	25.6630	1	.0000	.1281	2.5249
TV	-1.0130	.2260	20.0827	1	.0000	-.1120	.3631
Constant	-1.0215	.5615	3.3099	1	.0689		

probability is greater than 0.5, the respondent is predicted as a contraceptive user, in case the probability is exactly 0.5, coin flipping can be carried out for prediction.

The analysis identified that the coefficients for AGAMA, HUSEDU and SEXPREF are non-significant, indicating that these variables do not have significant variation in the dependent variable. The column labeled 'R' indicates the partial correlation between the dependent variable and each of the independent variables. These statistics indicate that maximum contribution is of the variable concerning number of living children (LCHILD) in explaining contraceptive behaviour i.e. one unit change in the LCHILD variable causes 0.2886 change in the log odds (dependent variable), while the other variables are kept constant. In other words, by one unit change in the variable LCHILD, the odds .rre increased by a factor 1.3346, indicating the importance of number of living children in predicting contraceptive behaviour.. The coefficient of family size preference (SIZEPREF) is -1.1394 which indicates that by one unit change in the value of SIZEPREF, the log odds of the STATUS for users decreased by 1.394, while the values of the other independent variables remained the same or it may be stated that, when the SIZEPREF changes by one unit, the odds decrease by a factor of 0.3200 and so on. The logistic analysis indicates that women education, family size preference, media exposure, number of living children, family income and religious belief are the important predictor variables in predicting contraceptive behaviour. Goodness of fit of the model given in Table 1 is tested by classifying the respondents into their exact categories.

Table 2 shows that 235 contraceptive users are correctly predicted by the model (Table 1), while 165 are misclassified. Similarly, 606 non-users of contraceptives are correctly predicted, while 94 are those who reported them as non-users, whereas they had the characteristics of users. Of 1100 repondents, 76.45((,;are correctly classified in this study. The higher percentage of misclassification of users may be due to the fact that majority of them had the characteristics of non-users and they started using contraceptive when they had already attained a large family.

The logistic coefficient for variable WOEDU (2) (Table 3) is -0.4722 which is highly significant indicating that at least 10 years of women education is an important component in determining contraceptive behaviour. It is also indicated that low level of women education WOEDU (1) would not be very useful in achieving the desired population goals and this finding is very important for policy makers. Respondents who believed that God fulfills all the basic needs of life, had large families indicating the implications of religious beliefs on demographic behaviour. Making people aware through different mass media and interpersonal channels. about the Islamic principles regarding family life is important because family planning is not coercive in character and is a key step for the promotion of small family norms. The coefficient for TV is -1:03 which is highly significant indicating the importance of mass media exposure in determining fertility behaviour. The goodness of fit of model in Table 3 is tested and classification of respondents into their exact categories is almost the same as in the model given in Table 1.The interaction effects between the independent variables were also found non-significant.

Conelusions and Recommendations: Logistic regression analysis identified significance of women education, preference for family size, number of living children, fatalistic attitude, family income and exposure to mass media in affecting contraceptive behaviour at the first stage of analysis. The other variables i.e. women age at marriage, husband education and sex preference could not produce variation in the dependent variable. The second stage of analysis, identified the relative significance of different categories of each of the independent variables. The analysis identified the importance of ten years of women's schooling. It was also indicated that majority of women preferred to have up to four children, while the second category of the size preference i.e. more than four children could not explain variation in the dependent variable, indicating that very large family is not preferred by Pakistani women. In the light of these findings, the improvements in socio-economic and cultural conditions of women are strongly recommended. At least secondary level of women education is essential for achieving population targets that will also help in minimizing the fatalistic attitude prevailing in the society. It is suggested that all the mass media channels including personal and interpersonal must be used to create awareness about the benefits of small families and the importance of mother-child health.

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