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Factors Affecting the Family Size in Pakistan: Clog-log Regression Model Analysis

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Abstract

Pakistanis has targeted to achieve replacement level of fertility that is 2.1 births by the end of 2025 (national population policy, 2010). But this target cannot be attained without knowledge of factors which affect family size. The empirical study is devised to investigate the contribution of various socioeconomic, demographical and attitudinal factors which force couple to have more than two children. Complementary log-log Regression Model has been used to identify factors affecting the family size. It is found from Multivariate Analyses that women's age, husband's education, women currently not working, lack of consensus between husband and wife on number of children, son preference, high fertility intention, contraceptive knowledge, contraceptive use and child mortality are responsible for big family size (more than two children).

Keywords

Logistic regression, Logit link, Complementary log-log regression, Replacement level of fertility, Odds ratio, PDHS (Pakistan Demographic and Health Survey), CEB (Children Ever Born to Women).

1. Introduction and Literature Review

Pakistan like many other developing countries is facing the problem of alarming population. Pakistan is at the early stage of transition from the past two decades (Ali and Buriro, 2008).

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Mortality rate has turned down rapidly but decline in fertility is sluggish.

Increase in adolescent population and reduction in dependency ratio exhibit that phase of population transition has got started. The average of more than six children per women has begun to turn down in late 1980's (Arnold and Sultan, 1992; Feeney and Alam, 2003). Rapid population created great hindrance to social and economic progress of country. Realizing the adverse consequences of rapid population growth, A Population Welfare Programme was first launched in early 1960's. But Pakistan is still far away from success. Average number of children ever born has declined to 3.87 according to PDHS 2006-07 which was 4.1 (as cited in Hashmi and Zafar, 1997) in 1990-91 PDHS. Currently Government is facing the severe shortage of resources in energy sector (gas, electricity) which cause load shedding. Most part of resources is consumed to fulfill the requirements of increased population and less is utilized for productivity purpose. Shortage of food grains has also risen to its crucial level. Siddiqui (1985) had pointed out that agriculture production has decreased even in those areas where it was in abundance in the past. Livestock production has also decreased. With this rapid population growth, it will become hard to meet the growing demand of food. Decline in population growth is national concern of Government to sustain the socio-economic development. Government is trying to commence and regulate various birth control programs. All this necessitates studying the effect of factors which keep the government away from lowering the population growth. It is only possible if impact of social, cultural, demographical and attitudinal factors on individual's fertility is estimated on the basis of scientific study.

Demographers have frequently used children ever born as a measure of fertility. There are various socioeconomic, demographical and attitudinal factors which affect the children ever born to a woman. These socioeconomic and cultural factors were also termed as "Background variable" due to their indirect effect on fertility through biological factors or proximate determinants of fertility (Davis and Blake, 1956).

Effect of socioeconomic and demographical factors on children ever born was studied in various countries e.g. India (Atella and Rosati, 2000; Dwivedi and Rajaram, 2004; Kannan and Nagarajan, 2008), Southern Ethiopia (Regassa, 2007), Bangladseh (Abdullah and Shafiqui, 1995; Hasan and Sabiruzzamman,

2008; Rahman et al., 2008), Portugeese (Santos and Covas, 2000) and Greece (Hondroyiannis, 2004), Michigan (Wang and Famoye, 1997).

In the context of Pakistan, some studies have also been conducted to investigate the effect of factors on children ever born (Abbasi et al., 2008; Butt and Jamal, 1993; Hakim, 1994; Hashmi and Zafar, 1997; Hussain et al., 2007). Only Butt and Jamal (1993), Hakim (1994) and Hashmi and Zafar (1997) had used national level data. But these studies had not used some important socioeconomic, demographic and attitudinal factors for Multivariate Analysis of children ever born to a woman. Moreover, behavior of some factors may also change when family size (less than two children, more than two children) is used as response variable rather than children ever born. Fortunately, the data on variety of factors which can affect family size are available in PDHS 2006-07. In this paper, effort has been made to study the effect of all available factors which can contribute towards the family size using recent most data at national level. Factors which have not been used in the past studies are ideal number of children (fertility intention), ideal number of boys (son preference), consanguineous marriage, polygyny, wealth index and age of husband for multivariate analysis of children ever born. A brief description of selected factors and covariates is given below.

Age of Women

Age of women is most important biological and also demographical determinant of fertility. Moon (1973) investigated through his study that 67% of variation in family size was due to age of women.

Age of Husband

Women could not stop child bearing without husband consent and if husband is older than wife then this decision become more difficult (Zafar, 1996). Hassan and Killick (2003) provide empirical evidence that fertility is reduced with the increase in the age of husband.

Age of Women at Marriage

Coale (1975) associated the higher fertility with early age at marriage due to long reproductive span. Mode and Litman (1975) found that increase in age at marriage solely could have ability to lessen the average number of live births from six to five.

Education of both Spouses and Fertility

Education has been recognized as fundamental factor for the formation of fertility pattern in any society. Education generally results in improvement in the status of individuals in the society in the form of better health facilities, employment status, awareness etc. (Cochrane, 1979). Education of women has more obvious impact on fertility as compared to husband's education. This fact had been evident in many relevant studies conducted in Pakistan (Hakim, 1994). Women education also changes marriage pattern which effect fertility (Sathar et al., 1988). Education also creates awareness about contraceptive methods and their use to limit number of births (Oheneba-Sakyi, 1992).

Work Status of Women and Fertility

Relation between women's work status and fertility are considered interdependent. Child rearing requires mother's time and finances which effect women's reproductive decisions. Reason of fertility decline in western industrial countries is also associated with women's work (Goldin, 1990; Mincer, 1985).

Son Preference

Gender biasedness is very common in Asian counties including Pakistan. Reason for son preference is the financial support which male child can offer in future. Girls are regarded as dependent member. Pakistan had evidence of higher son preference than India and Bangladesh (Nag, 1991). Niraula and Morgan (1994), Rahman and De Vanzo (1993) found that son preference effect the family size only in a natural fertility period. In Pakistani rural areas, women usually quote to have at least pair of sons "Jorri".

Region of Residence

Region is important factor because heterogeneity in population characteristics can be found among four provinces (Punjab, Sindh, KPK and Balochistan) of Pakistan. It is country of diversified cultures and norms. Women social status is also different in these provinces which can affect fertility behavior (Hakim, 1994). Pakistan is patriarchal society and there is a regional variability in its degree.

Place of Residence

Place of residence whether urban or rural was studied as fertility differentials in many demographical studies. Urban residents usually are more educated; belong

to higher occupational groups, having awareness about contraceptives which might result in small family size.

Use of Contraceptive

It is used for deliberate fertility control. Bangladesh, Indonesia and India which belong to almost same socio-economic condition had higher contraceptive rate as compared to Pakistan which had resulted in lower fertility in these countries (Mahmood and Ringheim, 1960). Regassa (2007) had also measured the impact of future intention to use contraceptives on children ever born.

Consanguineous Marriages

Pakistan is one of those countries where cousin marriage is practiced widely. Cousin marriage has biological effect on human inbreeding (Tuncbilek and Koc, 1994 as cited in Khalt, 1988). Shami et al., (1990) as cited in Hussain and Bittles (1999) also found positive association between number of pregnancies and cousin marriage but it was for live births. This positive association declined when numbers of pregnancy losses were also included in the analyses. In no consanguineous marriages girls are usually highly educated engaged in good jobs so it becomes difficult to find suitable mate in a family (Sathar and Kazi, 1988 as cited in Hussain and Bittles, 1999). This may result in delayed marriages which consequently reduce fertility.

Fertility Intention (Ideal Family Size)

Desire of couple about family size resulted in various attitudes of fertility i.e. coital frequency, contraception use or planning to conceive after certain period. Intended family size is a popular predictor of actual family size and is used by several social demographers (Schoen et al., 1999). Fertility preferences may vary with time and may also change at different parities.

Child Mortality

Infant or child mortality is also one of determinants of fertility. Couples sometimes produce more children for the replacement of those children who died so that their desired family sizes do not change. Zhang (1990) had presented the idea of hoarding of a child in case of possible deaths in future.

Polygyny

Polygyny is legal in Islam and there is permission of having four wives at one time (Quran, Surah Al-Nisa 4:3). Polygyny is taken as a proxy of abstinence which is one of important determinant of fertility. Birth spacing is also wider in

case of polygamous marriage which lower fertility. Less coital frequency resulted in lowering the fertility in polygamous marriage as compared to monogamous marriage (Anderton and Emigh, 1989 as cited in Alnuaimi and Poston, 2009). Polygyny may result in more number of children if husband wished to have more than one wife for "progeny" (Alnuaimi and Poston, 2009).

Husband's Desire for Children

Husband's desire for more children as compared to wife's desire create barrier in making decisions about birth control which effect number of children born (Saleem and Pasha, 2008). Lack of mutual understanding between the spouses about the decision of desirable family size may cause barrier in controlling fertility. Husband's desire as a predictor, depicts the agreement between husband and wife on reproductive decision and measures its impact on number of children.

Wealth Index

Income of household is one of the most important correlate of fertility. According to the classical Malthusian theory of fertility, higher income is associated with higher fertility (Micevska, 2001). Nature of relationship between income and fertility is contradictory. In short run it is anticipated as a positive while in the long run it is negative. Wealth index is indicator of socioeconomic status and it can be used as proxy for household income.

Marital Duration

Marital duration accounts period of exposure to risk of being pregnant (Atella and Rosati, 2000). Fecundability is associated with sexual union of couple which is a function of marital duration.

Objective of Study

According to population policy 2025, Pakistan is aimed at to attain the replacement level of fertility. Currently, average number of children ever born to women is above replacement level i.e. 3.9 (Ali and Buriro, 2008). The empirical study is devised to investigate the contribution of various socioeconomic, attitudinal and demographical factors towards family size or two child family norm. The identification of magnitude and direction of effect of socio-economic and demographic factors can help in population policy implications. The results will entail to control those factors which have positive effect on fertility (more than two children).

2. Material and Methods

The data was taken from PDHS (Pakistan Demographic and Health Survey) which was conducted in 2006-07. Respondents who provide information about specific variables for current analysis were ever married women, aged 15-49 years. The information relating to sample design is inculcated in survey setting option available in SPSS 17.0 version.

During analysis 38% missing observations are found. Kromery and Hines (1991) has concluded that list wise and pair wise deletion generated accurate estimates even if 60% of data was missing. Current model is fitted using 62% of data, after list wise deletion of missing cases.

Keeping in view the Government's promoted family size, the response variable CEB (Children Ever Born to women) is dichotomized in two clear cut categories i.e. total children ever born to a women less than 2 and other more than two (CEB≤2, CEB>2). This dichotomization technique was used by Hasan and Sabiruzzaman (2008), Nwakeze (2007), and Rehman et al. (2008). Nwakeze (2007) had dichotomized children ever born at four. Hasan and Sabiruzzaman (2008) and Rehman et al. (2008) had dichotomized it at one.

2.1 Complementary log-log Regression (Clog-log)

Binary Regression Model provides the basis of multifaceted models for ordinal, nominal and count model. Binary response variable has two categories, one represent the occurrence and other nonoccurrence of an event. Binary Regression Model explore how regressors affects the chance of occurrence of an event. The most popular Binary Model is Binary Logistic Regression Model or simply a Logistic Regression Model (Long and Freese, 2001).

$$E(y|x) = p\left(y = 1|x\right) = \frac{\exp(\beta' X)}{1+\exp(\beta' X)} \tag{3.1}$$

Theil (1970) derived Logit Model in which $p\left(y = 1|x\right)$ lie between 0 and 1. Probability in (3.1) is converted into odds, to restrict the prediction between 0 and 1. The odds are defined as;

$$\exp(\beta' X) = \frac{p(y = 1|x)}{1 - p(y = 1|x)} \tag{3.2}$$

Logistic Regression belongs to family of Generalized Linear Models (Agresti, 1996). In Logistic Regression like Ordinary Least Square continuous and

categorical predictors can be used. For "p" explanatory variables model is defined as;

$$\log\left(\frac{p(y=1|x)}{1-p(y=1|x)}\right)=\beta' X \tag{3.3}$$

The inverse of $\beta' X$ create another Binary Regression Model called Complementary log-log Regression (Long and Freese, 2001). The range of predicted probabilities lies between 0 and 1. The Complementary log-log Regression Model is;

$$p(y=1|x)=1-\exp\{-\exp(\beta' X\} \tag{3.4}$$

Taking log of the negative log of the complement of $p=p\left(y=1|x\right)$;

$$\log\{-\log(1-p)\}=\beta' X \tag{3.5}$$

Equation (3.5) is a specific form of Clog-log Model. Binary Regression Model uses the Maximum Likelihood (ML) Technique for the estimation of parameters. The Clog-log Model follows Gompertz Distribution. The left hand side of equation (3.5) is called Cloglog Link. Decision about choice of Link Function is essential when categories are ordered. Clog-log Link Function is suitable when higher categories are more probable as compared to lower categories. Furthermore, a Link Function is finalized which provides better fit. Hinkley (1985) suggested the following test to evaluate the appropriateness of Link Function. The steps are;

- Estimate the linear predictor after fitting the model with any candidate link.
- Add the square of this linear predictor in the model as a new predictor and observe its significance.
- If its effect is insignificant then it is concluded that link is appropriate.

3. Results and Discussions

3.1 Descriptive and Bivariate Analysis

Initially Descriptive and Bivariate Analysis is carried out to understand the general trend of various factors with family size. The predictors chosen are age of both spouses, age at first marriage, number of children died, educational level of both spouse (0: No education, 1: Primary, 2: Secondary, 3: Higher), women ever worked after marriage (0: No, 1: Yes), women current work status (0: No,1: Yes),

wealth index(1: Poorest, 2: Poorer, 3: Middle, 4: Richer, 5: Richest), region(1: Punjab, 2: Sindh, 3: Khyber Pakhtoon Khawa (KPK), 4: Balochistan), place of residence (1: Rural, 2: Urban), husband desire for children(1: Both want same, 2: Husband want more than wife, 3: Husband want fewer than wife), ideal number of boys (0: ≤2, 1: > 2), ideal number of children (0: ≤2, 1: > 2), polygyny (0: No, 1: Yes), consanguineous marriage (0: No, 1: Yes), ever use of contraceptives (0: No, 1: Yes), knowledge of contraceptives (0: No, 1: Yes), Marital duration (0: Never Married,1: 0-4, 2: 5-9, 3: 10-14, 4: 15-19, 5: 20-24, 6: 25-29, 7: 30+). To test the hypothesis of factors affecting the ideal family size, children ever born is dichotomized into two categories (0: ≤2, 1: > 2). Hence, response variable with "zero" value is regarded as a family who followed two family norm and "one" shows that couple has entered into risk category (more than two children). Descriptive study of the response variable versus predictors chosen provides a glimpse of the data (Table 1).

Table 1 shows that most of respondents got married at age 19. Majority of women surveyed are found to be illiterate (65%). Husband with higher education are 14.8%. Almost one third of total respondents are currently working. Intended fertility is measured by asking a question about ideal number of children and it is found that 83.4% want more than two children. Son preference is also prevalent in Pakistani society. Considerable percentage of women (30.3%) even wished to have more than two sons. Woman who has information of at least one birth control method is regarded as a woman having knowledge of contraceptives. Respondents who have knowledge of at least one contraceptive method are 96%. The percentage of ever users is 47.8%. It is frequently claimed that child mortality has declined which is also evident from survey that is 74% respondents reported no child death. There are 6.8% polygamous marriages. Cousin marriage is highly prevalent in Pakistani society (60.5%). Only 5% respondents stated that their husband want fewer children than her while 69.4% of spouses have consensus on family size.

In table 2, results of Bivariate Analysis are documented. Chi-square and Likelihood Ratio is used to test association between predictors and response variable. Polygyny, consanguineous marriage, region and place of residence have insignificant association with family size. Rest of factors indicates significant (5% level of significance) relationships (Table 2).

3.2 Multivariate Analysis

Prior to fitting of the candidate model, assumptions are checked. Multicollinearity is detected between marital duration and age of women. To handle the problem of Multicollinearity marital duration is dropped. Marital duration is actually measure of period at risk. Dropping of this variable do not cause any serious deficiency in the model because the effect of period at risk can also be studied by age at marriage. Variables related to work status are combined (to handle problem of Multicollinearity) and their interactive effect is studied. No Outlier is found, hence, model is fitted without discarding any observation of data being an Outlier. Since the higher categories is more probable (Figure 1) so Complementary log log Link (Clog-log) is most appropriate model. Furthermore, the appropriateness of Clog-log Model is verified by using the Hinkley's Technique (1985). Complementary log-log (Clog-log) Model is fitted and linear predictor is estimated as;

$$\ln\{-\ln(1-p)\} = \hat{\beta}'X \quad \text{or} \quad \hat{\eta}_i = \hat{\beta}'X$$

where, $\hat{\eta} = \ln\{-\ln(1-p)\}$

The value of square of linear predictor in the model as a regressor along with other regressors and again model is run. The coefficient of only linear predictor with p-value is documented in Table 3. The insignificance of linear predictors (Table 3) leads the conclusion that Link Function is not misspecified.

In Clog-log Model, hypothesis about two family norms is tested (Table 4) at 5% level of significance. The value of B=.000[a] in Table 4 indicates the reference category for categorical variable. The research question is; what factors forces couple to have big family size (more than two children) or above replacement level of fertility. Comparison of outcomes is made mostly with that fertility related studies which had assumed similar nature of hypothesis. Rahman et al. (2008) had defined big family if CEB is more than two. Nwakeze (2007) had used more than four children as big family for Nigeria. In Bangladesh Hasan and Sabiruzzaman (2008) had defined more than one child as entrance into high parity. These hypotheses about the size of family were defined according to situation of population growth in country. Design Effect is also shown in Table 4. It is the ratio of variance of complex design to variance of simple random sampling. The Design Effect for $\beta's$ is computed using mathematical relationship in which Intracluster Correlation of both independent and dependent variables is multiplied. Significance of Regression Coefficients is adjusted using square root of Design Effect.

Current age of women is a numeric variable and sign of coefficient is positive. As age of women increases, she tends to have more than two children it means parity increases with increase in age of women. Same result was also reported by Hasan and Sabiruzzaman (2008) and Nwakeze (2007).

Age at marriage is a numeric variable which is inversely related to family size. Increase in age at marriage tends to have less than and equal to 2 children. Hasan and Sabiruzzaman (2008) and Rahman et al. (2008) also found the same relationship.

Negative but insignificant relationship is found between husband's age and family size. Increase in husband's age reduces the chances of having more than two children. Santos-Silva and Covas (2000) had used this factor in modeling of children ever born (without any dichotomization) and reported positive relationship between age of husband and fertility.

Increase in education level tends the women to have less than and equal to 2 children. Illiterate, primary and secondary educated woman has increased risk of having more than two children as compared to women with higher education but effect is insignificant. Many studies had supported this fact with similar nature of hypotheses (Hasan and Sabiruzzaman, 2008; Rehman et al., 2008). But Nwakeze (2007) had found positive relationship between family size and education of women in Nigeria. In spite of high literacy rate among Nigerian women, fertility transition has not yet started because education had not raised women's status in terms of household's decisions (Nwakeze, 2007).

Situation is reverse in case of husband's education for Pakistani women. Positive relationship is found between husband's education and family size. Atella and Rosati (2000) had also found the same relationship between husband's education and fertility in India. Nwakeze (2007) and Rahman et al. (2008) had found significant inverse relationship between family size and education of husband. It depicts the picture of society where husband's desires influence wife's desire. Husband's background characteristics are not lowering the fertility in Pakistan.

Women work status is combined by taking the interaction of women ever worked after marriage and her current work status. Reference category taken is, the women who have ever worked after their marriage and are also currently working. Inverse relationship is traced out for those women who had never worked before but currently they are working.

Women who are currently working tend to have less than and equal to 2 children while women who ever worked after marriage but currently not working tend to

have more than two children as compared to women who is currently working and also worked after marriage. Women who never worked tend to have more children. Chances of small family size are more for those women who are currently working. Ever work status do not lowers the chances of big family. Working women's share in household expenditure actually determines her preference of smaller or big family size. More contribution in household expenditure from women as compared to husband decreases the chances of big family size (Nwakeze, 2007). Nwakeze (2007) had not just taken employment status but also considered the sector of employment. It was concluded in the study that women engaged in formal sector had less likely to have more than four children as compared to informal sectors.

Wealth index is categorical variable and highest wealth quintile is used as reference category. Inverse relationship is found between wealth index and children ever born. Women belonging to lower wealth index group tend to have more than two children as compared to richest group. A woman belonging to richer class has less chances of small family (less than two children) than richest but difference is insignificant. Economic status measured in any term, either by residential standard of respondent/income of both spouse/possession of modern household items/land size or material property/standard of living index has shown negative association in many studies (Hasan and Sabiruzzaman, 2008). Low income groups had more chances to have big family as compared to higher income group Nwakeze (2007). Contradictory findings were reported by Rahman et al. (2008) about income and monthly expenditure in Bangladesh. Relationship between income and family size was found to be positive. But it was just income of women. So relationship might change after addition of total family income.

The variable related to fertility preferences is husband's desire for children and reference category is a woman whose husband wants fewer children than her. Women whose husband, desire to have more children than wife tend to have big family (more than two children) as compared to women whose husband's desire for number of children is fewer then wife. But, for those couples, who want same number of children, tend to have less than and equal to 2 children. It means agreement between husband and wife on number of children decreases the chances of big family. In patriarchal society influence of husband on reproductive decision is positive. Hasan and Sabiruzzaman (2008) found that chances of entering into higher parity increases, if decision making power about number of children is made by husband. Women who had taken reproductive decision by herself were less likely to have big family.

Ideal number of boys shows prevalence of son preference in the society. The ideal number of children shows fertility intention of a woman. Women who stated that their ideal number of children or ideal number of sons are more than or equal to 2, tend to have more than two actual number of children as compared to those women who want less. Same was concluded by Rahman et al. (2008) for ideal number of children. In those societies where fertility transition has near to start, son preference depends upon parity. Same is the case with Pakistan. Regassa (2007) also found positive association between fertility and son preference in Ethiopian society. Previous studies also concluded that there was evidence of gender preference in Pakistan (Khan and Sirageldin, 1977; Nag, 1991 as cited in Mahmood and Ringheim, 1996; Arnold, 1992 as cited in Okun, 1996). The reason of positive association between ideal number of boys and fertility is because it is believed that sons has capability to carry family name and also provides economic and social security in old age. Girls are regarded as a dependent member of family. Even if daughters earn, parents found it disgusting to accept financial support from them. It is well known fact that sons are taken as source of strength for family particularly in rural areas, so couples wished to have at least two sons (usually called "Jorri" means pairing). They produce sometimes many daughters to fulfill their desire for sons which increases family size.

Knowledge of contraceptive is taken as reference category. Women who have knowledge of contraceptives and also those who ever used contraceptives have chances of more than two children. Hashmi and Zafar (1997) and Butt and Jamal (1993) have also shown same relationship in their studies. Women who had used contraceptives were less likely to enter in higher parity in Bangladesh (Hasan and Sabiruzzaman, 2008). The reason is successful family program in Bangladesh. On the other hand in Pakistan family planning program is not successfully working.

Infant or child mortality is also one of determinant of fertility. Number of children died is taken as a numeric variable. Child mortality also tends women to have more than two children. Hashmi and Zafar (1997) also reported the same conclusions. It is the highest coefficient of this model. It means child replacement has strong effect on the family size.

Women whose husband is in monogamous relation tend to have more than two children. Bukhari (2010) has given statement that keeping more than one wife is also one of the reasons for increase in population of Pakistan. But analysis do not support because monogamous women is more likely to have more than two children as compared to polygamous women. Monogamous women desired to have big family but her actual family size is insignificantly small in Nigeria as compared to polygynous women (Nwakeze, 2007).

Consanguineous marriage is also taken as categorical variable. Couples who are cousins tend to have children less than or equal to two children as compared non consanguineous couples. Same trends were also documented in some fertility studies (Ansari and Sinha, 1978; Reid, 1976 as cited in Khlat, 1988). The reason of result is the age of women. Most of women who are cousins with less than or equal to two children belong to age cohort 15-29 years (Figure 2). Very few women fall in the reference category those have completed their reproductive span.

For regional comparison, Baluchistan is taken as reference category. Coefficients for Punjab, Sindh and NWFP are positive for these regions. Respondents belonging to Punjab, Sindh and KPK have more chances of having big family (more than two children) as compared to Baluchistan. Urban residents tend to have less than or equal to two children as compared to rural. Nwakeze (2007) had shown that urban residents strongly preferred to have small family in Nigeria.

4. Conclusion and Policy Implication

Women age, husband age, women age at marriage, husband education (no and secondary), women current work status, wealth index (poorer, poorest and middle), ideal number of children, number of children died, ever use of contraceptives, cousin marriage and region (Punjab) has significant impact on size of family (two family norm). Positive relationship exist between size of family and women age, husband education, women who is currently not working or for those who never worked, women whose husband desire more children than her, ideal number of boys, ideal number of children, contraceptive knowledge, contraceptive users and number of children died. Age at marriage, husband age, women education, women current work status, wealth index, women whose husband desire same number of children as wife, polygamous marriage, cousin marriages and urban residents have negative association with family size.

Most of factors which intend women to cross Government's ideal family size are attitudinal factors. It necessitates the importance of creating awareness among husbands. Educated husband should also be motivated to change their attitudes towards fertility intention, son preference and use of contraceptive at right time. Knowledge and use of contraceptive has shown a same positive relation in the present study which was also documented by Hashmi and Zafar (1997) and Butt and Jamal (1993). The reason of this depressing result is that, people have though knowledge of contraceptives and they use contraceptive but after having a desired number of children. Moreover the use of contraceptive is mostly vogue in our

society for birth spacing, not to stop child bearing may be due to impact of religion. Government media campaign has been failed to convince people to use family planning methods to limit their families with two children. Yusuf (1993) criticized the Government media campaign of "Two children, happy family". The ideal family size, which government promote consist of one boy and one girl. People can perceive this message that family is incomplete if couple has not children of both sexes. Family with two sons or two daughters is not regarded as ideal hence Government endeavor is not getting any significant result of motivating people with two children family. Women financial autonomy also helps to restructuring their decisions about family planning and contraceptive use (Abbasi et al. 2008).

Media is playing very powerful role in today's society. Media should play its role for highlighting social issues. Awareness campaigns should be launched by Ministry of Population Welfare to create consciousness among people about the severity of scarce resources and convince them to maintain replacement level of fertility. Women's education should be promoted to get significant control over fertility because it results delay in marriages, create awareness and results in financial autonomy. Accessibility to contraceptives should be ensured particularly in rural areas.

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Table 1: Percentage Distribution of Respondents (Family Size × Factors)

Factors	Children born			Factors	Children born		
Age of women	**≤2**	**>2**	**Total**	**Ideal_children**	**≤2**	**>2**	**Total**
15-19	5.6	0.1	5.7	**≤2**	10.2	6.4	16.6
20-24	12.0	3.0	15.0	**>2**	28.2	55.2	83.4
25-29	9.7	10.3	20.0	**Total**	38.4	61.6	100.0
30-34	4.6	13.2	17.8	**Ideal_boys**			
35-39	2.4	14.1	16.5	**≤2**	29.8	39.9	69.7
40-44	1.6	11.4	13.0	**>2**	8.6	21.7	30.3
45-49	1.1	11.0	12.1	**Total**	38.4	61.6	100.0
Total	37.0	63.0	100.0	**Know_contraceptives**			
Age at marriage				**No**	2.2	2.0	4.3
10-14	3.4	11.5	14.9	**Yes**	34.8	61.0	95.7
15-19	16.9	34.8	51.7	**Total**	37.0	63.0	100.0
20-24	31.4	21.6	25.2	**Use_contraceptives**			
25-29	4.1	2.9	7.0	**No**	26.9	25.3	52.2
30-34	0.8	0.3	1.0	**Yes**	10.0	37.7	47.8
35-39	0.1	0.0	0.1	**Total**	37.0	63.0	100.0
40-44	0.0	0.0	0.0	**Children_died**			
Total	37.0	63.0	100.0	**No**	34.2	39.5	73.7
Age of husband				**≤2**	2.8	19.6	22.4
15-19	1.1	0.0	1.1	**>2**	0.0	3.9	3.9
20-24	6.3	0.5	6.9	**Total**	37.0	63.0	100.0
25-29	10.4	4.3	14.7	**Polygyny**			
30-34	8.1	8.6	16.7	**No**	34.3	58.9	93.2
35-39	5.1	12.2	17.3	**Yes**	2.5	4.3	6.8
40-44	2.8	12.7	15.5	**Total**	36.8	63.2	100.0
45-49	1.4	11.6	13.1	**Cousin marriage**			
≥50	1.6	13.1	14.7	**No**	14.2	25.3	39.5
Total	36.8	63.2	100.0	**Yes**	22.8	37.7	60.5
women Education				**Total**	37.0	63.0	100.0
No	20.2	44.7	65.0	**Husband desire for children**			
Primary	6.0	8.2	14.2	**Same as wife**	29.6	39.8	69.4
Secondary	7.2	7.2	14.4	**More than wife**	8.0	17.6	25.6
Higher	3.5	2.9	6.4	**Fewer than wife**	1.8	3.2	5.0
Total	37.0	63.0	100.0	**Total**	39.3	60.7	100.0
husband Education				**Place of Residence**			
No	10.7	24.5	35.2	**Urban**	12.4	21.1	33.4
Primary	5.6	10.5	16.2	**Rural**	24.6	42.0	66.6
Secondary	14.4	19.4	33.8	**Total**	37.0	63.0	100.0
Higher	6.2	8.6	14.8	**Marital duration**			

Factors	Children born			Factors	Children born		
Age of women	**≤2**	**>2**	**Total**	**Ideal_children**	**≤2**	**>2**	**Total**
Total	37.0	63.0	100.0	**0-4**	20.2	0.6	20.8
Ever worked_am				**5-9**	9.3	8.7	18.0
No	27.1	40.8	67.9	**10-14**	3.2	13.9	17.1
Yes	9.9	22.2	32.1	**15-19**	2.0	13.3	15.3
Total	37.0	63.0	100.0	**20-24**	1.2	12.6	13.8
Current_work				**25-29**	.8	8.8	9.6
No	28.8	45.3	74.1	**30+**	.3	5.1	5.4
Yes	8.21	17.8	25.9	**Total**	37.0	63.0	100.0
Total	37.0	63.0	100.0	**Region**			
Wealth index				**Punjab**	21.2	36.7	57.9
Poorest	6.8	12.6	19.4	**Sindh**	9.2	14.9	24.0
Poorer	7.4	12.6	20.0	**KPK**	4.8	8.7	13.5
Middle	6.6	12.8	19.4	**Baluchistan**	1.9	2.7	4.6
Richer	7.6	12.9	20.5	**Total**	37.0	63.0	100.0
Richest	8.6	12.1	20.7				
Total	37.0	63.0	100.0				

Table 2: Association of Family Size versus Demographical and Socio-economic Factors

No.	Factor	Chi-square	p-value	Likelihood Ratio	p-value
1	Age of women	2982.393	0.000	3298.086	0.000
2	Age at marriage	429.487	0.000	434.018	0.000
3	Age of husband	2470.698	0.000	2676.312	0.000
4	Women education	310.938	0.000	308.125	0.000
5	Husband education	131.271	0.000	132.217	0.000
6	ever worked_am	72.292	0.000	73.266	0.000
7	Current_work	44.957	0.000	45.655	0.000
8	wealth index	43.907	0.000	43.675	0.000
9	Husband desire for children	76.753	0.000	78.402	0.000
10	ideal_children	385.001	0.000	381.164	0.000
11	ideal_boys	223.311	0.000	228.346	0.000
12	Know_contraceptives	25.339	0.000	24.774	0.000
13	Use_contraceptives	628.008	0.000	643.805	0.000
14	children_died	1001.200	0.000	1239.791	0.000
15	Polygyny	1.028	0.617	1.001	0.625
16	Cousin marriage	2.901	0.135	2.905	0.135

No.	Factor	Chi-square	p-value	Likelihood Ratio	p-value
17	Region	11.146	0.014	11.170	0.014
18	Residence	3.367	0.109	3.361	0.109
19	Marital duration	4554.268	0.000	5286.441	0.000

- Level of significance 5%

Table 3: Testing Correctness of Link Function

	B	S.E	T	p-value
$\hat{\eta}_i^2$	-0.089	0.057	-1.557	0.116

Table 4: Parameter Estimates of Clog-log Regression Model

Factors	Clog-log Model						
	B	SE	Sig.	95%Confidence Interval		Design Effect (DE)	Square of DE
				Lower	Upper		
CEB=0	.699	.331	.035	.049	1.349	38.418	6.198
age of women	.198	.010	.000	.179	.217	44.739	6.689
age at marriage	-.214	.012	.000	-.237	-.190	56.143	7.493
age of husband	-.007	.005	.160	-.018	.003	35.588	5.966
Women education=no	.159	.137	.246	-.110	.429	45.077	6.714
primary	.055	.136	.685	-.213	.324	42.715	6.536
secondary	.036	.145	.806	-.250	.321	60.915	7.805
higher	.000[a]	.	.	.	.	.	.
Husband education=no	-.271	.097	.006	-.462	-.079	40.147	6.336
primary	-.194	.110	.079	-.410	.023	45.607	6.753
secondary	-.269	.087	.002	-.440	-.097	43.526	6.597
higher	.000[a]	.	.	.	.	.	.
Work status am=0* c=0	.097	.079	.219	-.058	.253	47.866	6.919

Factors	Clog-log Model						
	B	SE	Sig.	95%Confidence Interval		Design Effect (DE)	Square of DE
				Lower	Upper		
Work status am=0* c=1	-1.754	.142	.000	-2.032	-1.476	46.304	6.805
Work status am=1 * c=0	.243	.141	.084	-.033	.520	42.856	6.546
Work status am=1 * c=1	.000[a]	.	.	.	.	.	.
wealth index=poorest	.330	.135	.015	.066	.595	46.586	6.825
poorer	.235	.116	.043	.007	.462	41.084	6.410
middle	.205	.092	.026	.024	.386	32.796	5.727
richer	-.018	.081	.829	-.177	.142	34.188	5.847
richest	.000[a]	.	.	.	.	.	.
Husband desire for children=same as wife	-.074	.152	.629	-.373	.226	52.380	7.237
More than wife	.178	.161	.270	-.139	.496	52.041	7.214
Fewer than wife	.000[a]	.	.	.	.	.	.
ideal children=≤2	-.745	.088	.000	-.917	-.572	51.499	7.176
>2	.000[a]	.	.	.	.	.	.
ideal boys=≤2	-.132	.071	.065	-.272	.008	43.411	6.589
>2	.000[a]	.	.	.	.	.	.
Know contraceptives=no	-.009	.126	.943	-.256	.238	33.854	5.818
yes	.000[a]	.	.	.	.	.	.
Use contraceptive=no	-.987	.064	.000	-1.114	-.861	41.298	6.426
yes	.000[a]	.	.	.	.	.	.
children died	.901	.076	.000	.752	1.050	44.605	6.679
polygyny=no	.095	.121	.430	-.142	.333	44.829	6.695
yes	.000[a]	.	.	.	.	.	.
Cousin marriage=no	.154	.056	.006	.044	.265	38.988	6.244
yes	.000[a]	.	.	.	.	.	.
region=Punjab	.335	.116	.004	.107	.563	17.807	4.220

Factors	Cloglog Model						
	B	SE	Sig.	95%Confidence Interval		Design Effect (DE)	Square of DE
				Lower	Upper		
Sindh	.192	.119	.109	-.043	.427	18.378	4.287
KPK	.156	.120	.192	-.079	.391	17.166	4.143
Baluchistan	.000[a]	.	.	.	.	.	.
Place of residence=urban	-.039	.070	.579	-.177	.099	39.108	6.254
rural	.000[a]	.	.	.	.	.	.

- Level of significance 5%
- **0.000a** reference category

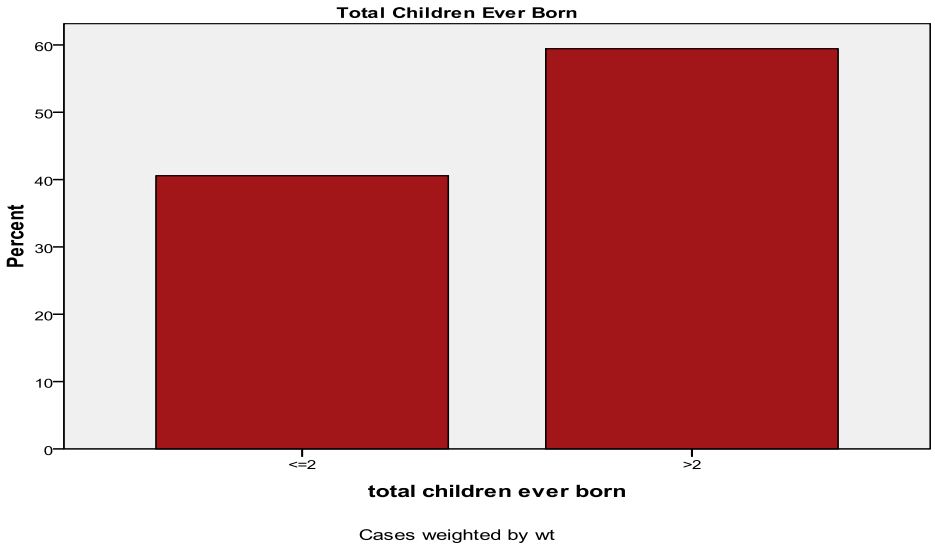

Figure 1: Simple Bar Chart for Children Ever Born to Women in Pakistan (CEB)

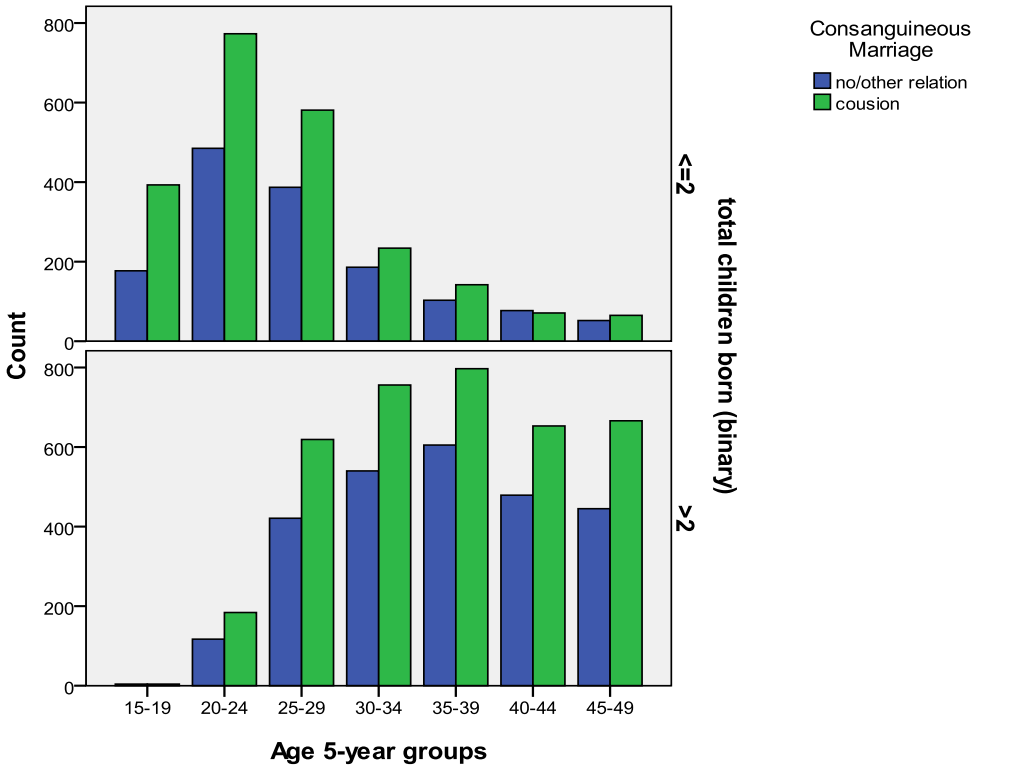

Figure 2: Multiple Bar Charts showing Consanguineous Marriage and Age of Women vs. CEB