**Pak. J. Commer. Soc. Sci.**
2010 Vol. 4 (2), 132-146

# Measuring and Modeling the Fertility Profile of Indigenous People in Pakistan: A Study of the Arians

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**Abstract**

Because of no ethnographical survey, ecological and ethnographical studies are available in an underdeveloped area of demographic research in Pakistan. Keeping this view in mind, this paper evaluates the fertility profile of the Arians, an indigenous community in Pakistan. A random sample of 510 ever-married Arian women aged (15-49) years was selected from three districts in Pakistan where most of the Arian population lived. The analysis demonstrated that a minor proportion of Arians women 9.9% do not want to have another child while already they have no children. With the increase in the number of children and maternal age, the desire to have another child drops rapidly after age of 34 years among Arians women in Pakistan. Among all the women, average number of children considered ideal is lower than the average actual number of children. However, they prefer more sons than daughters and consider that there should be at least one male child in the family, revealing preference for son. Overall findings suggest that the fertility profile of Arians women was higher than their national counterparts. Modeling fertility rates is concerned to model fertility curves. Statistical modeling on the three distributions of fertility rates namely, age specific fertility rates, distribution of forward cumulative age specific fertility rates and distribution of backward cumulative age specific fertility rates was carried out. Finally, the cross-validity prediction power technique has been applied to check the validity of these models.

**Keywords**: Age specific fertility rate; cross validity prediction power; demography, fertility, Punjabi Arians, reproductivity, statistical modelling.

## 1. Introduction

Demographic features of a population have direct relationship with both the social and biological environment. Fertility is one of the main demographic features of any population and the fertility profile of human population is proceeding in two phases; the first phase is primarily concerned with the estimation of standard measures of fertility. Demographic factors like age at marriage, present family size, gender preference (Mahadevan, 1979; Bhasin, 1990; Asari and John, 1998; Chachra and Bhasin, 1998; Bhasin and Nag, 2002) and socioeconomic factors like education, occupation, religion, contraceptive practice, etc. (Bhatia, 1970; Asari and John, 1998) are the determinants of desired family size. In most of the South Asian societies, there is a universal attitude for the son preference, for economic, religious or social reasons. Adult sons are expected to provide economic support to their parents (Das, 1984; Miller, 1981; DasGupta, 1987). As sons are believed to be the carriers of lineage, women tend to stop childbearing only after they had given birth to the desired number of sons (Vlassof, 1990). The percent of women, at each parity, using contraception tends to increase with number of living sons (Nag, 1991), suggesting preference for son. Old age security also motivates higher fertility (Vlassof and Vlassof, 1980; Goody et al. 1981). Parent's desire for more children is directly correlated with the parental fear of losing them (Mysore Population Study, 1961; Preston, 1978). Desirable family size also depends on the relative utilities of economic benefits and the cost of upbringing children.

The second phase of the fertility profile deals with fertility modeling that is primarily concerned to model fertility curves. Therefore, for many years, modeling fertility curves has attracted the interest of demographers and remains the area of research. In literature, a variety of reproductivity measures and mathematical models have been proposed which have described the reproductivity pattern of human population; see Pollard et al. (1990), Islam and Ali (2004), Peristera and Kostaki (2007) and Nasir et al. (2009). Some of these mathematical models have been shown to provide excellent fits to age-specific fertility rate distributions of human population. Some useful references to assess the fertility pattern in Pakistan are Sathar et al. (1988), Sathar and Kazi (1990), Sathar (1993), Sathar and Casterline (1998), Hussain and Bittles (1999) and Hagan et al. (1999). Since there is no ethnographical survey of the indigenous people of Pakistan, therefore the existing literature to assess the ethnic based fertility in Pakistan is lacking the study of reproductivity. This provides a rationale for the present study.

The ethnic diversity provides a unique opportunity to study key demographic variations among the endogamous populations living in different geographical and ecological conditions. Globally, on the aspects of fertility various studies have been conducted on different ethnic groups (Bhasin and Nag, 2002; Biswas and Kapoor, 2003; Dabral and Malik, 2004a; Kakkoth, 2004; Islam et al. 2009) but in Pakistan ethnographical studies is an under developed area of research. Thus, the focus of this paper is to describe the comprehensive fertility profile among Arian women residing in Punjab, Pakistan. It aims at studying and estimation of various measures of reproductivity, their desired for more children, gender preference, ideal number of children, decision of family size, pattern of the age specific fertility schedules, fitting of mathematical models to the age-specific fertility rates and modeling on forward and backward cumulative distribution of age-specific fertility rates.

## 2. The Arian People

The Arian is an agricultural caste settled mainly in the Punjab, India and Pakistan (Chowdhry, 1990; Bansal and Singh, 2003). Arians claims to be of Arab descent (Rose, 1911). The origin of Arains stem from Syria. It is claimed that the Arian came from Areeha also written as Ariha jericho, Syria. These were *Areehai people* who joined the force of" Muhammad Bin Qasim" in 712 AD. These Areehai people could not get back and forcefully they had to stay in Indo-Pak (Najeebabadi, 1931). In the reign of "Abbasia" they had to suffer. As time went on, these Areehai people settled in countries which are now a day known as Afghanistan, India and Pakistan. In Pakistan, Arians are nearly ten million rather some say that it is twenty million. In India, they range up to hundreds of thousands. In Afghanistan and free Tribes, their population is remarkable (Chaudhry, 1989). In Indo-Pak, wherever Arian people reside, they have formed some movements to better the society.

The present study was conducted among Arian residing in three districts of Pakistan namely Bahawalnagar, Bahawalpur, and Rahim Yar Khan. The data for the present study was collected on ever-married Arian women aged 15-49 years from a sample of 510 households comprising of 2225 individual using an interviewer scheduled. No more than one married women in the age group 15-49 years was selected from household. In the case of more than one ever-married woman in reproductive age per household, the eldest woman was selected. Further A two stage area Sampling was used in conducting this survey. At the first stage, a sample of area units was drawn and at the second stage, a sample of households was selected within that area. Table 1 shows the detailed area wise sample size for this study .The Structured questionnaire was filled by the interviewer from the ever married Arian women (15-49) years in the absent of any male member.

Table 1: The district-wise sample size

| District | Frequency | Percent |
|---|---|---|
| Bahawalnagar | 162 | 31.8 |
| Bahawalpur | 185 | 36.3 |
| Rahim Yar khan | 163 | 32.0 |
| Total | 510 | 100.0 |

## 3. Methods

### *General indices of fertility*

In the literature different kinds of indices have been suggested for the measurement of fertility. However, the following general indices were considered.

### *Crude birth rate (CBR)*

The most widely used and direct measure of population changed due to fertility is the Crude Birth Rate (CBR), is defined as

$$CBR = \frac{B^t}{P^t} \times k \tag{1}$$

The radix k is usually taken as 1000. This rate could serve as a good measure of overall changes due to birth, since it has been widely used because of simplicity in concept and measurement. But it has limitation of a crude rate. While calculating the crude birth rate, using reported data, notice that every birth is counted directly as an event and implicitly as an addition to the population. Therefore both numerator and denominator get increased and the CBR will not reflect the actual chance of child bearing.

### *General fertility rate (GFR)*

The CBR is open for criticism because of using the entire population in the denominator and the natural amendment will be to use only women of the reproductive age groups in the denominator. The rate, therefore defined is called the general fertility rate (GFR) and is calculated as:

$$GFR = \frac{B^t}{{}^f P^t} \times k \tag{2}$$

This rate is also expressed for $k = 1000$ women. The wide range of the age group in the denominator indicates that women of different fecundity status would be included in it and hence cannot belong to a homogeneous group as far as exposure to conception is concerned. Thus, the general fertility rate is also a crude rate.

### *Age-specific fertility rate (ASFR)*

The reproductive age interval (15-49) can be either divided into single year, 5 year, or wider intervals and the rates could be made specific to each age group. The age specific fertility rate is defined as

$$f_z^t = ASFR = \frac{B_z^t}{{}^f P_z^t} \times k \tag{3}$$

Because of the huge variations in fertility by age, age specific fertility rates have been found to be very useful.

### *Total fertility rate (TFR)*

The total of the age specific fertility rates is known as the total fertility rate (TFR). The TFR can be estimated using the following formula

$$TFR = 5 \times \sum_{\alpha}^{\beta} ASFR \tag{4}$$

and

$$TFR = \int_{\alpha}^{\beta} f_z \, d_z \tag{5}$$

where $\alpha$ and $\beta$ are the beginning and end of the child bearing period. Note that, when the rates refer to intervals greater than one, the ${}_n f_z$ values represent only the average for the interval and it is necessary to multiply them by n, the width of the interval, to get the total number of births of the interval as is done in (5). When the radix is equal to one, the total fertility rate can be seen to be the equivalent of the number of children a women will have, if she is subject to a fertility schedule described by the given age specific fertility rates during the reproductive period of her life ruling out mortality. This interpretation for TFR is interesting as well as useful because it gives the synthetic-cohort-equivalent of the completed family size of a women being defined as the number of live births a woman would have when she completes her reproductive period, usually taken to be the age of 49 years.

### *Modeling fertility rates*

A variety of models have been proposed in the literature to model the specific fertility pattern of a population but the polynomial and exponential models to model the age specific fertility pattern of Arians women in Pakistan were considered.

### *Polynomial models*

Using the scatter plot of age specific fertility rates of Arian women shown in Figures 1 and 2, it is observed that age specific fertility rates can be fitted by polynomial models with respect to different ages in year. Therefore, an *nth* degree polynomial model is considered and the form of the model is

$$y^A = b_0 + \sum_{j=1}^{p} b_j z^j + \varepsilon \tag{6}$$

where $z$ is mid age group in years; $y^A$ is age specific fertility rates; $b_0$ is the constant; $b_j$ is the coefficient of $z_j$ ( $j = 1, 2, \ldots, p$ ) and $\varepsilon$ is the stochastic error term of the model.

Using the plot of observed forward cumulative ASFR of Arian women shown in Figure 3, it has been observed that forward cumulative ASFR follows an nth degree polynomial model with respect to different ages in years, therefore the form of the model is

$$y^F = b_0 + \sum_{j=1}^{p} b_j z^j + \varepsilon \tag{7}$$

$y^F$ is forward cumulative age specific fertility rates. Where, $b_0$ is the constant; $b_j$ is the coefficient of $z^j$ ( $j = 1, 2, \ldots, p$ ) and $\varepsilon$ is the chance error term of the model. Using the plot of backward cumulative age specific fertility rates of Arian women shown in Figure 4, it has also been observed that backward cumulative age specific fertility rates follows an nth polynomial model with respect to different ages in year. Therefore, the model is

$$y^B = b_0 + \sum_{j=1}^{p} b_j z^j + \varepsilon \tag{8}$$

$y^B$ is backward cumulative age specific fertility rates; $b_0$ is the constant; $b_j$ is the coefficient of $z^j$ ( $j = 1, 2, \ldots, p$ ) and $\varepsilon$ is the disturbance term of the model. In all these models, select a suitable P for which the error sum of square is minimum.

### *Exponential family*

Exponential models have the exponential or logarithmic functions involved. They are generally convex or concave curves, but some models in this group are able to have an inflection point and a maximum or minimum.

Exponential: $$y = b_0 \exp(b_1 \times z) \tag{9}$$

Modified Exponential: $$y = b_0 \exp\left(\frac{b_1}{z}\right) \tag{10}$$

Logarithm: $$y = b_0 + b_1 \times \ln z \tag{11}$$

Reciprocal Logarithm: $$y = \frac{1}{b_0 + b_1 \times \ln z} \tag{12}$$

Vapor Pressure Model: $$y = \exp\left(b_0 + \frac{b_1}{z} + b_2 \times \ln z\right) \tag{13}$$

***Models validations***

To check how much these models are stable over the population, a measure of effectiveness, the cross validity prediction power (CVPP), $\rho_{cv}^2$ , is used (for details see Herzberg, 1969), which is defined as

$$\rho_{cv}^2 = 1 - \frac{(n-1)(n-2)(n+1)}{n(n-p-1)(n-p-2)}(1-R^2) \tag{14}$$

where $n$ is the number of cases, $p$ is the number of explanatory variables in the model and the cross-validated $R$ is the correlation between observed and predicted values of the dependent variable. Using the above statistics, it can be concluded that if the prediction equation is applied to many other samples from the same population, then ( $\rho_{cv}^2$ ) 100% of the variance on the predicted variable would be explained by the model (Stevens, 1996).

## 4. Results

***Current fertility levels***

Fertility related statistics are inevitable for policy maker, planners and administrative. The evaluation of the fertility levels in Arians on the basis of measures CBR, ASFR and TFR are presented here. A look at the current fertility levels indicates that the Crude birth rate of Arian women was 30.56 births per 1000 individuals, a much higher when compared to the National CBR of Pakistan 26.1 births per 1000 persons (Population and Demographic survey PDS, 2005). The General fertility rate of Arian women was estimated to be 117 births per 1000 Arian women which showed an increase of 6.32 percent as compared to national GFR (110.6; Population and Demographic survey PDS, 2005). The estimated ASFR of Arian women are higher then their national counters parts. The ASFR is highest in the age group (20-24) years. Whereas Age specific fertility rate (ASFR) is least in the age group (45-49) years. The Total fertility rate (TFR) of Arian women in Pakistan was estimated to be 5.17 life time births per women showed a gentle increase as compared to 3.8 children per Pakistani women of reproductive age.

***Desire for more children***

Over 45 percent of the non-sterilized Arian women said that they want another child (Table 2). The remaining said that they do not want any more children possibly indicating proportion of potential users of contraceptives. Surprisingly, 9.9 percent women who already have no living children said that they do not want another child. In a study conducted by (Debral and Malik, 2004b) reported that 100 percent Indian Gujjars women need another child. The situation is quite different for the ever married women of Pakistan, 85.3 percent of Pakistani women desire to have another child when they have actually had no children (Pakistan Reproductive Health and Family Planning Survey 2000-01). The Arian women having five living children do not want to have any more children. The information on age-wise desire for more children is given in Table 3. As the age increases the desire for more children is decreases, 91.7 percent of Arian women in the age group (15-19) years said that they want to have other children. The desire for more child decreases more rapidly after by the age of 34 years see in the (Table 3).

Table 2: Percent distribution of current married non-sterilized women aged (15-49) years, by their desire for children and number of living children.

| Desire for children | Number of living children | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Total |
| Want to have another child? | | | | | | | | | | | |
| Yes | 90.1 | 93.9 | 35.0 | 27.8 | 6.6 | 2.9 | 0 | 0 | 0 | 33.3 | 47.5 |
| No | 9.9 | 6.1 | 65.0 | 72.2 | 93.4 | 97.1 | 100 | 100 | 100 | 66.7 | 52.5 |
| Total | | | | | | | | | | | |
| Percent | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Number | 91 | 99 | 117 | 72 | 61 | 35 | 18 | 10 | 4 | 3 | 510 |

Table 3: Percent distribution of current married non-sterilized women aged 15-49 years by their desire for children and age.

| Desire for children | | Age (in years) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | Total |
| Want to have another child? | | | | | | | | | |
| | Yes | 91.7 | 85.1 | 68.8 | 58.2 | 39.5 | 36.6 | 30.4 | 47.5 |
| | No | 8.3 | 14.9 | 31.2 | 41.8 | 60.5 | 63.4 | 69.6 | 52.5 |
| Total | Percent | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | Number | 12 | 47 | 77 | 98 | 90 | 97 | 89 | 510 |

Table 4: Percentage of currently non-sterilized Arain women Aged (15-49) Years, who want to have another child, by gender preference.

| Preferred gender of additional child | Total | |
|---|---|---|
| | Number | Percent |
| Boys | 215 | 2.15 |
| Girls | 135 | 26.45 |
| Either | 160 | 31.40 |
| Total | 510 | 100.0 |

***Preference for a male child***

As for as Gender preference is concerned, more than 40 percent of the Arian women who want to have another child say that they want next children to be male and only one-fourth want a girl, which reflects universal attitude for gender preference (Table 4). Moderate majority of the ever married women say that there should be at least one male child in the family irrespective of the educational level of the women (Table 5).

Table 5: Percent distribution of ever-married women aged 15-49 years, whether they think there should be at least one male child in the family, according to education of women.

| Education | Whether there should be at least one male child in the family | | Total | |
|---|---|---|---|---|
| | Yes | No | Percent | Number |
| Illiterate | 51.4 | 48.6 | 100 | 109 |
| Under primary | 58.3 | 41.7 | 100 | 24 |
| Under primary | 54.9 | 45.1 | 100 | 74 |
| Middle | 57.9 | 42.1 | 100 | 95 |
| Metric | 61.0 | 39.0 | 100 | 77 |
| FA | 52.6 | 47.4 | 100 | 57 |
| Graduation | 66.0 | 34.0 | 100 | 47 |
| Master | 60.7 | 39.3 | 100 | 28 |
| Above master | 100 | 0 | 100 | 2 |
| Total | 57.1 | 42.9 | 100 | 510 |

***Ideal number of children***

More than 40 percent of the Arian women in Pakistan consider two to be the ideal number of children (Table 6). Less than one-fifth considers three to be the ideal. Among all the Arian women, the average ideal number of children is 3.02 (Table 6).

Table 6: Percent distribution ever-married Arian women age (15-49) years, by ideal number of children and number of living children

| Ideal no. of children | Number of Living Children | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Total |
| 0 | 7.7 | 0 | 0.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.6 |
| 1 | 0 | 4.0 | 0 | 1.4 | 0 | 0 | 0 | 0 | 0 | 0 | 1.0 |
| 2 | 57.1 | 62.6 | 64.1 | 15.3 | 16.4 | 17.1 | 11.1 | 30.0 | 0 | 33.3 | 43.5 |
| 3 | 11.0 | 8.1 | 7.7 | 55.6 | 6.6 | 8.6 | 11.1 | 0 | 25.0 | 0 | 15.1 |
| 4 | 20.9 | 23.2 | 23.9 | 26.4 | 70.5 | 22.9 | 11.1 | 40.0 | 25.0 | 33.3 | 29.0 |
| 5 | 3.3 | 0 | 2.6 | 1.4 | 3.3 | 51.4 | 5.6 | 0 | 25.0 | 0 | 5.7 |
| 6+ | 0 | 2.0 | 0.9 | 0 | 3.3 | 0 | 61.1 | 30.0 | 25.0 | 33.3 | 4.1 |
| Total Number | 91 | 99 | 117 | 72 | 61 | 35 | 18 | 10 | 4 | 3 | 510 |
| Percentage | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Mean | 2.47 | 2.59 | 2.65 | 3.11 | 3.70 | 4.08 | 4.94 | 4 | 4.5 | 4 | 3.02 |
| SD | 1.15 | 1.20 | 1.01 | 0.72 | 0.9 | 1.15 | 1.51 | 1.63 | 1.29 | 2 | 1.22 |

***Decision on family size***

As for as decision making for family size is concerned, more than sixty percent of the Arian women reported that Allah almighty take the decision of family size. Being a muslim, this suggests that the Arian women depend on Allah, where as only 8.4 percent reported that woman has to decide alone about her family size (Table 7).

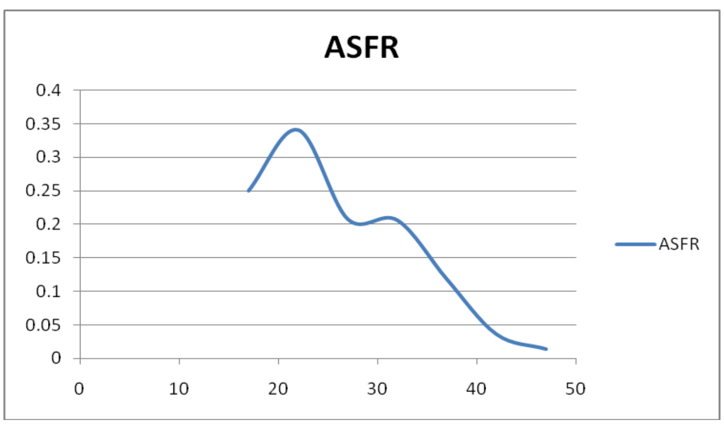
Table 7: Percent distribution of ever-married Arain women Age (15-49) years, by who decides on the number of children.

| Who decides on number of children? | Number | Percentage |
|---|---|---|
| Allah | 311 | 61.0 |
| Husband | 62 | 12.2 |
| Wife | 43 | 8.4 |
| Both | 94 | 18.4 |
| Total | 510 | 100.0 |

***Fertility modeling***

To model the age wise fertility schedules of Arians women, the data have been presented in graph paper shown in Figure 1. From Figure 1, it is found that all the fertility schedules show the traditional pattern that is the reciprocal of approximately V-shape. Beyond this fertility schedule, it is observed that the highest ASFR in the age group (20-24) years are 208, per thousand women. It also, reveals that the lowest fertility rate is 14 births which are in the last age group, (45-49) years. From this presentation, it is found that the age-interval (20-29) years is the most fertile period and the age–interval (45-49) years is the least fertile period in the reproductive span of Arian woman in Pakistan. In the modeling strategies, within the class of exponential family, the vapor pressure model for the distribution of age-specific fertility rates was found to be best fitted model among the other models (see Figure 2).

Figure 1: Age-specific fertility rates (ASFR) of Arian women in Pakistan.




X: Age group in years, and Y: Age-specific fertility rates.

The estimated model is

$$y^{A} = \exp(35.915471) - \left(\frac{193.99982}{z}\right) - 0.1330376 \times \ln(z) \tag{15}$$

For the forward cumulative distribution of age specific fertility rates of Arian women (see Figure 3) the polynomial model was found to be the best fitted model and the fitted equation is

$$y^{F} = (-1.267524) + (0.111354 \times z) + (-0.001267 \times z^{2}) \,. \tag{16}$$

And, for backward cumulative distribution of age specific fertility rates of Arian women (see Figure 4) the polynomial model was also found to be best estimated model and fitted equation is

$$y^{B} = (2.7102010) - (0.10671779 \times z) + (0.0010302432 \times z^{2}) \tag{17}$$

The estimated CVPP, $\rho_{cv}^{2}$, corresponding to their $R^{2}$ is shown in Table 8. From Table 8 it is seen that the fitted models in equations (15) through (17) are highly cross validated and their shrinkage are 0.138199, 0.02093 and 0.00908, these imply that the fitted model for the distribution of age specific fertility rates of Arian women in Pakistan will be stable more than 83 % over the Arians population in Pakistan similarly, the fitted model for forward cumulative distribution of age specific fertility rates will be stable more than 97 % and the fitted model for backward cumulative distribution of age specific fertility rates will be stable more then 98% over the Arians population.

Figure 2: The graph of observed and fitted model of age-specific fertility rates.

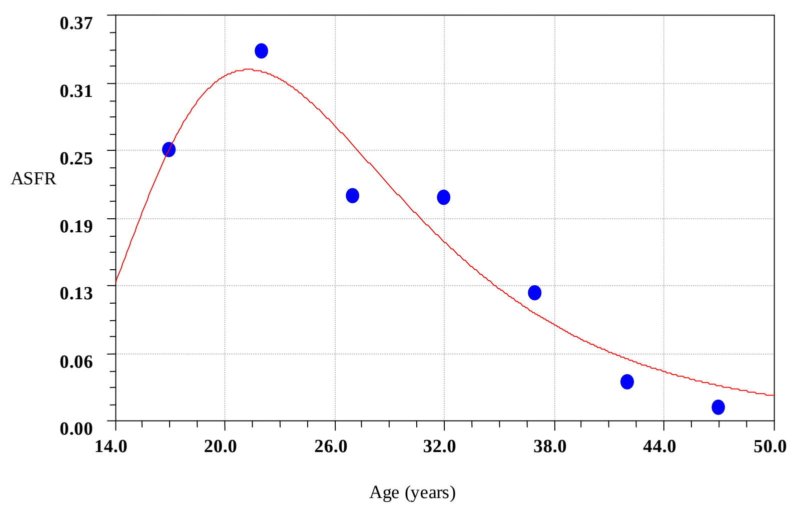


Figure 3: The graph of observed and fitted model of forward cumulative age specific fertility rates.

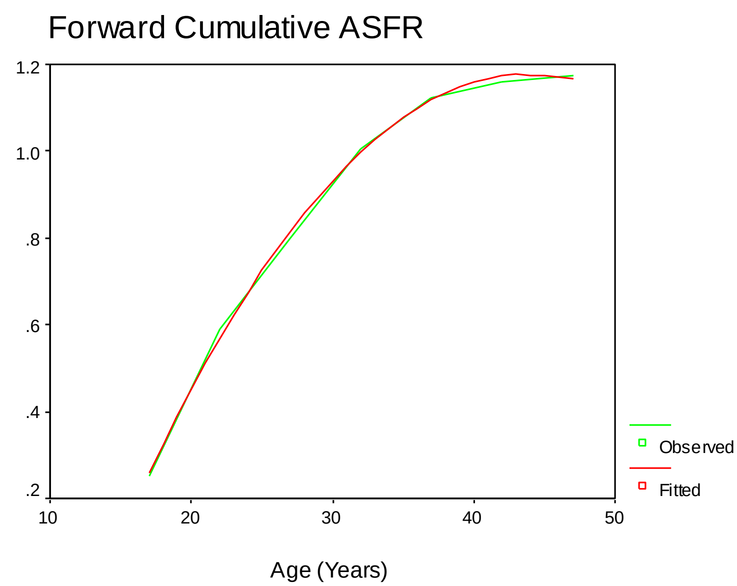



Figure 4: The graph of observed and fitted model of backward cumulative age-specific fertility rates.

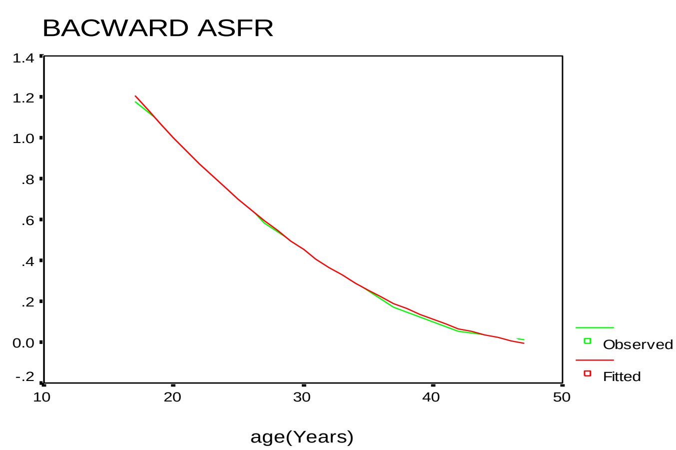


Table 8: Estimated Cross Validity Prediction Power, $\rho_{cv}^2$, of the predicted Equations of Age Specific Fertility Rates and its Forward and Backward cumulative Distribution of Arian women.

| Models | S | P | $R^2$ | $\rho_{cv}^2$ |
|---|---|---|---|---|
| 1. ASFR | 7 | 2 | 0.970684162 | 0.832481 |
| 2. FASFR | 7 | 2 | 0.998131937 | 0.9772 |
| 3. BASFR | 7 | 2 | 0.996053694 | 0.98697 |

The information on model fitting has been presented in Table 9. From Table 9 it is shown that all the parameters of the fitted models in equation (15), (16) and (17) are highly statistically significant with more than 95% of variance explained.

Table 9: Information on Model Fitting

| Models | Proportion of Variance Explained | Parameters | P-value |
|---|---|---|---|
| ASFR | 0.970684162 | $b_0$ | <0.01 |
| | | $b_1$ | <0.01 |
| | | $b_2$ | <0.01 |
| FASFR | 0.998131937 | $b_0$ | 0.0001 |
| | | $b_1$ | 0.0000 |
| | | $b_2$ | 0.0001 |
| BASFR | 0.966053694 | $b_0$ | 0.0000 |
| | | $b_1$ | 0.0004 |
| | | $b_2$ | 0.0023 |

**5. Discussion and Conclusion**

By and large, the Arian people are socially and economically active. In this study, a sample of 510 women respondents was used to measure the fertility profile. The study revealed that the fertility profile of Arians women was much higher than their national counter parts on the basis of standard fertility measures (Population and Demographic survey PDS, 2005). Generally, the desire to have another child drops, as the number of children increases (Debral and Malik, 2004b). Surprisingly a very minor proportion of Arians women who already have already no children said that they do not want to have another child, was clearly visible perhaps indicating the delay in pregnancies among Arians women. However, the key determinants for delay in pregnancies among Arians women in Pakistan remain an area for future research.

In most of the South Asian societies, there is a universal attitude for the son preference, for economic, religious or social reasons. Adult sons are expected to provide economic support to their parents (Das, 1984; Miller, 1981; Hussain et al. 2000*)*. The reason might be that male children be expected to provide economic support to their parents in developing countries. This study also showed that the preference for male child was universal among the Arians women in Pakistan. The degree of dependence on humans for deciding the family size among Arian women is substantially low which shows for Muslims the universal degree of dependence on Allah.

From the foregoing discussion, it may be concluded that fertility profile of Arian women in Pakistan is clearly higher than their national counter parts. Overall finding suggest, on the basis of standard fertility indices the significance of ethnic data is considerable in Pakistan. The general shape of the age specific fertility rates of Arian women in Pakistan shows the approximately V-shape pattern. The display of ASFR is different from the national population of Pakistan. Vapor Pressure model is fitted to be the best model on the distribution of ASFR. The forward and backward cumulative distribution of ASFR for Arian women in Pakistan has followed polynomials models with high cross validations.

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