Determinants of Adolescent Fertility in Pakistan:
Evidence from PDHS 2012-13

Sanam Wagma Khattak
Department of Economics
University of Peshawar
Peshawar, Pakistan

Abstract

Adolescence is a transitional period from childhood to adulthood, refers to age 15-19 years. Adolescent female marriage and childbearing is common in Pakistan particularly in rural areas, so it needs to know the determinants of adolescent fertility to control high population growth rate. This article examines some of the determinants of adolescent fertility in Pakistan using secondary data from PDHS (2012-13). Bivariate and multivariate analysis along with Poisson regression is used to seek determinants of adolescent fertility. It is obvious that female adolescent's work status, female adolescent exposure to mass media, age at marriage, education and infant/child mortality are the significant determinants of adolescent fertility. Therefore, these determinants should be targeted by the government to control adolescent birthrates.

Keywords: Adolescent Fertility; Bivariate and Multivariate Analysis; Population Growth; Infant/Child Mortality

Introduction

Pakistan covers only 0.67 percent of world's land area but contains 2 percent of the world's population. The population of Pakistan was 32.5 million in 1947 (at the time of independence), 33.74 million in 1951, 42.88 million in 1961, 65.31 million in 1972, 84.25 million in 1981 and 132.35 million in 1998 according to five census reports conducted in Pakistan from 1951 to 1998. In 1951 it was the 14th most populous country in the world. Its population had risen approximately 5 times reaching 191.71 million in 2015-16. Pakistan is now the sixth most populous country in the world (Government of Pakistan, 2015) besides China, India, USA, Indonesia, and Brazil and it has the highest rate of population growth (1.89 %). The growth of population is alarming in Pakistan. It is born out from the fact that the annual growth rate of population rose from 1.7 percent in 1951 to 1.89 percent in 2015. The population of 1951 has more the quadrupled. It stood at 191.71 million in 2015. If the population welfare programs are not effectively implemented, the population of Pakistan is projected to increase to 210 million by the end of the year 2020. Child marriage is widespread in Pakistan. Girls, as young as 13, are forced to get married by their parents or guardians. Using data from previous Pakistan Demographic and Health Survey of 2006-07, it is found that over 50 percent of the ever-married women in Pakistan between the ages of 20 and 24 got married before they turned 18. Most International conventions consider individuals under 18 as child. The authors

believe that the adverse impacts of early child marriages include high fertility rates (three or more childbirths), frequent childbirths with fewer than 24 months interval between births, unwanted pregnancies and pregnancy termination.

There are various causes for high fertility in Pakistan and adolescent fertility consists of a major part. Adolescence is a transitional period from childhood to adulthood accompanied by significant physiological, psychological and social changes. World Health Organization defines age group of 15-24 years as adolescent. It is an established fact that people with low income have more children because poor people are not afraid of further fall in their standard of living as a result of large number of children. They consider kids as earning assets. In Pakistan, adolescent marriages are common due to warm climate due to which puberty is attained at an early age, especially in rural areas for girls so the span for reproductively is quiet long. Also, large family is regarded as a power to influence and subdue persons around them. In rural areas due to lack of education, people are not aware of the economic distress caused by high birth rates plus the joint family system in rural areas though on decline, is also a cause for rapid bringing forth of children. Besides, the existence of polygamy in many parts of the country also contributes to increase in birth rates. The population control drive has not been pursued by the Government of Pakistan in right manner due to resistance on ethical and religious grounds. The influx of refugees especially from Afghanistan is continuing unabated in Pakistan. Pakistan is now a refugee paradise. Usually refugee girls enter wedlock in earlier age due to less education and poverty. All men and women of marriageable age enter wedlock because Pakistan is an Islamic state, so universality of marriage exists, also in Islam early marriages for both male and female are preferred so adolescent birth rates are higher in Pakistan.

Table 1: Change in Population Size and Growth Rate

Years	Population size (million)	Inter-census Growth rate
Estimated 1947	32.5	1.8
Population census 1951	33.7	1.8
Population census 1961	42.8	2.4
Population census 1972	65.3	3.6
Population census 1981	84.2	3.1
Population census 1998	132.5	2.6
2002 estimated	144.0	2.1*
2008 projected*	167.0	1.9
2015 projected	181.3	1.2
2050 projected*	349.0	--

Source: *Ministry of Population Welfare: 2008 January *FBS: Pakistan Demographic Survey 2005, PRB Population Data Sheet 2003

The negative effects of overpopulation are felt in every sector of the economy, and in every facet of economic life of the country. The high population growth rate is one of the factors responsible for Pakistan's poor performance showing in all social welfare sectors, despite of the impressive growth rates of GDP and GNP that have been observed in the country over the last decades. This scenario presents a picture that could be devastating for the country's already scarce national resource. The population growth rate mostly remained at or above 3 percent during late 1970s and 1980s and began to show a decline past mid 1990s (See table 1 above).

No doubt that population control is now imperative for Pakistan. All development efforts are futile unless the population growth rate is checked. However, no government has yet been successful in implementing and promoting a comprehensive program of family planning in the country. The reasons for this are not so much financial or social but religious. Family planning is considered taboo by the clergy, and any efforts on the part of the government to launch a family planning program are faced with strong resistance from religious leaders. No family planning program can be successful unless mass media creates awareness about it and contraceptive products are easily available to all sections of society in all parts of the country. The family planning program has never been effectively publicized, and this is the main factor responsible for its failure in Pakistan. Various reasons slow down the progress of reducing the adolescent fertility rate for example illiteracy, poverty, failure to raise awareness about the problems of large families, inefficient and unequal distribution of birth control facilities, preference of sons and lack of security in old age. In fact, analysis of population's matter in Pakistan is even more perplexing than in Bangladesh, Nepal or any other Islamic country. Reliable estimation of the precise levels of birthrates remains elusive because of inaccurate reporting of births. However, several investigations using different techniques reached the same conclusion that no substantial decline in population growth has occurred in Pakistan yet.

Literature Review
Adolescent pregnancy and child bearing have distinct and important deleterious consequences at global, societal and personal level. Internationally population growth is increasing more rapidly when women have their children in their teenage as early initiation of giving birth lengthens the reproduction period and subsequently increase fertility at the societal level. Strong association between adolescent childbearing and low levels of education brings a negative impact on their position and potential contribution to society. Individual adolescent fertility is associated with adverse maternal and child health outcomes including obstructed, low birth weight, fetal growth retardation, and high maternal and infant mortality rate.

Davis & Blake (1956) elaborated 11 intermediate factors which effect fertility. These 11 factors are grouped into three categories the first category is intercourse variables which includes age of entrance into sexual relations, stable celibacy, and duration of

reproduction time between unions or after unions (i.e.) when divorce, separation or death of husband causes the unions to break, voluntary abstinence, involuntary abstinence, and coital frequency. The second category includes conception variables which include fecundity or infecundity, used and non-used of contraception and fecundity or infecundity by voluntarily reasons (sterilization or health treatment etc.). The third category is gestation factor which includes feotal mortality, from involuntary causes and voluntary causes. Bongaarts (1978) further refined the list of proximate determinants. His work was an advanced over prior models because any data could be easily fitted into his model. Since Bongaart's published his first paper, more than 100 publications based on his framework in different countries and different regional settings have been published. Bongaarts reduced 11 intermediate variables of fertility given by Davis and Black to only 8 intermediate variables which were 'proportion married, contraception, induced abortion, lactationtional infecundability, frequency of intercourse, sterility, duration of fertile period and intrauterine mortality' but according to him the first 4 variables are more important as compare to others so 4 intermediate variables given by him is presented in this equation. The total fertility rate according to Bongaarts model is 15.3, an average estimate of TF (Total fertility)

$$TFR = TF \times C_m \times C_c \times C_a \times C_i$$

'Cm is index of Non-marriage, Cc in index of contraception, Ca is index of induced abortion and Ci is index of lactation infecundability.' Each index value ranges among 0-1, if the value of index is lesser than it will have larger effect on fertility variable. We can calculate each index from data available to see the influence of each index on fertility. In conventional societies where, male successor are preferred and child brought up is shared by close relatives and neighbors, fertility no doubt will be quiet high in traditional kin supporting societies large number of children are encouraged and supported found by Turkey (1989) and Low (2000).

Sathar (1984) explained positive relationship between mean marriage age for women and educational achievement. Illiterate women marry 4 years prior usually than women who achieved secondary or higher education. Many others also reported that rising trend in age at marriage does affect fertility but in close association with other socio-economic factors e.g. education, urban residence, women's decision and marriage outside blood relations. Stover (1998) revised the Bongaarts model in following way

$$TFR = PF \times C_x \times C_c \times C_a \times C_i \times C_f$$

Where TFR = 'Total Fertility Rate', C_x = 'Index of proportion of women sexually active', Cc= 'Index of contraception', C_a= 'Index of abortion' and C_i= 'Index of postpartum infecundability' and C_f is index of infecundity while PF is potential fertility. An effect of infecundity has been accounted for infecundity index, so total

fertility in Bongaarts model is no longer appropriate to describe the residual fertility. Potential fertility is defined as 'the total fertility rate for women, sexually active and fecund from age 15-49 and no practice of breast feeding, experience postpartum abstinence and use no contraception.' Its value is higher (i-e) 21 as compare to 15.3 of Bongaart's model. Stover model is superior to Bongaarts model because it assumes sexual activity both within and outside marriage.

Aziz (1994) by using data from PFS (Pakistan Fertility Survey) (1974-75), PCPS (Pakistan Contraceptive Prevalence Survey) (1984-88), PDHS (Pakistan Demographic and Health Survey) (1990-91) & Population & Family Planning Indicators survey (1993) on Bongaarts model (1978) to decompose total fertility rate from 1974-1993 by formula

$$TFR = C_m \times C_c \times C_a \times C_i \times TF$$

Where 'C_m is non-index of marriage, C_c is index of contraception, C_a is index of induced abortion and C_i is index of post-partum infecundability.' Among four proximate determinants, index of lactation infecundability (C_i) had the strongest effect 0.68 during period 1974-1993 followed by marriage index (Cm) = 0.69 from 1974-199-91 in Pakistan.

Masood (1998) tried to explore the social & cultural factor accounted for the importance of having children for women in Pakistani society by considering a sample of 196 currently married women from Faisalabad using triangulation strategy. The result showed that children in Pakistani society are seen as source of love, affection, satisfaction and hope for many parents. This leads to conclusion that as long as children remain the main source of security parents will continue to entertain large family.

Gupta et al. (1999) examined trends and determinants of adolescent fertility (15-19 years old) in Northeast Brazil. He used secondary data from 3 DHS conducted in 1986, 1991 & 1996. Logistic model was with adolescent fertility as dependent variable and individual and environmental factors like (age, place of residence, mass media exposure, race, education and religion) were independent factors. Their research revealed that level of education of young women is strongly associated with adolescent fertility, an adolescent with only primary schooling have more than double chances to have baby as compare to an adolescent with at least secondary education, even if we control age, time and other characteristics. So, there should be more promotion of education to encourage delayed child bearing among adolescent in North Eastern Brazil.

Sarkar (2009) showed that most teenaged mothers in Bangladesh are from rural areas where early forced marriage is ideal and maternal mortality is high (96.4%). His result confirmed that promotion of education and provision of family control pills are

strong determinants of controlling adolescent birth rates. In the last decades Latin America had been characterized by a systematic decrease in total fertility rate due to multifaceted combination of factors among those were urbanization, women became more educated, women increased participation is in labor market, introduction of family planning programs and diffusion of social acceptance of contraception also found by Wulf & Singh (1991).

Tewodras et al. (2010) assessed levels and determinants of adolescent fertility in Ethiopia from data set of Demographic and Health Survey (DHS-2005) using multivariate logistic regression using Bongaarts model. Age, educational status, place of residence, employment, marriage, contraceptive use, and postpartum Infecundability were used as determinants of adolescent fertility. The odds for increased adolescent fertility was higher in early adolescent (AOR = 7.6 CI = 6-9.9) and lower for education (AOR = 1.7 CI = 1.3-2.2) than their counterparts with no education. The observed fertility rate of 0.52 kids per woman from Bongaarts model showed 1.98 births per woman were averted due to non-marriage, delayed marriage, contraceptive use and postpartum infecundability so to avoid teenage marriages fight should be there against early marriages, efforts for promotion of more education and more utilization of family planning services.

Anna (2011) examined determinants of adolescent fertility with a particular focus on the possible association between adolescent fertility and idea diffusion. A sample of DHS data consisting of 6591 Nigerian female adolescents in the age of 15 - 19 in 2008 were used for analysis. The logistic regression shows a clear significant association between adolescent fertility and socio-economic determinants such as educational level, residence, religion and proximate determinants like marital status. The analysis furthermore showed that there is an effect of idea diffusion (mass media exposure) on fertility decisions for non-married adolescents in particular.

Nyarko (2012) studied determinants of adolescent fertility in Ghana using secondary data from GDHS (2008) using bivariate regression and found level of education, husband work status, wealth index, and exposure to mass media were important factors of adolescent fertility in Ghana.

Data and Methodology
To analyze the determinants of adolescent fertility of ever- married women in Pakistan at national and regional level, information from survey data PDHS (Pakistan Demography and Health Survey) 2012-2013 is collected. In this survey a total of 13,558 aged 15-49 ever-married women were identified, of which a major sample 7734 comprised of age between 15-19 years which refers to adolescent age. This analysis focuses only on women. In order to assess fertility level and determinants, information is compiled on adolescent fertility (i.e. total number of children ever born to women between age 15-19 years) using bivariate and multivariate analysis through Poisson distribution. We shall use Poisson model to

estimate relationship between child ever born as dependent variable and various determinants (economic, social and demographic) as independent variables because here dependent variable is a discrete or count variable, so we use Poisson model. 'Count or Poisson Model is used to investigate the relation between the numbers of children ever born and socio-economic and demographic variable of women obtained from a given survey' (Winkelmann and Zimmermann, 1995). 'Poisson model is one of the robust models for the analysis of discrete data based on the assumption that the dependent variable (number of live births to women) is distributed as Poisson and its logarithm is a linear function of the independent variable' (Chottapadhyay, 2006).

$$Log\ (\mu_i) =\ B_o\ +\ B_j X_j \qquad\qquad (1)$$
$$ui =\ Exp\ (B_0\ +\ B_j X_j) \qquad\qquad (2)$$
$$B_o\ +\ \sum_{j=1}^{k} Bj\ Xj \qquad\qquad (3)$$
$$\mu_i\ =\ e$$

Where μ_i is women's expected number of kids (i), Intercept is presented by B_o, $B_j's$ are regression co-efficient and X_j's are explanatory variables. If we assign value of 0-1 dummy variable to coefficients of B_j than exponent B_j will represent proportionate change if the value of variable changes from 0 to 1 in child ever born (Ceterus Peribus).

In current research, women's education, region, place of residence, wealth index, access to media, a woman's occupation and decision-making autonomy are social and economic determinants while age of woman, child loss experience, number of surviving children, current and ever contraceptive use and age at first marriage (Rukhsati) are biological determinants. In Pakistan, the process of sexual intercourse is strictly related to departure of bride from family home to husband's home). Also, current age of woman and age squared are used as co-variates. Furthermore, some variable was recoded from their original codes as contained in the PDHS to form variables that is relevant to the objectives of the present study.

Determinants of Adolescence Fertility in Pakistan
The present study measures the determinants related to Adolescent fertility of women. This study uses cross-sectional analysis of Pakistan divided into 6 regions Punjab, Sindh, Khyber Pakhtunkhwa, Baluchistan, Islamabad, and Gilgit Biltistan. Cross-section analysis allows for a more accurate investigation of a wider range of characteristics than does time series.

Table2: Poisson Regression Analysis Results Predicting Determinants of Adolescent Fertility among Women Aged 15- 19 Years. PDHS (2012-13)

Variables	Women Age 15- 19 years	
Regions	S.E.	Exp (B)
PUNJAB (Reference Category)		1
SINDH	0.300	0.71
K.P. K	0.410	1.03
BALUCHISTAN	0.397	1.01
ISLAMABAD	0.488	0.86
GILGIT BILTISTAN	0.795	1.20
Place of Residence	S.E	EXP(B)
RURAL (Reference Category)		1
URBAN	0.322	1.02
Women education	S.E	EXP(B)
ILLITERATE (Reference Category)		1
PRIMARY	0.261	0.63
SECONDARY	0.180	0.37
MORE THAN SECONDARY	0.000	1.23
Access to Media	S.E	EXP(B)
NO ACCESS (Reference Category)		1
INFREQUENTLY	0.309	0.88
FREQUENTLY	0.431	0.84
Wealth Index	S.E	EXP(B)
NOT WORKING (Reference Category)		1
AGRI-WOKER	0.374	1.05
NON AGRI-WORKER	0.360	0.90
Wealth Index	S.E	EXP(B)
POOREST (Reference Category)		1
POOR	0.325	1.05
MIDDLE	0.495	1.16
RICHER	0.519	1.03
RICHEREST	0.611	0.96
Child Loss Experience	S.E	EXP(B)
NONE (Reference Category)		1
ONE	O.842	1.60
MORE THAN ONE	0.622	1.96
Contraceptive Use	S.E	EXP(B)
NEVER USE (Reference Category)		1
EVER USE	0.456	1.58

Age at first marriage-Rukhsati	S. E	EXP(B)
BEFORE 18 YEARS (Reference Category)		1
18 + YEARS	0.052	0.30
Women's decision-making autonomy	S. E	EXP(B)
LOW (Reference Category)		1
MEDIUM	0.332	1.17
HIGH	0.459	1.05
AGE	0.439	2.14
AGE SQUARE	0.096	0.79
INTERCEPT	5.890	9.33
TOTAL NUMBER OF CASES	7734	

Reference Categories have a value of 1.00 EXP (β)
Source: Computed by the Author from 2012-2013 PDHS Data Sets

Adolescent fertility has been increased by {1-EXP ( )* 100} 2 percent among the residents of urban areas as compared to those living in rural areas (table 1) because in urban areas better health and nutritional conditions are available, more complete reporting of birth among urban women, heavy rural-urban migration, greater stability of marriage in urban areas of Pakistan and shorter breast feeding period of urban mothers as compare to their rural counter parts because women living in urban areas are mostly working women and they can afford powder milk which is a substitute to breast feeding while in rural areas majority women are household and they are poor as compare to urban mothers so they cannot afford powder milk (United Nation Monitoring Report, 1981). Adolescent fertility has shown a declining trend among those women who have attained primary education and above by 37 and 63 percent compared to those who have never been to school. Women with 7 or more year of schooling marry on average nearly 4 years later, have 25 percent more contraceptive and breastfeed child 8 months less with women with no education (United Nation Report, 1987:214). But adolescent fertility is 23 percent high for those who have attained above secondary education 'Relation between high education and adolescent fertility may be positive in the absence of contraception because better educated women may breastfeed less, have low rates of infant/child mortality so birth interval between kids shrinks directly contributing to supply of children (Economics & Statistics Administration, USA Dept. of Commerce Report). Frequent or infrequent access to media tends to reduce fertility by 12 and 16 percent as compare to those who have no access to media. Similarly, employment in agriculture sector tends to increase adolescent fertility by about 5 percent compared to those who are not working. Rural people are still dependent on their land for livelihood, so family labor is still important to produce more.

According to the results given in table 2, high adolescent fertility is observed among women experiencing child mortality. Death of one child increases adolescent fertility by 60 percent while death of two or more increases it by 96 percent indicating that child survival has significant effect on fertility, according to Kreider et al. (2009) 'increase in mother education and reduction in child and infant mortality have contributed to rapid decline in fertility in 47 countries of Asia, Latin America, North Africa, Caribbean and Sub-Saharan Africa.' Based on such evidences, we can argue that making efforts towards reducing, infant and child mortality in Pakistan could lead to further decline in adolescent as well as overall fertility in the long run. According to Adhikar (2010), a child death was almost translated into doubling of child ever born with women with no child loss.

Another interesting finding is that Pakistani women use family planning after achieving their desired family size, also the methods of family planning are not very much effective so ever users of contraceptive found to have 58 percent higher adolescent fertility than non-users. This may help to prove Charles Westoff's claim that contraception is often demand-driven; perhaps it is women looking to space birth or stop them only after they have reached their level of kids they desire.

Getting married after 18 and later is also demonstrated to reduce adolescent fertility by 70 percent compared to those who entered marital fertility earlier i.e. before age 18 (table 2). Rising age at marriage may decline fertility due to 'tempo effect' discovered nearly half a century ago by Ryder (See Bongraarts and Feeney 1998 for details). Our result is like Adhikar (2010) i.e. increasing age of women at first marriage seem to decrease children ever born significantly specially in countries like Pakistan where contraceptive prevalence rate is slow due to opposition of husband, fear of side effects, religious concerns and lack of knowledge of the supply sources as the paramount obstacle. As discovered by Casterline et al. (2001), 'increasing age at marriage could reduce lifetime fertility by minimizing the exposure time to the risks of pregnancy.' Getting married at 18 (or more) years of age has a very strong influence on decreasing adolescent as well as overall fertility rate in Pakistan.

Like results obtained in the inter-birth interval analysis, no statistically significant differences in adolescent fertility is observed among women belonging to different categories of wealth status and decision-making autonomy, suggesting that development factor have not yet fully penetrated into fertility regulation as far as Pakistani society is concerned. The position and status of the Pakistani women has hardly been changed and they are being confined to the sphere of the home. In most aspects, Pakistan remains a feudal and agricultural society with strong bond of casts, family and strong preference for male progeny discovered by Zeba et al. (2000). Finding of this study is not in line with Neo-classical economic theory that there is direct relationship between poverty and large family. The non-significant effect of wealth index on adolescent fertility may be due to considering child mortality as an independent predictor of fertility so to some extent it may help poverty effect and

explanation for non-significant effect of women's decision making autonomy on adolescent fertility due to recent initiative on gender equality and women empowerment that will require some time to break the traditional 'age old male dominance' in Pakistani society.

Punjab is taken as reference category. Women resides in other regions tend to have relatively high adolescent fertility as that of Punjab e.g. Galgit Baltistan where adolescent fertility rate is 20 percent higher followed by is KP where adolescent fertility is 3 percent and third is Baluchistan where adolescent fertility is 1 percent higher than Punjab when another confounding factor are held constant. This is because in these regions values of children are supposed to be high due to its traditional kin support system. (table2) In Sindh and Islamabad, adolescent fertility is 29 and 14 percent lower than Punjab respectively.

Devising a strategy to let women use contraceptive to space between birth from the very beginning rather than looking to limit fertility at a later age might help to reduce infant/ child mortality that has non-negligible effect on fertility in the long run, otherwise, contraceptive use at a later age to stop births may not be effective as shorter inter birth intervals could lead to increase infant/child mortality that goes against the overall fertility reduction endeavor.

Conclusion
Population growth is motivated by overall fertility which is very personal decision with very social and economic consequences. It is therefore a very sensitive issue for policy makers. Hence understanding the factors responsible for high adolescent fertility level would help in designing strategies effectively implement any program to tackle uncontrolled population and in uplifting the status of women from the very beginning. Pakistan has made tremendous progress in increasing the average age at marriage for girls, which increased from 13.3 years in 1950-59 to 23.1 in 2012-13. But despite the good work done, one in two young girls is still married off before she turns 18.

Major causes of the adolescent fertility are poverty, kin support system which not only exert pressure in having more babies but also shares cost of child rearing, male preferences in rural areas, universality of marriage, low contraceptive prevalence rate, high unmet need for family planning, and infant/child mortality tend to increase adolescent fertility in Pakistan. Although there is a decline in adolescent fertility in Pakistan as far as evidences obtained from two rounds of PDHS data sets are concerned but still confine to small pocket of people i.e. very highly educated, engaged in gainfully employment and living in nuclear system. The decline is not only lack of uniformity but also appears to be accomplished by a shift in timing of births. Available evidences show that there is tendency of lagging child delivery toward the peak reproductive age group (for instances women who receive basic education) which show a little decline in adolescent fertility but a slight increase in

other age categories. In most cases decline in adolescent fertility appears to be diminished by an increase in other categories either due to shifting in timing of child delivery or the inconsistence response to fertility inhibition factors, for instance rural women appear to maintain low adolescent fertility while urban women tend to have more.

Adolescent fertility is high in Khyber Pakhtunkhwa, Baluchistan and Gilgit Baltistan as compared to reference region (Punjab) due to their traditional norms and values, kin support system which not only encourages more babies but also shares the cost of child bearing which further perpetuates more kids plus there is also unmet need for family planning in these regions. If the demand for family planning is met in those regions no doubt adolescent as well as total fertility rate would reduce. But infant/child mortality has much significant effect on adolescent fertility and should be given top priority in reproductive health programs. In current study we see that death of one child increases adolescent fertility by 60 percent. It can also reduce maternal morbidity and mortality since frequent and too close births have non-negligible effect on well-being of mothers and children. In order to reduce adolescent fertility abolishment of early marriage and maintenance of minimum age at first marriage in all regions should be enforced, expansion of effective and efficient family planning services should be available to entire population, compulsory primary and child education policy must be enforced by Government specially encouraging females education through giving incentives and rewards for brilliant female students, providing more employment opportunities in rural sectors and better medical facilities can reduce infant/child mortality in Pakistan. As observed from the analysis of national and regional data, none of the single variable is responsible for fertility transition. The demographic, social and economic system should operate together to bring about radical change in total fertility. Even if economic development takes place, there will be less overall fertility decline as long as the social structure is not changed.

References

Anna, T. (2011). "Determinants of adolescent fertility". LUP Student Paper.

Adhikari, R. (2010). "Demographic, Socio-Economic, and Cultural Factors Affecting Fertility Differentials in Nepal". *BMC Pregnancy and Childbirth*. 10 (1). P. 19.

Article published in DAWN News Paper on 8 dec,2014" Children giving birth to children in Pakistan" by Murtaza Haider Director Regionomics.

Alemayehu, T., Haider, J., & Habte, D. (2010). "Determinants of Adolescent Fertility in Ethiopia". *Ethiopian Journal of Health Development*. 24 (1).

Aziz, A., & Ali, S. M. (1994). "Proximate Determinants of Fertility in Pakistan". *The Pakistan Development Review*. 33 (4). Pp. 727-742.

Bongaarts, J. (1978). "A Framework for Analyzing the Proximate Determinants of Fertility". *Population and Development Review*. Pp. 105-132.

Chattopadhyay, A., White, M. J., & Debpuur, C. (2006). "Migrant fertility in Ghana: Selection versus Adaptation and Disruption as Causal Mechanisms". *Population Studies*. 60 (2). Pp. 189-203.

Concise Report on world population situation in (1981,1984 &1987) UN, New York 1991: *Department of Int. Economic & Social Affairs.* Population Studies No 118.

Davis, K., & Blake, J. (1956). "Social Structure and Fertility: An Analytic Framework". *Economic Development and Cultural Change*. 4 (3). Pp. 211-235.

Demographic Transition in Pakistan, (2009). "The Imperatives of Family Planning in Attaining Fertility Transition: Exploring Future Prospects": *Rahnuma Family Planning Association of Pakistan.*

Feeney, G., & Alam, I. (1972). "Fertility, Population Growth, and Accuracy of Census Enumeration in Pakistan: 1961-1998. *Population*. 1970 (75). Pp. 6-3.

Government of Pakistan Statistical Supplement Economic Survey (Different Issues). Finance Division, Economic Advisors Wing, Islamabad.

Gupta, N., & da Costa Leite, I. (1999). "Adolescent Fertility Behavior: Trends and Determinants in Northeastern Brazil". *International Family Planning Perspectives*. Pp. 125-130.

Kreider, A. Shapiro, D. Varnes, C. & Sinha, M. (20090). "Socio Economic Progress & Fertility Transition in the Developing World: Evidence from the Demographic & Health Surveys": Paper presented at the international union for the scientific study of population. International Population Conference, Sep 27-Oct2, Marrakesh, Morocco.

Low, B. S. (2000). "Sex, Wealth, and Fertility: Old Rules, New Environments". *Adaptation and Human Behavior: An Anthropological Perspective.* L. Cronk, N. Chagnon & W. Irons. (Eds.). Pp. 323-44.

Masood, R. (1998). "The Importance of Having Children in Pakistani Society". *Pakistan Journal of Psychological Research*. 18 (1-2).

National Institute of Population Studies (Pakistan), and MEASURE DHS (Program). Pakistan Demographic and Health Survey. (Various Issues).

Nyarko, S. (2012). "Determinants of Adolescent Fertility in Ghana" *International Journal of Sciences*: *Basic and Applied Research* 5 (1). Pp. 21-32.

Population Census Organization. 1998. Retrieved on 2 January 2011. www.statpak.gov.pk/depts/pco.

Population Resources Bureau 2011.

Stata Corp, L. P. (2013). "Stata Power and Sample-Size Reference Manual."

Sathar, Z. A. (1984). "Does Female Education Affect Fertility Behaviour in Pakistan"? *The Pakistan Development Review*. Pp. 573-590.

Sathar, Z. A., & Kazi, S. (2000). "Women's Autonomy in the Context of Rural Pakistan". *The Pakistan Development Review*. Pp. 89-110.

Stover, J. (1998). "Revising the Proximate Determinants of Fertility Framework: What have we learned in the Past 20 years"? *Studies in Family Planning*. Pp. 255-267

Sarkar, P. (2009). "Determinants of Adolescent Fertility in Bangladesh" *The Social Studies*, 4 (6). Pp. 680-684

Turke, P.W. (1989). "Evolution & Demand for Children". *Pakistan Development Review*. 15 (1). Pp. 61-90.

Wulf, D. & Singh (1991). "Sexual Activity, Union and Childbearing among Adolescent Women in the America". *International Family Planning Perspectives*. 17(4).

Westoff, C. F. (1978). "The Unmet need for Birth Control in Five Asian Countries". *Family Planning Perspectives*. 10 (3). P. 173.

Winkelmann, R., & Zimmermann, K. F. (1995). "Recent Developments in Count Data Modelling: Theory and Application". *Journal of Economic Surveys*. *9* (1). Pp. 1-24.