Asia Pacific Journal of Educational Development 1:2 (December 2012): 29-39 DOI: 10.6228/APJED.01.02.04

Education and Fertility Decisions in India: A District-Level Analysis

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Abstract

The relation between education and fertility choice is a contentious issue in any discussion on development. However the debate often looses much of its fire due to the non-availability of crucial data and/or improper emphasis given to various aspects. For example, in most of these studies, the end variables (such as fertility, child mortality, gender disadvantage, etc.) are given more emphasis than the actual choice (such as proportion of births of higher order). In this paper, we study the relationship between some of these parameters culled from different sources at the district level. Our analysis reveals a strong relationship between these variables and that efficiency in the education delivery system fosters informed fertility choices.

Keywords: multi-dimensional appraisal, educational attainment, fertility decisions

1 Introduction

Development economists are concerned about the relationship between education and health, especially reproductive health. It is frequently argued that an expansion in educational facilities should help to improve public awareness of reproductive health, reduce the fertility rate, and close the gender gap. Empirical research has, however, failed to confirm this relationship unequivocally (Murthi, Guio, & Drèze, 1995). There are often claims and counterclaims giving contradictory results. This discrepancy between the theoretical assertions and empirical reality is a paradox that the development economists have to take into account.

The relationship between education and fertility choice is quite complex and susceptible to a number of open-ended questions. Fertility rate and gender disadvantage are a result of a long social process that includes factors that are external to the actual decisions (such as the availability of proper medical facilities). Hence the emphasis should be on the more immediate choice-related variables (such as the proportion of births of a higher order) that have a direct bearing on both the health of the mother and her babies, rather than on other indirect variables, as most of the earlier authors have done.

In this paper, we study the relationship between some of these parameters culled from different sources at the district level. We use the data on reproductive health published in the Third District Level Household Facility Survey (DLHS-3)-2008-09 conducted by the Ministry of Health and Family Welfare, Government of India.

We first present a brief discussion of the various relevant issues. In Section 3 we give a detailed description of the data. In Section 4 we describe the model and the variables. The results of the regression analysis are given in Section 5. Our conclusions are presented in the last section.

2 The Nexus between Education and Reproductive Health -- A Brief Survey

There is a general consensus that there is an inverse relationship between education and fertility rate. However, this relationship is not simple and clear, resulting in a lot of arguments and counter arguments about the exact nature of the relationship between education and fertility. What is clear is that there are widely divergent views regarding the factors responsible for fertility reduction.

The economist's standard logic seems to be based on the quality-quantity tradeoff developed by Becker, Duesenberry, and Okun (1960) and others (e.g., Galor & Moav, 2002; Galor & Weil, 1999, 2000; Rosenzweig & Wolpin, 1980). The point is succinctly put forward by Lucas (2002). In a traditional society, there is little return on human capital. As such, emphasis is on the quantity of unskilled labor. The result is positive fertility and a Malthusian gloom. The industrial revolution changed all this. It brought about a paradigmatic shift in the nature of and demand for the capital of human labor. As investment in human capital and the importance of skill formation rises, fertility falls and the quality of life improves.

Similar to the way in which education has a direct negative effect on fertility, fertility rate also has a direct effect on the educational levels attained by the children in a given household. This is because the number of children in a household determine to a certain extent the quality and standard of education of those children. This two-way phenomenon between education and fertility is known as the child Q-Q (Quantity-Quality) tradeoff

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and was first noted by Becker et al. (1960) and later modified and extended by others. In a more recent work, Becker, Cinnirella, and Woessmann (2009) points out that this famous Q-Q trade off indeed existed before the demographic transition started in Prussian countries.

Sociologists have a differing view on this subject[1] (Jaffe, 1959; Coachrane, 1979, 1983; Encarnación, 1974; Stycos, 1965). They opine that only after reaching a certain minimum threshold of education among women does the negative association between these two variables become prominent. Baily (1989), in a study of married women aged 15-49 from the rural part of Sierra Leone, has further strengthened the threshold proposition of women's education. He estimated the education threshold of this region to be six, below which greater education brings a higher fertility rate per household.

Education may reduce the fertility rate, but its role itself is a function of other socioeconomic or demographic factors. The impact of education on fertility in rural areas may be somewhat smaller than that of the urban areas, because of cultural or attitudinal differences. Caste or religion sometimes reduce or neutralize the effect of education, and may even lead to a positive association between education and fertility. An economic crisis or upswing can also have an indirect negative effect on fertility. Wasao (2001) found that in Africa educational opportunities coupled with religious beliefs, health facilities, and economic position all have a joint or simultaneous effect on fertility decisions. In this respect, the following observation of the United Nations (1985) on 30 developing countries should be kept in mind. The reverse 'U' shape, or positive association between education and fertility, is a common feature in underdeveloped countries, whereas widespread fertility reduction in more developed states is the outcome of greater educational opportunities, particularly for women.

Actually there is whole set of factors that may influence fertility. The history of fertility in the Western world cannot be ascribed solely to an increasing level of education. For it is clear that various other factors have also contributed to the fertility decline in the West, including changes in occupational patterns and living space, technological advancements, health care improvements, the spread of democracy and civil rights, and government policy. Even in the developing world, governments do not see expanding education as the sole way of reducing fertility.

Governments typically try to mitigate the problem of uncontrolled population growth in one of two ways. One approach is to adopt a strong-hand family-planning policy, enacting laws which force people to have less children, a system which has been in place in China for several decades. This approach is most effective if it includes appropriate rewards or punishment, so that at some future period of time people can realize for themselves that having a smaller family is for their own benefit. The other approach is to attempt to indirectly reduce fertility rates by implementing various programs and initiatives, the results of which will encourage people to have less children. Examples include programs designed to improve health facilities, educational opportunities, or job opportunities.[2] Direct government intervention to reduce the fertility rate is beyond the scope of our paper. In this paper we concentrate our attention on the second approach, particularly the impact of greater access to education or better socioeconomic conditions.

In the African context, Serbessa (2002) has shown that the level of female education has an important role in determining the fertility level in the household. In this work it is surprisingly observed that mere primary education among the female population not only doesn't lead to fertility reduction, but is actually associated with increased fertility. Education beyond the secondary level can create a negative impact on fertility from two different points of view. Firstly, a higher level of education delays the age of marriage and reduces the child-bearing age span of the women, resulting a reduced fertility rate for educated mothers. Secondly, higher education gives women more control over resources, increases their independence, and reduces their dependency on their children in old age. These two effects of female education on fertility are minimal among the primary educated women, because they are overshadowed by other effects of education, such as reduced lactation, improved fecundity, and reduction of child mortality.

By analyzing the Indonesian government's extensive educational data, Breierova and Duflo (2002) reaches the same conclusion as Serbessa (2002) and others that education, particularly female education, is strongly correlated with the fertility level in a society. Higher average years of schooling in the family or higher parental education can reduce the level of fertility to some extent. A closer view establishes the fact that female education is a major factor behind fertility reduction. This is proved by Breierova and Duflo (2002) work in the Indonesian context, where it is seen that disparity between the education level of a husband and wife is positively associated with fertility rate.

Tuman, Ayoub, and Roth-Johnson (2007), in their work in two Latin American nations, found that women's exposure to sex education has a clear negative effect on

[1] Recently many economists have also questioned the Q-Q approach (Banerjee & Duflo, 2011, p. 108).

[2] However, recently Banerjee and Duflo (2011) have shown the limitation of such indirect measures of controlling fertility.

fertility. Greater female educational attainment not only improves their self-reliance and self-confidence in various aspects of life that have a clear positive impact on fertility reduction, but also can enhance their knowledge about reproduction and contraceptives. Formal education along with sex education, if introduced in the early stage of education, particularly among females, has a definite impact on fertility rate.

Another empirical work, based on the Indian context, by Imai and Sato (2010), further strengthens the proposition of the negative association between education and fertility rate. They have pointed out that a preference for sons in Indian society greatly aggravates the fertility problem. Higher female education coupled with greater male literacy together can bring a downward trend in the fertility rate by reducing gender bias.

Contemporary analyses so far have shown an unambiguous negative association between education level and the reproduction rate. But there is a serious debate regarding the validity or uniqueness of this relationship among the researchers.

Soomro and Mahmood (2003), examining Pakistan's Census data, have argued that education and fertility exhibit a negative trend, but the rationale behind this association is much more complex than it originally looked. The family-planning program introduced by the government of Pakistan promoted the use of contraceptives much more among educated women than illiterate women. As a result, the impact of education on fertility may not reveal the actual situation, since a better target-oriented family planning program could reduce the fertility rate among the illiterate women and also offset the greater reliance on education.

By examining the world-wide trends in fertility rates, Basu (2002) explored the relationship between education and fertility in a larger dimension. Greater education or schooling of women creates some power or autonomy which helps them to take appropriate decisions regarding family planning. Higher female education increases the cost of raising children, and awareness of this issue has prevented educated women from having more children, which has effectively reduced the fertility rate in highly educated societies. The effect of increased education on declining mortality rates or rising aspirations of women has a clear indirect effect on fertility reduction (Basu, 2002).

In this entire debate it is very clearly noted that the diminishing trend of fertility in a society is a function of a host of socioeconomic, demographic, and cultural factors which act and react upon each other in a process that halts the cumulative progression of fertility. In this paper we are not trying to explore the role of one specific factor on fertility or reproduction, but rather examine the impact of all the possible issues or factors that have a direct or indirect effect on fertility or other related reproductive health factors. A major cause of the apparent paradox between education fertility relations is the emphasis on female education as the only determinant of reproductive health. Reproductive health decisions are always a family decision. The role of woman in such a decision making exercise depends on a lot of factors that cannot be determined in advance. Even an educated mother with all her good intentions may fail to influence the family's decision. However, a rise in overall awareness might help to tilt the family decision in her favor. The emphasis here should be on general awareness rather than just female awareness. Hence the overall educational parameters seem to be more important than just female-related educational parameters while assessing the nexus between education and reproductive health.

The relation between these two variables is mediated through economics. It is well documented by international data on per capita GDP (Gross Domestic Product) and infant mortality (Ray, 1998). However, the relation is far less clear for gender disparity (Sen, 2006). There is no monotonic relation between these two factors. In China, for example, substantial improvements in economic performance since the inception of economic reform have been associated with a sharp increase in gender disparity (Drèze & Sen, 1989). Again, Sen (2006) demonstrates that the fast-growing East Asian countries have a very dismal record with respect to child sex ratios, a reflection of sex selection bias at birth. In India also, in wealthier states such as Gujarat, Maharashtra, and Punjab (the state with the lowest recorded poverty) the child sex ratio is much below that of the poorer states of Bihar and Orissa. Even Kerala, the star performer in human development, is not doing very well in economic perspectives.

Again, the debate here is inconclusive (Murthi et al., 1995). There are a number of authors who argue that gender bias is less prevalent among poor households (Das Gupta, 1987; Krishnaji, 1987; Miller, 1981). The empirical findings may be justified on the grounds that poor families invest little in their children. Their so-called "neutrality" is motivated by their complete neglect in child care due to the pressure of appalling poverty. However, as the family income rises, the ugly face of gender discrimination begins to be seen. Agarwal (1986) argues the contrary. To her, less poverty reduces gender discrimination. The justification for this result is also obvious. Reduction of poverty reduces much of the heavy familial duties that a girl child has to perform. Moreover, a general improvement in the household income improves the food intake (both quantity and quality) of the girl child. In both ways, her survival is enhanced.

As argued by Murthi et al. (1995), the reason behind the confusion is the inability to locate the set of factors that are dominant in any particular situation. In such a situation, they suggest a multivariate analysis. They cite an earlier study by Kishor (1995), who also used census data for this purpose. However, use of census data seriously restricts the estimated model. From a census, we find information of end variables (such as child mortality and female bias). The more immediate variables are gauged from the behaviour of these end parameters. In our model we have tried to address this problem by incorporating more relevant choice-related variables.

3 Data Analysis and Information about Variables

3.1 Reproductive Health Variables

The District Level Household and Facility Survey (DLHS-3) is a nationwide survey covering 601 districts from 34 states and union territories of India. This is the third round of the district level household survey which was conducted between December 2007 and December 2008. The survey was funded by the Union Ministry of Health and Family Welfare, United Nations Population Fund (UNFPA) and United Nations Children's Fund (UNICEF).

The data was collected from 720,320 households from 34 states and union territories of India (excluding Nagaland). In these households, 643,944 married women aged 15-49 years and 166,260 unmarried women aged 15-24 years were interviewed. This report is based on the data collected from these women.

The DLHS-3 survey collected a wide array of information regarding reproductive health and the environments in which women live. It provides rich documentation of various aspects of the lives of married and unmarried women. It describes the environments in which they live, their family and educational backgrounds, and many other factors which influence a woman during her fertility period. It also collected information about their awareness regarding various health facilities related to the fertility period. The survey also includes data about the health infrastructure and the quality of health delivery that are so necessary for a woman and her child in order to safely pass to a healthy environment. The main goal of the NHRM (National Rural Health Mission) is to reduce the infant mortality rate (IMR) and maternal mortality rate (MMR) by promoting new bond care, immunization, antenatal care, institutional delivery, and post-partum care. DLHS- 3 survey is aimed at understanding the factors that determine these ends variables.

From this wide array of data we have selected only a few for our analysis. This selection is based mostly on the importance of the factors in reducing infant mortality and revealing the patterns of female discrimination.

The most important institutional parameter is the availability of a health clinic within three kilometers. Normally, it is an Indian custom to seek health facilities for pregnancy only at a very late stage. In such a case, the distance as well as the availability of services required are equally important.

This is an important factor that determines both IMR and MMR, but was thoroughly missed by earlier authors. Notably, this factor typically does not depend on the educational awareness of the population in some major way. Even a highly conscious mother or her family may fail to prevent the risk of still birth and/or physical or mental damages to the newborn when these facilities are missing. By incorporating them in our model, we sought to filter out the effect of these "education-neutral" variables in accessing the relationship between education and fertility decisions. However, this factor is not important of all types of fertility choices. For example, it has no bearing on the marriage age of females.

3.2 Socio-economic Variables

Another important factor is the poverty rate. The influence of poverty on reproductive health has created a lot of confusion, as argued earlier. However, in our case, this confusion should not arise.

The variables that we have selected for our study to capture reproductive health should have a direct negative correlation with poverty. This is because the variables we choose are unambiguously related to the families' economic conditions and their response to it. Unlike the earlier studies, the causation here is direct and there is no space for alternative formulations. Hence, we can steer ourselves out of the confusion that mars the standard exercise. Moreover our poverty estimate is direct, unlikely earlier studies.

The poverty estimate used by Murthi et al. (1995) is ad hoc. "The poverty indicator used here for each district is the Sen Index of rural poverty for the region in which the district is situated."

The DLHS survey gives us the proportion of people on the lowest wealth quintile at the district level. In order to construct the household wealth index, DLHS considers three aspects: household amenities, assets, and durables. Among the household amenities, the DLHS includes access to safe drinking water, sanitation facilities, fuel used for cooking, type of house, and per capita space in the house. The quality of housing is measured by the materials that are used in its construction -- concrete, sheet metal, straw, bamboo, etc.

Among the household assets, the DLHS includes fans, radios/transistors, sewing machine, televisions, telephones, motorcycles, and cars.

The wealth index is thus comprehensive and covers a wide array of possessions. There is wide a regional variation in the distribution of population according to the wealth index.

Further, we used several social features (such as the proportion of people belonging to Scheduled Castes and Scheduled Tribes, and the proportion of people living in urban areas). Lastly, the zonal dummies were used to capture the zone-specific effects.

4 The Empirical Model

To assess the impact of the socioeconomic variables on the demographic reproductive health factors, we first constructed the linear multiple regression model specified below:

$$Z_i = \beta_0 + X_j \delta_1 + e_i$$

Where Z_i is the dependent reproductive variables whose responsiveness with the vector of independent variables (X_j) is being verified separately by using a variable-specific regression model of the above-mentioned form.

The dependent variables that we have incorporated in our regression analysis are given below:

(1) Number of birth order 2 and above (BTH)
(2) Proportion of females married before legal age (MRG)
(3) Proportion of any modern methods of family planning (MOD)
(4) Proportion of institutional delivery (INS)
(5) Proportion of children 12-23 months who are fully immunized (IMMU)
(6) Proportion of mothers who have made at least three antenatal care visits during the last pregnancy (ANTE)

In order to estimate how these reproductive health issues are influenced by the various socioeconomic variables we have used the following independent variables in our regression analysis.

(1) Literacy (LIT)
(2) Wealth (WLTH)
(3) Social group (SC, ST)
(4) Urbanization (URB)
(5) Public health Centre (PHC)
(6) Regional dummies (DD, DW, DE)

The dependent variables concerning reproductive health are choice variables, except to some extent institutional birth and antenatal care visits. These factors may depend on the availability of institutions. All the others are more or less influenced by educational achievement coupled with other economic factors.

By analyzing the regression we try to determine whether the following relationships exist or not:

(1) Whether education reduces the birth rate, and whether education can improve the consciousness of the people in terms of realizing the importance of family planning, institutional delivery, the need for an antenatal visit to the doctor, or the necessity of immunization of the newly born babies.
(2) Whether poverty (explained by the wealth index) can have any desirable impact on the fertility choice decision.
(3) Whether urbanization can play any crucial role in determining the fertility behavior.
(4) Whether greater availability of the PHC has any impact on reproductive health issues.
(5) Whether zonal differences have any significant impact on describing the relationship between the variables.

There are several ways to tackle the problem. The baseline is obviously a multiple regression technique incorporating White heteroscedasticity-consistent estimates. These estimates are discussed in Table 1. However, as pointed out by numerous researchers, there are problems in using these simple methods. The relationship between education and fertility decisions are complex and are mitigated through a number of socio-economic constraints. Keeping in view these complexities, authors have routinely used the IV method in understanding the relationship. However, use of the IV method is seriously constrained by the choice of appropriate weights. The problem is multiplied in a cross-sectional analysis such as ours.

In its stead, we utilize a new method developed by Basu, Das, and Dutta (2010) (henceforth, BDD), an approach which offers several improvements over White's method. It utilizes the fact that within a cross-section, there are some region-specific effects that may affect the overall relation. The method filters out such systematic effects so as to make the relation between cross-section variables more succinct and clear. It is also better than the IV method, since no a priori weight has to be chosen. These results are depicted in Table 2.

5 Results and Discussion

Before discussing the regression techniques, we first present our basic data in Table 3. The table shows wide regional variation in the variables. In proportional terms, the Southern zone seems to have been a case apart from other zones. The North-South demarcation is well marked here. It is clear that there are region-specific systematic factors that have crucial effects. Thus the BDD technique seems to be appropriate here.

We first ran a step regression to choose our relevant variables. This procedure helped us to identify the factors that are of greater relevance for this study, and also

Table 1 Multiple Regression Results

Independent variables	Dependent variables					
	Proportion of births of order 2 and above	Proportion of population using any modern method of birth control	proportion of girls' marrying before completing 18 years	Proportion of institutional delivery	Proportion of children fully vaccinated	proportion of mothers having three antenatal care visits during pregnancy
			OLS-Step	$N = 601$		
Proportion of lowest wealth quintile	0.0966** (2.11)	-0.2473* (-4.767)	0.1084* (2.196)	-0.2541* (-3.793)	--	-0.1847* (-2.465)
% of SC population in the district	--	--	0.0774* (24.625)	-0.0679 (-2.922)	0.1026* (3.732)	--
% of ST population in the district	--	0.0869* (4.379)	--	-0.0996* (-4.341)	--	-0.0906* (-3.695)
LIT	-0.2542** (-3.580)	--	-0.8765* (-10.64)	0.4827* (4.678)	0.4829* (4.317)	0.4127* (3.530)
PHC	Not used	Not used	Not used	-0.1351* (-3.081)	-0.3881* (--7.011)	-0.2780* (-5.555)
Urbanisation	0.1119* (2.618)	-0.2916* -(5.066)	--	-0.2694* (-4.245)	0.3322* (-4.362)	-0.3211* (-4.566)
Northern dummy	0.0059 (0.1948)	0.0994* (2.488)	0.0032 (0.091)	0.2504* (5.577)	0.1694* (2.934)	0.2146* (4.248)
North Eastern dummy	-0.0008* (-2.652)	0.0015* (3.30)	0.0020 (0.5824)	0.007* (14.15)	0.0034* (5.971)	0.0077* (13.89)
Eastern districts dummy	0.59591* (5.751)	0.5829* (4.16)	0.3310* (2.847)	0.5067* (3.374)	0.7193* (3.703)	0.5049* (2.933)
Western dummy	0.0725 (1.245)	-0.1253** (-1.710)	-0.0273 (0.4543)	-0.1764** (-2.122)	-0.1094 (-1.034)	0.0275 (-2.883)
Constant	0.1431 (1.406)	0.00	0.4935* (4.221)	-0.2718** (1.869)	-0.2719 (1.480)	-0.2323 -1.395
Adjusted R^2	0.3117	0.4080	0.5811	0.6980	0.4205	0.6419

Note: *significant at 1% level; **significant at 5% level.

Table 2 A BDD Structure

	Dependent variables					
Independent variables	Proportion of births of order 2 and above	Proportion of population using any modern method of birth control	Proportion of girls' marrying before completing 18 years	Proportion of institutional delivery	Proportion of children fully vaccinated	Proportion of mothers having three antenatal care visits during pregnancy
			OLS-Step	$N = 601$		
Proportion of lowest wealth quintile	0.4104* (9.921)	-0.1790 (-4.064)	0.3967* (11.96)	-0.4216* (-7.185)	-0.1520* (-2.664)	-3015* (-5.303)
% of SC population in the district	0.7799* (10.02)	1.060* (12.80)	0.4655* (8.374)	0.6385* (5.651)	0.5206* (4.639)	0.4201* (3.837)
% of ST population in the district	0.1502* (5.49)	0.2612* (8.972)	--	0.1885* (3.127)	0.1391* (3.698)	0.1622* (4.419)
LIT	0.3069* (12.39)	0.2215* (8.402)	-0.6155* (-3.248)	0.1989* (5.155)	0.2448* (6.402)	0.2997* (8.016)
PHC	--	--	--	0.3424 (8.799)	0.3653* (9.459)	0.3875* (10.28)
Urbanisation	--	--	--	0.2811* (3.737)	--	0.1728** (2.372)
Northern dummy	-0.5992** (-2.463)	-0.0935* (-3.611)	-0.0042 (-0.215)	-0.1612* (-4.809)	-0.0661** (-1.986)	-0.2328* (-7.167)
North Eastern dummy	-0.0356 (-1.024)	-0.0651* (-1.760)	-0.018 (-0.633)	-0.0755 (-1.568)	-0.1447* (-3.023)	-0.1389* (-2.975)
Eastern districts dummy	-0.935* (-3.53)	-0.1846* (-6.560)	-0.0201 (0.94)	-0.1648* (-4.502)	-0.1341* (-3.689)	-0.2572* (-7.251)
Western dummy	-0.0896* (-3.340)	-0.0948* (-3.321)	-0.031 (-1.425)	-0.1422* (-3.786)	-0.11 (-2.949)	-0.2272* (-6.241)
Constant	0.0947* (4.705)	0.1222* (5.705)	0.0408 (2.49)	0.1219 (4.321)	0.0781* (2.791)	0.1521 (5.565)
Adjusted R^2	0.4898	0.4228	0.3635	0.4375	0.4312	0.5258

Note: *significant at 1% level; **significant at 5% level.

Table 3 Descriptive Statistics

Zone district	Proportion of total literate population (Age 7+)	Proportion of lowest wealth quintile	Proportion of girls' marrying before completing 18 years	Proportion of births of order 2 and above	Proportion of any modern method	Proportion of mothers who had at least 3 antenatal care visits during the last pregnancy	Proportion of institutional births	Proportion of children (12-23 months) fully immunized	Proportion of children breast fed within one hour of birth	Proportion of villages having a sub-centre within 3 km	Proportion of PHC functioning on 24 hours
Northern zone											
Mean	0.70	0.16	0.22	0.65	0.47	0.41	0.42	0.53	0.33	0.74	0.46
SD	0.10	0.17	0.18	0.12	0.18	0.22	0.18	0.22	0.20	0.13	0.30
North-Eastern zone											
Mean	0.81	0.13	0.11	0.61	0.40	0.53	0.46	0.37	0.56	0.60	0.53
SD	0.07	0.13	0.07	0.10	0.17	0.17	0.19	0.23	0.19	0.23	0.37
Eastern zone											
Mean	0.67	0.33	0.33	0.65	0.36	0.43	0.36	0.56	0.43	0.77	0.59
SD	0.12	0.19	0.16	0.10	0.11	0.18	0.17	0.18	0.24	0.14	0.27
Western zone											
Mean	0.69	0.20	0.22	0.61	0.57	0.55	0.52	0.54	0.48	0.61	0.67
SD	0.10	0.16	0.12	0.08	0.09	0.22	0.21	0.21	0.11	0.12	0.24
Southern zone											
Mean	0.75	0.07	0.16	0.57	0.61	0.90	0.84	0.77	0.60	0.70	0.43
SD	0.14	0.07	0.13	0.09	0.09	0.10	0.17	0.14	0.16	0.27	0.26

decreases the impact of multicollinearity. Our results are summarized in Table 1 and Table 2.

Several features are imminently clear from the study. First, poverty is negatively correlated with the desirable features of fertility choice decision (MOD, INS, IMMUN, and ANTE) and positively with the undesirable ones (BTH, MRG). A greater access to resources increases the awareness of the family members in terms of reproductive health issues. For example, reduction of poverty increases the consumption of luxury goods such as TVs, radios, computers with internet facilities, etc., all of which increases exposure to the mass media. This increases knowledge about the reproductive system and increases awareness regarding family planning, particularly in the developing world (Ramesh, Gulati, & Retherford, 1996; Westoff, 1999; Westoff & Bankole, 1999). This effect may be stronger than the education effect on fertility, though the measurement issue is quite complex (Basu, 2002). Our result in this matter further strengthens this proposition and has strongly pointed out the importance of wealth on making fertility decisions among the households.

The importance of education to the reproductive health system was also found in the regression analysis. Greater educational opportunities have an indirect negative impact on premature female marriage and positively influence all the desirable fertility choice variables, such as use of modern contraceptive, greater proportion of institutional delivery, higher proportion of antenatal care visits to hospitals, and greater immunization of newly born babies. This feature of education in terms of giving better health consciousness or improved awareness regarding family planning decisions clearly demonstrates the key role of education in improving fertility conditions in a society.

In the regression other exogenous variables such as social group, urbanization, and availability of PHCs had an ambiguous or mixed relationship with the reproductive variables. For example, from the regression results given in Table 1 it is observed that birth rates are higher in the SC community. This may be the outcome of early marriage of the girls in this group. Surprisingly, this phenomenon is quite rare among the STs, and from our regression result (given in Table 1) it is seen that early marriage is not prevalent among the STs. One most encouraging feature that is coming out from this regression analysis is that the government initiative to promote modern methods of family planning has made some inroads in the SC and ST communities. But this hasn't had much impact on the final desirable outcome of fertility reduction, simply because of poverty and lack of awareness in major health related issues. The importance of antenatal care during pregnancy periods is negligible among the SCs, which strengthens the proposition that lack of awareness prevents desirable outcomes in fertility matters amongst people in the lower sectors of society.

The role of urbanization and the availability of PHCs have failed to have any significant impact on reproductive health, except in increasing institutional delivery and the antenatal care visits. The effect of urbanization is positively related to both of these variables, while institutional delivery and antenatal visits do not depend on the availability of nearby PHCs. Again, all the zonal dummies are more or less significant, indicating that zonal differences persist in various reproductive health matters.

6 Concluding Remarks

There has been a worldwide debate about the association between education and fertility transition. In fact, it is a well accepted view that education can have a serious impact on fertility decisions, but the magnitude and/or direction of this association is questionable. Any other demographic or economic factors collectively or independently of education can create a bigger role in the achievement of desirable reproductive decisions among families. In this paper we try to examine the impact of various social factors along with educational attainability on the fertility decisions of households in the Indian context. We conclude that each and every factor that we have incorporated in our analysis has a sizable impact on different reproductive issues to some extent.

This analysis has raised some important policy prescriptions for the government. Firstly, the impact of poverty (as measured by the variable "proportion of lowest wealth quintile") on the fertility choice variables are imminent in our study. Poor people are generally less eager to take fertility control decisions than others. This clearly calls for a more target-oriented poverty alleviation program for the improvement of the socially deprived sections of the population. Secondly, the fertility choice decisions are less favorable in the relatively backward areas (such as the rural areas) where knowledge about modern birth control measures is limited and/or the information regarding the prospective benefits of lower fertility is weak. Thus, awareness relating to health-related issues should be improved, and for this purpose the mass media should come forward more deliberately than before. Thirdly, literacy rate comes as a dominant factor in fertility choice decisions. Hence, government expenditure on education should be increased and education policies of the government should be more specific so that a greater educational impact across the nation over all sections of the population can ultimately solve the problems of reproduction. If these initiatives are taken by the government, then in the long run increases in human capital due to increased educational facilities,

coupled with downward fertility pressure as a result of improved consciousness regarding health-related issues, can sustain steady and balanced growth in the future.

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