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9 July 2012

Online at <https://mpra.ub.uni-muenchen.de/39951/>  
MPRA Paper No. 39951, posted 09 Jul 2012 12:17 UTC

**Proximate illiteracy and modern contraceptive use in India**  
**Analysis of DHS data**

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**ACKNOWLEDGEMENT**

This paper was presented in the European Population Conference 2012 at Stockholm University (13-16 June 2012) and at Institute of Economic Growth, Delhi (4 May 2012). The authors would like to express their gratitude to Nisha Malhotra and Pushkar Maitra for their comments. We are also grateful to Sriparna Ghosh who assisted us in an early version of this paper. The usual disclaimer applies.

**Proximate illiteracy and modern contraceptive use in India**  
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*This paper examines the hypothesis that contraceptive use of illiterate women having literate partners (proximate literates), may be higher than that of illiterate women whose partners too are illiterates (isolate illiterates) using Demographic Health Survey data for India (2005-2006). Results reveal that the proximate illiteracy effect is significant, though restricted to specific groups; it varies according to contraceptive method; increasing the partner's education level does not increase strength of the externality effect; literacy of other female household members does not matter; and accounting for self selection into marriage increases strength of externality effect.*

## Proximate illiteracy and modern contraceptive use in India

### Analysis of DHS data

#### 1. INTRODUCTION

Family planning methods refer to methods used to attain the desired number of children and ensure the desired timing of conceptions and spacing between births. Such methods may be classified into three categories, depending upon their actual, theoretical and assumed reliability. *Folkloric methods* consist of locally described or spiritual methods believed popularly to reduce fertility, but of unproven effectiveness. Such methods consist of herbs, amulets, gris-gris, etc. *Traditional methods* consist of fertility preventing methods of proven effectiveness, like rhythm (or calendar) and withdrawal (*coitus interruptus*) methods. Although theoretically effective, the actual effectiveness of such methods depends upon the skill and knowledge of the users – so that they may not be very reliable in practice. *Modern contraceptive methods* include all hormonal methods (i.e., the pill, injectibles and implants), IUDs, male and female sterilization, condoms and modern vaginal methods (e.g., the diaphragm and spermicides). The literature on family planning considers only modern contraceptives to constitute ‘effective’ or ‘reliable’ methods of family planning (Zachariah et al., 1994; Oddens, 1997).

Despite the emphasis placed on providing safe family planning methods in the International Conference on Population and Development (ICPD), held in Cairo in 1994, there still exists a high unmet need for modern contraceptives.<sup>1</sup> A recent study estimates that round 215 million women in the developing world as a whole have an unmet need for modern contraceptives (Singh et al., 2009). Unmet demand is particularly high in developing countries, and among women with low levels of education. For instance, Demographic Health Survey data for India (2005-06) reveals that 52 per cent of illiterate women do not use any contraceptive method, while about a third of illiterate fecund women not wanting a child do not use any contraceptive method. Given that such women are mainly from low income households and have limited access to health care services, they comprise a particularly vulnerable section of the community.

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<sup>1</sup> Unmet demand for (modern) contraceptives refer to women who want to avoid pregnancy but are not using a (modern) contraceptive method.

Ensuring the reproductive health of illiterate female population requires massive investment of financial and administrative resources, given the size of this population.<sup>2</sup>

Further, there are socio cultural barriers that have to be faced in developing countries when implementing programmes seeking to educate women, or in increasing their autonomy with respect to reproductive choices. The latter type of barriers primarily stem from the asymmetric nature of relationship between partners within the dyad making reproductive (in this case, contraceptive) choice. As researchers point out, though it is the women who implement decisions relating to adoption of contraceptives men often have a significant influence on wife's attitude towards using contraceptives (Chapagain, 2005; Gubhaju, 2009),<sup>3</sup> with educated males being more likely to encourage partners to use contraceptives (Grady, 1996; Wilkinson, 1997; Wegner et al., 1998). Results of a multivariate analysis, undertaken for Nepal using three waves of DHS data, shows that a male partner with primary education is 25 per cent more likely to allow his wife to adopt contraceptives than an illiterate male (Gubhaju, 2009).<sup>4</sup>

In this context the concept of proximate illiteracy (Basu and Foster, 1998) assumes significance. The concept of proximate illiteracy is based on the existence of positive externalities generated by education at the micro level (Sen, 1985; Walker & Unterhalter, 2007). A potentially important form of such externalities from education is the benefit derived by an illiterate person from a literate family member. Basu and Foster (1998) argue that an illiterate person's ability to transform various kinds of informational inputs into 'functionings' (Sen, 1985) is linked to the

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<sup>2</sup> Illiterate women aged 7 years and above in India number 193.48 million according to the 2001 Census estimates. Recently released provisional figures reveal that this figure has risen to 272.95 million in 2011.

<sup>3</sup> Not infrequently, opposition from the male partner has been found to thwart aspirations of the female to use family planning methods (Speizer et al., 2005). Such opposition may arise because of the apprehension that allowing women freedom to make reproductive decisions will: [a] erodes the authority of the male partner within the family, [b] encourage the wife to be unfaithful, or [c] loose face within the community. It is also pointed out that even if contraceptive use is approved in theory, it may be disapproved in practice (Blanc, 2001) – reflected in the refusal to use male condoms. In some instances, women have been documented to have made covert use of contraceptives; this exposes women to violence if found out by their male partners.

<sup>4</sup> A study for Vietnam (Dang, 1995) shows, in fact, that education of male partners is more important than that education of women with respect to adoption of family planning methods.

literacy status of the household to which the person belongs.<sup>5</sup> This implies that even though an illiterate person is poorly placed in the matter of availing himself of useful information, those illiterate person who have literate family members (referred to as ‘proximate illiterate’), may be able to avail such information and attain a superior outcome compared to other illiterate persons whose family members are also not educated (‘isolate illiterates’). Empirical studies reveal that such externalities from literacy may improve health and labour outcomes substantially (Gibson, 2001; Basu et al, 2002).

In this paper we test for the importance of intra household externality from literacy with regard to the adoption of modern family planning methods. Proximate illiteracy implies that illiterate women are more likely to adopt modern contraceptive methods if they have access to a literate person in the household (specifically the husband, the principal decision maker with respect to choice of family planning method), thereby attaining a family planning outcome superior to that of isolate illiterates. After examining this hypothesis, we extend our line of enquiry as follows:

- a) Since illiteracy is a very broad concept (covering people who can barely read and write to those who are graduates or have even higher levels of education), an interesting question is whether increasing the level of education of the partner increases the externality effect substantially. That is, instead of comparing between illiterate women with literate and illiterate partners, if we compare between illiterate women with partners having primary or secondary education levels, and illiterate women having partners with correspondingly lower levels of education, will the difference in contraceptive usage levels increase, remain same or decrease? This is important in determining the critical level of education at which the externality effect is maximized.

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<sup>5</sup> Basu et al. (2000) identifies several contexts in which such intra-household externality may arise:

‘The government circulates an order intimating the availability of social assistance to physically handicapped people, widows and accident victims. Agricultural extension workers disseminate printed information on new technology relating to irrigation, and high-yielding crop varieties. Leaflets are distributed by a non-govern-mental voluntary agency advising rural people of their specific rights to information. The village moneylender doctors the statements of his borrowers' liabilities to his own advantage. The public health office puts out a simple printed bulletin on the advantages of oral rehydration.’ (pp. 35)

- b) Contraceptive methods are also not homogenous, but vary with respect to several parameters. For instance, the implication of sterilization, which is a permanent birth control method, is quite different from the implications of using condoms. Hence, we divide the sub sample into three groups - those using condoms, those who have undergone sterilization and those using other methods – and examined the strength of the proximate illiteracy effect for each of these groups.
- c) Thirdly, it should be pointed out the proximate illiteracy effect that we have measured so far is not a pure effect stemming from the possession of human capital within the family. Allowing the externalities from education to dissipate freely among all household members has benefits for the household *as a whole*, but may adversely affect some members (particularly those who were initially dominant). The reason is that previously subjugated family members, empowered by the externality from literacy, may demand a greater share in the intra household allocation of resources. This provides an incentive to constrain the free dissipation of the proximate illiteracy effect (Basu et al, 2002; Maddox, 2007). So, what we have measured is: Gross (pure) effect of human capital after adjusting for barriers and constraints to the dissemination of externalities. In the last section of our work, we will try to disentangle the two effects and provide a rough estimate of the pure or gross proximate illiteracy effect.
- d) Finally, we consider the fact that there may be selection into marriage. In other words, women possessing some other characteristics may have a better chance of getting married to a proximate illiterate. Such women may also be more (less) receptive to the beneficial externalities stemming from partner's literacy. This will lead to an over(under)estimation of the proximate illiteracy effect.

The paper is structured as follows. After describing the data source and methodology employed in this paper, we state the findings of the econometric analysis of the impact of proximate illiteracy on adoption of modern contraceptives. The findings of the all India sample (Total, Rural and Urban) are reported initially. This is followed by a discussion of results of extensions to the basic model. The concluding section brings out some points of interest for policy makers.

## **2. DATABASE AND METHODOLOGY**

## 2.1 Conceptual framework

Following Basu and Foster (1998) the conceptual framework underlying the concept of proximate illiteracy is explained below.

Consider a country with  $n$  adults and  $m$  households. Each household has a household literacy profile,  $x^h$ , indicating each member's literacy level. So, if  $x_j^h = 1$ ,  $x_j^h$  person is literate, while if  $x_j^h = 0$  implies that  $x_j^h$  person is illiterate. Basu and Foster (1998) uses the term *society* to refer to the vector of household literacy profiles  $X = (x^1, x^2, \dots, x^m)$ . The vector  $X$  contains information on the household structure as well as the literacy level in the country. For instance,  $X = [(0,1) (1,0,0)]$  is a society with two households having two and three members each. Further, each household has one literate member. Now the standard approach to literacy is to ignore the household structure and concatenate the household vectors in  $X$ . For instance, in our example  $X = [(0,1) (1,0,0)]$  the literacy profile is:  $x^0 = (0,1,1,0,0)$ . The standard measure of literacy is given by proportion of literate members. Mathematically,

$$L(X) = \sum_i x_i^0 / n_x, \quad [1]$$

when  $\sum_i x_i^0 = \#\{i | x_i^0 = 1\}$ .

Now, let us assume that having a literate member in the household generates  $\alpha$  benefits ( $0 < \theta < 1$ ) to remaining (illiterate) members of the same household. Then the *effective* literacy profile of household  $h$  is given by:

$$\overline{x}_j^h = \begin{cases} 1 & \text{if } x_j^h = 1 \\ \theta & \text{if } x_j^h = 0, \text{ and } x_k^h = 1 \text{ for some } k \neq j \\ 0 & \text{if } x_k^h = 0 \text{ for every } k \end{cases} \quad [2]$$

The overall *effective* literacy profile, denoted by  $x^*$ , is the literacy profile obtained from the resulting vector of *effective* household profiles. So for the vector  $X = [(0,1) (1,0,0) (0,0)]$ ,  $x^* = (\theta, 1, 1, \theta, \theta, 0, 0)$ . The transformation leaves every literate member and each isolated illiterate unchanged, but assigns  $\theta$ , instead of 0, to proximate illiterates. The measure of *effective* literacy is then defined by:

$$L^*(X) = \sum_i x_i^* / n_x. \quad [3]$$

## 2.2 Methodology

The hypothesis of this paper is that proximate illiteracy effect exists. Statistically we want to test the null hypothesis  $\theta > 0$ , against the alternative hypothesis  $\theta \neq 0$ . In the present context, this implies:

Illiterate respondents with literate partners are more likely to adopt contraceptive methods than illiterate women with illiterate partners.

To test this hypothesis, we initially regress the decision to use modern contraceptives on a dummy representing proximate illiteracy (which takes the value of 1 for proximate illiterates and is 0 for isolates).

$$MCUSE = \alpha + \beta \text{ PLEFFECT} + u_i \quad [4]$$

when:

MCUSE = 1 if respondent uses modern contraception; = 0 else;

PLEFFECT = 1 if partner is illiterate; = 0 else;

and  $u_i$  is error term.

This model is estimated for the all India sample (Total, Rural and Urban). Subsequently, the reduced form model is supplemented by including demographic, socio cultural and economic characteristics, measures of autonomy and institutional features as control variables. The regression equation is:

$$MCUSE = \alpha + \beta_1 \text{ PLEFFECT} + \delta \text{ Control Variables} + u_i \quad [5]$$

when the control variables are:

(a) Continuous variables:

- V512 = Marital duration;
- V012 = Age of respondent; SV012 = Square of age;
- V730 = Age of partner;
- SLINFHS = Standard of Living index;
- RATIO = Ratio of living sons to living children;
- LCHILD = Number of living children;

(b) Categorical variables:

- NORTH = Dummy for respondent residing in North India; EAST = Dummy for respondent residing in East India; WEST = Dummy for respondent residing in West India; SOUTH = Dummy for respondent residing in South India (Reference category: CENTRAL);
- RURAL = Dummy for rural residents (Reference category: Urban residents);
- HSC: Dummy for Hindu-Scheduled Caste; HST: Dummy for Hindu-Scheduled Tribe; HGEN: Dummy for Hindu Forward Castes; OSRC: Dummy for Other socio religious communities (Reference category: Muslims)
- FCHILD: Last child was female; NOCHILD: Childless (Reference category: Male child)
- EMP = Dummy for working respondent (Reference category: Not working);
- PWCJ = Dummy for partner working in white collar jobs; PSALES = Dummy for partner working in sales job; PSERVICE = Dummy for partner working in services; PAOTHER = Dummy for partner working in other jobs (Reference category: Manual labourer);
- RV602: Dummy for wanting another child (Reference category: Infecund/Sterilized/Does not want another child);
- V384A: Dummy for having heard family planning on radio;
- V384B: Dummy for having heard family planning on television;
- HOSP: Dummy indicating that last child was delivered institutionally
- HFALONE = Dummy for respondent visiting health facility by herself;
- VALONE = Dummy for taking decision to visit relatives home alone.

Two points should be noted at this junction. Although respondents may have used traditional or folkloric methods, we have clubbed such women with those not using any contraceptive methods. There are two reasons for clubbing users of folkloric methods with non users. Firstly, the proportion of women using folkloric methods is insignificant (0.53 percent), and secondly because such methods are not effective. Traditional contraceptive methods, on the other hand, are used by 6.2 percent of the sample. This is quite large. Moreover, Alka Basu (2005) has argued that such methods may be effectively used by the urban elite to control fertility levels more effectively than the modern methods. However, use of methods like rhythm and withdrawal requires skill and knowledge from the male partner. Illiterate women and their partners are unlikely to possess the level of knowledge or skill to use traditional methods

effectively.<sup>6</sup> This justifies the clubbing of women using traditional and folkloric methods with those not using any methods at all. Since the dependent variable is binary (the respondent either uses a modern contraceptive, or does not), the appropriate regression model is a logit (or a probit) model.

Another point to be noted is that we have considered literacy level of only the partner. This is in contrast to empirical work on proximate illiteracy (Gibson, 2001; Basu et al., 2002; Iverson & Palmer-Jones, 2008) which defines proximate illiteracy in terms of *any* household member. We depart from the standard practice as choice of contraceptive method is a private decision taken *within* the dyad. This is also justified by facts. DHS data for India, for instance, reveals that in only 0.5 percent cases does someone outside the dyad take the decision; in general the decision is made jointly (82 percent), by the partner (6 percent) or by respondent (11 percent).

### 2.3 Data Source

The study is based on unit level Demographic Health Survey (DHS) data collected in a national level survey from November 2005 to August 2006. This survey is the third in a series of national surveys.<sup>7</sup> It was conducted under the stewardship of the Ministry of Health and Family Welfare, Government of India, with the International Institute for Population Sciences, Mumbai, serving as the nodal agency. DHS (or National Family Health Survey, NFHS, as this database is also called in India) is a household survey providing estimates of indicators of population, health, and nutrition by background characteristics at the national and state levels. Information was collected based on individual interviews. A nationally representative sample of 109,041 households, 124,385 women aged 15-49 years and 74,369 men aged 15-54 years – covering 99 per cent of the population in 29 states - were interviewed. The sample was drawn using a multi stage stratified sampling method (IIPS & Macro International, 2006: 11-13).

The Individual file (IAIR51FL) is used for analysis. Out of the sample of 124,385 women, 39,769 illiterate women (constituting 32 per cent of the sample) were selected. Information on education level of partner is recoded to classify women as having either illiterate or literate

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<sup>6</sup> More than two third of the sample do not have any knowledge of the ovulatory cycle,

<sup>7</sup> Earlier DHS surveys were carried out in 1992-93 (NFHS-1) and 1998-99 (NFHS-2).

partners. About 54 per cent of these women had literate partners; corresponding figure for rural and urban areas are 51 and 61 per cent, respectively. This variable captures the impact of proximate illiteracy.<sup>8</sup>

### 3. DOES PROXIMATE ILLITERACY MATTER?

#### 3.1 Results of reduced form equations

Our research hypothesis is that CPR is higher among proximate illiterates, compared to CPR among isolate illiterates. To test this hypothesis we regress current contraceptive use on a dummy indicating whether the respondent's partner is literate (PLEFFECT). Results of this reduced form model, presented in Table 1, indicate that the proximate illiteracy effect exists and is statistically significant.

**Table 1: Results of reduced form model of proximate illiteracy**

Sample	NPLEFFECT	Z	N	$\chi^2$	Pseudo-R <sup>2</sup>
India	1.21	8.46***	31943	71.60	0.0016
India – Urban	1.23	4.75***	8801	22.55	0.0019
India - Rural	1.16	5.54***	23142	30.76	0.0010

*Note: \*\*\* denotes significance at 1% level.*

#### 3.2 Introducing control variables

In this section, we introduce control variables. The value of  $\chi^2$  is greater than the tabulated value in all instances, indicating that the null hypothesis (all elements of the coefficient vector are equal to zero) is rejected at 1% level. The goodness of fit (given by the McFadden pseudo R<sup>2</sup>) varies between 0.21 (Urban) to 0.26 (Rural). This is quite satisfactory given that cross section samples contain a great deal of unobserved heterogeneity.

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<sup>8</sup> Although proximate literacy normally considers whether any member of the family is literate or not, in the case of contraceptive use we consider only whether the partner is literate or not. The reason is that contraceptive use is essentially a private decision made by the partners. DHS data reveals that only 0.5 per cent cases does any one other than the respondent or her partner have any influence on the decision to use contraceptive use.

**Table 2: Results of Logit Model for All India – Total, Rural & Urban**

MCUSE	All India		India-Urban		India-Rural	
	Odds Ratio	z	Odds Ratio	z	Odds Ratio	z
PLEFFECT	1.11	3.05***	1.11	1.58	1.11	2.51***
NORTH	1.76	12.32***	1.31	3.35***	2.09	12.91***
EAST	0.99	-0.25	0.78	-2.87***	1.13	2.02**
WEST	2.68	15.75***	1.99	6.92***	3.17	14.10***
SOUTH	3.41	17.17***	3.20	10.65***	3.34	12.51***
RURAL	0.81	-4.72***				
V512	1.05	8.21***	1.05	4.34***	1.05	7.35***
V012	1.21	9.05***	1.17	4.27***	1.22	7.77***
SV012	1.00	-10.95***	1.00	-5.65***	1.00	-9.26***
V730	0.98	-4.82***	0.99	-1.7*	0.98	-4.67***
LCHILD	0.89	-9.92***	0.96	-1.88*	0.85	-10.76***
RATIO	1.75	7.71***	1.76	4.57***	1.73	6.12***
NOCHILD	0.10	-12.08***	0.08	-6.97***	0.10	-9.85***
FCHILD	0.94	-1.64*	0.95	-0.79	0.94	-1.28
RV602	0.06	-36.09***	0.09	-19.46***	0.05	-29.86***
HSC	1.78	9.89***	1.42	4.00***	2.40	10.74***
HST	1.87	9.09***	1.34	1.72*	2.44	10.39***
HGEN	1.80	11.57***	1.41	4.59***	2.43	12.32***
OSRC	1.15	1.84*	1.07	0.47	1.43	3.74***
V384A	0.99	-0.29	0.92	-1.19	1.06	1.07
V384B	1.54	10.26***	1.55	6.77***	1.50	7.22***
SSLINFHS	1.02	5.68***	1.03	4.39***	1.02	3.87***
EMP	1.30	7.20***	1.35	4.59***	1.30	5.83***
PAOTHER	1.02	0.58	0.86	-1.53	1.04	0.76
PWCJ	0.98	-0.26	1.02	0.21	0.96	-0.42
PSALES	1.04	0.59	1.07	0.85	0.98	-0.20
PSERVICE	0.97	-0.40	0.94	-0.59	1.05	0.44
HOSP	1.08	0.94	1.11	0.93	1.03	0.29
HFALONE	1.12	3.25***	1.18	2.56***	1.10	2.28**

MCUSE	All India		India-Urban		India-Rural	
	Odds Ratio	z	Odds Ratio	z	Odds Ratio	z
VALONE	0.95	-1.06	0.90	-1.17	0.97	-0.46
N	20388		6494		13894	
$\chi^2$	6874.11	0.00	1842.46	0.00	4919.07	0.00
Pseudo-R <sup>2</sup>	0.24		0.21		0.26	

Note: \*\*\* denotes significance at 1% level, \*\* at 5% level and \* at 10% level.

The odd ratio of PLEFECT is value is greater than unity and is statistically significant at 1% level for both the Total and Rural sample. This implies that proximate illiterates are more likely to use contraceptives than isolate illiterates. Further, the difference in contraceptive prevalence rates between isolates and proximates is 11 percent for the all-India sample. The latter holds for rural areas also, which is quite high. In urban areas, however, PLEFECT is not significant even at 10% level. A possible reason why the impact of proximate illiteracy is not significant in urban areas is that illiterate women with illiterate partners are not really “isolates” – they have access to information through networks created during employment, greater access to public media, and other sources of information (Madhavan et al., 2003).

Most of the demographic control variables are statistically significant. Respondents living in North, and particularly in West and South India are significantly more likely to use modern contraceptives than respondents from Central India. The latter may be a reflection of the regional variation in empowerment observed by Dyson and Moore (1983). This variation is also observed in rural India. While women from East India are less likely to use contraceptives than Central Indian women in rural areas, the situation reverses in urban India. Prevalence of CPR among rural respondents is expectedly lower than that in urban areas.

Odd ratio of marital duration and age of respondent is statistically significant at 1% level and greater than unity, indicating a positive relationship with contraceptive use. Now Iverson and Palmer-Jones (2008) had argued that the effect of proximate illiteracy will become stronger for older respondents or for women married for a longer period, as time eases communication flows between partners. While results apparently support this hypothesis, they should be treated with caution as contraceptive demand is guided by biological processes. Another implication of the

link between demand for contraceptive and biological processes is that need for contraceptive gets reduced as the women becomes older,<sup>9</sup> so that the relationship between age and contraceptive demand is expected to be non linear (Reddy, 1984). The coefficient of the square of age is expectedly negative and significant at 1% level. Contraceptive use and partner's age is also found to be negatively related.

Odd ratios for number of living children is found to be less than unity and statistically significant at 1% level. Greater proportion of sons among children removes resistance to adoption of birth control techniques. This is consistent with the strong son preference observed in India (Arnold, 2001; Jayaraman et al. 2009; Dutta & Husain, 2011). Although respondents whose last child was a female child are also found to be less likely to use modern contraceptives than women whose last birth is male, coefficients are not statistically significant except at the all India level.<sup>10</sup> Predictably, childless respondents have OR less than unity which are all significant at 1% level. Fertility preference (desire for an additional child) is also found to substantially and significantly reduce demand for contraceptives.

In line with other works (James & Nair, 2005; Alagarajan & Kulkarni, 2008) Muslims are found to have a lower CPR than all other socio religious communities. This may be observed for rural and urban areas. The group OSRC has a higher contraceptive prevalence rate than Muslims in the all India and urban samples; in rural areas, the difference is not statistically significant.

Public media is found to be an important substitute for partner's education. Respondents who watch TV are more likely to adopt contraceptives. In contrast, the influence of radio has dwindled.

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<sup>9</sup> Two processes are important in reducing demand for contraceptives among older women - sexual activity will decline, and her reproductive period will terminate, with the onset of menopause (Dutta and Husain, 2011).

<sup>10</sup> This results is somewhat surprising in view of the benefits of having sons, vis-à-vis daughters, identified in the literature on family economics – having sons enable parents to retain property (particularly land) within the same lineage, obtain inter-generational insurance for their old age, ensure that their last rites are performed, etc. The results may be explained by the observation that parents (mainly from the Hindu community) are found to desire at least one girl because of social duty like *kanya dan* (selflessly giving away a daughter in marriage) (Arnold 2001; Dutta & Husain, 2011).

Economic status of the respondent also determines probability of adopting contraceptives. Probability of adopting family control methods increases with standard of living. Participation of the respondent in economic activities is also important. One reason may be the opportunity costs of pregnancy increases. Increasing autonomy may be another factor. Results confirm this expectation. Surprisingly, contraceptive use does not vary significantly over partners' occupational category.

The institutional variable, dummy for place of birth, reveal that women whose last birth was in a private or public health facility is more likely to use contraceptives. However, the odd ratios are not statistically significant. Of the two variables capturing autonomy, only HFALONE (whether respondent visits health facilities by herself) is found to encourage contraceptive usage significantly.

#### 4. EXTENSIONS OF BASIC MODEL

##### 4.1 Analysis at disaggregate level

The sample characteristics and results of bivariate analysis (reported in Appendix Tables A and A2) indicate that there may be an association between the proportion of proximate illiterates and contraceptive use for some control groups. For instance, Muslims have both a lower share of proximate illiterates and lower level of CPR. This indicates the possible presence of an unobserved variable that may be creating a spurious relationship for the aggregate sample. To eliminate the effect of this omitted variable, we divide the sample of illiterate women by several criteria, and tested for the presence of proximate illiteracy for each of the sub samples. The alternative criteria used are: geographical zone, socio religious groups, employment status of respondent, partner's occupation, standard of living index<sup>11</sup> and gender of last child. Although we have regressed current contraceptive use on all remaining control variables used earlier, we state only the coefficient and t statistic of PLEFFECT, along with model statistics, in Table 3.

**Table 3: Results of Logit Model by Selected Groups – All India level**

Correlate	Sub Group	Odds Ratio	Z	N	Chi <sup>2</sup>	Pseudo R <sup>2</sup>
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<sup>11</sup>Based on scores, five quintile categories were formed.

Geographical Zones	North	1.27	3.05***	4383	1269.13	0.21
	East	1.08	1.02	4021	886.02	0.17
	West	1.15	1.1	2087	780.26	0.30
	South	1.20	1.18	1706	582.63	0.32
	Central	1.08	1.44	8089	2474.03	0.22
Marital duration (in years)	0-4	1.30	1.21	1603	190.02	0.19
	5-9	1.23	2.03**	2889	1048.46	0.29
	10-14	1.10	1.11	3497	1224.47	0.25
	15-19	0.99	-0.06	3985	1128.68	0.21
	20-24	1.15	1.72*	3770	856.14	0.17
	25-29	1.11	1.2	3090	596.97	0.14
	30+	1.18	1.38	1520	215.18	0.10
Age of respondent (in years)	15-19	1.28	0.65	747	82.35	0.24
	20-24	1.34	2.24**	2242	692.59	0.28
	25-29	1.12	1.3	3391	1279.89	0.27
	30-34	1.15	1.62	3872	1290.17	0.24
	35-39	1.06	0.72	4099	1027.84	0.19
	40-44	1.13	1.43	3317	664.80	0.15
	45-49	1.06	0.62	2643	393.80	0.11
Standard of living	Bottom 20%	1.34	3.80***	4497	1715.85	0.28
	Next 20%	1.01	0.2	4861	1645.92	0.25
	Middle 20%	0.98	-0.23	2944	971.27	0.24
	Rich 20%	1.03	0.32	4316	1430.98	0.24
	Richest 20%	1.29	2.76**	3770	905.26	0.18
Socio-religious community	Muslim	1.04	0.45	3217	779.07	0.18
	Hindu SC	1.10	1.23	3821	1315.28	0.25
	Hindu ST	1.13	1.16	2461	1045.62	0.31
	Hindu General	1.11	1.97**	9162	3119.80	0.25
	All others	1.63	3.81**	1727	599.89	0.26
Employment status of respondent	Not employed	1.10	1.85*	9396	2964.88	0.23
	Employed	1.13	2.59***	10992	3939.03	0.26
Occupation of partner	White collar jobs	1.02	0.11	1108	244.20	0.16
	Sales	0.99	-0.07	1860	524.18	0.20
	Services	1.02	0.1	1091	292.79	0.20
	Manual labour	1.14	2.41**	8601	3120.30	0.26
	All others	1.14	2.32**	7681	2715.78	0.26
Place of last delivery	Not in public hospital	1.12	3.08***	19330	6609.14	0.25
	In public hospital	0.98	-0.12	1058	322.56	0.22

Fertility preference	Infecund / sterilized / unmarried / does not want child	1.12	3.07**	16370	2459.44	0.11
	May want another child	1.03	0.16	4018	285.48	0.16

Note: \*\*\* denotes significance at 1% level, \*\* at 5% level and \* at 10% level. All control variables were also taken in each regression.

Important results are as follows:

- a) *Geographical zones*: The impact of proximate illiteracy is insignificant in all these geographical zones, while the externality from partners' literacy is observed in North Indians states (Table 3). One explanation may be in terms of access to kinship relations that have been reported to encourage contraceptive use (Godley, 2001). The prevalence of exogamy in Northern states curtail access to kinship (Dyson and Moore, 1983), which may restrict communication with matrimonial relatives and make women more dependent on partners for reproductive knowledge.
- b) *Marital duration*: Partners' literacy encourages adoption of birth control methods only for respondents married 5-9 years and 20-24 years.
- c) *Age of respondent*: Similarly it is only among respondents aged 20-24 years that we find significant proximate illiteracy effect.
- d) *Fertility preference*: We find a significant impact of partners' literacy only for the group "Infecund/sterilized/unmarried/does not want child". This is possibly because female sterilization requires consent of partner, which is more likely if he is literate.
- e) *Socio religious groups*: Externality from partners' education occurs significantly in 'better off' Hindu-General and OSRC communities. In backward communities (HSC, HST and Muslims), on the other hand, cultural restrictions lowering the status of women, coupled with reluctance of males to communicate with their partners (Maddox, 2007) limits strength of the PLEFFECT.
- f) *Standard of living Index*: Table 3 shows that the coefficient of PLEFFECT is significant only for the poorest and richest standard of living index groups. This may indicate the lack of alternative sources of knowledge of respondents from poor households, or the greater willingness of their partners to share reproductive

knowledge (as opportunity costs of conception – as proportion of total household income - may be relatively higher among poorer households). In the richest 20% group, opportunity costs of having a large family may motivate sharing of information.

- g) *Employment status*: The impact of proximate illiteracy is also found to be significant among both employed and unemployed women. Partners may be motivated by opportunity costs of pregnancy to share information with employed wives and encourage them to adopt contraceptives. The significant PLEFFECT observed among unemployed women, on the other hand, may be explained in terms of their exclusive dependence for reproductive knowledge on their partners.
- h) *Partner's Occupation*: PLEFFECT is significant only in the case of respondents whose partners are manual labourers or in the residual All Others category.
- i) *Place of last delivery*: Respondents delivering at home, particularly if the birth is not attended by trained medical personnel, may lack source of information about need and method of birth control. In such cases, their partner may be the sole source of informant, so that his literacy becomes important in determining adoption of contraception.

The analysis undertaken for disaggregated samples indicates that proximate illiteracy effect is not an across the board impact but is strongly conditioned by socio cultural barriers and forces. This results in obstacles to the transmission of knowledge; in other cases, alternative sources of knowledge reduce the importance of the partner. The result, though operating through different channels and having different implications for reproductive rights of women, is the same in both cases – proximate illiteracy operates only in specific cases and among selective communities.

#### **4.2 Does level of education matter?**

There may be several reasons why the positive externality of literacy is not pervasive among all groups. One reason, of course, may be that literacy is too low an education level for the male member of the dyad to have sufficient edge over his illiterate partner. Given that illiteracy denotes merely the ability to read and write, and does not incorporate any concept of comprehension, a literate person may not be able to develop the ability to comprehend knowledge about family planning methods and its importance to a level sufficient for him to

transmit it to his partner. In this context, the existence of a substantial literature pointing out that the male partner may not have knowledge about issues relating to reproductive health may be noted (Mahmood & Ringheim, 1997; Char et al, 2009). For instance, Char et al.’s study of men in Madhya Pradesh noted that “men conceptualize family planning in ways different from the government family planning promotion campaigns” (Char et al., 2009: 136) and that their knowledge of temporary contraceptive methods was limited to knowledge of their names. This implies that a ‘literate’ partner may not have adequate information to share.

This has an important methodological implication. Instead of taking a dummy for literacy we can experiment with higher levels of education to find out if – and at what level – education generates externalities for the illiterate partner. This is undertaken in this section. Given the frequency distribution of partners, we consider only two levels – partner has at least primary education (PPEFFECT) and partner has secondary education (PSEFFECT).<sup>12</sup> The analysis undertaken earlier is repeated, replacing the PLEFFECT dummy with these dummies. The results are summarized in Table 4 below.

**Table 4: Comparison of effects of different levels of proximate education on contraceptive use of partner**

Group	Literacy	Primary	Middle
All India	All India (1.11)***	All India (0.93)**	All India (0.93)**
	Rural (1.11)**	Urban (0.87)**	Urban (0.87)**
Geographical zone	North (1.27)***	East (0.79)***	East (0.79)***
Marital duration	5-9 years (1.23)**	0-4 years***	0-4 years*
	20-24 years (1.15)*		15-19 years (0.84)**
Age of respondent	20-24 years (1.34)**	45-49 years (0.84)*	15-19 years***
			45-49 years (0.17)*
Standard of living index	Poorest (1.34)***	Next poorest (0.81)***	Next poorest (0.81)***
	Richest (1.29)**		
Socio-religious community	Hindu General (1.11)**	Hindu General (0.90)**	Hindu General (0.90)**
	All others (1.63)***		

<sup>12</sup> Only 1.87 per cent of sample women have husbands with at least higher secondary education (corresponding to 12 years of schooling). Primary and secondary education levels correspond to 5 and 10 years of schooling, respectively.

Group	Literacy	Primary	Middle
Employment status	Not working (1.10)*		
	Working (1.13)***		
Occupation of partner	Manual labour (1.14)**		
	Other (1.14)**		
Place of last delivery	Not in public (1.12)***	Not in public(0.92)**	Not in public(0.92)**
Fertility preference	Infecund, sterilized or unmarried (1.12)***	Infecund, sterilized or unmarried (0.92)**	Infecund, sterilized or unmarried (0.92)**

Notes:

1. Figures in parentheses are Odd Ratios for proximate education effect.
2. Three critical educational levels are considered – literacy (col. 2), primary (col. 3) and middle (col. 4).
3. Significance of this coefficient at 1%, 5% and 10% level is denoted by \*\*\*, \*\* and \*, respectively.
4. Control variables were taken, but their coefficients not reported.

The critical level of education may be identified by comparing significance and value of odd ratios for different groups formed by the socio demographic and economic correlates. While the coefficient of PLEFFECT is statistically significant among 16 groups (including India Total and India Rural), coefficients of PPEFFECT and PSEFFECT are significant among nine and eleven groups, respectively. More important is the fact that the 16 odd ratios for PLEFFECT are greater than unity (implying that the partners' literacy encourages contraceptive use), while the statistically significant odd ratios for PPEFFECT and PSEFFECT are *all* less than unity (implying that having a literate partner actually *reduces* probability of using contraceptives). In other words, an increase in gap in educational attainments makes partners reluctant to share information with their illiterate women, conflicting with findings reported by Gubhaju (2009) for Nepal. This finding - that externality effect is positive for literacy only - has an important policy implication, viz. only a small investment by the government on literacy drives can improve reproductive health outcomes substantially.

Another possible way of checking strength of different levels of education is to use dummies for respondents with partners with below primary education (EDUMMY1), middle level education (EDUMMY2) and higher level education (EDUMMY3), taking respondents with illiterate partners as the reference category. Results (Table 4b) confirm that literacy has the strongest results.

**Table 4b: Results of logit model to test strength of different levels of partner's education**

<b>Variables</b>	<b>Odds Ratio</b>	<b>z</b>	<b>P&gt;z</b>
EDUMMY1	1.27	5.34	0.00
EDUMMY2	1.02	0.40	0.69
EDUMMY3	0.90	-1.02	0.31
V512	1.05	7.99	0.00
V012	1.21	9.06	0.00
SV012	1.00	-10.91	0.00
V730	0.98	-4.99	0.00
SSLINFHS	1.02	6.30	0.00
RATIO	1.75	7.72	0.00
LCHILD	0.89	-9.92	0.00
NORTH	1.76	12.31	0.00
EAST	0.98	-0.51	0.61
WEST	2.66	15.62	0.00
SOUTH	3.36	16.92	0.00
HSC	1.79	9.98	0.00
HST	1.87	9.06	0.00
HGEN	1.82	11.73	0.00
OSRC	1.15	1.87	0.06
V384A	0.99	-0.16	0.87
V384B	1.54	10.25	0.00
NOCHILD	0.10	-12.09	0.00
FCHILD	0.93	-1.70	0.09
EMP	1.30	7.08	0.00
PAOTHER	1.02	0.58	0.57
PWCJ	1.05	0.58	0.56
PSALES	1.05	0.78	0.44
PSERVICE	0.98	-0.21	0.83
HOSP	1.08	0.91	0.36
RV602	0.06	-36.11	0.00
HFALONE	1.12	3.21	0.00
VALONE	0.95	-1.05	0.29
RURAL	0.81	-4.70	0.00
N	20388		
LR $\chi^2$	6899.85		
Pseudo-R <sup>2</sup>	0.2441		

#### 4.3: Type of contraceptive method

As noted earlier, contraceptives are not homogenous but vary widely with respect to method and ease of use, reversibility and co operation of husband. For instance, female sterilization – used by 83.8% of respondents using modern birth control methods - is irreversible and requires hospitalization. It can be undertaken only with the husband’s consent or (without his consent) if the respondent has freedom of movement and can visit her maternal home easily. The Government also focuses on female sterilization and offers incentives to women who opt to get sterilized. On the other hand, male sterilization (2.9%) and condoms (5.6%) - are male methods. Pills (used by 5.4% of respondents) may be taken easily, are reversible and require only ability to access health care services. We would therefore expect that the impact of proximate illiteracy varies from one contraceptive method to another.

To model the influence of partner’s literacy we conceptualize the problem in the form of a choice tree (Fig. 1). In the first stage, the choice is between using a modern contraceptive or not. In the second stage, those who have decided to adopt a modern birth control method have to choose between alternative methods. Since the proportion of women using birth control methods apart from female sterilization is relatively low (16%), we group them together. A sequential logit model may then be used to capture such two-stage choice. The results of the first stage model are the same as Table 2. So we focus only the results of the second stage – choice between female sterilization and other modern methods (Table 5).

**Table 5: Coefficient of Proximate illiteracy dummy in sequential and multinomial logit models**

Model	Choice	OR / RRR	Z
Sequential logit	No method vs Modern method	1.11	3.05***
	Female sterilization vs Other modern methods	0.99	-0.18
Multinomial logit	Female sterilization vs Pills	1.02	0.18
	Female sterilization vs Condoms	0.97	-0.30
	Female sterilization vs Other modern methods	1.02	0.18

*Notes: Other control variables were taken in regression. \*\*\* denotes  $p < 0.01$ .*

We find that the coefficient of PLEFFECT is insignificant. This implies that partner's literacy is important in deciding whether to adopt birth control methods, but the choice of method is influenced by supply side measures – resulting in the majority of illiterate women getting sterilized. To check the robustness of this method, we also estimated a multinomial logit for women deciding to adopt modern birth control methods. Taking female sterilization as the base outcome we consider choice between female sterilization, condoms, pills and other methods. Once again, we find that the coefficient of PLEFFECT is statistically insignificant in all cases (Table 5).

#### 4.4 Estimating 'pure' proximate illiteracy effect

Now, the proximate illiteracy effect estimated so far consists of two components:

- a) *Human capital effect*: The presence of a literate family member spontaneously improves welfare of other illiterate members.
- b) *Bargaining effect*: In reality, family members may be reluctant to share their knowledge with other members. For instance a literate male may be reluctant to share his knowledge with female members as the improvement in family (and his own welfare) welfare may be offset by an increase in bargaining power of the female, reducing share of *male* member in household resources (Doss, 1996; Haddad et al., 1997; Maddox, 2007).

It would be interesting to see the strength of the 'pure' human capital effect. For this we need a family member who is not interested in the family allocation of resources (or whose share depends positively with that of respondent). Such a person will be willing to share the fruits of literacy with the respondent. Using the Household File we have created a dummy (NPLEFFECT) whose value is unity if there exists any literate female resident member in the household in the same generation as the respondent, and is equal to 0 in all other cases. The logic is as follows:

- a) Given India's social structure, male resident members are unlikely to discuss contraceptive methods with female relatives;
- b) There is greater communication between female resident members;
- c) Female members of the *same generation* will be less reluctant to share reproductive knowledge. Mother in laws are obviously very much affected by empowerment levels

of the respondent, while members of younger generations are ‘disinterested’ but unlikely to discuss contraceptive methods with older relatives.

Equation 5 is reestimated, replacing PLEFFECT (whether partner is literate) with NPLEFFECT; keeping other control variables unchanged. Our results (stated in Table 6) show that the coefficient of NPLEFFECT is insignificant in all three models, even at 10% level. Thus, our analysis does not indicate the existence of any ‘pure’ human capital effect.

**Table 6: Proximate illiteracy effect from female resident member**

Sample	NPLEFFECT	Z	N	$\chi^2$	Pseudo-R <sup>2</sup>
India	0.87	-1.63	20388	6867.42	0.24
India – Urban	0.87	-1.06	6494	1841.08	0.21
India - Rural	0.86	-1.46	13894	4914.92	0.26

*Note: Other control variables were included in regression models, but not reported here.*

This may be due to several reasons. Firstly, the decision to use a contraceptive may be exclusively determined by bargaining between the dyad, with other ‘disinterested’ family members providing at most knowledge about family planning methods but not influencing the decision. As noted earlier in only 0.5 percent cases does any person from outside the dyad act as the decision maker. Thus, the pure human capital effect is at most quite weak as it provides only knowledge, and is easily offset by the partner’s dominancy. Secondly, are other female members really disinterested? In Indian family structures, even members of the same generation (like a sister in law) may not prefer her brother’s wife to be empowered as the latter may try to set up a nuclear family, where the former’s occasional return from matrimonial home may be restricted. In support of this we have reestimated the NPLEFFECT for each zone. In the results for Central sample – where marriage is endogenous (Dyson and Moore, 1987) – NPLEFFECT is significant at 5% level, but is negative (OR: 0.74; z:-2.28).

#### **4.5 Is there self selection into marriage with proximate illiterates?**

Finally we consider the possibility of selective mating. Alaka Basu (1996) has pointed out that characteristics of males who marry literate females are different from those who marry illiterate females. Extending this proposition, we may argue that “attributes of illiterate females who marry literate males, ...are likely to be different from those married into illiterate households (that is, women who end up as isolate illiterates)” (Iverson and Palmer Jones, 2008: 800). This

implies that marriage is not random, but a selective process. In that case, we cannot discount the possibility that the relatively higher contraceptive prevalence levels observed among proximate illiterates, compared to that amongst isolate illiterates, may actually reflect the unobserved attributes of illiterate women married to literate men.

Two situations may be conceptualized based on effectiveness of proximate illiteracy. Literature on proximate illiteracy points out that effectiveness of transmission of externalities from literacy will depend upon receptiveness of the illiterate member, and willingness of the literate member to share knowledge. In case of random mating, all four possible combinations of these two traits will be distributed randomly among dyads. If, however, marriage is selective then the possibility of one of the four possible combinations - (Receptive female, Willing to share male), (Receptive female, Unwilling to share male), (Unreceptive female, Willing to share male) and (Unreceptive female, Unwilling to share male) - is likely to be higher among dyads with literate male partners.

**Table 7: Probit model testing selection into marriage**

<b>Variable</b>	<b>Coefficient</b>	<b>Z</b>
VAW	-.0524841	-7.37***
DEC	.0611048	6.77***
MOB	-.0351081	-4.70***
EMP	-.2150632	-15.02***
Intercept	.2515818	21.07***
N	31559	
$\chi^2$	344.88	0.00***
Pseudo-R <sup>2</sup>	0.0079	

*Note: \*\*\* denotes significance at 1% level.*

For instance, comparing employment status (EMP), and factor scores for mobility (MOB), decision-making (DEC) and tolerance of domestic violence (VAW) between illiterate women with literate and illiterate partners, we find that proximate illiterates are more likely to be unemployed, passive in decision making, accept domestic violence and have less freedom of

movement.<sup>13</sup> This is also supported by results of probit model, wherein probability of being selected by a literate partner is regressed upon employment status and factor scores for mobility, decision making and tolerance of domestic violence (Table 7). Our analysis suggests that illiterates being selected for marriage by literate males are passive and docile agents, characteristics which will reduce their receptivity. This implies that the strength of the proximate illiteracy effect observed earlier in Table 2 is likely to be an underestimate. To get a less biased estimate we have used predicted probabilities of having a literate partner – given by PRED(PLE) – in the equation. Table 8 reveals that the proximate illiteracy effect becomes substantially stronger. The marginal effect is 0.4122 against 0.0254 (equation [5], reestimated as a probit model) – once selection into marriage is considered.

**Table 8: Re-estimated probit model using predicted proximate illiteracy**

<b>Variable</b>	<b>Coefficient</b>	<b>Z</b>
PRED(PLE)	1.04	2.62***
Other control variables	Yes	
N	20161	
$\chi^2$	6736.24	0.00***
Pseudo-R <sup>2</sup>	0.2410	

*Note: \*\*\* denotes significance at 1% level.*

## 5. CONCLUSION

To sum up, this study finds some evidence of transmission of information (Basu-Foster proximate illiteracy effect) related to family planning methods from a literate person to his illiterate partner. This is very important, given the asymmetry between partners with respect to reproductive decisions and the tendency of men to act as “gate keepers” of family welfare (Char et al., 2009). However, such transmission is not across the board, but is observed to occur only for female sterilization and use of modern methods like foam, IUD, injectibles, etc., and among specific communities. Moreover, it is the partners’ education level, rather than that of other female relatives, that is crucial in adopting contraceptive methods. Another major finding is that

<sup>13</sup> Statistical tests (t-tests) show that difference in score for employment status, tolerance of domestic violence and decision-making is statistically significant at %5 level. In case of mobility scores, the difference is statistically insignificant.

level of education does not matter in generating this externality. This is very important for policy design, as it implies that even a small level of investment in literacy campaigns generates substantial externalities in the sphere of reproductive health. It also implies that a strategic option before policy makers in developing South Asian countries is to refocus family planning programmes away from women to men, seeking to reeducate them about benefits of contraceptives and provide them information about alternative methods through inter personal communication with health workers.

Given the evidence in favour of the proximate illiteracy effect observed among specific sub groups, a natural question that may arise is why such externality does not arise among all communities/sub groups. An important reason for the failure to find evidence of any significant flow of information between partners except among communities may lie in barriers to such transmission. For instance, Maddox (2007) points out that even if the literate partner possesses information, he may not be willing to share this information. The case of the literate Iqbal, who is unwilling to share the benefits of his literacy with his illiterate wife, may be noted. A possible reason for the refusal may be socio cultural barriers, which discourage communication with wives. Such barriers may be found in, for instance, Muslim communities where the status of women is exceptionally inferior. Partners may also be reluctant to share information as the knowledge may empower women and increase her bargaining power within the family. The strong son preference, coupled with the fact that it is the women who bears the cost of conception, also may encourage men to withhold information related to contraceptives.

We should also not overlook the presence of alternative sources of information, other than the partner, about reproductive issues. The presence of such substitute sources of information, too, is community or group specific. As pointed out by Godley (2001) and Madhavan et al. (2003) access to networks and contacts with kins may reduce dependence of an illiterate woman on her partner. Government policies like *Swarna Jayanti Sahari Swarojgar Yojana* (Golden Jubilee Urban Self employment Scheme) and *Swarna Jayanti Grameen Swarojgar Yojana* (Golden Jubilee Rural Self employment Scheme) seeking to empower women through formation of Self Help Groups may also serve as alternative transmitters of reproductive knowledge. Convergence

between such employment generation programmes and family planning programmes can augment such information flows.

Another important substitute source of information is the public media, particularly television. Table 2 shows that women who watched family planning messages on television are 21 per cent 50 percent more likely to use contraceptives than other women. This is in line with works noting the positive effect of public media on contraceptive use (Agha, 2002) – with even soap entertainments programmes being found to exert a strong influence (Vaughan et al., 2000). NFHS reports also observe that television is an important source of information about family planning. This calls for greater reliance on public media in spreading messages about family planning among less educated families.

However, such information can only sensitize the viewer about the need to adopt the contraceptives. The objective of the policy makers should not be merely to encourage women to use contraceptives, but to ensure more informed decision making. This calls for providing information about the alternative contraceptive methods available, their economic costs, their side effects, etc. Anecdotal evidence from medical practitioners reveal that the thrust to encourage sterilization often leads to undesirable side effects as patients are not informed about side effects of this method. The National Rural Health Mission (2005) has introduced a new category of health workers in India, called Accredited Social Health Activist (ASHA). ASHAs are supposed to undertake face to face interaction with target women and encourage them to adopt contraceptives, go for regular ante natal check ups, deliver in health care institutions, immunize children, etc. These ASHAs also have the potential to be an alternative source of reproductive knowledge. An interesting exercise for the future would therefore be to analyze to what extent they have played this role successfully.

Finally, our analysis also reveals that illiterate women who are housebound, docile and passive are more likely to get married to a literate partner, and – in turn -are more likely to benefit in terms of better reproductive rights. This finding, along with the failure to disentangle a ‘pure’ human capital effect, underlines the importance of reproductive rights of women in the battle of sexes. The nuances of this battle and the interactive impact of reproductive rights and partners

literacy on this battle is too complex to be fully captured and analyzed by applying quantitative methods to large scale data sets. Qualitative case study based methods are necessary to explore more fully the inter relationship between selection of mates, sharing of reproductive knowledge and consequent empowerment effects (if any). This task is left as another possible refinement of the present analysis.

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**Appendix Table A1: Profile of respondents**

Correlate	Sub-groups	Urban	Rural	Total
Geographical zone	North	21.8	22.3	22.1
	Central	33.3	37.9	36.6
	East	18.7	23.2	21.9
	West	12.1	8.0	9.1
	South	14.1	8.8	10.3
Socio-religious identity	Muslim	25.4	12.8	16.3
	Hindu-SC	22.7	19.3	20.2
	Hindu-ST	3.8	12.9	10.4
	Hindu-Gen	43.0	45.5	44.8
	All Others	5.1	9.6	8.3
Age 5-year	15-19	2.7	5.1	4.4

<b>Correlate</b>	<b>Sub-groups</b>	<b>Urban</b>	<b>Rural</b>	<b>Total</b>
groups	20-24	10.2	12.7	12.0
	25-29	17.0	16.9	17.0
	30-34	18.5	18.4	18.4
	35-39	21.5	19.0	19.7
	40-44	16.5	15.7	15.9
	45-49	13.6	12.3	12.6
Marital duration (grouped) [excludes: married gauna not performed]	0-4	7.2	9.2	8.6
	5-9	13.8	15.2	14.8
	10-14	16.9	17.5	17.3
	15-19	19.1	19.0	19.1
	20-24	19.5	17.6	18.1
	25-29	15.4	14.3	14.6
	30+	8.1	7.2	7.5
Standard of Living Index	Low	16.8	39.8	33.5
	Medium	38.1	39.9	39.4
	High	42.3	16.3	23.4
	Not de jure resident	2.7	4.0	3.6
Partner's occupation	Did not work	2.9	1.7	2.0
	Prof., Tech., Manag.	3.3	2.1	2.4
	Clerical	4.2	1.7	2.4
	Sales	16.2	5.8	8.7
	Agric-employee	8.1	49.2	37.9
	Services	9.1	3.6	5.1
	Skilled & unskilled manual	56.1	35.8	41.4
	Don't know	0.0	0.1	0.1
Recode of partners education	No education	39.1	48.9	46.2
	Below primary	20.6	20.5	20.5
	Middle level	36.7	28.4	30.7
	Secondary	0.8	0.6	0.7
	Higher level	2.7	1.6	1.9
Recode of current method	No use	36.0	45.5	42.9
	Other methods	6.8	6.7	6.7
	Modern	57.2	47.8	50.4

**Appendix Table A2: Contraceptive use between proximate illiterates and isolate illiterates**

<b>Correlate</b>	<b>Sub-Group</b>	<b>Isolate Illiterate</b>	<b>Proximate Illiterate</b>
Type of place of residence	Urban	54.0	59.2
	Rural	45.9	49.5
	Total	47.8	52.6
Geographical zone	North	53.1	58.3
	Central	35.7	42.4
	East	38.5	41.8
	West	66.1	68.0
	South	72.0	71.8
Socio-religious identity	Muslim	35.3	41.0
	Hindu-SC	51.7	54.6
	Hindu-ST	47.3	49.5
	Hindu-Gen	54.6	56.7
	All Others	36.6	44.3
Age 5-year groups	15-19	5.2	6.0
	20-24	22.6	26.9
	25-29	44.5	48.7
	30-34	56.0	61.1
	35-39	58.2	63.8
	40-44	54.8	60.5
	45-49	52.4	59.8
Marital duration (grouped) [excludes: married gauna not performed]	0-4	7.0	10.8
	5-9	29.5	35.9
	10-14	49.0	55.5
	15-19	59.6	62.6
	20-24	57.3	64.5
	25-29	55.4	61.4
	30+	53.0	62.0
Standard of Living Index	Low	41.5	44.9
	Medium	52.2	50.8
	High	63.1	63.0
	Not de jure resident	28.0	26.8
Partner's occupation	Did not work	51.3	55.0
	Prof., Tech., Manag.	57.0	55.0
	Clerical	46.3	59.7
	Sales	48.3	52.4
	Agric-employee	49.4	51.8
	Services	55.7	57.5

<b>Correlate</b>	<b>Sub-Group</b>	<b>Isolate Illiterate</b>	<b>Proximate Illiterate</b>
	Skilled & unskilled manual	45.3	51.3
	Don't know	8.3	30.8
Recoded place of last delivery	No child	58.9	62.6
	Other delivery	29.1	33.4
	Public sector institution	47.6	45.7
Recode of household size	1-2 members	30.6	34.4
	3-4 members	47.7	51.2
	5-6 members	54.8	59.0
	7-8 members	45.1	51.2
	More than 9 members	38.9	45.4
Sex of last living child	No child	2.1	2.9
	Male child	55.1	60.0
	Female child	45.6	50.1
Allowed to go to: health facility	Alone	53.4	59.1
	With someone else only	42.4	45.8
	Not at all	35.2	41.9
Final say on visits to family or relatives	Respondent alone	55.3	57.2
	Respondent and husband/partner	49.0	54.8
	Husband/partner alone	47.4	53.8
	Someone else	23.5	30.8
	Other	37.7	33.7
Heard FP on radio last months	No	47.2	52.4
	Yes	50.6	52.9
Heard FP on TV last months	No	43.6	47.2
	Yes	61.8	61.3