Fertility Transition in Andhra Pradesh: Role of Diffusion in Use of Contraception among Illiterate Women

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Abstract

Andhra Pradesh achieved faster fertility decline in a span of time. This attracted the attention of researchers in social sciences in the background of unfavourable socioeconomic conditions such as higher female illiteracy and infant mortality. This paper assesses the trends of fertility among illiterate and literate women and the role of diffusion factor on the use of contraception by illiterate-currently married women by using the data from the SRS (1996-2013) and DLHS-3(2007-08). The gap in fertility between literate and illiterate women at the initial stage was very high. However, the sharp decline in fertility of illiterate women during the latest period has led to emerging convergence in fertility rates between them. Logistic regression analysis further showed that illiterate currently-married women, who had accessed information about family planning from health personnel such as Doctors/ANM/ASHA, were more likely to use contraception as compared with those who did not access such information even after controlling socio-economic factors. Overall, the diffusion of information channel through health personnel played a significant role in the dramatic decline of fertility among illiterate women.

Keywords: Use of contraception, illiterate women, diffusion, Andhra Pradesh.

I. Introduction

According to India's Sample Registration System (SRS), the total fertility rate (TFR) in Andhra Pradesh was 4.6 children per woman in 1971, which has dropped to 1.7 in 2007 and continues to be around 1.7 to 1.9. Similarly, southern states such as Kerala and Tamil Nadu have undergone a rapid fertility transition along with higher literacy rates and low infant mortality. The dramatic fertility decline in Andhra Pradesh[1] with low social development indicators brought curiosity among the researchers (James, 1999). Fertility decline happened despite high illiteracy, infant mortality, child mortality and other unfavourable factors (Rajan, 2005). As per 2011 census, the female literacy rate is about 58 per cent which is lower than the national average of 65 per cent (Census, 2011).

The past literature has proved that significant fertility reduction occurred among socio-economically advanced women (United Nations, 1973; Coale & Watkins, 1987; Dreze & Murthi, 2001). The better educated women are empowered, have full freedom and familiarity with family planning measures which leads to lower fertility. Fertility decline in India is a contribution of female education along with other factors (Dreze & Murthi, 2001). The conventional socio-economic theories propound that a gradual improvement in socio-economic development will lead to reduction in fertility. However, the recent evidence suggests that it may not be universal. For instance, recent studies found rapid decline in fertility without a significant improvement in the female literacy rate in Bangladesh and Andhra Pradesh (Dev et al., 2002; James, 1991). Evidence has shown that female literacy reduced birth rates surprisingly small in percentage terms in Andhra Pradesh and Uttar Pradesh after controlling various socio-economic indicators (Parikh et al., 2001). The failure of

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[1] Andhra Pradesh in this study refers to Andhra Pradesh including the present state of Telangana.

socio-economic factors in prediction of fertility decline has brought a new concept like role of ‑diffusionøin fertility decline. Some of the recent researchers from the diffusion school criticised the socio-economic theories and emphasized the diffusion process of fertility transition. Diffusion of birth control method as an innovation spread from person to person, group to group and region to region (Van De Kaa, 1996). Demographers argue that diffusion may progress somewhat independently and faster than the socio-economic development in fertility decline (Retherford, 1985; Montgomery & Casterline, 1996; Lesthaeghe & Vanderhoeft, 2001).

The concept of diffusion argument has been derived from the Princeton European Fertility Study. This study predicted fertility decline within the linguistic counters and emphasised the role of diffusion in fertility transition rather than the socio-economic variables (Knodel & Van de Walle, 1979). Fertility decline in developing countries is attributed to various types of diffusion processes such as social interaction and contagion between neighbouring areas (Bongaarts, 2002; Casterline, 2001). Similarly, decline of fertility in India and Bangladesh is also observed through the diffusion channel of a social interactive process within the community without profound socio-economic development (Dev *et al.*, 2002). Substantial adoption of family planning by the uneducated women is observed in India and it is attributed to the significant reduction in fertility decline (Arokiasamy, 2009). For instance, more than two-fifths of the reduction in TFR was contributed by illiterate women between 1992-93 and 2005-06. The increase in contraceptive prevalence rate among uneducated women has been larger and faster than the educated women (Bhat, 2002; McNay et al., 2003; Arokiasamy, 2009). The higher use of contraception by uneducated women is caused by diffusion of positive externalities of community, educated women and mass media exposure (McNay *et al.,* 2003; Arokiasamy et al., 2004). Large decline of fertility in Andhra Pradesh is assumed to be the process of diffusion of information about family planning through friends/relatives/peers, mass media (TV, radio and newspaper), doctors/auxiliary nurse midwife (ANM)/, anganwadi worker (AWW)/accredited social health activist (ASHA) and group meeting. In this study, acquisition of information about family planning from friends/relatives/peers, mass media, Doctors/ANM/AWW/ASHA and group meeting are considered as proxy indicators to diffusion of information about family planning in Andhra Pradesh. The objectives of this paper are (a) to assess the trends and levels of fertility among illiterate and literate women, and (b) to assess the role of diffusion factors in the use of contraception by illiterate currently married women.

II. Data and methods

Data on fertility indicators from the Sample Registration System were used for assessment of trends in fertility by literacy level from 1996-2012 across the rural and urban areas (Registrar General of India, 1991-2012). SRS provides data on fertility and mortality indicators continuously from 1969-70. It is designed to provide reliable estimates of fertility and mortality indicators at national and state levels separately for rural and urban areas. The revision of SRS sampling frame is undertaken every 10 years based on the results of the latest census. For all the years, the sample design and size are prepared in such a way that the outcome based on SRS data is comparable over time (for details on sampling, see RGI, 1991-2012). Data related to information about family planning method from friends/peers/relatives, group meetings, mass media and Doctors/ANM/ASHA are considered as diffusion factors. These data have been taken from District Level Household Health Survey-3, India. DLHS-3 was a nationwide representative survey which covered sample of 21,730 ever married women in Andhra Pradesh. Along with this information, DLHS-3 provides information on maternal health, child health and family planning (IIPS & MoHFW, 2010).

Sampling Design

Multi-stage stratified systematic sampling was adopted for DLHS-3. In the first stage, fifty primary sampling units (PSUs) were selected for the survey from each district which were census villages in rural areas and census enumeration blocks (CEB) in urban areas. In rural areas, villages were selected by probability proportional to size (PPS) systematic sampling and in the second stage

households were selected by systematic sampling. For urban areas, first wards were selected through probability proportional to size systematic sampling, in the second and third stages CEBs and households were selected through systematic sampling. Census of India, 2001 was used as a sampling frame for DLHS-3. All villages and urban wards in a district were stratified by household size into three strata of less than 50, 50-300 and 300+ households, two strata for 30 per cent below and 30 per cent above SC/ST population and implicitly by the alternating order of female literacy. The variables used for stratification are derived from the 2001Census. The number of households representing a district is either 1000 or 1200 or 1500, considering the levels of immunization, antenatal check-up and institutional delivery as given by DLHS-2 including 10 per cent over sampling to cushion for non-response (IIPS & MoHFW, 2010)

Selection of variables for analysis

In order to assess the role of diffusion on use of contraception by currently married women, currently married literate women and currently married women with no education, ‑use of contraception‑ is taken as a dependent variable. It is measured as a dichotomous variable for which *1* means ‑use of any method of contraception‑ while *0* means ‑no use of contraception‑ The diffusion variables considered as predictors are information about family planning from TV, radio and newspapers; friends/relatives/peers; group meetings; and Doctors/ANM/AWW/ASHA. Socio-economic and demographic variables such as place of residence, caste, religion, wealth quintile (proxy for standard of living), son preference and daughter preference are considered as controlled variables.

Statistical analysis

In this paper, we have defined diffusion into two broad categories: social network and mass communication. Both of them are considered as a social learning process and acquisition of information on family planning from others (Montgomery & Casterline, 1998). To assess the trends in TFR with literacy level, line diagram was used. The cross tabulation was carried out to show the contribution of diffusion in use of contraception by educated and uneducated women. The bivariate logistic regression was carried out to assess the effect of diffusion factors on the use of contraception among illiterate currently married women.
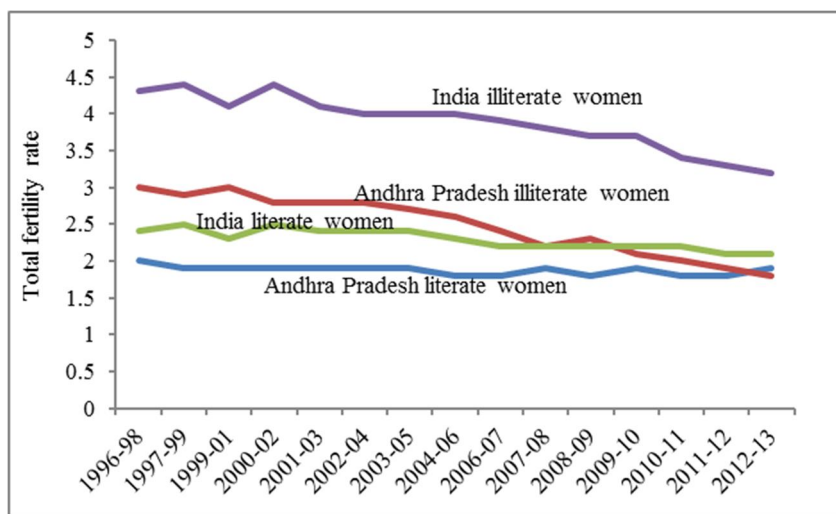
III. Results

The levels and trends in fertility rate are shown with literacy level for Andhra Pradesh and India from 1996 to 2013 in Figure 1.1.The large difference in fertility between literate and illiterate women at initial level was due to a higher number of children by illiterate women and this difference has narrowed down at the end of the transition period due to faster decline in fertility among illiterate women and stabilisation of fertility levels among literate women in India, especially in Andhra Pradesh. The difference in number of children per literate women and illiterate women is still high in India whereas this difference has disappeared in Andhra Pradesh and both groups of women have almost the same number of children at the end of the transition period 2011-12.

Figure1.2 shows the trends of total fertility rate with literacy level in rural Andhra Pradesh from 1996 to 2011. The fertility gap between literate and illiterate women at initial period was higher in rural areas and at the end of the transition it was only 0.3. This is due to faster decline in fertility among illiterate women.
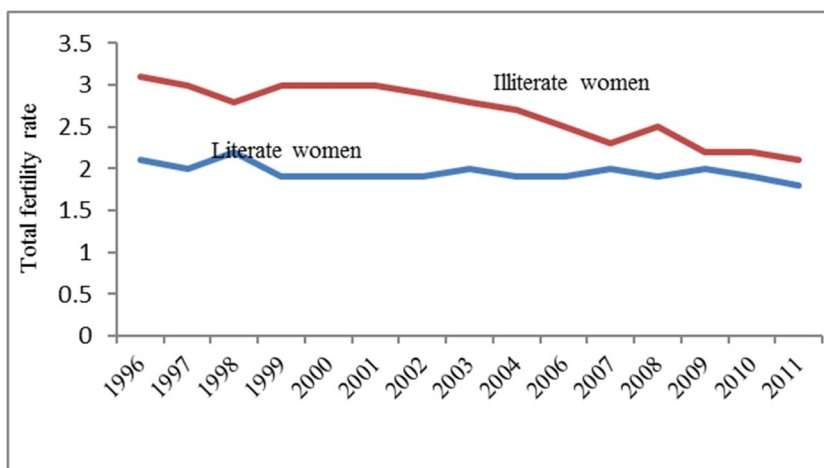
Figure 1.3 shows trends in total fertility rate with literacy level in urban Andhra Pradesh from 1996 to 2011. It shows that the illiterate women have more children than the literate women in the initial period and illiterate women have lower number of children than the literate women at the end of the transition period in urban areas. A large decline in fertility among illiterate women may be due to the diffusion of information on family planning which played a critical role in the use of contraception.

Figure 1.1 Trends in total fertility rate by literacy level for Andhra Pradesh and India, 1996-2013
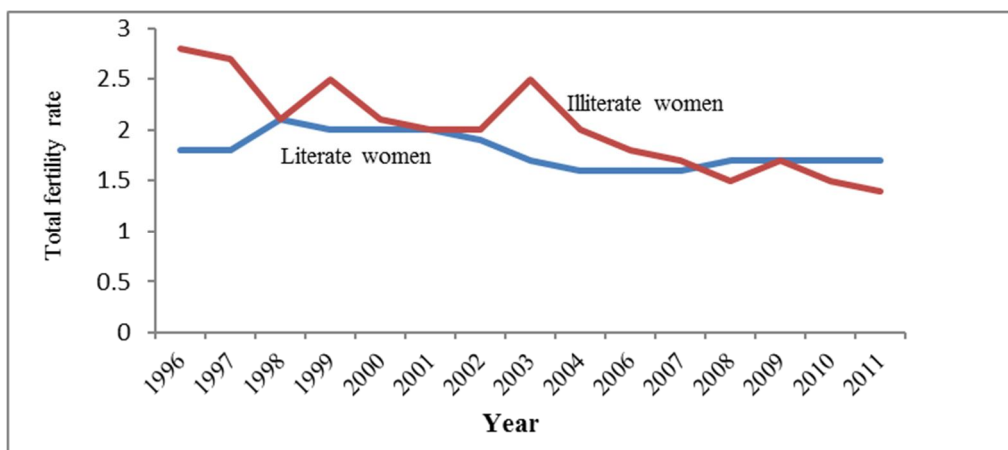

Source: Registrar General of India, SRS (1996-2013).

Figure 1.2. Trends in total fertility rate with literacy level for rural Andhra Pradesh, 1996-2011

Source: Registrar General of India, SRS (1996-2011).

Figure 1.3. Trends in total fertility rate with literacy level for urban Andhra Pradesh, 1996-2011

Source: Registrar General of India, SRS (1996-2011)

Table 1: Percentage of currently married women, currently married literate women, currently married illiterate women who heard about family planning from different sources (diffusion variables), DLHS-3, 2007-08

Diffusion variables	Percentage	Sample size
Currently married women		
Information about family planning from TV, radio and newspaper	43.3	6996
Information on family planning from friends/relatives	54.9	8849
Information on family planning from group meeting/programme	8.1	1308
Information on family planning from Doctor/ANM/AWW/ASHA	77.1	12394
Currently married literate women		
Information about family planning from TV, radio and newspaper	61.1	5130
Information on family planning from friends/relatives	52.5	4471
Information on family planning from group meeting/programme	8.3	704
Information on family planning from Doctor/ANM/AWW/ASHA	71.5	5993
Currently married illiterate women		
Information about family planning from TV, radio and newspaper	24.1	1866
Information on family planning from friends/relatives	57.4	4432
Information on family planning from group meeting/programme	7.9	605
Information on family planning from Doctor/ANM/AWW/ASHA	83.2	6401

Table 1 shows the percentage of currently married women, currently married literate women and currently married illiterate women who came to know about family planning from different sources (diffusion factors). Access to information about family planning from friends/relatives is more than 50 per cent among currently married women, currently married literate and illiterate women. But access to such information is slightly higher among illiterate women (57.4%). Similarly, access to information from health personnel such as Doctors/ANM/AWW/ASHA is higher among illiterate women (83%) compared with currently married women (77%) and literate women (71%). Access to information from TV, radio and newspaper is higher among literate women (67%) compared with currently married women (43%) and illiterate women (24%).

Table 2: Percentage use of contraception among currently married women with diffusion factors, DLHS-3, 2007-08

Diffusion variables	Use of contraception with diffusion (%)	Use of contraception without diffusion (%)
Information about family planning from TV, Radio and newspaper	73.4	75.8
Information on family planning from friends/relatives	73.8	75.8
Information on family planning from group meeting/programme	72.7	74.9
Information on family planning from Doctor/ANM/AWW/ASHA	75.9	70.8

Table 2 shows the percentage use of contraception among currently married women with diffusion factors. Use of contraception is higher (76%) among currently married women who obtained information about family planning from health units such as Doctor/ANM/AWW/ASHA compared with without obtaining such information (70.8%). Other diffusion factors have not shown significant difference in the use of contraception among currently married women with access to information and without access to information about family planning. Table 3 shows the association of diffusion factors in the use of contraception by literacy level among currently married women. The use of contraception is higher among illiterate women who obtained information about family planning from T.V/radio/newspaper and Doctors/ANM/AWW/ASHA than those without obtaining such information (without diffusion as information about family planning). In the case of literate women, use of contraception is more than 70 per cent for those who got information from Doctors/ANM/AWW/ASHA than those without obtaining any information about family planning

Table 3: Percentage use of contraception by currently married women with literacy level, DLHS-3, 2007-08

Diffusion variables	Use of contraception by illiterate women with diffusion (%)	Use of contraception by illiterate women without diffusion (%)	Use of contraception by literate women with diffusion (%)	Use of contraception by literate women without diffusion (%)
Information about family planning from TV, radio and newspaper	80.0	78.1	71.0	71.3
Information on family planning from friends/relatives	77.7	79.6	69.7	72.7
Information on family planning from group meeting/programme	76.4	78.7	69.3	71.3
Information on family planning from Doctor/ANM/AWW/ASHA	79.3	74.5	72.0	68.8

(without diffusion as information about family planning). Overall, the use of contraception is higher among illiterate than literate women irrespective of access to information about family planning.

Table 4 shows the logistic regression analysis on contraception among currently married women, currently married literate women and currently married illiterate women by association of diffusion and socio-economic factors. Results shows that the use of contraception is more [OR=1.28, P<0.01] among currently married women who have accessed the information about family planning from health personnel such as Doctors/ANM/AWW/ASHA after controlling the socio-economic factors. Women who accessed the information about family planning from friends/relatives [OR=0.82, p<0.01] are less likely to use contraception. Women from middle [OR=1.29, P<0.01] and rich [OR=2, P<0.01] classes are more likely to use contraception compared with poorest women after controlling other factors. Women from rural areas are less likely [P< 0.82, P<0.01] to use contraception compared with women from urban area after controlling other factors. In the case of religion, Muslim women [OR=0.71, P<0.01] are less likely to use contraception and Christian women [OR=1.81, P<0.05] are more likely to use it compared with Hindu women after controlling other factors. Women educated up to 6-10 years [OR=0.49, P<0.01] and 11 years and above [OR=0.27, P<0.01] are less likely to use contraception compared with illiterate women. Women without living son [OR=1.32, P<0.01] and without living daughter [OR=1.38, P<0.01] also are more likely to use contraception after controlling other factors.

In the case of currently married literate women, use of contraception is more [OR=1.25, P<0.01] among those women who have accessed the information about family planning from health personnel such as Doctors/ANM/AWW/ASHA after controlling other factors. Other diffusion factors, *viz-a-viz* women who had access to information about family planning from TV, radio [OR=0.86, P<0.05] and newspaper and friends/relatives [OR= 0.82, P<0.01] are less likely to use contraception among currently married literate women. Women without living son [OR=1.8, P<0.01] and without living daughter [OR= 1.44, P<0.01] are more likely to use contraception. Other socio-economic factors such as place of residence and standard of living index which are proxy for economic status have not shown any significant effect on contraception use.

Similarly, the illiterate currently married women who have accessed the information about family planning from Doctors/ANM/AWW/ASHA [OR=1.38, P<0.01] are more likely to use contraception as compared with the women who did not access such information even after controlling for socio-economic factors such as caste, religion, economic status, son preference and place of residence. Further, illiterate women from middle [OR=1.39, P<0.01] and rich [2.06, P<0.01] standard of living classes are more likely to use contraception compared with the poorest women after controlling other factors. Other socio-economic factors such as caste, religion and place of

Table 4: Logistic regression analysis results (odds ratios) on use of contraception by women with educational level by association of diffusion and socio-economic factors, DLHS-3, 2007-08

Predictor variables	Currently married women	Currently married literate women	Currently married illiterate women
Information about family planning from TV, radio and newspaper			
No [R]	1	1	1
Yes	1.01	0.86**	0.95
Information on family planning from friends/relatives			
No [R]	1	1	1
Yes	0.82***	0.82***	0.87
Information on family planning from group meetings/programmes			
No [R]	1	1	1
Yes	0.94	0.97	0.89
Information on family planning from Doctors/ANM/ AWW /ASHA			
No [R]	1	1	1
Yes	1.28***	1.25***	1.38***
Womenøs education in years			
Illiterate	1	-	-
1-5	0.90	-	-
6-10	0.49***	-	-
11 years and above	0.27***	-	-
Caste group		-	-
SC [R]	1	1	1
ST	0.98	0.82	1.10
Others	1.44***	1.40***	1.49***
Living son			
No [R]	1	1	1
Yes	1.32***	1.80***	1.19*
Living daughter			
No [R]	1	1	1
Yes	1.28***	1.44***	1.27**
Standard of Living Index			
Poorest [R]	1	1	1
Poor	1.13	0.89	1.23
Middle	1.29***	1.04	1.39***
Rich	2.00***	1.43	2.06***
Residence			
Urban [R]	1	1	1
Rural	0.82***	0.89	0.99
Religion			
Hindu [R]	1	1	1
Muslim	0.71***	0.74**	0.80
Christian	1.18**	1.35**	1.06
Others	2.46	1.86	3.13
Constant	2.19***	1.58	1.55***

P<0.05**, P<0.01***, P< 0.10*, R: Reference category.

residence have not shown any significant effect on the use of contraception by illiterate currently married women. Similar to socio-economic factors, other diffusion factors such as acquisition of information about family planning from friends/relatives /peers, TV, radio and newspaper and group meeting have not shown any significant effect on the use of contraception.

IV. Conclusion

In this paper, we attempted to assess (a) the trends in fertility among literate and illiterate women, and (b) access to information about family planning from various sources by illiterate currently married women with proxy diffusion indicators. The results show that fertility gap between literate and illiterate women was higher at initial stage due to more number of children among illiterate women. This gap was lessened at the end of the transition period due to faster decline of fertility among illiterate women. At the initial stage, literate women already had low fertility and illiterate women had higher fertility which became equal at the end of the stage. Further, we found that in urban areas the illiterate women have lower number of children than the literate women at the end of the transition. The faster decline of fertility among illiterate women, diffusion factors as access to information about family planning from Doctor/ANM/AWW/ASHA and mass media (TV, radio and newspaper) have played a crucial role in substantial adoption of family planning by illiterate currently married women in Andhra Pradesh. The results indicated that the use of contraception among illiterate currently married women who have accessed information about family planning from Doctors/ANM/AWW/ASHA and mass media (TV, radio and newspaper) is about 79 per cent and 80 per cent respectively. Similarly, the results from logistic regression have shown that after controlling the socio-economic factors, illiterate women who have accessed information from Doctors/ANM/AWW/ASHA were more likely to use contraception than those who did not get the information from them.

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