

# **Impact of Sterilization on Fertility in Southern India**

## **Background**

The first two international conferences on population were mainly focused on the need for curtailing rapid population growth by placing greater emphasis on family planning. However, the third international conference was given high priority to programs that focus on women's rights, gender equality, reproductive rights and reproductive health of the women. Following the recommendations of this conference, Government of India has removed all the targets for family planning from April 1996. It was reported that average Indian women becomes pregnant eight times and gives births to 6-7 children, of which 4-6 live. More than a third of the 140 million who became pregnant in 1988 in the developing countries did not want another child (Coyaji, 1993). Regulation of fertility seems to be the solution that can significantly decrease the incidence of unwanted fertility. Among the modern contraceptives, sterilization is the most popular method and has the key advantage of offering permanent protection from becoming pregnant. However, non-terminal methods are easy to initiate, easy to reverse, and relatively easy to distribute, but they are generally associated with brief continuation, and are often fail to prevent unwanted pregnancies and births. Sterilization not only averts large number of unwanted births but also benefits women's health by reducing the absolute number of pregnancies. A study of twelve developing countries including India has reported that the number of births averted by one sterilization was more than three times the number averted by the use of an intrauterine device (Ross et al. 1986). It restricts fertility largely and as a consequence, proportion of first order births tends to rise and proportion of higher order births tends to fall. This change in the pattern of fertility may reduce maternal, infant and child mortality rates on an aggregate level.

Numerous studies have shown that the impact of sterilization on fertility depends upon the characteristics of the users (Ross, 1992; Ross et al., 1987). In Southern India, for example, considerable variations in the levels of fertility and contraceptive use, especially the acceptance sterilization, is observed. The percentage of couples sterilized was 57 percent, 52 percent, 51 percent, 46 percent in Andhra Pradesh, Karnataka, Kerala and Tamil Nadu states, respectively (IIPS and ORC Macro, 2000). But the estimated total

fertility rates were 2.3, 2.1, 2.0 and 2.2 in Andhra Pradesh, Karnataka, Kerala and Tamil Nadu, respectively. Similarly, the unwanted fertility was estimated to be highest in Karnataka state followed by Tamil Nadu, Andhra Pradesh and Kerala states (see: page 126, IIPS and ORC Macro, 2000). Thus, it is interesting to observe the characteristics of acceptors and the significance of sterilization on fertility in these states. The present study proposes to examine three important demographic aspects viz. the timing of sterilization, fertility among sterilized and non-sterilized couples, and the impact of sterilization on fertility according to various socio-economic characteristics of women. The study will also examine the role of selected program factors on the three demographic aspects mentioned.

### **Objectives**

The proposed study aims:

- 1) To examine the differentials in the timing of sterilization and fertility among sterilized and non-sterilized couples according to various socio-economic characteristics
- 2) To assess the impact of sterilization on fertility according to various socio-economic characteristics
- 3) To appraise the role of selected program factors on the timing of sterilization and fertility among sterilized and non-sterilized couples
- 4) To examine the role of selected program factors in the impact of sterilization on fertility

### **Data**

The present study proposed to use data from the large-scale national sample survey, National Family Health Survey –2 (NFHS-2) conducted in India during 1998-2000. Data for the four southern states only will be used for the present study. The details of the sample design and implementation of the survey can be obtained from the all India NFHS report (IIPS and ORC Macro, 2000). Relevant questions on fertility and timing of sterilization were included in the Women’s Questionnaire. In addition, information on relevant program and community level variables will be extracted from the village data file. Since the data on program and community level variables were available only for rural women, while analyzing the role of selected program factors the study will restrict to rural women.

## Methodology

Let 't' be the time that elapsed before an individual woman or her spouse experiences the event (sterilization). On the other hand clearly a significant number of women (or couples) do not experience the event at the time of survey, that is, we get censored observations. In such situation, life table analysis provides the basic methodology for examining the differentials. The basic approach would be to categorize the duration into a number of segments and then follow up the future transition through these segments. The conditional probability of being sterilized between time points  $t_i$  and  $t_{i+1}$ , ( $q_i$ ), and the conditional probability of not being sterilized in the same interval ( $p_i$ ) are given as:

$$q_i = (d_i/n_i)$$

and  $p_i = 1 - q_i$  with  $n_i = n_i^* - (C_i/2)$

where,  $n_i^*$  = the number of couples exposed at the beginning of interval ( $t_i, t_{i+1}$ )

$d_i$  = the numbers of couples were sterilized in the same interval

$C_i$  = the number of couples among those who had both terminated and reached the same interval without experiencing the event (that is non-sterilized couples).

The proportion surviving ( $S_i$ ) from experiencing the event (or non-sterilized) at the end of the interval ( $t_i, t_{i+1}$ ) is given as:

$$S_i = (1 - \prod p_i)$$

The differentials in fertility are studied through average children ever born to women by the acceptance of sterilization. For carrying out this analysis, we have grouped women into two groups as sterilized and non-sterilized and the differentials in their fertility are studied by background characteristics of the women and her spouse. There is a notion that women choosing for sterilization may be self-selected for higher than average fecundity. To examine this idea, the fertility experience of sterilized women during the five-year period before sterilization (that is from the date of last birth) was compared with that of the non-sterilized women who have a marital duration of five years from the last birth. The above indicator can tell us whether the women or couple's sterilized have a higher fertility than the non-sterilized women during the previous five year period from the last birth.

The effect of sterilization on fertility in the above listed three states has studied by parity progression ratio approach. The methodology that was forwarded by Stupp and Samara (1994) is adopted for the present paper. In this approach, total marital fertility is disaggregated through parity progression ratios. It is well known that the total marital fertility can be expressed as:

$$TMFR = P_0 + P_0 * P_1 + P_0 * P_1 * P_2 + \dots + P_0 * P_1 * P_2 * \dots P_i$$

where, 'i' is the maximum parity achieved and  $P_0, P_1, P_2, \dots,$  and  $P_i$  are the proportion of women at parity "i" would progress to "i+1". The life table approach is used for computing the proportion of women progressing to higher parity. The  $P_i$  values are computed by combining the synthetic cohort probabilities of progressing to a given parity within intervals of duration since the previous parity was achieved. The progression ratios calculated took into account all exposure and births falling within the period categorized by intervals of duration up to 120 months since the previous birth. In general,  $P_i$  values are computed as:

$$P_i = 1 - S_i(120)$$

where,  $S_i$  is the proportion of women not progressing to parity 'i'. In order to get the birth averted due to sterilization, a hypothetical total marital fertility rate (TNSMFR) that would have occurred in the absence of sterilization is computed by using the above equations. The difference in the TNSMFR and the TMFR in the presence of sterilization will give the average number of births averted per woman in a population.

## Results

Following are some observations from our preliminary analysis.

- ⇒ Significantly high proportion of women from Southern States of India undergo sterilization within the first 10 years of marriage. These percentages are higher than the national average.
- ⇒ Sterilization rates significantly vary among other social and economic conditions of the respondents.

- ⇒ The number of children ever born in the last five years prior to the last birth did not vary significantly between sterilized and non-sterilized couples. Fertility among sterilized women is higher than that of non-sterilized women after controlling for ever use of contraception prior to sterilization, parity at use, and background variables. This could imply that women prefer sterilization once they reach the desired number of children.
- ⇒ Our estimation shows that about two children per woman were averted through sterilization. However, this number is slightly over two children in States such as Karnataka and Andhra Pradesh.