

CORRELATES OF FEMALE STERILIZATION REGRET IN THE SOUTHERN STATES OF INDIA

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Summary. This study analyses factors associated with the incidence of sterilization regret in the four south Indian states of Andhra Pradesh, Karnataka, Kerala and Tamil Nadu. Using data from the National Family Health Surveys, in all four states the incidence of regret was found to be less than 10% and the factors significantly associated with it were child loss experience and quality of services. Hence, there is a need to improve the quality of services, both in terms of counselling and service provision, and women need to be counselled about the permanent nature of sterilization in order to avoid future regret.

Introduction

Sterilization is a permanent method of contraception that cannot easily be reversed to restore fertility, as can be done in the case of temporary methods such as the intrauterine device (IUD), oral pills or the diaphragm. Therefore any decision to become sterilized for contraceptive reasons should be made after careful thought and being adequately informed of the low chances of its reversal (Petta *et al.*, 1995). From a programme perspective it is costly and difficult to provide services for reversal of sterilization. Given this, it is in the interests of both clients and providers to keep the chances of future regret after sterilization at a minimum.

The most frequently used surgical method of contraception in many parts of the world is female sterilization. Globally, more than 138 million women of reproductive age had been sterilized at the beginning of the nineties (Church & Geller, 1990). In several countries where the acceptance of female sterilization has been rather high, like the United States, Canada and Brazil, the phenomenon of sterilization regret has also been noticed (Henshaw & Singh, 1986; Marcil-Gratton, 1988; Vieira & Ford, 1996). It has been estimated that about 10% of sterilized women have experienced some degree of regret about having undergone this procedure (Warren *et al.*, 1988; Calvert, 1995).

Women who have experienced marital problems, who are under 30 years of age, who have less than high school education and who are not participating in the labour force are more likely to regret sterilization (McGonigle & Huggins, 1990). A study in the Dominican Republic (Loaiza, 1995) emphasized the need to improve the quality of sterilization counselling, since a higher proportion of younger women with fewer children, and women who had the operation before they had used any other method of contraception tended to regret being sterilized. Women with a history of elective abortions or poor pregnancy outcomes also tend to regret more frequently (McGonigle & Huggins, 1990).

Sterilization regret in Thailand was found to be higher when the method used was tubectomy rather than vasectomy (Pitaktesombati & Janowitz, 1991). This difference persisted even when other variables were introduced as controls, such as the number of children at the time of sterilization, subsequent death of a child, whether sterilization was done at the time of a Caesarean section and the residency status of the respondent.

While most studies have examined sterilization regret for individuals who wished either that they had not undergone it at the time they did, or not at all, a study in Sri Lanka (Hapugalle *et al.*, 1989) noted regret that existed because women would have liked it earlier.

If for any reason an individual wants reversal, the surgery needed is costly, difficult and has very little chance of being successful. Of 394 women who requested reversal of tubal sterilization during 1984–92 at Brazil's State University of Campinas infertility clinic, only 69 eligible candidates finally persevered with the process. In a 12-month follow-up, only thirteen of them achieved pregnancy (Petta *et al.*, 1995).

The desire for reversal of sterilization has been found to be highest among minorities such as African-American or Hispanic groups (Henshaw & Singh, 1986). Even though a small percentage of women who regret sterilization ask about surgical reversals (Platz-Christensen *et al.*, 1992; Calvert, 1995), the emotional and fiscal costs (where this is not free) of these procedures are quite high.

The Indian situation

In the Indian context, more than two-thirds of couples of reproductive age use sterilization, either male or female. The majority of these sterilizations are female since the contribution of male sterilization to the total number of sterilizations is less than 5% (Government of India, 1996).

One possible explanation for sterilization regret in India could be the use of coercion to accept sterilization. Coercion had earlier been used in the Indian Family Planning Programme (Misra, 1980) when the number of sterilizations increased from 1354 thousand in the pre-emergency period (1974–75) to 2669 thousand in the first year of emergency and subsequently increased 3.75 times to 8261 thousand in 1976–77 (Government of India, 1996), when the new Population Policy was announced with a clear-cut mandate to reduce the birth rate to 25 per 1000 population by the end of the 6th plan period. There is, however, no reason to believe that sterilizations during the past 20 years were a consequence of coercion.

In the period prior to 1996, the Indian Family Planning Programme was target driven and the emphasis was on a permanent means of contraception, viz.

sterilization. This resulted in higher levels of acceptance of sterilization, especially female sterilization. But such sterilizations were voluntary and the high acceptance of sterilization was due to the high demand for sterilization among the population (IIPS, 1995).

The contraceptive prevalence rate in India has been steadily increasing since the early seventies with the percentage of couples of reproductive age protected by modern methods increasing from 10.4% in 1970–71 to 43.5% in 1992–93 (Government of India, 1994). There are regional variations in the couple protection rates, with the four southern states of Andhra Pradesh, Karnataka, Kerala and Tamil Nadu experiencing relatively higher rates compared with the eastern or northern states. The contribution of sterilization to the couple protection rates (CPRs) in these states is also very high, with more than 80% of the CPR being due to sterilization (calculated from Government of India, 1994). Several researchers have pointed to the poor quality of services in the Indian Family Planning Programme in general (Ravindran, 1993; Gupta, 1993; Ramanathan, Dilip & Padmadas, 1995) and the inadequacy of information being provided to women about the different contraceptive methods (Ramanathan, 1996). Given this, perhaps women who accept sterilization may not be adequately informed of the permanency of, or the possible problems associated with the procedure.

It is possible that the burden of contraception, like that of childbearing, falls to women, not necessarily because they volunteer to use them, but because they do not have a choice. Being unaware of the possible side-effects of sterilization or its irreversibility, they perhaps prefer sterilization and even accept it as a means of avoiding future childbearing. However, subsequent morbidity or the desire for another child results in regret. It should also be remembered that in India, some proportion of the sterilization is postpartum sterilization and so the willingness to accept a permanent contraceptive may be biased by the experience of the birth that has just occurred.

Objectives

There is therefore a clear need to examine the sterilization decision retrospectively and study any reasons for regret. The quality of services in the family planning programme also needs to be examined, especially from the point of view of the acceptance of sterilization and the subsequent regretting of the decision. This paper examines the characteristics of the women undergoing sterilization and their assessment of the quality of services by the subsequent incidence of regret, in order to determine the set of factors that predispose a woman to regret.

Materials and methods

Data

The study uses data from the National Family Health Surveys (NFHS), which is a nationwide study of more than 89,777 women of reproductive age from 25 major states and union territories in India (IIPS, 1995). Analysis is restricted to the four

southern states, namely Andhra Pradesh, Karnataka, Kerala and Tamil Nadu where the contraceptive prevalence rate is relatively higher, and female sterilization makes a disproportionately large contribution to it.

Methodology

A comparison is made between those who regret and those who do not to assess whether any of these characteristics explain regret among sterilization users. Logistic regression is used to identify the factors that are significantly associated with regret and also to calculate the odds ratios.

Limitations

The concept of regret in this study is based on self-reporting. Since this is a cross-sectional retrospective study, it is possible that the status of regret of sterilization is affected by the time lapse from the timing of sterilization, with those having undergone sterilization in the past having more time to develop regret than those who have undergone the procedure more recently.

It is also possible that the intensity of this regret varies between individuals, but the information available in the NFHS data set was not adequate to measure this. However, those who answered that they had regretted having undergone sterilization were asked to state their reasons for doing so, and these have been tabulated. These reasons have been used as an indirect means of evaluating the intensity of regret.

The probability of regret is less than 25% in all the four states and usually in such a situation the results of logistic regression could be biased (Menard, 1995). However, here these results have been used to supplement those obtained from simple bivariate chi-square analysis.

Results

The proportions of sterilization acceptors who subsequently regretted this decision were 4.7%, 4.3%, 8.4% and 9.6% respectively for the four southern states of Andhra Pradesh, Karnataka, Kerala and Tamil Nadu (see Table 1). Regret was higher in the relatively more demographically developed states of Kerala and Tamil Nadu. Regret caused by the desire for an additional child by either of the spouses was higher in the states of Kerala and Tamil Nadu, when compared with the other two states. Other reasons for regret include the health problems faced as a direct consequence of the surgical procedure or the subsequent morbidity caused by it, as perceived by the respondent.

The specific reasons for regret have been further analysed in Table 2. The desire for another child by the woman or her husband accounted for less than a third of the total in the states of Andhra Pradesh, Karnataka and Tamil Nadu. In Kerala, the state that has the lowest fertility levels, this was very high: more than two-thirds of the women regretted the sterilization decision either because they themselves or their husbands desired another child. The proportion of women stating desire to replace a dead child as a reason for regret was lowest in the two states of Kerala and Tamil

Table 1. Percentage distribution of sterilized couples by experience of regret

	Andhra Pradesh	Karnataka	Kerala	Tamil Nadu
Regret due to desire for another child	2.5	1.2	6.7	3.6
Regret due to other causes	2.2	3.1	1.7	6.0
Total regret	4.7	4.3	8.4	9.6
Did not regret	95.3	95.6	91.6	90.4
Total (%)	100.0	100.0	100.0	100.0
Total no. of cases	1772	1728	1921	1436

Table 2. Percentage distribution of couples experiencing sterilization regret by reasons for regret

Reasons	Andhra Pradesh	Karnataka	Kerala	Tamil Nadu
Respondent wants another child	21.7	9.7	57.5	22.8
Replace dead child	22.9	16.7	10.0	7.4
Husband wants another child	8.4	1.4	11.9	7.4
Side-effects	44.6	70.8	18.1	58.8
Other reasons	2.4	1.4	2.5	3.6
Total (%)	100.0	100.0	100.0	100.0
No. of cases	83	75	161	138

Nadu, which have lower infant and child mortality rates in relation to the other two states. Regret due to the side-effects of sterilization was lowest in Kerala, when compared with the other three states.

The sterilization acceptors in these states are categorized in terms of their characteristics (see Table 3). The proportion of women regretting sterilization was classified in terms of the children ever born. The proportion of women with two children or less was about one-third of the total among those regretting and those who did not regret in the three states of Andhra Pradesh, Karnataka and Tamil Nadu. In Kerala, however, close to two-thirds of the women with two or less children regretted sterilization when compared with other states.

A higher proportion of the women who regretted sterilization were those who had problems with sterilization. In Kerala this proportion of women who had problems was lower among both groups, those who regretted and those who did not.

Besides these, sterilization regret was also examined in terms of it being the one and only means of contraception used or if alternatives were used before opting for it. There were no differences in the two groups by the use of sterilization as the first ever

Table 3. Characteristics of sterilization acceptors by regret

Characteristics	Andhra Pradesh		Karnataka		Kerala		Tamil Nadu	
	Y	N	Y	N	Y	N	Y	N
Children ever born								
<2	30.1	22.5	17.3	20.8	61.5	37.7	34.1	26.4
>3	69.9	77.5	82.7	79.2	38.5	62.3	65.9	73.6
Actual fertility more than DFS								
No	94.0	91.4	86.7	87.1	98.7	97.0	80.4	79.3
Yes	6.0	8.6	13.3	12.9	1.3	3.0	19.6	20.7
Problems with sterilization								
Yes	58.5	18.3	73.0	21.1	39.1	15.4	69.3	23.0
No	41.5	81.7	27.0	78.9	60.9	84.6	30.7	77.0
First ever used method sterilization								
Yes	98.8	92.7	88.0	82.9	59.0	60.9	79.0	81.7
No	1.2	7.3	12.0	17.1	41.0	39.1	21.0	18.3
Total (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No. of cases	83	1689	75	1653	161	1760	138	1298

Y denotes regret for sterilization and N denotes no regret for sterilization.

used method. However, more than 80% of the women in the three states of Andhra Pradesh, Karnataka and Tamil Nadu had used sterilization without trying other options.

This magnitude of use of sterilization as the first ever used method is a cause for concern, especially when there is a felt need for spacing (IIPS, 1995). Even if women accepted sterilization as the first option, voluntarily, it does not take away the need to provide alternatives that are less permanent. In India, urbanization and modernization have resulted in a breakdown of the traditional practices of prolonged breast-feeding, postpartum abstinence and other taboos governing frequency of intercourse, and consequently increasing natural fertility levels (Srinivasan *et al.*, 1984; Srinivasan, 1988) and shortening birth intervals (Mishra & Irudayarajan, 1998) have been noticed. This may have resulted in unmet need for birth spacing in India as evident in the NFHS (IIPS, 1995).

The women assessed the quality of sterilization services using a five-point scale, and this information has been classified by the regret status of women in Table 4. The women who regretted sterilization rated the quality of services lower than those who did not regret sterilization across all four states. To test the significance of this relationship, the first three categories of rating of quality of services, viz. excellent, very good and all right, were grouped together to indicate good quality and the last two were grouped together to indicate poor quality. A chi-square test of association found that quality was significantly associated with regret status in the three states of Andhra Pradesh, Karnataka and Kerala (chi-square values of 48.81 [$p=0.0000$], 8.15

Table 4. Distribution of sterilized couples by their evaluation of sterilization care and regret

Sterilization care rating	Andhra Pradesh		Karnataka		Kerala		Tamil Nadu	
	Y	N	Y	N	Y	N	Y	N
Excellent	2.4	9.2	2.8	14.3	3.2	5.2	8.1	12.6
Very good	37.8	41.4	63.4	58.4	40.3	44.3	45.6	52.2
All right	36.6	44.7	22.5	23.8	46.8	46.0	36.0	28.9
Not so good	15.9	4.0	9.9	2.9	5.8	3.7	7.4	5.0
Very bad	7.3	0.7	1.4	0.6	3.9	0.8	2.9	1.3
Total (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Average score	3.12	3.54	3.56	3.86	3.33	3.49	3.49	3.70
SD	0.95	0.74	0.76	0.67	0.80	0.69	0.86	0.80
No. of cases	83	1689	75	1653	161	1760	138	1298

Y denotes regret for sterilization and N denotes no regret for sterilization.

[$p=0.0043$] and 8.19 [$p=0.0042$], respectively). In Tamil Nadu there were indications of a weaker association (chi-square of 2.93, $p=0.0870$). (Since some of the cell frequencies are rather small in magnitude (<10), the chi-square values used here are those obtained with the Yates correction (Blalock, 1979). However, care was taken to ensure that no more than one such frequency existed in any of the 2x2 contingency tables.)

Follow-up services varied in the different states but within each state there were no marked differences between the two categories of women, i.e. those who regretted and those who did not (see Table 5). A higher percentage of women who regretted sterilization rated the follow-up services as poor when compared with those who did not regret. The follow-up services were also rated on a five-point scale starting from excellent to very bad and classified into two groups as good and poor follow-up services by merging the three categories of excellent, very good and all right to constitute good quality and not so good and very bad to indicate poor quality. In all four states, the quality of follow-up services was strongly associated with regret status (chi-square values of 31 [$p=0.0000$], 105.08 [$p=0.0000$], 11.85 [$p=0.0010$] and 46.20 [$p=0.0000$] were computed for Andhra Pradesh, Karnataka, Kerala and Tamil Nadu respectively).

The women who regretted sterilization were more likely to have consulted a doctor than those who did not, but this association was not significant in a majority of the states studied. Finally, the women who regretted sterilization were most likely to say that they had problems with sterilization and this phenomenon was uniform in all four states. This association was found to be statistically significant in all four states (chi-square values were 80.24 [$p=0.0000$] for Andhra Pradesh, 106.32 [$p=0.0000$] for Karnataka, 57.02 [$p=0.0000$] for Kerala and 134.42 [$p=0.0000$] for Tamil Nadu).

Table 5. Distribution of sterilized couples by sterilization regret and quality of services

Quality of services	Andhra Pradesh		Karnataka		Kerala		Tamil Nadu	
	Y	N	Y	N	Y	N	Y	N
Sterilization follow-up								
Yes	30.5	38.1	64.4	53.4	18.4	18.0	37.2	31.9
No	69.5	61.9	35.6	46.6	81.6	82.0	62.8	68.1
Quality of follow-up care								
Excellent		8.3	6.4	10.1	3.4	6.7	9.8	9.8
Very good	32.0	45.8	68.1	59.3	31.0	38.3	49.0	56.4
All right	56.0	44.0	17.1	28.1	51.7	48.6	33.3	33.2
Not so good	8.0	1.7	8.4	2.3		5.8	7.9	0.4
Very bad	4.0	0.2		0.2	13.9	0.6		0.2
Consulted medical person								
Yes	64.6	50.3	52.8	46.6	33.8	31.5	54.0	36.4
No	35.4	49.7	47.2	53.4	66.2	68.5	46.0	63.6
Sterilization problem								
Yes	58.5	18.5	73.0	21.1	39.1	15.3	69.3	22.9
No	41.5	81.5	27.0	78.9	60.9	84.7	30.7	77.1
Total (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No. of cases	83	1689	75	1653	161	1760	138	1298

Y denotes regret for sterilization and N denotes no regret for sterilization.

Apart from the categorical analysis of sterilization acceptors by regret status and specific characteristics, a logistic regression model was used to identify the factors that determine sterilization regret. This was undertaken to understand the relationships between the individual independent variables and the phenomenon of sterilization regret while controlling for the effects of other factors. The set of independent variables considered for the analysis based on available literature (McGonigle & Huggins, 1990; Henshaw & Singh, 1986; Pitaktepsombati & Janowitz, 1991; Loaiza, 1995) were age, work status, pregnancy wastage, experience of child loss, education and assessment of quality of care. All these variables were transformed into dichotomous categories for the analysis.

Discussion

In all the four states examined, experience of child loss was a common significant explanatory variable (see Table 6). Clearly, a woman who had experienced child loss was almost twice as likely to regret her sterilization decision as her counterpart who had no such experience (see Table 7).

Similarly, women's assessment of quality of services did have a bearing on the phenomenon of regret. Women who evaluated the quality as being poor were more likely to regret sterilization than those who evaluated it as good in all four states.

Table 6. Results of logistic regression, dependent variable=sterilization regret

	Independent variables						
	Age	Work Status	Edn	Preg. Waste	Exp. Child Loss	Q. Cont. Serv.	Const.
Andhra Pradesh	0.0341 (0.8900)	- 0.5432 (0.0373)	0.0578 (0.8214)	0.0740 (0.8510)	0.8252 (0.0006)	1.8551 (0.0000)	- 3.4046 (0.0000)
Karnataka	0.5256 (0.0696)	0.4453 (0.0802)	- 0.8757 (0.0095)	0.4137 (0.2304)	0.7662 (0.0025)	0.9685 (0.0181)	- 3.8756 (0.0000)
Kerala	- 0.4512 (0.0193)	0.0676 (0.7179)	- 0.3636 (0.0770)	0.1997 (0.3811)	0.6193 (0.0035)	0.7929 (0.0080)	- 2.0123 (0.0000)
Tamil Nadu	- 0.5764 (0.0032)	0.3854 (0.0421)	- 0.4342 (0.0329)	0.1747 (0.4631)	0.5093 (0.0094)	0.4702 (0.1330)	- 2.1260 (0.0000)

Figures in parentheses are the p values.

Dependent variable=sterilization regret (do not experience regret=0, experience regret=1). Independent variable names and values=Age ($\leq 29=0$, $30+ =1$); Work Status (not working/working at home or outside without wages=0, working outside home for wages=1); Edn=education (illiterate=0, literate=1); Preg. Waste=experience of pregnancy wastage (has never experienced any spontaneous abortion or still birth=0, has experienced spontaneous abortion or still birth=1); Exp. Child Loss=experience of child loss (children ever born=children surviving=0, children ever born > children surviving=1); Q. Cont. Serv.=quality of contraceptive services (excellent, good and all right=0, not so good and very bad=1).

Table 7. Odds ratios from logistic regression, dependent variable=sterilization regret

	Independent variables					
	Age	Work Status	Edn	Preg. Waste	Exp. Child Loss	Q. Cont. Serv.
Andhra Pradesh	1.0347	0.5809	1.0595	1.0769	2.2823	6.3922
Karnataka	1.6915	1.5610	0.4166	1.5124	2.1517	2.6339
Kerala	0.6369	1.0700	0.6952	1.2211	1.8576	2.2098
Tamil Nadu	0.5619	1.4702	0.6478	1.1909	1.6641	1.6003

Dependent and independent variable names and values as in Table 6.

However, while looking at this result it is important to remember that since this is a cross-sectional study, the direction of causation cannot be inferred from the statistical analysis. It is as likely that the regret status influenced the ratings of quality as it is likely that the quality of care influenced the regret status. Prospective studies of sterilization users may be useful to determine the direction of causation.

Age influenced the incidence of sterilization regret. In Andhra Pradesh and Karnataka older women were more likely to regret than younger women. In Kerala and Tamil Nadu younger women were more likely to regret than older women. In this case, the associations were statistically significant.

In Karnataka, Kerala and Tamil Nadu, women who were working were more likely to regret sterilization and in Andhra Pradesh women who did not work were more likely to regret. This association was significant in Tamil Nadu and Andhra Pradesh. Women with more education were more likely to regret sterilization in Andhra Pradesh whereas women with more education were less likely to do so in the states of Karnataka, Kerala and Tamil Nadu.

Women who had experienced pregnancy wastage were more likely to regret sterilization than those who had no such experience. However, this relationship was not found to be statistically significant in any of the four states examined.

The experience of regret by women who had accepted sterilization has implications for the quality of services provided by family planning programmes. Quality needs to be improved by counselling women very carefully about their sterilization decisions, dwelling on its possible irreversibility and providing detailed information about side-effects. This is all the more needed because women who regretted the sterilization decision did so because of subsequent child loss or perceived side-effects.

Careful counselling of women prior to the adoption of sterilization might keep the incidence of regret at relatively low levels. In addition, there is a need to promote other contraceptive methods as available options since an overwhelming majority of women in this study gave sterilization as their first ever used method.

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