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Francis Zavier A. J.* and Sukumari N. Nair**

Regret after Sterilisation: A Socio-Demographic Analysis in South India

Introduction

BEING the most popular birth control method in the world, sterilisation helped to reduce fertility rates in a number of countries (Population Crisis Committee, 1996). The number of sterilisations performed annually in developing countries is high or rising. However, all the sterilised persons are not fully satisfied with the method due to physical and emotional reasons. Philliber and Philliber (1985) observe that regret after sterilisation is common among sterilised populations and in most of the countries the proportion of women regret sterilisation falls below 10 percent. Sterilisation regret is moderately high in Latin American countries where sterilisation use is also high (Loaize, 1995). In Dominican republic Loaize (1995) found that among sterilised women 7 percent were found to be dissatisfied with the method, 17 percent regret being sterilised and 13 percent would not make the same decision again. The pressure, for sterilisation, especially, from Husband and Doctors lead 14 percent women to regret being chosen sterilisation in Zaire (Bertrand, 1991). As a permanent method of family planning, sterilisation has played a significant role in the fertility transition among some of the states in India and is a crucial factor in other states. Sterilisation turned out to be an important birth control method since the implementation of the family planning programme in India in 1952. Sterilisation, IUD and Conventional Contraceptives (CC) are the three popular methods offered through.this programme. A total of 4.58 million sterilisations were done in the country in 1994-95 as against 4.50 million in the previous year. Among the South Indian states, Kerala and Karnataka reported better performance in 1994-95 than in 1993-94. In India, due to sterilisation 30.2 percent were effectively protected as on March 1995 (Government of India, 1996). AH the South Indian states—Andhra Pradesh, Karnataka, Kerala and Tamil

* Research Scholar, Department of Demography, University of Kerala.
** Research Investigator, Population Research Centre, University of Kerala.

Nadu—have a higher percentage of effectively protected couples than all India average of 45.8 percent. Among these states, Kerala and Tamil Nadu achieved more than 100 percent of the target and in Karnataka, it is 88.9 percent and Andhra Pradesh achieved 96 percent of total targets in the year 1994-95.

In Kerala, family planning programmes started relatively later. In 1972, out of the couples protected by the three methods—sterilisation, IUD and CC (20 percent of total couples were protected in Kerala at that time)—17.5 percent were by sterilisation. During 1957-1972,5.42 lakhs births had been averted by sterilisation (Kurup, 1978). From 1980 onwards Kerala was able to maintain consistently an achievement of over 90 percent of the target of sterilisation every year. Kerala was the pioneer in massive vasectomy camps. The mass vasectomy camp held during July 1971 in Ernakulam, Kerala performed a total of 62,913 vasectomies during the month (Krishnakumar, 1972 and Nair P. S., 1974). This encouraged other states to adopt it. However, the massive camp approach of vasectomy was abandoned in 1973, but still sterilisation maintains its top position among the various family planning methods in Kerala.

In all countries, couples who want no more children have the option of sterilisation. A satisfied and successful case of sterilisation can be the best medium for motivating and promoting people to adopt this method. According to National Family Health Survey (1992-93) in Kerala, 99 percent of currently married women have the knowledge of female sterilisation and 90 percent have knowledge of male sterilisation. Moreover, 76.8 percent of the intended users prefer sterilisation among those 58.3 percent intends to use it within 12 months (Nair P. S. *et al,* 1995). In Andhra Pradesh, 38.1 percent accepted female sterilisation and 6.6 percent male sterilisation. Among the intended users of tubectomy, 74.5 percent prefer to use it within 12 months after the Survey (Ramachandrudu *et al,* 1995). In Tamil Nadu, 37.5 percent underwent tubectomy operation and only 2 percent accepted vasectomy and within 12 months followed by the survey 65.5 percent intends to use these methods (Ramanujam *et* a/., 1995). Similarly, in Karnataka, 67.4 percent of all the intended users of female sterilisation prefer to use it within one year after the survey. Among the current users of family planning methods, 41 percent are using tubectomy (Rao *et* a/.,1995). Among the South Indian states, highest proportion of sterilisation regret is in Tamil Nadu (9.7 percent) followed by Kerala 8.4 percent. Relatively low percent of sterilisation regret is seen in Karnataka (4.3 percent) as well as in Andhra Pradesh (4.7 percent). Considering the high demand for sterilisation in the future and the role it has been playing, regret after sterilisation must be addressed. There is hardly any study that focused attention in this area in our country. Therefore, the aim of the present study is to find out the social and demographic factors leading to regret after sterilisation in Southern region of India.

Data and Methodology

National Family Health Survey (NFHS, 1992-93) was designed to collect data on the demographic and socioeconomic differentials of fertility, family planning, and maternal and child health. The NFHS covered 24 states and the National Capital Tarritory of Delhi, which comprise 99 percent of the total population of India. In all, 89,777 ever-married women age

13-49 and 88,562 households were covered with uniform questionnaires, sample designs and field procedures. The data collection was carried out on a state-by-state basis during April 1992 to September 1993. The NFHS in Kerala was done during October 1992 and February 1993 and collected information from all fourteen districts on a representative sample of 4332 ever married women age 13-49 from 4387 households. In Tamil Nadu, NFHS was carried out during April-July 1992 and collected information from 3948 ever married women. In Karaataka, a sample of 4413 ever married women (interviewed during November 1992-February 1993) and in Andhra Pradesh, a sample *of 4216* ever married women were interviewed during April-July 1992.

Sterilisation for this study is defined as either male or female sterilisation. The respondents (women aged 13-49 years) were asked whether they regret in accepting sterilisation or not and reasons for regret were collected from those who have regrets. Using logistic model the effects of socio-demographic variations on regret after sterilisation are estimated. The regression models estimated are based on the following form:

Prob (event) = I/ [1 + *e* - *(BO + BiX)], BO* and *Bi* are coefficients, *X* is the vector of independent variables.

Variables Used for the Logistic An alysis

Sterilisation Regret

The respondent's/her husband's regret for having been sterilised. *Age*

of the Respondent

Age of the respondent at the time of the survey is taken as present age of the respondent. It is defined in two categories, women aged < 30 years and > 30 years. Respondents whose age < 30 years is taken as the reference category for analysis.

Age at Marriage of the Respondent

Age at first marriage of the respondent is considered for the present analysis. It is defined as following age groups, < 20 years and > 20 years (reference period is respondents whose age at marriage < 20 years) for Kerala and for other states < 15 years and >15 years (reference period is respondents whose age at marriage is < 15 years).

Work Status of the Respondent

This is grouped into two categories working and non-working. The reference category is working women.

Age at Sterilisation

Since, sterilisation here taken as vasectomy and tubectomy, age at sterilisation is defined as age at sterilisation of the respondent (for tubectomy) or respondent's age at the time of

husband's sterilisation (for vasectomy) and is grouped into two, women sterilised before 25 years and 25 years or after. Base line for the analysis is the respondents whose age at sterilisation is less than 25 years.

Source of Sterilisation

The source (public or private) from which the respondents were sterilised is considered here. For the analysis, private source is taken as the reference category.

Religion of the Respondents

The three major religions Hindu, Christian and Muslims are taken for the analyses. For comparison Hindu women are taken as the reference category.

Education of the Respondent

For the logistic analysis education is grouped into two categories, namely, illiterates and literates. The reference category is illiterate women.

Sex Combination of Children

It is defined into three categories, those having sons only, having daughters only and those having both son and daughter. Those having both son and daughter is considered as the reference category.

Location of the Residence

Respondents current place of residence (whether they are living in urban or in rural area) is used for the analysis. Urban area is taken as the reference category.

Findings

Reasons for Regret

The respondents were enquired about the reasons for regret and they gave various reasons. Table 1 presents reasons for which the respondent or her husband regret sterilisation being

TABLE 1: REASONS FOR REGRET STERILISATION

Reason	*Kerala*	*Karnataka*	*A.P.*	*T.N.*	*India*
Respondent wants another child	57.5(92)	9.7(7)	21.7(18)	22.8(31)	28.8
Replace dead children	10.0(16)	16.7(12)	22.9(19)	7.4(10)	13.4
Husband wants another child	11.9(19)	1.4(1)	8.4(7)	7.4(10)	4.8
Side effects	18.1(29)	70.8(51)	44.6(37)	58.8(80)	47.4
Other reasons	2.5(04)	1.4(1)	2.4(02)	3.7(5)	5.6
Total	100.0(160)	100.0(72)	100.0(83)	100.0(136)	(1439)

done. In general, side effect is the main reason for sterilisation regret in India (UPS, 1995). Among the states, in Karnataka (70.8 percent), Andhra Pradesh (44.6 percent), and Tamil Nadu (58.8 percent) side effects after sterilisation is the main reason for regret, corresponding all India figure is 47.4 percent. Dharmalinkam (1995) observed that in Terunelveli (Tamil Nadu) spousal relationships and physical and material cost after sterilisation were found to discourage the practice of family planning. In Kerala, only 18.1 percent of the respondents reported side effects as the reason and the main reason for regret is "Respondent wants another child". It is the second dominant reason for sterilisation regret in Tamil Nadu (22.8%) and all India (28.8 percent), whereas in Karnataka (16.7 percent) and Andhra Pradesh (22.9 percent) the second dominant reason is "replace dead children". Studies show that in developing countries sterilisation regret is associated with desire for more children whereas in developed countries it is because of remarriage and the desire to have children in the new marital union (Piotrow, 1980). Kerala is an exception among the south Indian states in the case of reason for regret. Therefore it is interesting to look into the determinants of sterilisation regret. The subsequent sections analyse the determinants.

Kerala

Present age of the respondents is an important factor that affects the sterilisation regret. Table 2a shows that 14 percent of the total sterilisations in the age group 20-24 regret the decision to sterilise and 11 percent in 30-34 age group regret. It shows a decreasing trend after age 30. Age distribution of the respondent's husband shows that highest percent of regret is seen among the 30-34 years age group. It is interesting to note that all the 4 husbands aged 20-24 regret the decision to sterilise. Husband's age also shows a decreasing trend as the age increases.

The low age at marriage of the respondents is likely to increase the couples decision to sterilise, because it allows the women more years to be in the reproductive period. The table shows that those who married between 25 and 29 years and presently sterilised, 14 percent regret it and 10 percent of those who married below 15 years regret it.

Age at sterilisation of the respondents has great influence on regretting sterilisation. It is likely that those who adopt sterilisation at younger ages regret it later, because the woman has to be live more years without the risk of bearing children, meanwhile situation may change. The table shows that out of the total sterilisations in the age below 25 years of the respondents, 10.78 percent is regretting it and 7.33 percent in the age group 25-29 and 6.6 percent in the age above 30 years regret after sterilisation. This shows that those who underwent sterilisation operation at younger ages might regret it later compared to others.

Another important determinant of the risk to sterilise is the number and sex of the children they are having. In our sample 45 percent of the respondents with one living child regret being done sterilisation and only 10.98 percent of the respondents with two children regret it. The proportion of sterilisation regret is less with increase in the number of children.

Sterilisation regret by sex of living children reveals that sex preference of the children is a likely factor for sterilisation regret cases. Highest percentage of sterilisation regret is noticed among those having either sons or daughters only. In the sample, 5 out of 6 persons

who were sterilised and also having no children at the time of the survey, regret being accepted sterilisation. Among the respondents, 20.31 percent with daughters only and 14.14 percent with sons only regret being done sterilisation. Compared to those having no girls, relatively higher proportion of respondents with no boys regret sterilisation. This shows the son preference among the sample women. A strong association between not having a child of each sex and regret after sterilisation rather than the number of children found among Sri Lankan women (Hapugalla *et al.*, 1989). Desire to have another child of particular sex was the reason for one-third of sterilisation regret cases in Sao Paulo (Vieira, 1996).

TABLE 2 a: DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS IN KERALA

Characteristics	*Regret*		*No regret*	
	%	(No.)	%	(No.)
Age of the respondents				
15-19	0.00	(0)	100.00	(1)
20-24	13.69	(10)	86.31	(63)
25-29	9.42	(34)	90.58	(327)
30-34	10.83	(47)	89.17	(387)
35-39	9.00	(42)	91.00	(427)
40+	4.86	(28)	95.14	(548)
Husbands age				
20-24	100.00	(4)	0.00	(00)
25-29	10.98	(9)	89.02	(73)
30-34	12.07	(28)	87.93	(204)
35-39	8.70	(41)	91.30	(430)
40+	7.02	(79)	92.98	(1046)
Respondents age at marriage				
<15	10.28	(ID	89.72	(90)
15-19	8.06	(85)	91.94	(969)
20-24	7.81	(50)	92.19	(590)
25-29	13.86	(14)	86.14	(87)
30+	8.33	(01)	91.67	(ID
Age at sterilisation				
<25	10.78	(73)	89.22	(604)
25-29	7.33	(56)	92.67	(708)
30+	6.60	(3D	93.40	(439)
Total number of living children				
0	83.33	(5)	16.67	(1)
1	45.00	(18)	55.00	(22)
2	10.98	(87)	89.02	(705)
3+	4.74	(51)	95.26	(1025)
Sex combination children				
No Children	83.33	(5)	16.67	(1)
Have sons and daughter	4.46	(60)	95.53	(1283)
Daughters only	20.31	(53)	79.69	(208)
Sons only	14.14	(43)	85.86	(261)

Education is the key factor that influences the attitude, practice and behaviour of the couples towards family formation. Among the total sterilisations, respondents whose educational level is below upper primary, 21.23 percent are recorded regretting sterilisation (Table 2b). The percentage of regret is around 7 for those who have education between upper primary and below P.O. level. Among the 16 sterilised persons who were educated up to post graduate or above, none regret being sterilised. Educational level of respondent's husband shows that husbands having education below upper primary are more likely to regret. In other educational levels no significant difference is seen. The three major religions Hindu, Muslim and Christian are considered for the analysis. In Kerala regret among Christian women is the highest followed by Muslim women. Proportion of regret among Hindu women is the least. This shows that even though being the highest users of family planning methods, Christian women regret their decision to sterilise.

TABLE 2b: SOCIO-ECONOMIC CHARACTERISTICS OF THE RESPONDENTS IN KERALA

Chracteristics	*Regret*		*No regret*	
	%	(No.)	%	(No.)
Respondents education				
Illiterate	10.90	(23)	89.10	(188)
Lower primary	10.33	(50)	89.67	(434)
Upper primary	6.63	(32)	93.37	(451)
High school	7.78	(49)	92.22	(581)
Below P. G.	7.78	(7)	92.22	(83)
P. G. & above	0.00		100.00	(16)
Husband's education				
Illiterate	8.60	(13)	91.40	(138)
Lower Primary	10.28	(51)	89.72	(445)
Upper primary	7.16	(39)	92.84	(506)
High school	8.45	(48)	91.55	(520)
Below P. G.	5.74	(7)	94.26	(115)
P. G. & above	9.38	(3)	90.62	(29)
Religion of the respondents				
Hindu	7.24	(89)	92.76	(1140)
Muslim	9.41	(27)	90.59	(260)
Christian	11.48	(45)	88.52	(347)
Type of residence				
Urban	8.09	(45)	91.91	(515)
Rural	8.57	(116)	91.43	(1238)
Source of sterilisation				
Government hospitals/institutions	9.04	(136)	90.96	(1369)
Private hospitals/institutions	6.16	(25)	93.84	(381)

Sterilisation regret by the type of residence shows that 8.09 percent of the respondents out of the total sterilisations in urban areas regret being sterilised, the corresponding figure for rural areas is 8.57 percent, i.e., there is not much difference in regretting sterilisation whether they reside in rural or urban areas.

Receiving sterilisation from the government service can lead to a higher sterilisation regret than private service. The reason for the regret may be most of the sterilisation in the public service is done through Government institutions, where the necessary facilities are lacking. Moreover, the Government personnel are keen on achieving their target only. Data suggest that 9.04 percent of women who received sterilisation from public service regret sterilisation whereas the corresponding figure in private sector is 6.16 percent. This shows the relative better care and facilities in the private sector.

The results of logistic analysis for sterilisation regrets are presented in Table 3. The estimated effects of the independent variables and its significant levels are presented in this

TABLE 3 : LOGISTIC ANALYSIS FOR KERALA

Variables	*B*	*Exp (B)*
Present age of the Respondents	-0.2002	0.8185
Age at marriage	-0.2468	0.7815
Age at sterilisation	-0.5016**	0.6065
Christian	0.7455***	2.1074
Muslim	0.5556**	1.7430
Education of respondents	-0.7288***	0.4825
Source of sterilisation	0.4250*	1.5295
Having daughters only	1.7570***	5.7949
Having sons only	1.2315***	3.4263
Work status of respondents	-0.1090	0.8967
Location of residence	-0.1052	0.9002
Constant	-2.3825***	
-2 Log likelihood	974.8370	

*p<0.1 **p<.05 ***p< .001

table. In Kerala, present age below 30 years, age at first marriage below 20 years, work status of the respondents and type of residence have no significant relation with the dependent variable, sterilisation regret, i.e., in Kerala these variables are unimportant in explaining sterilisation regret. Other independent variables give a significant relation with the dependent variable. Age at sterilisation is positively associated with sterilisation regret. Those sterilised at an age older than 25 years have 0.61 times more regret than their counterparts, i.e. who sterilised at an age younger than 25 years. In Metropolitan Montreal, women who choose sterilisation before the age of 30 were the most likely to regret the decision (Marcil-Graton, 1988). In Sao Paulo undergoing sterilisation at young age was significantly associated with sterilisation regret. Both the religions, Christian and Muslim, have a significant positive relation with the dependent variable. Christian women have 2.11 times more regret than Hindu women and Muslim women have 1.74 times more regret than Hindu women. The literate women have 0.48 times more regret than their peers in illiterate category. Acceptance of sterilisation from government sources is also one of the factors leading to sterilisation regret. Finally, the sex combination of children gives the strongest positive relation of all the independent variables selected. Those who have daughters only regret 5.79 times more than those have

sons and daughters. The risk to regret being sterilised is 3.42 times more to those have sons only than to those have sons and daughters.

Karnataka

In Karnataka, age of the respondents at the time of survey reveals that majority of the respondents who regret sterilisation is in the age group 30-39 years (Table 4a). Regret after sterilisation is more among persons in the age group 35-39 years, 6.15 percent of the total sterilisations followed by 5.4 percent in 30-34 years.

TABLE 4a : DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS IN KARNATAKA

Characteristics	*Regret*		*No regret*	
	%	(No.)	%	(No.)
Age of the respondents				
15-19	12.5	(1)	87.50	(7)
20-24	2.45	(5)	97.55	(199)
25-29	2.80	(12)	97.20	(413)
30-34	5.40	(21)	94.60	(368)
35-39	6.15	(20)	93.85	(305)
40+	4.28	(16)	95.72	(358)
Husbands age				
< 35 years	2.22	(8)	97.78	(352)
35-39	4.81	(18)	95.19	(356)
40-44	3.82	(13)	96.18	(327)
45-49	4.78	(14)	95.22	(279)
50+	6.25	(22)	93.75	(330)
Respondents age at marriage				
<15	5.77	(47)	94.23	(768)
15-19	3.41	(24)	96.59	(679)
20+	2.25	(04)	97.75	(174)
Age at sterilisation				
<25	3.84	(32)	96.16	(801)
25-29	5.25	(29)	94.75	(523)
30+	3.64	(12)	96.36	(318)
Total number of living children				
0	50.00	(2)	5000	(2)
1	12.50	(5)	87.50	(35)
2	4.80	(20)	95.20	(393)
3	2.40	(14)	97.60	(576)
4+	5.02	(34)	94.98	(644)
Sex combination of children				
No children	50.00	(2)	50.00	(2)
Have sons and daughter	3.81	(52)	96.19	(1283)
Daughters only	6.96	(43)	93.04	(261)
Sons only	2.41	(02)	97.59	(81)

Regret after sterilisation is high among those who got married below 15 years. In this age group, 5.77 percent regret it and 3.41 percent of the respondents who married between 15 and 19 years of age and presently sterilised regret the acceptance. Therefore regret is likely more associated with low age at marriage in Karnataka also.

The percentage of respondents who were sterilised and having regret is 3.84 in the age group less than 25 years. Highest proportion having regret is seen among those sterilised between ages 25 and 29 years.

The number of children and sex of the children affect the sterilisation regret. In Karnataka, only 12.5 percent of those having 1 living child regret the method being used, 4.8 percent with 2 living children and 5.02 percent with 4 or more living children regret the acceptance of this method. Sex of the child reveals that 3.81 percent having sons and daughters regret sterilisation. Among the persons who have sons only 2.41 percent and among the respondents with daughters only, 6.96 percent (the highest percent) regret the sterilisation. Having daughters only is a major factor in sterilisation regret in Karnataka.

Table 4b shows that a high percent of the sterilised persons is illiterate. Among the illiterate sterilised persons, 5.87 percent regret it followed by 2.89 percent in the educational level literate to primary. Among working population, 6.32 percent regret after sterilisation, while 2.41 percent among the non-working population regret it. Government services were the main source of sterilisation among the respondents who regret it (4.65 percent). Muslim women constitute the majority of the regret cases in the sample. Among the Hindus, 4.19 percent regret being sterilised.

TABLE 4b : SOCIO-ECONOMIC CHARACTERISTICS OF THE RESPONDENTS IN KARNATAKA

Characteristics	*Regret*		*No regret*	
	%	(No.)	%	(No.)
Respondent's education				
Illiterate	5.87	(62)	94.13	(994)
Literate-primary	2.89	01)	97.11	(369)
Middle school	1.08	(1) 0)	98.92	(92)
High school +	0.51		99.49	(195)
Work status of the respondents				
Working	6.32	(54)	93.68	(801)
Not working	2.41	(21)	97.59	(849)
Religion of the respondents				
Hindu	4.19	(65)	95.81	(1485)
Muslim	7.81	(10)	92.19	(118)
Christian			100.00	(24)
Type of residence				
Urban	1.84	(10)	98.16	(534)
Rural	5.50	(65)	94.50	(1116)
Source of sterilisation				
Government hospitals/institutions	4.65	(70)	95.35	(1437)
Private hospitals/institutions	1.90	(4)	98.10	(207)

In Karnataka, independent variables selected are respondents present age, age at marriage, age at sterilisation, having daughters only, and work status of the respondents. Religion is not taken in the analysis because of lack of representation of all religions. The variable "having sons only" is dropped as the number of cases is very low. Out of the independent variables, respondents present age, age at marriage, having daughters only and work status of the respondents are significant. The results are given in Table 5. It shows that respondents who are in the age group older than 30 years regret 1 .78 times than that of those who are younger

TABLE 5 : LOGISTIC ANALYSIS FOR KARNATAKA

Variables	*B*	*Exp (B)*
Present age of the respondents	0.5796**	1.7854
Age at marriage	0.6591**	1.9330
Age at sterilisation	0.1231	1.1310
Having daughters only	0.8133**	2.2550
Work status of respondents	-0.9197***	0.3986
Constant	-3.7183***	
-2 Log likelihood	569.764	

*p<0.1 **p<. 05 ***p<. 001

than them. Sex combination of children, respondents 'having daughters only' is showing significant relation with sterilisation regret and they regret 2.26 times more than those 'having sons and daughters'. Work status of the respondents shows that in Karnataka, non-working women have less regret than working women (0.40 times less than working). Occupational status of respondents in Karnataka shows that all sterilisation regret cases are doing physically strenuous jobs, such as farming, fishing and hunting (68.8 percent), production and transport (14.1 percent) and sales workers (1.56 percent). Marcil-Graton (1988) commented that women who are in the labour force are less likely than others to regret being done sterilisation in Metropolitan Montreal.

Andhra Pradesh

Tables 6a and 6b show the background characteristics of the respondents in Andhra Pradesh. A scattered pattern of the respondents present age can be seen from the table. In the sample, 6.83 percent in the age group 40-44 years regret sterilisation followed by 5.53 percent in the age group 20-24 years. Age of husbands shows that 5.68 percent of the respondents with regret have husbands aged < 35 years followed by 6.37 percent in age 50 or older.

In Andhra Pradesh also illiterate women formed the majority among the sterilisation regret cases. Among these women, 4.86 percent regret being done sterilisation and 5.46 percent of literate of educated upto primary school level regret. In this state also Hindu women formed the majority among the sterilised persons having regret (4.61 percent). Not much difference in the sterilisation regret can be seen in urban and rural areas; 4.84 percent

in rural areas against 4.47 percent in urban areas. Among the couples who had done sterilisation from Government sources, 4.51 percent regret the method and the corresponding

TABLE 6a: DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS IN ANDHRA PRADESH

Characteristics	*Regret*		*No regret*	
	%	(No.)	%	(No.)
Age of the respondents				
15-19	5.56	(1)	94.44	(17)
20-24	5.53	(13)	94.47	(222)
25-29	3.82	(16)	96.18	(403)
30-34	4.46	(17)	95.54	(364)
35-39	3.26	(11)	96.74	(326)
40+	6.83	(25)	93.17	(341)
Husbands age				
< 35 years	5.68	(25)	94.32	(415)
35-39	2.35	(9)	97.65	(374)
40-44	4.35	(16)	95.65	(352)
45-49	5.79	(13)	94.21	(238)
50+	6.37	(20)	93.63	(294)
Respondents age at marriage				
<15	4.72	(54)	95.28	(1089)
15-19	4.91	(26)	95.09	(503)
>20	3.57	(03)	96.43	(81)
Age at sterilisation				
<25	4.90	(46)	95.10	(892)
25-29	4.47	(23)	95.53	(492)
30+	4.15	(12)	95.85	(277)
Total number of living children				
0	40.00	(2)	60.00	(3)
1	25.40	(18)	74.60	(53)
2	4.80	(21)	95.20	(421)
3	2.40	(15)	97.60	(610)
4+	4.40	(27)	95.60	(586)
Sex combination of children				
No Children	40.00	(2)	60.00	(3)
Have sons and daughters	2.84	(37)	97.16	(1267)
Daughters only	9.66	(17)	90.34	(159)
Sons only	9.96	(27)	90.04	(244)

percentage for private sources is 5.48. The work status of the respondents also show not much difference in sterilisation regret (4.86 percent of non-working against 4.61 percent of working). The age at marriage of the respondents in Andhra Pradesh indicates that 4.72 percent of the sterilisations resulted in regretting the method among who married less than 15 years and 4.91 percent in 15-19 years of age at first marriage. Further, 4.90 percent

in rural areas against 4.47 percent in urban areas. Among the couples who had done sterilisation from Government sources, 4.51 percent regret the method and the corresponding

TABLE 6a: DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS IN ANDHRA PRADESH

Characteristics	*Regret*		*No regret*	
	%	(No.)	%	(No.)
Age of the respondents				
15-19	5.56	(1)	94.44	(17)
20-24	5.53	(13)	94.47	(222)
25-29	3.82	(16)	96.18	(403)
30-34	4.46	(17)	95.54	(364)
35-39	3.26	(11)	96.74	(326)
40+	6.83	(25)	93.17	(341)
Husbands age				
< 35 years	5.68	(25)	94.32	(415)
35-39	2.35	(9)	97.65	(374)
40-44	4.35	(16)	95.65	(352)
45-49	5.79	(13)	94.21	(238)
50+	6.37	(20)	93.63	(294)
Respondents age at marriage				
<15	4.72	(54)	95.28	(1089)
15-19	4.91	(26)	95.09	(503)
>20	3.57	(03)	96.43	(81)
Age at sterilisation				
<25	4.90	(46)	95.10	(892)
25-29	4.47	(23)	95.53	(492)
30+	4.15	(12)	95.85	(277)
Total number of living children				
0	40.00	(2)	60.00	(3)
1	25.40	(18)	74.60	(53)
2	4.80	(21)	95.20	(421)
3	2.40	(15)	97.60	(610)
4+	4.40	(27)	95.60	(586)
Sex combination of children				
No Children	40.00	(2)	60.00	(3)
Have sons and daughters	2.84	(37)	97.16	(1267)
Daughters only	9.66	(17)	90.34	(159)
Sons only	9.96	(27)	90.04	(244)

percentage for private sources is 5.48. The work status of the respondents also show not much difference in sterilisation regret (4.86 percent of non-working against 4.61 percent of working). The age at marriage of the respondents in Andhra Pradesh indicates that 4.72 percent of the sterilisations resulted in regretting the method among who married less than 15 years and 4.91 percent in 15-19 years of age at first marriage. Further, 4.90 percent

regret sterilisation who accepted it at an age less than 25 years and 4.47 percent of the couples who underwent operation at the age 25-29 years.

TABLE 6b: SOCIO-ECONOMIC CHARACTERISTICS OF THE RESPONDENTS IN ANDHRAPRADESH

	Regret		*No regret*	
Characteristics	%	(No.)	%	(No.)
Respondent's education				
Illiterate	4.88	(55)	95.14	(1076)
literate-primary	5.46	(16)	94.54	(277)
middle	5.77	(09)	94.23	(147)
school	1.70	(03)	98.30	(173)
high school+				
Work status of the respondents				
Working	4.61	(42)	95.39	(803)
Not working	4.86	(41)	95.14	(869)
Religion of the respondents				
Hindu	4.61	(72)	95.39	(1490)
Muslim	7.20	(09)	92.80	(116)
Christian	3.08	(02)	96.92	(63)
Type of residence				
Urban	4.47	(24)	95.53	(513)
Rural	4.84	(59)	95.16	(1160)
Source of sterilisation				
Government hospitals/institutions	4.51	(63)	95.49	(1334)
Private hospitals/institutions	5.48	(19)	94.52	(328)

The analysis of total number of children in Andhra Pradesh shows that 25.4 percent with one child and 4.8 with two children regret sterilisation. Among those having more than 4 children, the sterilisation regret is 4.40 percent. In the sample, 9.96 percent having sons only regret being sterilised a relatively higher percent to those having daughters only.

TABLE 7 : LOGISTIC ANALYSIS FOR ANDHRA PRADESH

Variables	*B*	*Exp(B)*
Present age of the respondents	0.3590	1.4324
Age at marriage	0.0259	1.0263
Age at sterilisation	-0.1678	1.8455
Education of respondents	-0.3149	0.7299
Source of sterilisation	-0.2377	0.7885
Having daughters only	1.2927***	3.6426
Having sons only	1.3340***	3.7963
Work status of respondents	0.0577	1.0594
Location of residence	-0.1171	0.8895
Constant	-3.3619***	
-2 Log likelihood	620.9920	

***p< .001

In Andhra Pradesh, the independent variables selected for logistic analysis are respondents present age, age at marriage, age at sterilisation, education of women, source of sterilisation, having sons only, having daughters only, location of the residence and work status of the respondents. Religion is not taken here also, because of lack of representation of all religions. Among these variables "having sons only" and "having daughters only" are significant with sterilisation regret. None of the other variables have a significant relation. Respondents having sons only regret 3.80 times and having daughters only 3.64 times than those having sons and daughters.

Tamil Nadu

The age distribution of the respondents in Tamil Nadu shows that among the women who have regret after sterilisation, 31 percent are in the age group 25-29. Out of the total in this age group, 13.61 percent regret sterilisation (Table 8a) followed by 10.20 percent of the respondents aged 40-44 and 9.38 percent in the age group 20-24. Among the women having regret, 11.73 percent of their husbands are below 35 years of age. The present age of the couples shows that being in the middle age is likely to increase sterilisation regret.

Age at marriage analysis shows that 11.17 percent of the respondents whose age at first marriage is less than 15 years and 9.20 percent in 15-19 age group regret adopting sterilisation. This indicates that lower age at marriage may influence regret after sterilisation. Similarly age at sterilisation is also an important factor influencing regret. In the present sample, 12.26 percent sterilised before 25 years regret in accepting the method. Among the women who have regret, majority are in this age group. Those who were sterilised at an age greater than 30 years recorded 11.48 percent. Lower percent of sterilisation regret can be seen among those who were sterilised between the ages 25 and 29 years.

Regret sterilisation by total number of children shows that 25 percent who regret sterilisation have a single child only and 11.1 percent have 2 children. Those having 4 children or more the percent of regret is not low (8.47 percent). The reason for regret may be due side effects of sterilisation rather than preference for sex of their children. The percent of regret is the highest among those either having daughters only (17.6 percent) or having sons only (15.19 percent). Among those having both sons and daughters sterilisation regret is 7.02 percent.

Table 8b shows that majority (67 percent) of the regret cases are illiterate persons. Among the total sterilisations, 12.3 percent in the illiterate group and 7.86 percent in literate to primary group regret being sterilised. It is clear from the table that as education increases regret after sterilisation decreases.

Among the persons who regret being done sterilisation, Hindu women recorded 92 percent of the total regret cases. Among the total Hindu women who were sterilised, 9.82 percent regret for the acceptance. The representation of other religious groups in Tamil Nadu is negligible. Respondents present location of residence reveals that 10.26 percent in the rural areas regret sterilisation while it is 8.35 percent in urban areas. This shows that rural women are more likely to regret than urban women in Tamil Nadu. In this state, 92.2 percent of the regretted cases underwent sterilisation operations at Government institutions. Among this

TABLE 8a: DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS IN TAMIL NADU

Characteristics	*Regret*		*No regret*	
	%	(No.)	%	(No.)
Age of the respondents				
15-19	0.00	(0)	100.00	(7)
20-24	9.38	(12)	90.62	(116)
25-29	13.61	(43)	86.39	(273)
30-34	7.29	(24)	92.71	(305)
35-39	7.82	(23)	92.18	(271)
40+	10.20	(36)	89.80	(317)
Husband's age				
< 35 years	11.73	(38)	88.27	(286)
35-39	10.71	(33)	89.29	(275)
40-44	7.27	(21)	92.73	(268)
45-49	8.98	(23)	91.02	(233)
50+	9.02	(22)	90.98	(222)
Respondent's age at marriage				
< 15	11.17	(45)	88.83	(358)
15-19	9.20	(70)	90.80	(691)
20-24	8.85	(23)	91.15	(237)
Age at sterilisation				
<25	12.26	(70)	87.74	(501)
25-29	5.64	(29)	94.36	(485)
30+	11.48	(38)	88.52	(293)
Total number of living children				
0	50.00	(4)	50.00	(4)
1	25.00	(14)	75.00	(42)
2	11.10	(48)	88.90	(380)
3	7.10	(36)	92.90	(469)
4+	8.47	(36)	*91.53*	*$9}*
Sex combination of children				
No children	50.00	(4)	50.00	(4)
Have sons and daughter	7.02	(73)	92.98	(967)
Daughters only	17.60	(25)	82.40	(117)
Sons only	15.19	(36)	84.81	(201)

group of women, 10.57 percent regret it. There are only 10 cases of acceptance from private sources.

, for the logistic analysis independent variables selected were respond

present age, age at marriage, age at sterilisation, education of women, having sons only, having daughters only, location of the residence and work status of the respondents. Out of these only three variables are significant. The results are presented in Table 9. The analysis show that illiterate women are more likely to regret than literate women. The literate women regret 0.5 times than that of illiterate women. Sex combination of children give a highly significant positive relation. Women "having boys only" regret 2.3 1 times more than that of

TABLE 8a: DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS IN TAMIL NADU

Characteristics	*Regret*		*No regret*	
	%	(No.)	%	(No.)
Age of the respondents				
15-19	0.00	(0)	100.00	(7)
20-24	9.38	(12)	90.62	(116)
25-29	13.61	(43)	86.39	(273)
30-34	7.29	(24)	92.71	(305)
35-39	7.82	(23)	92.18	(271)
40+	10.20	(36)	89.80	(317)
Husband's age				
< 35 years	11.73	(38)	88.27	(286)
35-39	10.71	(33)	89.29	(275)
40-44	7.27	(21)	92.73	(268)
45-49	8.98	(23)	91.02	(233)
50+	9.02	(22)	90.98	(222)
Respondent's age at marriage-				
< 15	11.17	(45)	88.83	(358)
15-19	9.20	(70)	90.80	(691)
20-24	8.85	(23)	91.15	(237)
Age at sterilisation				
<25	12.26	(70)	87.74	(501)
25-29	5.64	(29)	94.36	(485)
30+	11.48	(38)	88.52	(293)
Total number of living children				
0	50.00	(4)	50.00	(4)
1	25.00	(14)	75.00	(42)
2	11.10	(48)	88.90	(380)
3	7.10	(36)	92.90	(469)
4+	8.47	(36)	91.53	(389)
Sex combination of children				
No children	50.00	(4)	50.00	(4)
Have sons and daughter	7.02	(73)	92.98	(967)
Daughters only	17.60	(25)	82.40	(117)
Sons only	15.19	(36)	84.81	(201)

group of women, 10.57 percent regret it. There are only 10 cases of acceptance from private sources.

In Tamil Nadu, for the logistic analysis independent variables selected were respondents present age, age at marriage, age at sterilisation, education of women, having sons only, having daughters only, location of the residence and work status of the respondents. Out of these only three variables are significant. The results are presented in Table 9. The analysis show that illiterate women are more likely to regret than literate women. The literate women regret 0.5 times than that of illiterate women. Sex combination of children give a highly significant positive relation. Women "having boys only" regret 2.3 Itimes more than that of

TABLE 8b : SOCIO-ECONOMIC CHARACTERISTICS OF THE RESPONDENTS IN TAMIL NADU

Characteristics	*Regret*		*No regret*	
	%	(No.)	%	(No.)
Respondent's education				
Illiterate	12.30	(93)	87.70	(663)
Literate-primary	7.86	(29)	92.14	(340)
Middle school	4.64	(07)	95.36	(144)
High school+	5.96	(09)	94.04	(142)
Work status of the respondents				
Working	11.21	(85)	88.79	(673)
Not working	7.78	(52)	92.22	(616)
Religion of the respondents				
Hindu	9.82	(127)	90.17	(1166)
Muslim	3.33	(2)	96.77	(60)
Christian	12.86	(9)	87.14	(61)
Type of residence				
Urban	8.35	(37)	91.65	(406)
Rural	10.26	(101)	89.74	(883)
Source of sterilisation				
Government hospitals/institutions	10.57	(127)	89.43	(1075)
Private hospitals/institutions	4.52	(10)	95.48	(211)

TABLE 9: LOGISTIC ANALYSIS FOR TAMIL NADU

Variables	*B*	*Exp(B)*
Present age of the respondents	-0.0833	0.9201
Age at marriage	0.0814	1.0848
Age at sterilisation	-0.3528	0.7027
Education of respondents	-0.6947**	0.4992
Having daughters only	1.1320***	3.1017
Having sons only	0.8380***	2.3118
Work status of respondents	-0.2403	0.7864
Location of the residence	-0.0142	0.9859
Constant	-1.9598***	
-2 Log likelihood	848.610	

*P<0.1 **P<.05 ***P<.001

those "having sons and daughters". Similarly, those "having daughters only" regret 3.10 times than that of those having sons and daughters.

Summary and Conclusions

Although in developing countries, regret followed by sterilisation is due to the desire for more children, the pattern is not true in the case of South India, except Kerala. In general,

the regret is due to the side effects of sterilisation in South India. A large proportion of respondents in Andhra Pradesh, Tamil Nadu and Karnataka received sterilisation service from government sources. Also, side effects among women who utilised governmental source for sterilisation was found higher than those who utilised private sources. This finding concludes that care during and after sterilisation could be lacking for these women. In Kerala, the desire to have another child is the major reason for regret. Among the four states selected, sex combination of children is major factor affecting the regret after sterilisation. Therefore, it can be concluded that people had the intention to prefer the sex of their children, but the social norms regarding the number of children at the time of sterilisation prevented them from doing so. The regret after sterilisation is partly due to cultural practice, i.e., the value of sons in our society. Other factors influencing regret after sterilisation varies from state to state. For example, in Kerala religion strongly influenced sterilisation regret. It was found that Christian women experienced highest regret among the three major religious groups. Age at sterilisation and source of sterilisation were found significant factors only in Kerala. In Kerala and Tamil Nadu, being illiterate increases the regret. In Karnataka, the present age of the respondents, work status and age at marriage were found significant but not in other states. The low age at marriage of the Karnataka women force them to complete their fertility as early as possible and adopt sterilisation. The remaining reproductive period without the burden of having additional children is lengthy for these women and this may lead to regret. In this state, a major proportion of women were not having white-collar jobs. The sterilised manual workers and those who do heavy work always complain about adopting sterilisation. Also, a positive and significant relationship was found between sterilisation regret and working women. In Andhra Pradesh, sex combination of children is the only significant factor that influenced sterilisation regret.

In this context, we recommend some measures to be taken to reduce the regret after sterilisation. First, possible misconceptions and improper knowledge about sterilisation are common among illiterates. Therefore, pre-sterilisation counselling to those, especially less educated and young women (who intend to undergo sterilisation) needs to be followed. Second, couples should be encouraged to use temporary methods of family planning before they complete their desired family size. This ensures the spacing of births and thus avoids the possibility of sterilisation at younger ages. Third, the follow-up services to the sterilisation acceptors should be made efficient. Finally, public sources of sterilisation should function effectively in order to give full satisfaction to the acceptors.

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