

## Access to Postpartum Sterilization in Southeast Brazil

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All women hospitalized for delivery over a ten-week period at the largest maternity hospital in Campinas in the State of São Paulo, Brazil, were questioned about their interest in and plans for sterilization. Results from a categorical data analysis indicate that among the study variables, cesarean delivery was the necessary condition for postpartum sterilization and was significantly associated with the patient's ability to pay for services. Further, the variability in the proportion of women sterilized postpartum was almost perfectly explained by a linear model with main effects for parity and for the patient's ability to pay for services.

BRAZIL HAS the largest population in Latin America, with early 1980 census estimates of between 115 and 118 million.<sup>1</sup> Fertility began to decline around 1965, and recent surveys indicate a continuing decrease. The population growth rate was 2.8 for the period between 1965 and 1970, and was estimated to be 2.4 for the period from 1975 to 1979.<sup>2</sup>

During the early 1970s, the government was opposed to family planning, but by 1977 it had modified its position to the extent of promising to provide contraceptives to women for whom pregnancy would create a severe health risk; however, this pledge has not yet been implemented.<sup>3</sup>

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One of the country's most important methods of family planning is female sterilization. Data from a recent contraceptive survey indicate that it is the second most prevalent method in São Paulo, the country's richest and most populous state.<sup>4</sup> Of currently married women between the ages of 15 and 44, 64 per cent were using some contraceptive method; of these, 25 per cent had been sterilized. Seventy-five per cent of all sterilizations were performed for women in the year of their last delivery.

Although data on the percentage of sterilizations in conjunction with cesarean delivery are unavailable for the state of São Paulo, surveys conducted in the summer of 1980 reveal that in two Northeast states (Rio Grande do Norte and Pernambuco) 60 per cent of the sterilization were carried out at the time of cesarean delivery (unpublished data).

Couples able to afford modern methods have many options, so it is not surprising to find that the use of oral contraceptives and condoms is positively correlated with in-

come<sup>4</sup> or that among women who do not want more children, the percentage sterilized rises with family income.<sup>5</sup>

Twenty years ago, sterilization was performed in Brazil only if medically indicated,<sup>6</sup> but, today, social and economic factors contribute greatly to its justification. Although the Brazilian Medical Ethics Code condemns sterilization, it is permitted in "exceptional" cases when certified by three physicians. However, the rationale for exceptions is not explicit, and many physicians perform the procedure by interpreting the Code to include women who would be at high risk if they become pregnant.

Women who have had previous cesarean deliveries are at high risk, and when they undergo this surgery for the third time, they are almost always sterilized. It may be more difficult for a woman who has never had a cesarean to qualify for a sterilization unless she can meet the other criteria of the "exceptional" cases.

Although the Brazilian Penal Code does not refer to male or female sterilization,<sup>6,7</sup> these procedures are not permitted by the Ministry of Health within its Program of Maternal-Child Health. This attitude is reflected in the national health insurance program, which does not reimburse physicians for sterilization services. Moreover, since the largest employer/employee health insurance plan relies on these government schedules to determine rates of compensation for physician services, it, too, omits payment for surgical sterilization.

As a consequence of government policy, insurance coverage includes the cost of delivery and, usually, a cesarean delivery, but not the concurrent sterilization. Because of the additional personnel, medications, anesthetics and longer hospitalization required, reimbursement rates are necessarily higher for cesarean than for vaginal deliveries, and more generous under private sector plans than through the national insurance system.

Information gathered in four hospitals in the city of Campinas indicates that access to sterilization among women hospitalized for obstetric delivery depends on their socioeconomic status.<sup>8</sup> Although the data collection instrument used was not specifically designed to study access, it may be inferred from these data that sterilization is not equally available to all women.

To gain more information concerning access to sterilization, a study was undertaken at a large maternity hospital in Campinas, chosen because it serves patients of widely varied socioeconomic status and, consequently, of different abilities to pay for surgery.

### Data and Method

The study was conducted over a ten-week period, from December 1979 through February 1980. An interview was scheduled after delivery but before discharge for women giving birth during this time. They were asked a number of questions: Did they want any more children? Had they heard about sterilization, and, if so, had they planned to be sterilized? If they had planned to be sterilized, was the procedure actually carried out? If not, why not? And were they considering alternative plans for sterilization? Women who said they were not interested in this method of contraception were asked the reason(s) for their attitude.

During the study period, 2,279 women gave birth, and interviews were completed for 2,194 of them (96.3 per cent). Some information was obtained for 72 of the other cases, but none for the remaining 13.5

The potential market for sterilization services consists of women who want no more children. However, not all women who fall into this group are likely to want to

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§ Payment status and type of delivery account for the major differences between the women for whom an interview was and was not completed.

make an irreversible decision to limit their fertility. In an effort to confine the analysis to those who might be expected to have completed their families and not be unduly influenced by the circumstances of pregnancy and delivery, the population analyzed has been limited to the 927 married women who have at least two children, including the current delivery, and are between the ages of 20 and 44 (henceforth described as women who desire no more children).

The analysis proceeds in steps, the first of which is descriptive, concerning distributions of age, parity (after delivery), monthly family income, education, type of payment for medical services and method of delivery among the 927 women who desire no more children. However, all of them will not necessarily choose sterilization. Therefore, in the second stage of the analysis, attention is directed toward describing how the population desiring no more children chooses sterilization as the preferred method of family planning. The last phase of the analysis is concentrated on the subset of women preferring sterilization services. In this third stage, frequent use is made of methods of estimation and hypothesis testing from cross-classified data.

## Results and Analysis

### The Market for Sterilization

The second column of Table 1 presents data on the characteristics of women who desire no more children. More than 25 per cent of the women are from 20 to 24 years of age, and more than 60 per cent are under 30; almost 30 per cent have had exactly two children; more than 40 per cent have not completed primary school (less than four years), and less than 20 per cent have eight or more years of education. More than 50 per cent have a monthly family income under \$300, and for less than 20 per cent it is at least \$500; income is unknown for 14

per cent. Close to 38 per cent of the women had cesarean deliveries; the others, except for one whose type was unrecorded, had vaginal deliveries.

Almost 10 per cent are private patients, 7 per cent are covered by employer/employee-financed plans (*convenio*), more than 70 per cent by government insurance, and 20 per cent have no medical coverage. All women are classified as private patients if they were assigned to the private section of the hospital, and included in this group are some insured patients. It is assumed that women assigned to the "private" section of the hospital will be treated equally, despite the differences in type of payment for services. This inference is borne out by the hospital policy requiring the physician's permission to interview a woman assigned to a private room, but not patients in other accommodations.

*Convenio* includes all women who pay for their care through a privately financed insurance plan but do not stay in a private room. "Government insured" encompasses the group paying for care with public insurance. "Indigent" includes all women without any medical insurance.

The higher the woman's level of education, the more likely she is to be a private or a *convenio* patient. Similarly, the higher her family's income, the more apt she is to be a private patient. However, 14 per cent of the women did not know or did not wish to report their family income. Because of this large unknown proportion, and since payment status is closely related to income, greater attention will be paid to the impact of the other characteristics (age, parity, education, payment status and type of delivery) on access to sterilization.

### Information Concerning Sterilization

To obtain a sterilization, a woman must first have heard of the procedure. Column 3 of Table 1 shows that almost nine out of ten women who want no more children

have heard about sterilization. Further, except for parity, the proportion having heard of sterilization increases monotonically with increasing levels of the characteristics in column 1 of Table 1. Indigent patients are least likely (79 per cent) and private patients are most likely (98 per cent) to have heard of it. Women who had cesarean deliveries are more likely to have heard of sterilization (95 per cent) than those giving birth vaginally (86 per cent).

Among the patient characteristics of interest, payment status has the largest spread in the percentage of patients who

have heard of sterilization. A sterilized friend is the most important source of knowledge (63 per cent), and a physician is the second (16 per cent). However, private patients are more likely to have received this information from a doctor (25 per cent) than are *convenio* (16 per cent., nationally insured (15 per cent) or nonpaying patients (18 per cent).

**Plans for Sterilization**

Of all women who want no more children and have heard of sterilization, as

TABLE 1. Desire for No More Children, Knowledge of and Plans for Sterilization of Married Women Aged 20-44, With at Least Two Children, by Selected Characteristics

Characteristic	A Number Desiring No More Children	Have Heard of S*		S* Plans
		Per Cent of A	B Number of	Per Cent of B
All characteristics	927	89.2	827	58.2
Age				
20-24	263	83.6	220	36.4
25-29	310	91.0	282	58.5
30-34	208	90.9	189	76.7
35-39	115	93.0	107	70.1
40-44	31	93.5	29	55.2
Parity				
2	276	89.5	247	30.0
3	291	90.4	263	65.4
4	360	88.1	317	74.1
Monthly family income				
\$ 0-\$199	285	84.2	240	58.3
\$ 200-\$299	185	87.0	161	57.1
\$ 300-\$499	163	93.9	153	57.5
\$500	163	98.8	161	68.3
Unknown	131	85.5	112	45.5
Education (years)				
0-3	381	82.7	315	61.0
4	240	92.1	221	57.9
5-7	131	91.6	120	54.2
8	175	97.2	171	56.1
Payment status				
Indigent	94	78.7	74	40.5
Government insured	662	89.1	590	58.1
<i>Convenio</i>	66	93.9	62	61.3
Private	92	97.8	90	72.2
Unknown	13	84.6	11	45.5
Delivery type				
Vaginal	576	85.5	494	44.9
Cesarean	350	94.8	332	78.0
Unknown	1	100.0	1	—

\* S = Sterilization.

shown in column 5 of Table 1, 58 per cent said that they planned to be sterilized. The percentage of women who plan to be sterilized is curvilinear with age, with 36 per cent of women between the ages of 20 and 24 planning to be sterilized, as compared with 77 per cent between the ages of 30 and 34 and 55 per cent from 40 to 44 years of age. As parity increases, so does the proportion planning sterilization. Among women at parity 2, 30 per cent plan to be sterilized, as compared with 65 per cent at parity 3 and 74 per cent who have given birth to four or more children.

Education and family income up to \$500 monthly show little association with plans for sterilization. However, 10 per cent more women at the highest monthly income level plan to be sterilized than those less privileged.

Private patients were more likely to say they planned to be sterilized than insured patients, and insured more than the indigent. Finally, women having cesarean deliveries were almost twice as likely to be planning sterilization as those who had vaginal deliveries.

#### Information Concerning Sterilization Facilities

To be sterilized postpartum, a woman must know that services are offered at the hospital where her baby is born. Column 3 of Table 2 shows that 78 per cent of women who want no more children and who have heard about sterilization know that it is available at the hospital. This proportion is lowest for the age group between 20 and 24 years and highest for women 30 years of age and over, an expected relationship since many under the age of 30 may be less strongly committed to the decision to be sterilized than older mothers and, therefore, have sought less information about the procedure. Knowledge shows little variation with parity, but is surprisingly low for women at parity 4 and over, compared with women at lower parities. Knowledge

concerning services increases with income and education, and only 60 per cent of women who had vaginal deliveries were as likely to be as knowledgeable as those who had cesarean deliveries. The relationship to payment status is particularly strong. More than 95 per cent of private patients know that sterilization is offered at the hospital, as compared with only 43 per cent of nonpaying patients.

The varied answers to the questions concerning availability may be a function not only of the woman's knowledge of the existence of the hospital's sterilization facilities, but also of her perception that these services are being offered to her. It may be that some women, particularly those from the lower socioeconomic groups, answer negatively because they believe that the facilities are not available to them, rather than that the hospital does not actually possess such facilities.

#### Who Gets Sterilized?

The last two columns on Table 2 display, respectively, the numbers and percentages of women sterilized among those planning it who also knew that services were available at the hospital. Of these 376 women, 226 (60 per cent) received sterilizations. The proportion sterilized increases with income, education and for age groups up to those between 35 and 39 years of age. For parity (including the current birth), the percentage sterilized reaches a maximum (74 per cent) at parity 3. Payment status has an important influence on who is sterilized. More than 80 per cent of the private patients who planned sterilization were sterilized, as compared with 68 per cent of the *convenio*, 54 per cent of the government insured and 46 per cent of the indigent patients. Finally, women with cesarean deliveries were 16 times more likely to receive postpartum sterilization than those who had vaginal deliveries.

To investigate further the influence of payment status on who is sterilized, atten-

TABLE 2. Knowledge About Availability of Sterilization and Attainment of Postpartum Sterilization for Selected Characteristics of Married Women Aged 20-44 Who Have at Least Two Children, Desire No More Children and Are Planning Sterilization

Characteristic	A Number of S* Plans	Know S* Offered at Hospital		Postpartum S*	
		Per Cent of A	B Number of	Per Cent of B	Number
All characteristics	481	78.2	376	60.1	226
Age					
20-24	80	66.3	53	54.7	29
25-29	165	77.6	128	56.3	72
30-34	145	84.1	122	63.1	77
35-39	75	80.0	60	66.7	40
40-44	16	81.3	13	61.5	8
Parity					
2	74	81.1	60	48.3	29
3	172	81.4	140	73.6	103
4	235	74.9	176	53.4	94
Monthly family income					
\$ 0-\$199	140	70.7	99	47.5	47
\$ 200-\$299	92	78.3	72	44.4	32
\$ 300-\$499	88	83.0	73	63.0	46
\$500	110	89.1	98	76.5	75
Unknown	51	66.7	34	76.5	26
Education (years)					
0-3	192	68.8	132	47.7	63
4	128	78.1	100	61.0	61
5-7	65	87.7	57	68.4	39
8	96	90.6	87	72.4	63
Payment status					
Indigent	30	43.3	13	46.2	6
Government insured	342	76.7	263	54.0	142
<i>Convenio</i>	38	97.4	37	67.6	25
Private	65	95.4	62	83.9	52
Unknown	5	20.0	1	100.0	1
Delivery type					
Vaginal	222	57.2	127	5.5	7
Cesarean	259	96.1	249	87.9	219
Unknown	—	—	—	—	—

\* S = Sterilization.

tion will be restricted to the 375 women who were both planning sterilization and aware of its availability at the hospital (225, i.e., 60 per cent were sterilized).<sup>†</sup>

The variables of interest in this analysis are postpartum sterilization, payment

status, age, education, parity and type of delivery, each classified at two levels. Payment status is defined as public (indigent and government insured) and non-public (*convenio* and private). Age is dichotomized by year groups, 20-29 and 30-44, and education by year groups, zero-four and at least five. Because of the practice of performing sterilizations for women having their third cesarean delivery, parity (including present birth) is

<sup>†</sup> There are 375 women available for this analysis, instead of 376 as shown at the top of column 4 of Table 2, because one woman could not be classified by payment status.

dichotomized by two and at least three, and the method of delivery is categorized as vaginal or cesarean.

The strongest first-order association between the explanatory variables and sterilization is exhibited by the method of delivery (Pearson  $\chi^2 = 236.9$ , 1DF,  $p < 0.01$ ). Among women who had cesarean deliveries, 88 per cent were sterilized, compared with 6 per cent of the others. In descending rank of importance of first-order association with sterilization, the explanatory variables following method of delivery are payment status, education, parity and age. However, the association between age and sterilization does not achieve significance at  $\alpha = 0.05$ .

In general, to be sterilized postpartum a woman must have an abdominal delivery. For patients in this category, the proportion sterilized (0.88) is the same regardless of payment status. However, a significantly greater proportion of women in the nonpublic payment subpopulation (0.83 versus 0.60) had cesarean births (Pearson  $\chi^2 = 18.8$ , 1DF,  $p < 0.01$ ). Non public payment patients who had vaginal deliveries receive proportionally more sterilizations (0.25 versus 0.03) than public payment patients (Pearson  $\chi^2 = 13.4$ , 1DF,  $p < 0.01$ ).

Cesarean delivery is, in general, the necessary condition for postpartum sterilization and, as shown above, is significantly associated with payment status. Consequently, it is of interest to focus on the

association between sterilization and each of the explanatory variables (age, parity and education), while controlling for payment status. When payment status is controlled using the Mantel-Haenszel procedure,<sup>9</sup> only parity remains significantly associated with sterilization (Mantel-Haenszel  $\chi^2 = 8.2$ , 1DF,  $p < 0.01$ ).

A close look at the four subpopulations defined by the levels of payment status and parity (Table 3) reveals that the respective proportions of women sterilized can be represented almost perfectly by an additive model with main effects for payment status and parity (i.e., there is no interaction between payment status and parity). The methods of Grizzle, Starmer and Koch<sup>10</sup> are applied to estimate and test the statistical significance of the main effects. Table 4 displays estimates of the payment status and parity effects, along with test statistics for their significance. Both main effects are highly significant. The estimates indicate that, regardless of parity, the difference in the proportions sterilized between women whose payment is nonpublic and public is 26 per cent. Similarly, the difference between the per cent of women of parity 3 or more and of parity 2 who were sterilized is 18 per cent, regardless of payment-status level.

**Why Women Are Not Sterilized**

Of the 375 women who planned to be sterilized and knew about available ser-

TABLE 3. Prevalence of Sterilization by Payment Status and Parity (for the 375 Women Who Were Both Planning Sterilization and Aware That It Was Available at the Hospital)

Payment Status	Parity	Sterilized		
		Yes		No
		Number	(Proportion)	Number
Public	2	16	(0.38)	26
	≥ 3	132	(0.56)	102
Nonpublic	2	16	(0.64)	9
	≥ 3	61	(0.82)	13

TABLE 4. Analysis of Variance Table for a Main Effect Model of the Proportion of Women Sterilized (for the 375 Women Who Were Both Planning Sterilization and Aware That It Was Available at the Hospital)

Source of Variation	Estimate of Effect	DF	$\chi^2$ Test Statistic
Payment status	0.26	1	27.0*
Parity	0.18	1	8.1*

\* Denotes significance at  $\alpha = 0.01$ .

vices, 40 per cent were not sterilized postpartum. The most frequent reason given was type of delivery (38 per cent); of the women who had vaginal deliveries, 48 per cent (57/120) gave this as a reason for failure to be sterilized. Other frequent explanations for not having undergone sterilizations were: a) it was not customary for the doctor to do them, or he did not want to operate (29 per cent); b) the physician considered that the woman was too young or that she did not have enough children (15 per cent); and c) the woman either did not discuss the possibility of, or actually arrange for, sterilization with her doctor (7 per cent).

### Conclusions and Policy Implications

Data from this study show that the method of payment for care substantially influences the eventuality of the sterilization. Wealthier women who are private or *convênio* patients are more likely to be sterilized than are the poor, whose care is financed through government insurance or who are indigent. Results also show that women sterilized postpartum almost always have had cesarean deliveries. Regardless of whether she is sterilized, a cesarean delivery is more likely as the socioeconomic status of the woman rises.

What then can be done to increase access to this method of family planning among poor women in Brazil? A more liberal interpretation of the Medical Ethics Code that would consider women to be at high

risk for reasons other than those associated with previous cesarean birth would improve access to postpartum sterilization. As a consequence of current policies, women with high family income who have a history of cesarean deliveries may qualify for sterilization on medical grounds, whereas poor women who have had vaginal deliveries are turned down for sterilization because of the very nature of their delivery.

Physicians who do perform postpartum sterilizations cannot charge for their services under the national or private insurance plans. Other countries have increased access to sterilization by modifying medical insurance plans (thus making it more attractive for surgeons to perform the operation) or by paying physicians directly. In the United States, as in many other countries, most medical insurance plans cover both tubal ligations and vasectomies, and the extension of coverage to include sterilization has doubtless increased the number carried out.

Brazil is well on its way to modifying its posture regarding family planning, and there are signs that a publicly supported program will soon be undertaken. The Minister of Health, Waldir Arcoverde, recently announced official adoption of a family planning program throughout the country that will include free access to tubal ligations.

This article has demonstrated that access to sterilization in Brazil is differentially affected by legal and institutional constraints on delivery of services. These results may

be generalized to other medical services and geographic locations. The present controversy in the United States over family planning and abortion could give rise to conditions similar to those in Brazil.

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