SOCIOECONOMIC CORRELATES OF FEMALE STERILIZATION IN BRAZIL

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1 - Background

In Brazil, as in other developing countries, fertility transition began in the 60s among more privileged urban groups from more developed regions. From 1970 onwards, this process gradually spread to all social classes, both rural and urban, in all regions. As a consequence, the average number of children per woman rapidly declined from 6.3 in 1960 to 2.5 around 1993. Although such figures hide important regional and socioeconomic differentials, the Total Fertility Rate was significantly reduced even in the rural Northeastern Region, the poorest area of Brazil, falling from 8.5 in 1970 to 4.5 in 1996.[2]

2. Concerning levels and trends of fertility in Brazil, see Carvalho and Fernandez (1986), Oliveira and Silva (1986), Carvalho and Wong (1996), Albuquerque and Casares (1996).

In Brazil, as in other countries, the most important proximate determinant of this decline has been the availability and dissemination of highly effective contraceptive methods (Merrick and Berquó, 1983; Silva *et al.*, 1990; Badiani *et al.*, 1997). Brazil, however, presents some unique characteristics. First, no population control or family planning policies were explicitly implemented, even though the government adopted a permissive attitude towards private agents working with this issue (Carvalho and Wong, 1996, p. 383). Second, only two methods – the pill and female sterilization – have been responsible for over two-thirds of contraception. Sterilization is the most widely used method, and its prevalence has grown sharply mainly in the poorest areas of the country.[3] Third, until recently, sterilization was not available on demand. It was legally permitted only on medical grounds, or in special circumstances regulated by the Medical Code of Ethics, namely, for cases in which a future pregnancy would pose a health risk for the woman. Repeat cesarean section deliveries are the most frequent risk condition allowing physicians to place women in this category, because the rate of this type of delivery is very high. Doctors tend to adhere to the dogma "once a cesarean, always a cesarean, and three cesareans result in sterilization". Many women even plan another pregnancy in order to obtain a tubal ligation during the surgical delivery. These factors explain, in part, why sixty percent of female sterilizations in Brazil have been performed coterminously with a c-section.[4]

This extensive reliance on female sterilization - an irreversible method that is said to have possible harmful effects on women's physical and mental health - has received special attention in the debate on reproductive health and rights in Brazil.

There seems to be some consensus around the idea that the excessive weight of sterilization in the mix of methods is due to the lack of real access to alternative methods *vis-à-vis* a strong and generalized motivation to limit family size. Some authors, however, go even further stating that sterilization has been abusively and indiscriminately

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3. In 1996, 40 percent of all Brazilian married women aged 15-44 were sterilized, representing 52 percent of all contracepting women (Badiani *et al.*, 1997). The prevalence increased from 27 percent to 39 percent between 1986 and 1996 at the national level, from 25 percent to 44 percent in the Northeastern Region, the poorest region of the country, and only from 32 percent to 34 percent in São Paulo, the most developed region (Arruda *et al.*, 1987; Badiani *et al.*, 1997).

4. In this regard see e.g. Rutenberg and Ferraz (1988), Badiani *et al.* (1997).

performed, mainly in women less economically favored and with less access to information (for examples, see Berquó, 1982, 1994; or Barroso, 1984). In this sense, far from being a conscious individual choice, sterilization has been inserted in a context of birth control programs where - together with hormones - only these two highly effective methods have been made available to the population. This limited supply on the part of private and/or public health services may indicate the lack of appropriate family planning services integrated into comprehensive health programs in line with birth control actions *stricto sensu* (see e.g. Berquó, 1982, 1987; Ávila, 1991).

Other studies, on the other hand, have tried to show the sterilization demand component by testing the relation between the use of this method and the social status of those using it. Using the 1986 Brazil Demographic and Health Survey (1986 DHS)[5], Alencar and Andrade (1989, 1991) found a positive relation between income and education levels and female sterilization, controlled by women's parity and age, for all regions of Brazil. They assume such results indicate the inaccuracy of the hypothesis that sterilization is basically performed in the lower classes of the population, which are more vulnerable to the lack of alternative methods and information. The authors also suggest that, even though sterilization may be considered a precarious and undesirable method, it is relatively more accessible to people with greater information and material resources in countries such as Brazil, where the variety of contraceptive options has not been made available universally (Alencar and Andrade, 1991, p. 16)[6].

In face of evidence showing the high demand for sterilization, other authors have admitted that most surgeries have been insistently requested by women, and are not the result of direct manipulation or coercion. However, they argue that the reason behind this demand is that women from lower classes in Brazil view sterilization as "the only possible way", the "last resource" against the abandonment they feel regarding reproductive health (Corrêa, 1982; Barroso, 1984; Serruya, 1992; Berquó, 1994).

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5. The 1986 DHS was the first national survey about fertility and family planning in the country and was named "Pesquisa Nacional sobre Saúde Materno-Infantil, Brasil - 1986".

6. Rutenberg and Ferraz (1988) also present data indicating the increase in the percentage of sterilized women with an ascending scale of socioeconomic classes.

This paper contributes to the discussion surrounding the dissemination of female sterilization in Brazil, adding new approaches to the 1986 DHS data, and examining the recent developments through data from the 1996 DHS[7]. First, we investigate female sterilization in Brazil according to the socioeconomic status of women. We have taken women's education and an indicator of household income[8] as a proxy of this status, supposing that women of lower socioeconomic levels have less information about and less access to the range of fertility control options available. This situation may, therefore, allow them less freedom of choice and also less access to sterilization. We analyze the independent effect of income and education in order to explore the hypothesis that income level is fundamental to gaining access to sterilization, whereas education is a very important factor to the adoption of alternative methods. Next, based on some characteristics of sterilized women, we explore the hypothesis that, in lower socioeconomic status, sterilization occurs under worse conditions. In other words, we believe women of higher socioeconomic status adopt sterilization after having their desired number of children, at the end of a "contraceptive history" in which they used temporary methods to space births. Among less privileged classes, on the contrary, sterilization may occur before women have had the opportunity of planning and managing the size of their families.

2 - **Socioeconomic differentials in female sterilization in Brazil**

Table 1 shows, for 1986 and 1996, the distribution of married women[9] according to their choice of contraceptive method, including those who did not use any method, by income levels.[10] The first relevant observation is that the higher the income, the lower the percentage of women not using any kind of method. Also, between 1986 and

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7. In Brazil, "Pesquisa Nacional sobre Demografia e Saúde - 1996".
8. A scale of socioeconomic classes was built as an indicator of income, based on the ownership of a set of consumer goods, household facilities and education. For more details, see Appendix 1.
9. Throughout this article, "married women" refers to women who reported being in a stable union, whether formal or informal.
10. For the purpose of brevity, from this point forward, we use "income level" and "income" to designate the socioeconomic class scale.

Table 1
Distribution of current contraceptive users by method, among married women aged 15-44,
by socioeconomic class. Brazil, 1986 and 1996

Methods	Socioeconomic class [b] - 1986					Socioeconomic class [b] - 1996					Relative change 1986/1996 (%)			
	L	L-M	M	U/U-M	Total	L	L-M	M	U/U-M	Total	L	L-M	M	U/U-M
Not using	50.6	27.9	23.0	21.3	33.8	34.2	20.9	17.3	13.7	21.9	-32.4	-25.1	-24.8	-35.7
Sterilization:														
Female	15.9	28.8	32.2	44.2	26.8	37.4	40.2	37.0	39.3	38.4	135.2	39.6	14.9	-11.1
Male	-	0.5	1.4	3.7	0.8	0.4	1.1	4.1	7.9	2.8	-	120.0	192.9	113.5
Pill	22.7	29.7	26.8	15.0	25.2	19.7	24.4	26.6	19.4	23.3	-13.2	-17.8	-0.7	29.3
Condom	0.6	1.9	2.7	2.4	1.7	1.8	4.1	5.5	8.5	4.6	200.0	115.8	103.7	254.2
Other methods [a]	1.3	2.9	3.7	4.3	2.7	1.4	3.4	3.4	3.8	3.0	7.7	17.2	-8.1	-11.6
Periodic abstinence	2.5	3.1	6.0	7.6	4.0	1.9	2.6	2.8	5.6	2.9	-24.0	-16.1	-53.3	-26.3
Withdrawal	6.4	5.2	4.2	1.5	5.0	3.2	3.3	3.3	1.8	3.1	-50.0	-36.5	-21.4	20.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0				

Source: 1986 and 1996 DHS.
a. Including: IUD, diaphragm, injections and others.
b. L = lower; L-M = lower-middle; M = middle; U/U-M = upper and upper-middle.

Table 2
Distribution of current contraceptive users by method, among married women aged 15-44,
by years of schooling. Brazil, 1986 and 1996

Methods	Years of schooling - 1986					Years of schooling - 1996					Relative change 1986/1996 (%)			
	None	1-4	5-7	8 +	Total	None	1-4	5-7	8 +	Total	None	1-4	5-7	8 +
Not using	52.7	36.3	27.1	25.6	33.8	33.5	26.6	21.4	16.0	22.1	-36.4	-26.7	-21.0	-37.5
Sterilization:														
Female	23.8	27.3	26.3	27.2	26.8	47.4	41.2	35.6	35.9	38.5	99.2	50.9	35.4	32.0
Male	-	0.2	0.7	2.4	0.8	0.3	1.6	2.2	4.8	2.9	-	700.0	214.3	100.0
Pill	13.5	23.3	34.1	28.1	25.2	7.7	20.0	28.4	25.7	23.1	-43.0	-14.2	-16.7	-8.5
Condom	0.7	1.3	1.8	2.7	1.7	2.7	2.8	4.6	6.7	4.6	285.7	115.4	155.6	148.1
Other methods [a]	2.0	1.7	3.2	4.9	2.7	2.1	2.4	2.6	4.1	2.8	5.0	41.2	-18.8	-16.3
Periodic abstinence	1.0	3.3	3.1	6.9	4.0	2.2	2.1	1.9	4.3	2.9	120.0	-36.4	-38.7	-37.7
Withdrawal	6.3	6.6	3.7	2.2	5.0	4.1	3.3	3.3	2.5	3.1	-34.9	-50.0	-10.8	13.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0				

Source: 1986 and 1996 DHS.
a. Including: IUD, diaphragm, injections and others.

1996, such percentages presented a decrease of approximately 30 percent in all income levels. In relation to the mix of methods, female sterilization increased. In 1986, the pill was more prevalent than sterilization in the lower classes; in 1996, sterilization became by far the most used method in all income levels. Moreover, female sterilization presented a strong positive relation to income in 1986, demonstrating the importance of purchasing power to gaining access to this method. However, this relationship was not present in 1996, suggesting that this method became available to all socioeconomic groups during this period.

With regard to methods of lower prevalence (condoms, periodic abstinence, withdrawal and others), there is also an important differential by income levels, since they all presuppose knowledge of and/or access to them. During the analyzed period, the use of modern methods (condoms and others) increased, specially the use of condoms, probably as a result of AIDS prevention campaigns.

Table 2 presents the distribution of contraceptive methods according to women's years of schooling (none, up to 4, from 5 to 7, and 8 and above). The trends and relations shown for the set of methods do not substantially differ from those presented in Table 1. The greatest difference is that the weight of sterilization in the set of choices presented no clear positive relation to the level of education, neither in 1986 nor in 1996, when, on the contrary, the relation became clearly negative.

In fact, since data in Tables 1 and 2 include women who did not use any method, the relative importance of each method becomes biased by the general increase of contraception as we go up the scales of both schooling and income levels. When analyzing the charts presented in Figures 1 and 2, which show the mix of methods among women using some kind of method, it is possible to observe that specific sterilization rates decreased with the level of education even in 1986. This trend became stronger in the following decade. On the one hand, this set of data suggests that, at least in 1986, purchasing power was important to gaining access to sterilization. On the other, it suggests that schooling tended to draw women away from this irreversible method, most likely because more knowledge allowed them to choose other contraceptive alternatives.

Figure 1
Mix of methods, among contracepting women, by socioeconomic class.
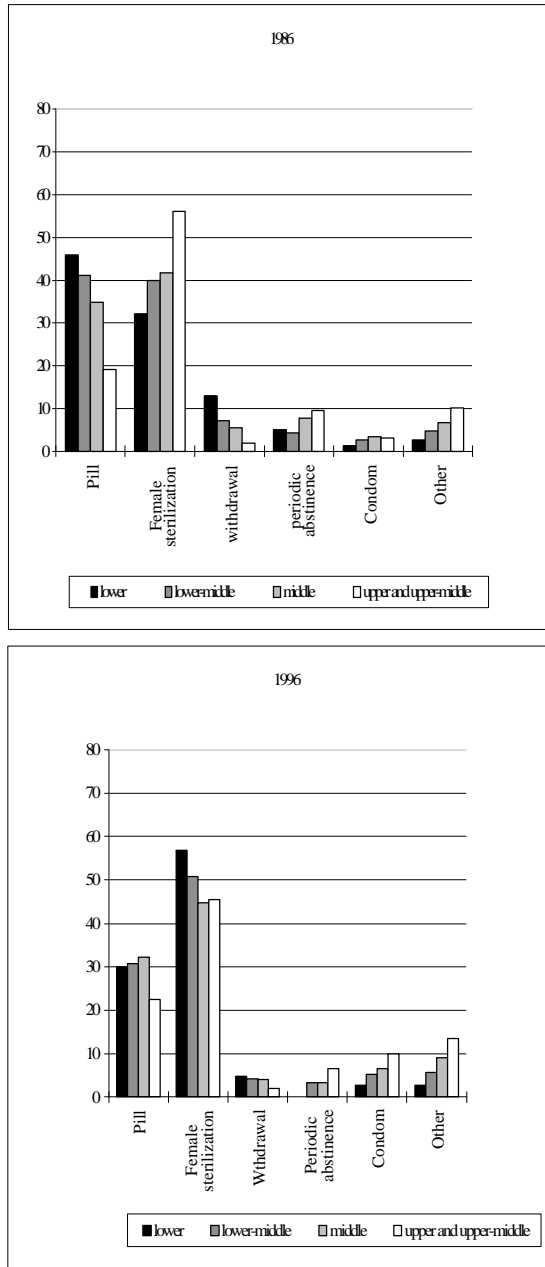Brazil, 1986 and 1996

Figure 2
Mix of methods, among contracepting women, by years of schooling.
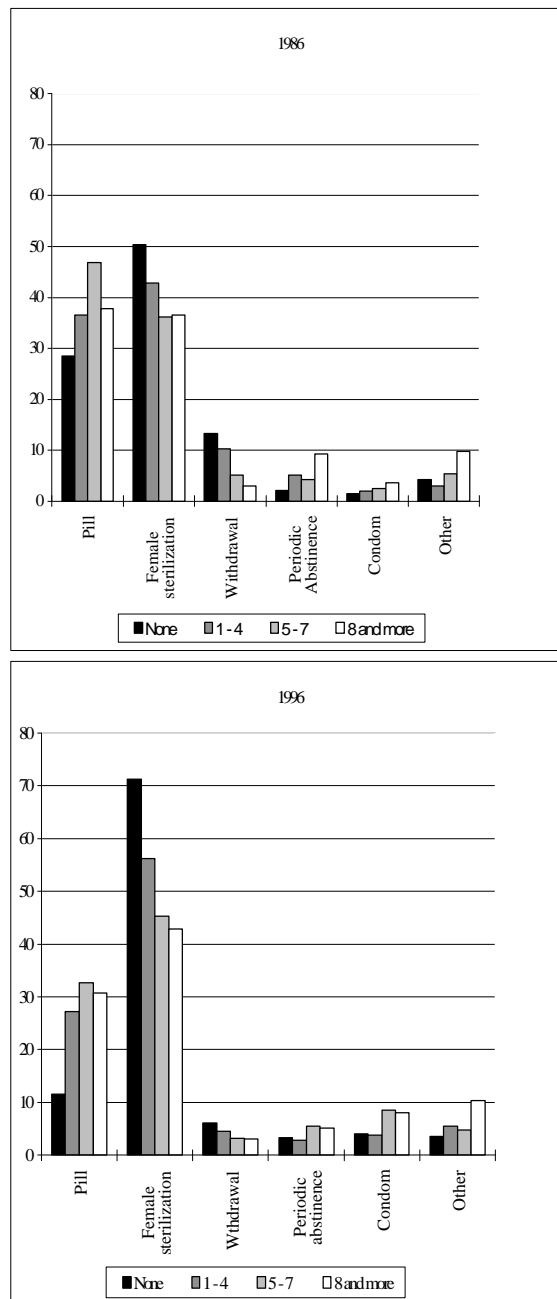Brazil, 1986 and 1996

Table 3
Specific rate of sterilization among married women,
aged 15-44, currently using contraceptive methods,
by socioeconomic class and years of schooling.
Brazil, 1986 and 1996

Socioeconomic class	Years of schooling					Var 1
	None	1-4	5-7	8 +	Total	
1986						
lower	49.9	31.2	16.8	21.5	32.1	-56.9
lower-middle	51.0	45.3	30.8	28.7	39.9	-43.7
middle	51.4	56.4	47.2	29.9	41.8	-41,8
upper and upper-middle	-	76.6	82.3	51.0	56.2	-33.4
Total	50.4	42.9	36.2	36.6	40.5	-27.4
Var 2	-	145.5	389.9	137.2	75.1	
1996						
lower	71.5	56.1	45.5	58.2	56.8	-18.6
lower-middle	72.3	55.0	42.8	47.3	50.8	-34.6
middle	69.8	56.3	44.5	38.7	44.7	-44.6
upper and upper-middle	-	54.1	61.9	43.2	45.5	-20.1
Total	71.2	56.7	56.4	42.7	53.1	-40.0
Var 2	-	-3.6	36.0	-25.8	-19.9	

Source: 1986 and 1996 DHS.
Var 1 = relative difference between the groups with lower and higher education.
Var 2 = relative difference between the "lower" and "upper and upper-middle" groups.

Table 3 presents specific sterilization rates by education according to income levels, thus capturing the de-aggregated effects of one variable controlled by the other. This analysis confirms in a more detailed manner the results of the previous bivariate analyses. There was a positive relation between income level and sterilization prevalence in all levels of education in 1986, but this relation weakened or even disappeared in 1996. The relation between level of education and sterilization, however, was negative in all income strata, both in 1986 and in 1996, with the exception of the lower stratum, in which sterilization rate increased in the group with 8 years of schooling and above in relation to the group with seven years or less. This is possibly due to the

fact that a better educated woman, albeit poor, can find ways other than her own financial resources to gain access to the surgery.[11]

Although it is quite important to describe the individual behavior of the variables relevant to the scope of this paper, it is also necessary to recognize the probable effects of other variables affecting the findings. Women's age is perhaps the most important of these variables. On the one hand, age increases the likelihood of a woman being sterilized, and on the other, older women tend to present higher income and lower levels of education due to the recent movement for education in Brazil. Therefore, the next section presents a multivariate analysis, including some control variables to test the independent role of income and education on the probability of sterilization.

3 - **Multivariate analysis**

The multivariate analysis was performed by adjusting logistic regression models to 1986 and 1996 data. In both models, the dependent variable is *Steril*, defining whether women are sterilized or not. As explanatory variables, the following were included:

Class   the same socioeconomic scale used in the previous section, but without grouping them into those four classes. (All 80 classes were used in continuous form.)

Educ   also a continuous variable, in which the level of education was calculated as simple years of schooling.

Region   region of residence, included as a dummy variable with the value of 0 for Central-Southern regions of Brazil, where socioeconomic development is higher; and 1 for the Northern, Northeastern and Central-Eastern regions, where the poorest sector of the population is concentrated.

Age   woman's age in simple years, also as a continuous variable.

Rururb   another dummy variable, where 0 corresponds to residence in urban sectors and 1 to residence in rural sectors.

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11. In countries of great income and education inequalities, the representation of people from low-income classes with high levels of education is very small. Therefore, those figures should be interpreted with care.

Nchildr variable indicating parity of women, in number of children ever born.

The results presented in Table 4 reinforce what the previous analyses anticipated, with all coefficients being highly significant (see *p*-values listed in Table).[12] In the two years analyzed, the income level variable showed a *positive* relation, whereas education showed a *negative* relation to the likelihood of a woman being sterilized. Interpreting odd ratios as an increase in the probability of a woman being sterilized, it is possible to state that in 1986 each additional class in the income scale meant a 5 percent increase in the probability of sterilization.[13] In 1996, the rate of increase dropped to 1 percent. The only difference between these findings and those observed in the univariate analysis of the previous section is that, in 1996, when controlled by other variables, the relation of sterilization with classes becomes positive, although with a value very close to 1. This indicates that the probability of sterilization is not very sensitive to changes of income class.

As for education, results totally confirm the findings of the previous section. In 1986, each additional year of schooling decreased the probability of sterilization in 6 percent, whereas 10 years later, this decrease equaled only 2.5 percent. Therefore, the model of 1996 showed a smaller impact of schooling on sterilization.

The control variables of the model have produced the expected results. Living in the poorest regions of the country had a strong positive effect on sterilization, which increased over time. The negative effect of living in rural areas also decreased between 1986 and 1996. Both results show the regional generalization under way in the dissemination of the method. Age and parity of women, as expected, had a positive effect on the probability of being sterilized. Both effects became stronger in 1996, not because the average age of women at sterilization or parity at sterilization increased (the opposite is shown in the next section), but possibly because such factors became relevant

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12. Although there is an obvious relation between the indicator of income and education, the inclusion of an interaction term between the two variables, tested by the authors, did not result in changes in the model significant enough to justify the loss of interpretative ease possible in the model without interactions.

13. It is important to observe that, contrary to how it may appear at first, a 5 percent increase is quite significant, since there are 80 classes among which the probability of sterilization increases to that extent.

Table 4
Logistic model estimate for the probability of being sterilized,
among married women, aged 15-44, currently using contraceptive methods.
Brazil, 1986 and 1996

Variable	1986				1996			
	β	S.E.(β)	p-value	Odds ratio	β	S.E.(β)	p-value	Odds ratio
Class	0.0516	0.0078	0.0000	1.0530	0.0102	0.0048	0.0334	1.0102
Educ	-0.0594	0.0175	0.0007	0.9423	-0.0244	0.0117	0.0361	0.9759
Region (N, NE, C)	0.6875	0.1173	0.0000	1.9887	1.1676	0.0758	0.0000	3.2143
Age	0.0876	0.0090	0.0000	1.0916	0.1127	0.0061	0.0000	1.1193
Rururb (rural)	-0.6270	0.1285	0.0000	0.5342	-0.2202	0.0941	0.0192	0.8023
Nchildr	0.2179	0.0306	0.0000	1.2435	0.5261	0.0312	0.0000	1.6924
Constant	-4.1412	0.2886	0.0000		-5.3618	0.2123	0.0000	

Source: 1986 and 1996 DHS

when all the others explaining the differences among women were minimized.

The results of the multivariate analysis confirm and better qualify the results previously presented. First, it is important to stress that all evidence regarding the role of purchasing power in sterilization is coherent with the hypothesis that, when there is a general motivation for contraceptive use, women who can pay for and who use private medical services have greater access to sterilization than those depending on free public services. The strong correlation between c-sections and postpartum sterilization in Brazil could also partly explain the importance of income for the access to sterilization. Several studies have shown that when c-sections are indicated, doctors tend to perform them more frequently for private patients than for insured patients, and even less so for indigent patients (see Rutenberg and Ferraz, 1988). However, our data shows that, during the period analyzed, there was an expressive reduction in the importance of income as an explanatory factor for sterilization, either because the service has become cheaper or, most likely, because other non-financial forms of access became available to poorer women.

Secondly, contrary signs regarding the effects of income and education on sterilization suggest that, when there is a strong motivation for contraception, sterilization is a function of knowledge of and access to it, among other things, as well as of knowledge of, motivation for and access to other alternative methods. Therefore, formal education may mean knowledge of and motivation for other methods whose use may depend on some form of more elaborated information. Sterilization, on the other hand, in a scenario where there is a limited supply of this service, may depend more on income than on education, since the information requirements for its use are relatively quite simple. The adoption of this method, however, depends on surgical procedures, implying costs. The decrease in the relative importance of education during the period analyzed corroborates all evidence of the wide generalization of the method among Brazilian women.

4 - Some characteristics of sterilized women by income and education

In the previous section, the socioeconomic status of women – shown through indicators of income and education – was related to the use of sterilization. This section attempts to qualify this practice by relating the same socioeconomic indicators to some characteristics regarding the reproductive experience of sterilized women. Such characteristics involve a number of indicators of the reproductive and pre-sterilization contraceptive history, as well as of the perception of women regarding the ability of sterilization to fulfill their expectations. Our assumption is that higher levels of income and education are related to better "sterilization conditions". Good sterilization conditions refer to cases in which women plan the desired number of children through the use of temporary contraceptive methods, and, upon reaching their ideal family size, deliberately opt for an irreversible method.

This hypothesis may be explored tentatively through the information available in the 1986 and 1996 DHS by using some of the developed indicators presented on Tables 5 and 6.

Pre-sterilization contraceptive history is examined through two approximated indicators, since complete histories are only present in surveys for more recent births, thus excluding most sterilized women. Information on the first contraceptive method used indicates that, in 1986, a significant share of women with a lower level of income (32.2 percent) and education (39.6 percent) did not use any other method before sterilization. This percentage sharply decreased as income and education levels increased. In 1996, the trend remained the same, although it is possible to observe a decrease in the percentages of poorer (26.8 percent) and less educated (32.7 percent) women using sterilization as their first method. One result, however, seems unusual: during this period, there was an increase in the percentage of lower-middle class women with one or more years of education falling within this category.

Among women of higher socioeconomic level, contraceptive use occurred earlier with regard to parity. In 1986, more privileged women (those with higher income and education levels) had on average 2.8 and 2.7 fewer children, respectively, than women with lower income and education levels upon the use of first method. In 1996, there was a decrease in the average parity at first contraceptive use, and in socio

Table 5
Some characteristics of sterilized women according to socioeconomic class. Brazil, 1986 and 1996

Characteristics	Socioeconomic class [a] - 1986				Socioeconomic class [a] - 1996			
	L	L-M	M	U/U-M	L	L-M	M	U/U-M
Percentage of adopters of sterilization as first method (%)	32.2	12.6	11.5	7.7	26.8	15.5	9.2	3.7
Mean parity at first contraceptive use	3.4	1.8	1.2	0.6	2.2	1.3	0.8	0.3
Interval between first union and first birth:								
percentage with a negative interval	11.2	10.1	4.5	2.7	16.5	11.2	8.2	5.5
mean interval (in months)	15.2	14.9	17.7	21.1	19.7	18.4	18.8	23.1
Parity at sterilization:								
mean parity	5.5	4.2	3.4	2.9	4.3	3.4	2.9	2.6
percentage of women with 4 and more children	72.1	52.0	35.9	17.3	55.3	37.4	23.0	10.6
Median age at sterilization	29.0	28.9	29.4	29.6	27.3	27.0	27.3	27.8
Mean interval between first birth and sterilization (in months)	116.9	109.6	95.5	80.3	99.4	89.7	88.1	77.1
Mean interval between births	21.7	28.0	29.2	27.7	23.6	26.8	30.7	30.3
Difference between number of living children and ideal number of children:								
living children equal ideal	22.3	34.8	44.8	53.5	30.6	40.2	49.7	64.9
living children greater than ideal	45.2	39.4	24.1	17.7	46.5	39.2	28.0	17.3
living children less than ideal	32.5	25.8	31.1	28.8	22.9	20.6	22.2	17.8

Source: 1986 and 1996 DHS.
a. L = lower; L-M = lower-middle; M = middle; U/U-M = upper and upper-middle.

Table 6
Some characteristics of sterilized women according to years of schooling. Brazil, 1986 and 1996

Characteristics	Years of schooling - 1986				Years of schooling - 1996			
	None	1-4	5-7	8 +	None	1-4	5-7	8 +
Percentage of adopters of sterilization as first method (%)	39.6	17.3	9.6	7.2	32.7	18.5	12.7	8.2
Mean parity at first contraceptive use	3.4	2.2	1.2	0.7	2.9	1.6	1.0	0.6
Interval between first union and first birth:								
percentage with a negative interval	9.7	9.3	5.4	4.8	13.5	11.4	13.1	7.8
mean interval (in months)	17.6	15.4	17.6	19.5	19.6	20.0	16.7	20.1
Parity at sterilization:								
mean parity	5.7	4.4	3.4	3.0	4.7	3.8	3.2	2.7
percentage of women with 4 and more children	65.8	58.5	34.5	22.1	69.4	44.2	31.5	14.0
Median age at sterilization	31.2	29.4	28.5	28.8	27.3	27.4	26.7	27.4
Mean interval between first birth and sterilization (in months)	134.8	112.5	96.1	74.9	115.5	100.1	87.2	73.5
Mean interval between births	25.6	27.2	30.1	24.9	23.8	28.0	28.5	27.6
Difference between number of living children and ideal number of children:								
living children equal ideal	17.3	31.7	49.4	50.0	25.1	38.4	39.1	58.2
living children greater than ideal	48.2	41.5	28.5	21.2	51.8	39.1	39.7	22.3
living children less than ideal	34.5	26.8	22.1	28.8	23.1	22.5	21.2	19.5

Source: 1986 and 1996 DHS.

economic level (the difference of parity between women at a higher position and those at a lower position in the scales of income and education was 1.9 and 2.3, respectively).

A second group of indicators is used to examine time intervals between some significant reproductive events, as well as some characteristics of women at sterilization. These factors may be considered indirect indicators of the use of temporary methods before sterilization, or of the control exercised by women over the reproductive process. There are important differences also regarding this aspect.

When associating the first birth with the first union, it is possible to observe that the percentage of women who had children before marriage decreased with the increase of income and education, both in 1986 and 1996. However, all percentages increased during this 10-year period, which is compatible with evidence of growth in the number of teenage pregnancies in Brazil. On the other hand, during this same period, the average intervals between the first union and the first birth after marriage grew for all social groups, probably due to the higher use of temporary methods early during marriage.

Both parity and average age at sterilization declined during the period for all social groups, but the most impressive result is the existence of a great socioeconomic disparity among indicators of parity at sterilization, which altered only slightly between 1986 and 1996. Average spacing among births,[14] which could indirectly indicate control over reproduction, also presented important socioeconomic differentials which hardly changed during the period analyzed.

Finally, through the difference between the ideal number of children and parity at sterilization, we have tried to assess information related to the perception of women as to the adequacy of the moment they were sterilized. The degree of coincidence between parity reached and ideal number of children declared varied positively with both income and education. Also, the percentages grew during the decade for all social groups, improving absolute positions without altering relative ones. This is a significant result, even if we admit that the concept of "ideal number of children" is somewhat vague due to the difficulty of distinguishing between desire (abstract) and intention (guide to action).

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14. This is an indicator developed from the ratio between the average interval after the first birth to sterilization and the actual number of children delivered.

The analysis of these indicators is still far from conclusive, since they involve behavior patterns that are difficult to classify. Nevertheless, it seems clear that there are obvious socioeconomic differentials in all indicators of sterilization conditions. Also, every one of these differentials favor women of higher income and education levels. If, on the one hand, changes that occurred between 1986 and 1996 pointed to an improvement of most indicators, on the other hand, they also undoubtedly showed that socioeconomic differentials still exist.

5 – Conclusion

Above all, the findings of this study demonstrate that better socioeconomic status implies a wider range of possibilities regarding the use of alternative contraceptive methods, which seem to fundamentally depend on the access to information, appropriate knowledge and control over the very mechanisms of reproduction.

When testing the relation between prevalence of female sterilization and indicators of the socioeconomic conditions of women, we have discovered that the importance of sterilization in the mix of contraceptive choices tends to increase with income and decrease with education. We have also observed that both variables tended to decrease in importance between 1986 and 1996. With the significant increase of sterilization practices during this period, this fact demonstrates the process of expansion and generalization of the method throughout all socioeconomic strata.

Assuming the positive relation between purchasing power and sterilization shows the importance of the role of demand for this method in Brazil, the remaining evidence presented here demonstrates that the considerable restrictions of supply cause women of lower socioeconomic strata to be twice penalized by the practice of sterilization: firstly, by its restricted access and, secondly, and above all, by the relative situation of what we have called here "sterilization conditions".

Since socioeconomic differentials of the use of sterilization decreased between the two years analyzed, the existence of socioeconomic differentials regarding "sterilization conditions" may indicate an even more perverse situation. If women who were sterilized because they had greater access to the procedure were also those who could have sterilized in better conditions, all evidence indicates that the dis-

semination of the method implies greater possibilities of access for less privileged women, without however guaranteeing good conditions of choice.

The situation indicates that a greater number of women, with less and less economic, social or geographic distinctions, tend to be sterilized earlier, sometimes even without having had the chance to delay or space births, that is, to plan the size of their family. Within this context, family planning policies are critical to ensure that the practice of sterilization will no longer be used simply as a contraceptive method to guarantee a rapid fertility decline in Brazil. It may then become an appropriate choice once the desired number of children has been reached and temporary methods have been used to space the number of births.

Appendix 1
Observations on the socioeconomic classification employed

The variable of income, usually the first alternative as a socioeconomic indicator, could not be used in the present work because it was only available for the year of 1986, thus making impossible a comparison between the two years analyzed.

Therefore, as a proxy of the variable of income, it was used a socioeconomic scale, developed by the Brazilian Association of Market Research, to the study of the consumer market in Brazil.[15] This scale tries to define socioeconomic classes according to variables capable of discriminating the extent to which households of different social groups have the capacity to consume goods. The idea inherent to this definition is that being apt to consume implies not only having consumer power but also cultural conditions and a lifestyle predisposing to the consumption of goods.

The choice of variables to compose this scale was based on a specific research gathering data on family income and the ownership of consumer goods, household facilities and education. These variables were submitted to stepwise regression analyses in order to determine their degree of correlation with the variable of family income, resulting in the selection of the following items: TV, radio, bathroom, car, domestic employee, vacuum cleaner, wash-

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15. The methodology used may be found in *Mercado Global*, Jan./Feb., 1984.

ing machine and head of household level of education.[16] The socioeconomic scale was constituted as the weighed sum of these variables (considering not only their existence but also their respective quantities). The weight of each one was proportional to their coefficient in the multiple regression, according to the following table:

System of points

Item	Points						
	Do not have	Have					
		1	2	3	4	5	6 +
Television	0	2	4	6	8	10	12
Radio	0	1	2	3	4	5	6
Bathroom	0	2	4	6	8	10	12
Automobile	0	4	8	12	16	16	16
Maid	0	6	12	18	24	24	24
Vacuum cleaner	0	5	5	5	5	5	5
Washing machine	0	2	2	2	2	2	2

Husband's level of education	Points
Illiterate/incomplete primary school	0
Complete primary/incomplete middle school	3
Middle school complete/incomplete high school	5
Higher education complete	10

At the end, 5 classes were established based on the total punctuation of the household, according to the following:

Classes	Points
Upper	35 or more
Upper-middle	21 a 34
Middle	10 a 20
Lower-middle	05 a 09
Lower	00 a 04

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16. Since 98 percent of households were headed by the husband, and our interest was to examine the effect of women's education on sterilization, we used husband's income instead of head of household income.

As an example, let's consider a household with one domestic employee, two TV sets, two radios, one car, one washing machine, one vacuum cleaner and two bathrooms, and in which the husband has completed higher education. The total number of points reached is 37, being the household classified as belonging to the "Upper" class.

In another household, with one bathroom, one washing machine, one TV set and two radios, the husband has a high school level of education. The total number of points reached is 9, thus falling into the "Lower-middle" class.

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