Contraceptive discontinuation and switching in Brazil

Iúri da Costa LEITE
Escola Nacional de Saúde Pública
Rio de Janeiro, Brazil
Email: iuri@procc.fiocruz.br

Neeru GUPTA
IDEA International Institute
Québec, Canada
Email: ngupta@idea-international.org

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Abstract

Contraceptive prevalence is relatively high in Brazil (55 percent among women of reproductive age). Reversible methods account for less than half of the mix, raising attention to the need for monitoring family planning service-related outcomes that might be linked with quality of care. This paper examines the factors associated with method discontinuation and switching among current contraceptive users. Drawing on data from the Demographic and Health Survey calendar, multilevel discrete-time competing risks hazard models are used to estimate the random- and fixed-effects on the probability of a woman making a specific transition at a given duration of use. Contraceptive continuation was found to be highest for the pill, the most popular reversible method. Probabilities of abandonment while in need of family planning and of switching to another method were highest for injections. Failure, abandonment and switching were each higher among users in the Northeast region compared to the relatively prosperous Southeast, pointing to seemingly important disparities in the availability and quality of family planning and reproductive health care services across regions of the country.

Introduction

The 1960s saw the start of sustained process of fertility decline in Latin America. In Brazil in particular, the total fertility rate (TFR) has already reached a level as low as that of many developed countries: 2.5 lifetime children per woman in 1996 (BEMFAM, 1997). The general consensus is that the most important proximate determinant of fertility decline has been a widespread increase in the use of contraceptive methods. However, high levels of prevalence alone do not necessarily result in low levels of fertility. Impacts are conditioned by use-effectiveness, including rates of method failure, user error and provider failure (Dominik et al., 1999; Potts and Selman, 1979; Robey et al., 1992). Moreover, while fertility decline has become rather generalized in Brazil, there remain important differences across sub-regions and social groups in relation to the stage and pace of this process. Differentials in availability, accessibility and acceptability of the range of contraceptive technologies may mean that not all methods are favoured at the same time.

Rapid increases in contraceptive prevalence and accumulated experience with each method have heightened awareness that the choice of method is an important research and policy question. Evidence from a number of developing countries reveals that the mix of specific methods tends to continually evolve, as newer and more effective methods increase in popularity. For example, a dramatic rise in sterilization acceptance has been noted in many countries, especially in the Latin American and Asian regions, often at the expense of other methods (Palmore and Bulatao, 1989; Tsui, 1985). It has been estimated, based on cross-national analyses of survey data, that at least half of contraceptors switch methods within a five-year period (Shah, 1991). With regard to

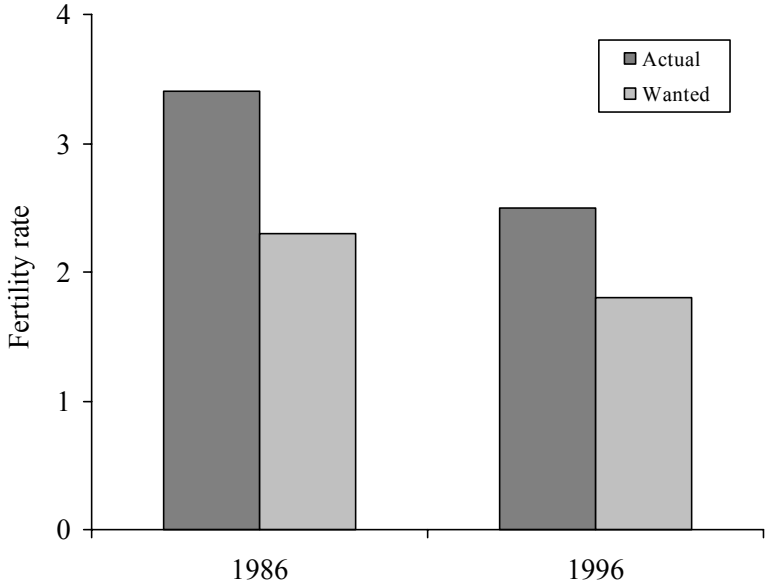
temporary methods alone, about a third of women from six developing countries were found to have stopped use of their method within 12 months (Ali and Cleland, 1995). Such findings underlie the increasing importance of monitoring trends and determinants of method choice, as family planning and reproductive health programs must adapt to meet users' changing needs and preferences.

In Brazil, the contraceptive method mix has undoubtedly played an important role in the overall process of fertility decline. According to data from the Demographic and Health Survey (DHS), the most commonly used method is female sterilization, a long-term and highly effective method, relied upon by 27 percent of women of reproductive age (BEMFAM, 1997). The second most popular method is oral contraceptives, used by 16 percent of women. Use of all other reversible methods combined stands at about 10 percent. It is likely that some combination of individual and community-level factors eventually shaped this mix. Analyses of DHS results have revealed a number of socio-cultural variables, including media exposure and religiosity, as exercising significant influences on contraceptive method choice (Rios-Neto et al., 1991). Research using multilevel modeling has also pointed to significant random effects at the municipal level on women's adoption of sterilization, likely reflecting influences of the service environment such as presence of hospitals (Leite et al., 1997).

Despite relatively high overall levels of contraceptive use, there appears to remain a large unmet need for family planning. Brazil does not have an official national family planning program, although in recent years some family planning-related services have been incorporated into the country's maternal and child health program. One investigation in southern Brazil disclosed important constraints in the availability of and access to family planning and reproductive health

services for women, as well as severe deficiencies in quality of care (Díaz et al., 1999). It is estimated that if all Brazilian women who wanted to limit their fertility were protected by effective contraception, the TFR in 1996 would have stood at 1.8 children, or some one-third lower that the actual rate (Figure 1). This proportion was about the same as that observed ten years earlier, albeit at a higher fertility level. In order to fully understand the mechanisms through which method choice has influenced fertility transition, it is imperative to investigate the components of contraceptive dynamics such as contraceptive discontinuation and switching.

Figure 1: Total and wanted fertility rates, Brazil, 1986-1996.



Source: ORC Macro, 2004

Contraceptive discontinuation and switching are closely related, as the impact on fertility depends to a great extent on both the woman's decision to use another method and the effectiveness of that method.[1] Of particular interest is switching to a less effective method or to no method, which increases the chance of conception and is therefore likely to increase the

overall level of fertility. Switching between methods of similar effectiveness may hold less important demographic impacts, although any switching may potentially increase the risk of an unintended pregnancy, as women are more likely to experience a method failure in the first months of use when they are not fully familiar with the new method. One study of contraceptive dynamics suggested that, overall, at least one-third of the TFR in 15 developing countries (including Brazil) was associated with either a contraceptive failure or a contraceptive discontinuation for reasons other than a desire to get pregnant (Blanc et al., 2002). It has been argued that contraceptive continuation rates could be raised substantially by eliminating discontinuation due to non-method and method related reasons (Zhang et al., 1999).

In addition to fertility implications, declines in contraceptive failure rates have been associated with declines in abortion rates, although the relationship may be tempered by changes in the demand for fertility regulation (Senlet et al., 2001). Moreover, in light of the HIV/AIDS epidemic, patterns of discontinuation and switching for condoms, the only effective barrier method against the transmission of HIV and other sexually transmitted infections, hold important implications for health program interventions. While the epidemic has shown signs of stabilization in Brazil in recent years, UNAIDS (2002) estimates that the majority (53 percent) of all female AIDS cases remain the result of heterosexual transmission.

The objective of this paper is to analyze the factors associated with contraceptive discontinuation and switching in Brazil, drawing on data from the 1996 national DHS. We examine the demographic and socio-cultural influences of discontinuation and switching across reversible contraceptive methods, focusing special attention on the reported reasons for method

discontinuation. Identifying the predictors of method failure and discontinuation in a context of rapid and profound changes in fertility-related behaviours and expansion of AIDS prevention and control strategies could assist program managers and policymakers in improved targeting of reproductive health care services.

Data and methods

The DHS is one of the largest programs collecting quantitative data on reproductive health knowledge, attitudes and practices in the developing world. Surveys are carried out using standardized instruments, methods of training, data collection, and data processing (ORC Macro, 2001). The most recent DHS in Brazil, the 1996 *Pesquisa Nacional sobre Demografia e Saúde,* collected information through personal interviews with a nationally representative sample of 12,612 women aged 15-49 years (BEMFAM, 1997).

In addition to core questions for measuring basic indicators for population and health program monitoring and evaluation, some surveys include additional modules designed to obtain specialized information on specific topics, such as maternal mortality or anthropometry. The present analysis takes advantage of the "calendar" module of reproductive events. The calendar records exceptionally detailed information (i.e. month-by-month) about the timing of a number of events – including marital unions, residential mobility, births, and contraceptive use – occurring in the five full calendar years preceding the survey. A relatively less-exploited module among the DHS surveys, the calendar has become increasingly important in monitoring

contraceptive dynamics and has greatly facilitated researchers' capabilities to conduct analyses of discontinuation and switching in particular (Curtis and Blanc, 1997).

The calendar records, for each episode of use, the type of contraceptive method, the dates of starting and ending of use, and the reason for discontinuation of use. Pregnancies, live births and abortions are also documented. This retrospective method of measurement makes heavy demands on the memory of respondents but recall is aided by prior entry into the calendar of live births, ascertained earlier in the interview. In precisely timing events in relation to one another, the calendar provides a valuable framework for resolving inconsistencies in respondents' responses related to birth dates, breastfeeding durations, and segments of contraceptive use or non-use. Overall, the quality of information obtained through this method has been evaluated as superior to alternative retrospective data collection techniques for longitudinal information (Goldman et al., 1989; Westoff et al., 1990).

For this study, a discrete-time competing risks hazard model is used to estimate the probability of a woman making a specific transition at a given duration of use. A discrete-time competing risks model is basically a multinomial logistic model in which the observations are repeated according to the duration of use until the event occurs or is censored. This approach allows incorporation of time-varying covariates as compiled in the calendar (such as woman's age, marital status and parity at the time of use). Our main interest is to describe the patterns and explain the independent determinants of contraceptive discontinuation and switching among women at risk.

Included in the model are all sexually experienced women who initiated use of a reversible method of contraception over the period covered by the calendar. The units of analysis are the episodes of contraceptive use (i.e. continuous use from month to month). Observations in the three-month period immediately before the survey fieldwork are excluded, a conventional research practice to reduce the bias in estimation of use-failure rates, given that some women may not yet have recognized they are pregnant and as such some contraceptive failures not identified. Likewise excluded are episodes of use that began prior to the calendar period, as the date of initiation would not have been recorded.

We consider here episodes of use of the pill, injections, condoms and traditional methods. Uses of other modern reversible methods (such as IUD, diaphragm or spermicides) are excluded for computational reasons, due to the small number of episodes observed in the survey, and since it was not considered pertinent to aggregate these methods into a single category as discontinuation and failure rates can vary substantially across methods. Episodes of sterilization are also excluded given that the likelihood of discontinuation for this method is essentially nil.[2]

In examining the patterns of contraceptive discontinuation and switching, four categories were created for the response variable: (1) failure; (2) abandonment of the method while still in need of family planning; (3) switching to another reversible method; and (4) continuing use of the method. Contraceptive failures include any (presumably unintentional) occurrence of a pregnancy while using the method. Episodes where the woman reported having discontinued use for non-method-related reasons, such as a desire to get pregnant, marital separation or infrequent sex, were included under the fourth category as they were not considered to have ended while in

need of family planning. These categories should be interpreted as approximate as self-reported reasons for contraceptive discontinuation may be somewhat unreliable (Steele and Curtis, 2003).

A number of episode-specific and woman-specific variables were included in the model as potential compounding factors, including contraceptive intention and duration of use as well as woman's age, marital status, number of living children, education, ethnicity, place of residence (according to the residential history in the calendar), and mass media exposure (as assessed through television viewing habits). These covariates have been considered in previous studies as relevant to the assessment of influences on contraceptive use, method choice and/or discontinuation in Brazil and elsewhere in the developing world (see, for example, Ali and Cleland, 1999; Curtis and Blanc, 1997; Gupta, 2000; Leite et al., 1997; Rios-Neto et al., 1991; Steele and Curtis, 2003). Moreover, in the Brazilian context, particular attention is paid to differentials across sub-regions, notably contrasts across the relatively prosperous Southeast region versus the poverty-stricken Northeast.[3]

Of further substantive and methodological interest, our study uses a multilevel approach. Standard regression models assume that observations are independent. However, given the hierarchically nested structure of the data being used here, multilevel modeling becomes necessary to allow for controlling for any unobserved correlation between observations within hierarchical levels. At the first level, in modeling women's episodes of contraceptive use, an individual may contribute more than one segment of use to the sample. At the second level, the DHS sampling scheme entails selection of households and individuals within enumeration clusters (Macro International, 1996); individuals from the same sampling cluster are considered

likely to exhibit similar demographic and behavioural characteristics (because of a variety of unmeasured and unmeasurable factors) compared to those selected from different clusters. The multilevel model is thus used to compensate for assumed intra-woman and intra-cluster dependence of observations. Moreover, a cluster can be considered a proxy for neighbourhood or community, and reflects local service environment as well as local "culture". It has been argued that women in the same community often talk to each other and, therefore, are more likely to exhibit similar behaviours regarding contraceptive use (Entwisle et al., 1989).

The multilevel discrete-time competing risks model is applied to estimate cumulative probabilities of contraceptive failure, abandonment and switching according to the set of background characteristics. The formulation of the model is as follows:

$$\ln\left(\frac{\lambda_{rtijk}}{\lambda_{4tijk}}\right) = \alpha_{rt} + \beta_r' x_{tijk} + u_{rijk} + v_{rk}, \quad r = 1, 2, 3$$

where λ_{rtijk} is referred to as the hazard of a transition of type *r* at time *t* for the use interval *i* of woman *j* from cluster *k*. The baseline hazard is represented by α_{rt}, a function of time. β_r is the vector of parameters for transition *r*, with x_{tijk} the associated set of covariates (the same for each of the three types of contrasts against continuation of method use). The estimators u_{rjk} and v_{rk} measure the random variations at the woman and cluster levels respectively. They are assumed to be mutually independent and normally distributed with mean zero and variances σ^2_{rjk} and σ^2_{rk} respectively.

The final sample for the study consisted of 6,027 episodes of contraceptive use. The analysis was carried out using the *MLwiN* statistical software program, using the second order predictive quasi likelihood (PQL) procedure for non-linear multilevel modeling (Rasbash et al., 2000).

Results

Descriptive analysis

As seen in Table 1, findings from the Brazil DHS characterize a population that, in comparison with much of the developing world, is essentially urban (82 percent), relatively educated (62 percent with at least some secondary schooling), and highly exposed to modern mass media communication (89 percent watching television on a weekly basis). The country's most populous region is the Southeast (42 percent), which includes the metropolitan areas of São Paulo and Rio de Janeiro, followed by the nine states that comprise the Northeast region (28 percent).

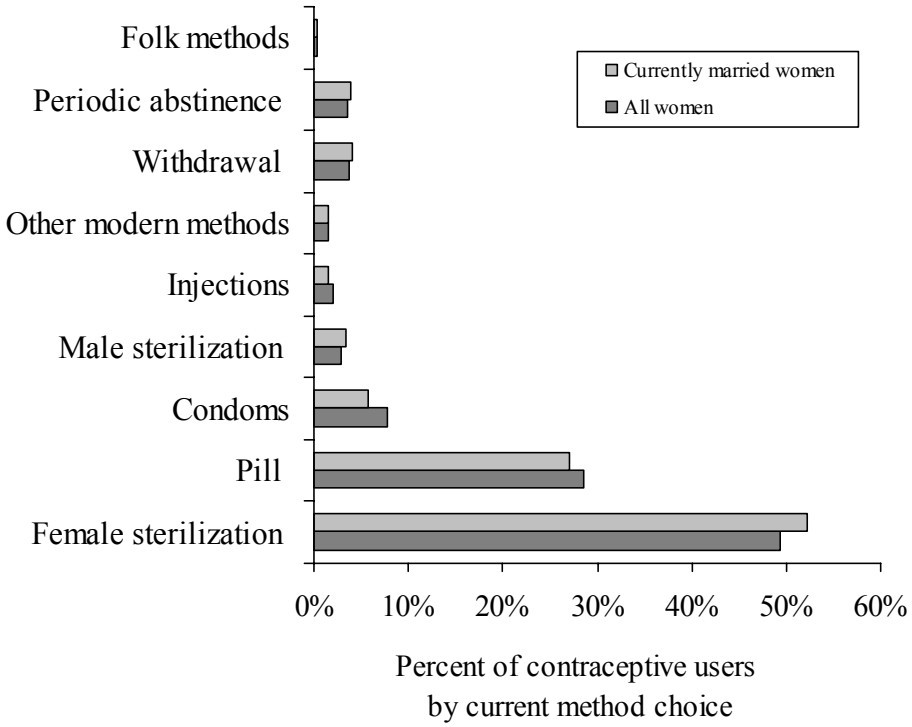
At the time of the survey, 55 percent of all women of reproductive age, and 77 percent of married women, were currently using some method of family planning. Of these, over half were relying on either female or male sterilization (Figure 2). Among users of reversible methods, the majority were adopters of oral contraceptives followed by condoms. There was little appreciable difference in the method mix according to the woman's marital status, except perhaps a somewhat higher reliance on sterilization to the detriment of condom use among those who were married.

Table 1: Percentage distribution of women aged 15-49 by selected background characteristics, Brazil, 1996.

Age group	
15-19	20
20-24	15
25-29	15
30-34	15
35-39	14
40-44	12
45-49	9
Marital status	
Married/living together	60
Not in union	40
Number of living children	
0	34
1	17
2	20
3+	29
Ethnicity	
White	42
Other	58
Educational attainment	
No schooling	5
Primary	33
Secondary	55
Higher	7
Mass media exposure	
Watches TV regularly (every week)	89
Does not watch TV	11
Place of residence	
Rural	18
Urban	82
Region	
North	5
Northeast	28
Southeast	42
South	17
Center-West	8

Source: Demographic and Health Survey (*N=12,612 women).*
Note: Characteristics refer to those reported at the time of the survey.

Figure 2: Contraceptive method mix, by marital status, Brazil, 1996 DHS.



Contraceptive discontinuation rates among the most common reversible methods by self-reported reason for discontinuation are presented in Table 2. Preliminary analysis of findings from the calendar reveals an overall discontinuation rate of 43 percent for the five-year period prior to the survey. The rate was lowest for users of orals and highest for users of injections. Fewer than 4 percent of women cited a desire to become pregnant as the reason for having ended an episode of use. Not surprisingly, failure rates were higher with respect to traditional methods (periodic abstinence and withdrawal), while concerns over side effects were more widely reported among users of modern hormonal methods (injections and orals).

Table 2: Contraceptive discontinuation rates, by reason for discontinuation, Brazil, 1996 DHS.

Reason for discontinuation	Contraceptive method					Total
	Pill	Condoms	Injections	Periodic abstinence	Withdrawal	
Method failure	4.8	5.1	4.7	17.0	15.7	5.9
To become pregnant	5.0	3.7	4.5	2.9	4.3	3.7
Side effects, health	11.8	3.6	27.4	1.5	0.6	7.7
All other reasons	23.3	47.7	27.1	35.8	41.6	26.1
All reasons	**44.8**	**60.0**	**63.7**	**57.1**	**62.2**	**43.4**

Source: ORC Macro, 2004.
Note: Rates based on 5 years of calendar data and represent the proportion of users discontinuing a method within 12 months after the start of use.

Results from the competing risks hazard model

Cumulative probabilities of contraceptive failure, abandonment and switching according to selected episode- and woman-level variables are presented in Table 3. These twelve-month cumulative probabilities are derived from the estimated coefficients from the multilevel discrete-time competing risks hazard model which, along with the distribution of episodes by method used, can be found in Annex (Tables A1 and A2 respectively).

As expected, the probability of failure was highest for episodes of use of traditional methods (0.23), after controlling for other potentially confounding factors. Probabilities of abandonment (presumably while in need of family planning) and of method switching were highest for injections. In contrast, the probability of continuation was highest for the pill (0.64), the most widely used reversible method overall. Continuation was also high for condoms, albeit at a lower measure than for the pill.

Table 3: Twelve-month cumulative probabilities of contraceptive failure, abandonment and switching according to selected episode-level and woman-level variables.

	Failure	Abandonment	Switching	Continuation
Method				
Pill	0.0647	0.1341	0.1607	0.6404
Condoms	0.0910	0.0750	0.3761	0.4578
Injections	0.0702	0.1694	0.3881	0.3722
Traditional methods	0.2272	0.0373	0.2962	0.4394
Contraceptive intention				
Spacing	0.0724	0.0912	0.2364	0.6000
Limiting	0.0979	0.1123	0.2020	0.5877
Woman's age				
≤ 19	0.1112	0.1129	0.2270	0.5489
20-24	0.1006	0.0923	0.2067	0.6004
25-29	0.0802	0.0869	0.2230	0.6100
30-34	0.0843	0.1204	0.2283	0.5694
35+	0.0449	0.1476	0.1822	0.6253
Marital status				
Married/living together	0.0957	0.1027	0.2273	0.5743
Other	0.0650	0.1049	0.1831	0.6471
N° of living children				
0	0.0928	0.1352	0.2464	0.5255
1	0.0755	0.1023	0.2235	0.5987
2	0.0847	0.0911	0.1956	0.6286
3+	0.1075	0.0782	0.1771	0.6372
Ethnicity				
White	0.0767	0.0951	0.2494	0.5789
Other	0.0960	0.1106	0.1902	0.6032
Years of schooling				
0-3	0.1022	0.1644	0.1772	0.5562
4-8	0.0951	0.1144	0.2208	0.5696
9-11	0.0742	0.0774	0.2177	0.6308
12+	0.0587	0.0549	0.2550	0.6314
Mass media exposure				
Watches TV regularly	0.0865	0.0985	0.2214	0.5937
Does not watch TV	0.0895	0.1820	0.1527	0.5757
Region				
North	0.0661	0.1696	0.2293	0.5349
Northeast	0.0965	0.1642	0.2764	0.4628
Southeast	0.0868	0.0782	0.2129	0.6221
South	0.0721	0.0536	0.1428	0.7314
Center-West	0.0901	0.1014	0.1724	0.6360
Global	0.0869	0.1034	0.2155	0.5942

Source: 1996 Demographic and Health Survey *(N = 6027 episodes of use)*.
Note: Episodes of use of reversible contraceptive methods that began prior to the five-year calendar period or of sterilization use are not included.

The probability of failure was essentially inversely associated with the woman's age at the start of the episode of use, as well as with her educational attainment. Abandonment was more likely among adolescents (19 years and under) as well as older users (30 years and over) compared to users in their twenties. Abandonment was also positively correlated with the number of living children at the start of the episode. Method switching was more common among married users than their unmarried counterparts, all else being equal.

The probabilities of failure, abandonment and switching were each higher for episodes of use among women in the Northeast region compared to those in the Southeast, a pattern that was statistically significant ($p<0.05$). No discernible difference was found according to urban/rural residence, after controlling for education and other background characteristics (see Table A1 in Annex). This latter result was consistent with analytical findings for contraceptive discontinuation from certain other countries (for example, Ali and Cleland, 1999).

At the same time, significant cluster-level random variations were found with respect to contraceptive switching (Table A1), pointing to additional unmeasured contextual influences that may increase or decrease the probability of a woman changing her method of choice. Such effects may be related to, for example, peer influences or proximity of service delivery points for family planning services and reproductive health care.

Discussion

Over 90 percent of governments around the world provide either direct or indirect support for contraceptive methods, including that of Brazil (United Nations Department of Economic and Social Affairs, 2003). While Brazil does not have an official family planning program, certain related services have been incorporated into the national maternal and child health program, in recognition of the right of individuals and couples to access family planning and reproductive health information and supplies. It is being increasingly recognized that measures for the monitoring and evaluation of family planning service efforts need to go beyond their impact on fertility. In countries where contraceptive prevalence is relatively high, services aiming to reduce the number of unintended pregnancies must pay special interest to the needs of current contraceptive users. Increased attention to quality of care has heightened attention on outcomes that might be associated with the quality of family planning services, notably contraceptive discontinuation and switching (Blanc et al., 2002).

This paper examined patterns of contraceptive discontinuation and switching for reversible methods in Brazil, drawing on data from the DHS calendar. In the analysis of discontinuation, particular attention was paid to the reasons for stopping use, differentiating method failure (i.e. presumed unintentional pregnancy) from abandonment while in need for family planning. Multilevel competing risks hazard models served to assess the random- and fixed-effects on contraceptive dynamics.

Overall, the twelve-month cumulative probability of continuation was found to be highest for oral contraceptives, the most commonly used reversible method among women of reproductive

age. Somewhat encouragingly in the face of the HIV/AIDS epidemic, continuation was also high for condoms, albeit at a lower measure than for the pill. As could be expected, the probability of failure was highest with respect to traditional methods. Greater likelihoods of abandonment and switching were found for injections compared to other modern and traditional methods, echoing research results from a number of Latin American countries and reinforcing suggestions that family planning service managers examine more closely the delivery of injectables (Blanc et al., 2002).

Failure for all methods combined was highest among adolescent and less educated users, likely related to higher rates of user error. Research elsewhere on Brazil and other Latin American countries has also reported that women of lower educational attainment, a characteristic considered as proxy for socio-economic status, were less likely to adopt sterilization for contraceptive purposes (Leite et al., 2004). Such patterns could partially be a reflection of poor outreach and follow-up of family planning services towards disadvantaged social groups.

Moreover, after controlling for episode- and individual-specific factors, the probability of contraceptive failure, as well as of abandonment and switching, was significantly higher in the Northeast region compared to the Southeast, pointing to seemingly important disparities in the availability and quality of family planning and reproductive health care services across regions of the country.

Many previous studies of contraceptive discontinuation and/or switching have focused only on reports from married women (e.g. Ali and Cleland, 1995; Blanc et al., 2002; Steele and Curtis,

2003; Zhang et al., 1999). Often this was due to the nature of the available data, as some DHS countries limited sample coverage to ever-married women. The present analysis took advantage of available calendar data for all women of reproductive age, in a context of widespread sexual activity and contraceptive use regardless of marital status. While little appreciable effect was found of marital status on the probability of contraceptive abandonment, curiously, method switching was significantly less common among users who were not married at the start of the episode of use compared to those who were married. Such findings point to the need for further research on contraceptive use dynamics among unmarried women, a group that has tended to be neglected in earlier investigations.

One limitation to this analysis may have been a failure to adequately address the issue of the potential endogeneity of contraceptive method choice in the discontinuation process. A recent study using multiprocess models showed that method choice was endogenous in the case of contraceptive abandonment, at least according to an application for the effect of choice of IUD and implants over the pill and injections in Indonesia (Steele and Curtis, 2003). The potential consequences of endogeneity on discontinuation and switching remain uncertain in the context of Brazil, where the use of reversible clinical methods is nonetheless very low, suggesting an interesting path for future study.

Notes

1. Presumed efficient contraceptive methods include sterilization (virtually 100% effective), oral contraceptives, injections, IUD, implant, condoms, and other "female scientific" methods (such as the diaphragm, jelly, foam or sponge). Among the more inefficient methods are periodic abstinence, withdrawal, douche, and other "folk" methods. However, method-specific effectiveness can vary according to the consistency and correctness of use for each menstrual cycle (see Dominik et al., 1999; Trussell et al., 1990).

2. There were 6 survey cases of women who reported their partners had been sterilized but that they were not using any method or the method being used was not male sterilization. These cases are assumed to be “inconsistencies" rather than observations of sterilization discontinuation (Macro International, 1997).

3. Much attention has been paid in the literature to disparities between the poverty-stricken Northeast and more affluent Southeast, the two most populous regions that together represent 70 percent of the total population. For example, in terms of income levels, in 1996 the proportion of workers earning less than one legal minimum wage was some 2.4 times higher in the Northeast (58 percent) than in the Southeast (24 percent). A similar tendency was observed in terms of rates of adult illiteracy: 40 versus 9 percent (BEMFAM, 1997). Such differences are considered to hold important implications for demographic and health outcomes.

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Annex

Table A1: Estimated coefficients and standard errors from the multilevel competing risks hazard model for the effects on contraceptive failure, abandonment and switching in the five years preceding the survey.

	Failure		Abandonment		Switching	
	Coefficient	*S.E.*	*Coefficient*	*S.E.*	*Coefficient*	*S.E.*
Constant	-3.050	0.210	-2.772	0.261	-3.994	0.252
Method						
Pill	-1.447*	0.092	1.099*	0.170	-0.787*	0.104
Condoms	-0.928*	0.128	0.687*	0.202	0.227	0.117
Injections	-1.083*	0.225	1.600*	0.233	0.354*	0.165
Traditional (ref)	0.000	-	0.000	-	0.000	-
Duration of use (months)						
1-3	0.047	0.121	-0.153	0.090	0.338*	0.087
4-6	0.316*	0.120	-0.202*	0.095	0.393*	0.090
7-12	0.162	0.112	-0.304*	0.086	0.068	0.087
13-18	0.022	0.128	-0.105	0.088	0.025	0.095
>18 (ref)	0.000	-	0.000	-	0.000	-
Contraceptive intention						
Spacing	0.000	-	0.000	-	0.149	0.104
Limiting	-0.311*	0.102	-0.217	0.114	0.000	-
Woman's age						
≤ 19	0.147	0.117	0.246*	0.105	0.137	0.107
20-24 (ref)	0.000	-	0.000	-	0.000	-
25-29	-0.234*	0.110	-0.068	0.112	0.069	0.099
30-34	-0.145	0.136	0.295*	0.146	0.128	0.129
35+	-0.827*	0.178	0.450*	0.183	-0.145	0.164
Marital status						
Married/living together	0.450*	0.123	0.039	0.110	0.274*	0.110
Other (ref)	0.000	-	0.000	-	0.000	-
N° of living children						
0 (ref)	0.000	-	0.000	-	0.000	-
1	-0.275*	0.124	-0.343*	0.121	-0.160	0.119
2	-0.186	0.149	-0.485*	0.162	-0.318*	0.153
3+	0.044	0.179	-0.645*	0.206	-0.425*	0.195
Ethnicity						
White	-0.202*	0.086	-0.129	0.103	0.293*	0.090
Other (ref)	0.000	-	0.000	-	0.000	-
Years of schooling						
0-3 (ref)	0.000	-	0.000	-	0.000	-
4-8	-0.084	0.110	-0.373*	0.132	0.210	0.138
9-11	-0.385*	0.133	-0.815*	0.160	0.147	0.153
12+	-0.618*	0.208	-1.157*	0.248	0.306	0.195
Mass media exposure						
Watches TV regularly	-0.049	0.134	-0.628*	0.157	0.358	0.189
Does not watch TV (ref)	0.000	-	0.000	-	0.000	-
Place of residence						
Rural (ref)	0.000	-	0.000	-	0.000	-
Urban	-0.033	0.173	-0.434	0.240	0.108	0.182
Region						
North	-0.452*	0.168	-0.038	0.166	-0.255	0.174
Northeast (ref)	0.000	-	0.000	-	0.000	-
Southeast	-0.260*	0.108	-0.888*	0.133	-0.403*	0.123
South	-0.533*	0.139	-1.349*	0.164	-0.883*	0.151
Center-West	-0.235	0.137	-0.640*	0.163	-0.626*	0.164
Random effects estimators						
Cluster level	0.007	0.058	0.010	0.081	0.196*	0.077
Woman level	0.155	0.102	3.260*	0.178	2.115*	0.136

Source: 1996 Demographic and Health Survey *(N=80,407 calendar observations)*. ref=Reference category.
Note: Episodes of use of reversible contraceptive methods that began prior to the five-year calendar period or of sterilization use are not included.

Table A2: Distribution of episodes of contraceptive use in the five years preceding the survey according to method.

Method	Number of episodes	Percentage distribution
Pill	3513	58.3
Condoms	1083	17.9
Injections	367	6.1
Traditional methods	1064	17.7
Total	**6027**	**100**

Source: 1996 Demographic and Health Survey.
Note: Episodes of use of reversible contraceptive methods that began prior to the five-year calendar period or of sterilization use are not included.