

Spontaneous and voluntary fetal losses in Brazil in 1999-2000: a study of associated factors

Perdas fetais espontâneas e voluntárias no Brasil em 1999-2000: um estudo de fatores associados

Abstract

Despite its illegality in Brazil, about 31% of all pregnancies end in abortion. Most abortions are performed by unskilled personnel and under unsafe conditions, resulting in increased female mortality. This study used data from a cross-sectional representative sample of 3,047 puerperal women, in 1999-2000, part of a national multicenter study on the prevalence of syphilis in Brazil. Of these, 1,838 women with at least one previous pregnancy before the reference pregnancy were included in the analysis. The outcomes studied were voluntary prior fetal loss, spontaneous prior fetal loss, and no prior fetal loss. The analysis was carried out using multinomial logistic regression. The results indicated a high number of fetal losses per woman (up to six); and 31% of the losses were voluntary. The absence of prenatal care, history of STD in the reference pregnancy, and absence of living children were factors that increased the odds of fetal loss. For voluntary fetal loss, being non-white, having more than one partner in the previous year, and an early age at first sexual intercourse also increased the odds of fetal loss. These data confirm the public health relevance of abortion in Brazil. Characteristics related to women's vulnerability should be considered in family planning programs in order to reduce the number of abortions and their consequences. Counseling must also be provided, targeting women with a previous abortion.

KeyWords: Abortion. Voluntary fetal loss. Brazil. Puerperous women.

Carla Jorge Machado^I

Ana Christina de Lacerda Lobato^{II}

Victor Hugo Melo^{III}

Mark Drew Crosland Guimarães^I

^IDepartment of Preventive and Social Medicine, School of Medicine, Federal University of Minas Gerais (UFMG); Research Group in Epidemiology and Health Service Evaluation (GPEAS/UFMG)

^{II}Júlia Kubistchek Hospital - FHEMIG

^{III}Department of Medical Clinic, School of Medicine, Federal University of Minas Gerais (UFMG)

Conflicts of interest: nothing to declare

Corresponding author: Carla Jorge Machado. Av. Augusto de Lima 1376/ sala 908, 30190-003 Belo Horizonte, MG, Brasil. E-mail: carlajmachado@gmail.com

Resumo

Apesar de ilegal no Brasil, cerca de 31% das gestações terminam em aborto. A maioria dos abortamentos provocados é realizada por pessoas não capacitadas, e em condições inseguras, resultando em aumento da mortalidade feminina. O presente estudo utilizou dados de uma amostra representativa de 3.047 puérperas, de 1999-2000, de corte transversal, parte de estudo multicêntrico nacional sobre soroprevalência de sífilis no Brasil. Destas, foram analisadas 1.838 puérperas com pelo menos uma gravidez anterior à gravidez de referência. Os desfechos estudados foram perdas fetais prévias (voluntária e espontânea) e ausência de perda fetal prévia. A análise foi conduzida por meio de regressão logística multinomial. Os resultados indicaram alto número de perdas fetais por mulher (até seis) e 31% das perdas foram voluntárias. A ausência de pré-natal, a história de DST na gravidez de referência e a ausência de filhos vivos aumentaram a ocorrência de perdas fetais. Para as perdas voluntárias, a raça/cor não branca, mais de um parceiro no ano anterior e idade precoce à primeira relação sexual também concorreram para o aumento da ocorrência. Características de vulnerabilidade destas mulheres devem ser consideradas em programas de planejamento familiar e de aconselhamento de mulheres, focalizando aquelas que já tiveram abortos, para a redução do número e consequências deste procedimento.

Palavras-chave: Aborto. Perdas fetais voluntárias. Brasil. Puérperas.

Introduction

Abortion has been the subject of several studies in Brazil¹. A recent review of twenty years of research on abortion in the country shows that most studies on public health come from empirical data². The greatest challenge in assessing the magnitude of abortion in Brazil is the lack of access to reliable data because a high number of women omit having had induced abortions in research projects using questionnaires with direct questions². Given the need for quality data on abortion, some surveys in the country used specific strategies aimed at ensuring these women privacy and anonymity of response using the Randomized Response Technique (RRT)³ or the ballot-box technique^{1,4}. These initiatives indicate the increasing need to obtain valid and reliable data on abortion, giving the urgency of tackling this serious problem that can lead to undesirable consequences for women.

The World Health Organization (WHO) estimates that half of all pregnancies worldwide are unintended, and that one in nine women resort to abortion⁵. The great majority (97%) of these procedures occur in developing countries where abortion is illegal. In Brazil, calculations show that the abortion rate is 31%. That is, there are approximately 1.44 million miscarriages and/or unsafe abortions at a rate of 3.7 per 100 women⁵. According to data from the *Pesquisa Nacional de Aborto* (PNA – National Abortion Survey), in 2010, more than one in every five women had had an abortion by the end of their reproductive lives¹.

Abortion is a crime in Brazil, legal only in the case of sexual violence (rape) or where there is a risk to the woman's life (Article 128, I and II of the Criminal Code)⁶. Regardless, abortion is widely practiced, through unsafe methods that increase maternal morbidity (Domingos and Merighi, 2010). Being illegal hardly diminishes this practice and brings negative consequences to women's health^{2,7}. Moreover, because it is illegal, obtaining information about abortion can be difficult

in the context of its criminalization in the country⁸.

The nearly 20 million annual abortions performed worldwide in an unsafe manner result in approximately 68,000 deaths in adolescents and adult women, representing 13% of maternal deaths⁹. In Latin America and the Caribbean, abortion accounts for at least 12% of maternal deaths, and in some regions of Latin America for up to 30%¹⁰. Depending on the location, complications resulting from abortions in Latin America account for 50% of maternal deaths¹¹.

Studies show that deaths from abortions occur mainly among young women^{12,13} of underprivileged social strata^{12,13}, with low education^{12,13}, and residing in the outskirts of the cities^{12,13}. Black women are also much more affected and are at twice the risk of dying from this cause^{9,14} than white women. The reasons for terminating a pregnancy vary according to age, marital status, and social context. Among those without any children, a common allegation is the need to postpone motherhood to allow further study or work^{14,15}.

According to some authors, the 20-29-year age group accounts for the highest number of abortions, with percentages ranging from 51% to 82% of women in each study². A recent study in Brazil (the National Abortion Survey), however, indicated that the younger-than-19-year age group was predominantly responsible for abortions¹⁷. Over 70% of women assessed in the last 20 years were on a stable marriage and more than half of women who experienced induced abortion had at least eight years of schooling². A national study on abortion rates in women admitted to hospitals serving users of the SUS (the Brazilian Unified Health System) showed that 20% of almost 2,300 abortions occurred among adolescents, with a prevalence of incomplete abortions¹⁸. Another important finding in this study was the occurrence of abortions starting at the age of 11, stressing the need to implement pregnancy prevention measures at younger ages in school sex education curricula¹⁸.

A national publication, analyzing information from 12,612 interviewed women as part of the 1996 National Demographic and Health Survey (PNDS in Portuguese), showed that the prevalence of miscarriages was 14% and that of induced abortions was 2.4% for the whole of Brazil¹⁹. According to this study, abortion rates increase with women's age, and the most important risk factors identified were living in an urban area, having more than one child alive and not being white. The last two findings were corroborated by the PNA, which studied urban women¹⁷. The objectives of this study were to estimate the prevalence of voluntary fetal losses in Brazil, based on a representative study on congenital syphilis among puerperae in Brazil²⁰, and its associated factors. For this study, a multinomial response model was used, which allowed the evaluation of spontaneous and voluntary losses separately, compared to women without losses.

Materials and Methods

Study design and population

This is a cross-sectional analysis, part of a national multicenter study on the prevalence of syphilis among puerperae developed between 1999 and 2000²²⁻²⁴. A random probabilistic sample was selected, comprised of 3047 women who had recently undergone childbirth in referral maternities registered with the National STD/AIDS Program (PN-DST/AIDS, in Portuguese), weighted by the monthly number of mothers by federal unit in the country. The sample was proportional to the estimated number of hospitalizations by federal unit and the number of centers in each state, ensuring the selection of at least one center per state or federal unit. Only one state was excluded for failing to respond to letters sent by the research coordinators. A total of 24 states were represented. The parameters used to estimate the sample size were: prevalence of syphilis among the puerperae of 3%, confidence level (type I error) of 5%

and level of accuracy of 0.6%. Additionally, 5% of loss was estimated. Methodology details can be found in Guimarães (2000)²⁰ and Rodrigues & Guimarães (2005)²¹.

Eligibility criteria for study participation were pregnancy and admission for delivery or curettage in selected centers in 2000, and consent to participate, by means of a signed informed consent form. Under Brazilian law, a puerpera aged 16 or more is considered emancipated and therefore able to sign a consent form. Still, researchers of this study decided to make sure that parents or guardians also signed for minors (aged less than 18 years). The present study was approved by the Ethics Committee of the Federal University of Minas Gerais (UFMG) (Official opinion ETIC 029/3).

The selection of pregnant women occurred randomly at their maternity admission, by the use of spreadsheets considering the predetermined sample size. In order not to affect the routine care of the service, consent was obtained and interviews were conducted after delivery or curettage in an appropriate environment. For this analysis, only puerperae who had been pregnant at least once before the current pregnancy (reference pregnancy) were included. There were no refusals on the part of women in the study, but there were losses because some had left the maternity hospital before they were approached.

Event and explanatory variables

Responses of history of at least one fetal loss before the reference pregnancy were considered as a response variable, classified as follows: 1) women with at least one voluntary loss, and 2) women who reported at least one spontaneous loss but no voluntary loss. Women with no pregnancy losses formed the comparison group. It should be noted that the number of women with voluntary losses was obtained by subtracting the number of pregnancies reported in the question "of these losses, how many happened spontaneously?" from the number of pregnancies reported in the question "in

all, how many pregnancies have you lost?". That is, data were obtained indirectly by subtracting two variables.

Potentially explanatory variables in this analysis were grouped into: 1) socio-demographic characteristics: age, ethnicity, level of education, number of children, marital status, household income, 2) history of STD: syphilis, other STDs, and 3) prenatal care: number of visits to health services 4) sexual history and reproductive health characteristics: uses of contraceptive throughout life, number of partners in the previous year, age at first heterosexual intercourse, and age at first pregnancy.

Data were collected through semi-structured interviews with a previously tested instrument applied by trained service professionals. Medical record data and prenatal care card, whenever available, were used to supplement the information²⁰⁻²².

Statistical Analysis

Frequency distribution of variables was used to build the profile of study participants, who had been pregnant at least once before the current pregnancy. Additionally, the prevalences of women with no prior losses, with spontaneous losses, and with voluntary losses were estimated for the present sample and the analysis of difference between proportions using Pearson's Chi-square test was performed. Subsequently, univariate analysis was performed comparing women with prior spontaneous losses with those without previous losses, and women with previous voluntary losses with those without previous losses. Continuous variables were dichotomized, with the exception of the following: age at the time of the interview, monthly household income and age at first sexual intercourse. Regarding age at the time of the interview, the categories were: <18 years, 18-23 years, 24+ years. This cutoff was created because the average age at interview was 23 years and researchers felt, moreover, that it was appropriate to separate participants who had not yet reached the age of majority from the others

(18+ years). Regarding the number of live births excluding the reference pregnancy, the categories were as follows: no children, one child, more than one child. As for income, researchers chose to explore a larger number of categories, based on the minimum wage (MW) at the time of the interview, which was R\$132.00 (approximately US\$62.00): (<1 MW, MW1-3, >3 MW). Regarding age at first heterosexual intercourse, since the median was 16 years, the following categories were created: <16 years, 16-17 years, 18+ years. The odds ratio (OR) was estimated with 95% confidence intervals (95%CI) among subgroups based on each variable. The significance level was 0.05.

Likewise, polytomous (or multinomial) multivariate logistic was used to determine the independent effect between selected variables and outcome²¹, with adjustments for variables which, in the univariate analysis, showed a value of $p < 0.20$. In the univariate polytomous logistic regression analysis, women who had spontaneous abortions were compared with women who had no losses; women who had voluntary losses were also compared with those who had no losses. Thus, both groups were compared with a reference group. At first, intermediate models were produced for each of the three groups. All variables contained in each group were included and then sequential deletion was made according to each variable's statistical significance. Only those variables with $p < 0.05$ remained in the final model²³.

Regarding the analysis of women, sampling was performed in two stages: stratified (in which each stratum was a state of the federation), with the random selection of the health center within each state; followed by selection of pregnant women, which occurred at maternity admission (randomly) by means of worksheets, considering the predefined sample size. Thus, the data were treated independently during analysis.

Results

Of the 3,047 puerperae effectively interviewed, 51 were excluded due to missing

information or inconsistent variables related to previous pregnancies or the number of previous pregnancies, leaving a total of 2,996 mothers. Of these, 1,946 (65.0%) had at least one pregnancy before the reference pregnancy. Other 51 observations were excluded because of inconsistent information, such as declaring a number of spontaneous losses greater than the number of total losses. In order to maintain database consistency throughout the analysis, apart from these 51 cases, 64 other cases were excluded due to missing information in any of the variables selected for analysis. Thus, the final database consisted of 1,831 (94.1%) puerpera with at least one pregnancy before the current one.

General characteristics of the study population

In the sample analyzed, there were 1,171 (64.0%) women with no prior fetal loss, 482 (26.3%) with a history of spontaneous fetal loss and 178 (9.7%) with a history of voluntary fetal loss (Table 1). Considering previous pregnancy losses, in total, there were 942 fetal losses, of which 646 (68.6%) were spontaneous and 296 (31.4%) voluntary. For spontaneous losses, 482 mothers reported one to five losses, with an average loss of 1.34 per woman (SD=0.65) and median of one loss. In the case of voluntary losses, 178 women reported one to six losses, with an average of 1.69 per woman (SD = 1.00) and a median of two losses (data not shown).

Table 1 also shows the three groups according to selected characteristics. As for the results which proved to be significant for differences between proportions, the following stand out: for women with no previous losses against those with spontaneous fetal losses, the highest proportion was of women aged below 23 years ($p < 0.05$), non-white ($p < 0.01$), with more than one child ($p < 0.001$), single ($p < 0.05$), and with an income between 1 and 3 minimum wages ($p < 0.05$). On the other hand, smaller proportions of women without losses were found comparing the two groups of women

(without losses and with voluntary losses, respectively), in situations of absence of children ($p < 0.001$), history of other STDs apart from syphilis ($p < 0.001$), lack of prenatal care in the current pregnancy ($p < 0.001$), and more than one partner in the previous year ($p < 0.001$). Finally, the picture is similar when comparing the groups of women without losses and with voluntary losses, but with important differences in terms of the higher proportion of women who are white ($p < 0.01$), unmarried ($p < 0.05$); and with an

income of less than the minimum wage ($p < 0.05$) among those with voluntary losses.

Factors associated with spontaneous and voluntary fetal losses

Table 2 shows the univariate analysis of fetal losses (spontaneous or voluntary) of the women selected for this study. Among the statistically significant variables, women aged 18-23 years had more occurrences of spontaneous or voluntary fetal losses,

Table 1 - Selected characteristics of puerperous women in maternity hospitals indexed by the National STD/AIDS, according to reports of fetal losses. Brazil, 2000.

Tabella 1 - Características selecionadas de puérperas atendidas em maternidades de referência cadastradas pelo Programa Nacional de DST/AIDS, segundo relato de perdas fetais.

Variables	Fetal losses			Statistical significance for difference among proportions (Pearson's Chi-square; degrees of freedom)	Total (N=1831) n (%) ¹
	No fetal losses (N=1171) n (%) ¹	Spontaneous (N=482) n (%) ¹	Voluntary (N=178) n (%) ¹		
Age (<18 years)	55 (4.7)	20 (4.2)	8 (4.5)	0.041* (4)	83 (4.5)
Ethnicity (non-white)	753 (64.0)	311 (62.7)	136 (76.0)	0.003** (2)	1200 (64.8)
Schooling (< 9 years)	937 (79.6)	390 (78.6)	132 (73.7)	0.197 (2)	1459 (78.8)
Number of children born alive (>1)	564 (48.2)	210 (43.6)	81 (45.6)	<0.001*** (4)	865 (46.7)
Number of children born alive (none)	38 (3.3)	105 (21.8)	45 (25.3)		188 (10.3)
Marital status (single)	664 (56.7)	265 (55.0)	118 (66.3)	0.022* (2)	1047 (57.2)
Income (< 1 mw)	134 (11.4)	53 (10.7)	23 (12.9)	0.035* (4)	210 (11.3)
Income (1-3 mw)	620 (52.7)	225 (45.4)	92 (51.4)		937 (50.6)
History of syphilis	35 (3.0)	18 (3.7)	7 (3.9)	0.648 (2)	60 (3.3)
History of STD	44 (3.8)	33 (6.9)	17 (9.6)	0.001** (2)	94 (5.1)
Prenatal care in the reference pregnancy (No)	185 (15.8)	100 (20.8)	54 (30.3)	<0.001*** (2)	339 (18.5)
>1 partner in the previous year	112 (9.6)	60 (12.5)	47 (26.4)	<0.001*** (2)	219 (12.0)
Use of a contraceptive method throughout life (never)	247 (21.1)	92 (19.1)	30 (16.9)	0.385 (2)	369 (20.2)
Age of first sexual intercourse (<16 years)	417 (35.6)	161 (33.4)	71 (39.9)	0.491 (4)	649 (35.5)
Age of first sexual intercourse (16-17 years)	332 (28.4)	138 (28.6)	52 (29.1)		522 (28.6)
Age of first pregnancy (<18 years)	480 (41.0)	186 (38.6)	70 (39.3)	0.644 (2)	736 (40.2)
Idade primeira gravidez (<18 anos)	480 (41.0)	186 (38.6)	70 (39.3)	0.644 (2)	736 (40.2)

¹ % in relation to the total in each group / ¹ % em relação ao total de cada grupo

* $p < 0,05$; ** $p < 0,01$; *** $p < 0,001$

Table 2 – Association between reported fetal losses and selected characteristics of postpartum women in maternity reference Indexed by the National STD / AIDS, according to the reports of fetal losses: univariate analysis¹. Brazil, 1999-2000.

Tabella 2 – Associação entre relato de perdas fetais e características selecionadas de puérperas atendidas em maternidades de referência cadastradas pelo Programa Nacional de DST/AIDS, segundo relato de perdas fetais: análise univariada¹. Brasil, 1999-2000.

Variáveis	Spontaneous fetal losses			Voluntary fetal losses		
	OR	95% CI	p-value	OR	95% CI	p-value
Age (years):						
<18	0.78	(0.46-1.32)	0.355	0.82	(0.38-1.76)	0.608
18-23	0.77	(0.62-0.97)	0.024*	0.64	(0.46-0.93)	0.013*
>23	1.00			1.00		
Ethnicity:						
White	1.00			1.00		
Non-white	0.95	(0.76-1.18)	0.621	1.78	(1.24-2.56)	0.002**
Schooling:						
<9 years	0.94	(0.73-1.22)	0.651	0.72	(0.50-1.03)	0.074
>8 years	1.00			1.00		
Number of children born alive						
None	1.00			1.00		
1	0.11	(0.07-0.16)	<0.001***	0.08	(0.05-0.13)	<0.001***
>1	0.13	(0.09-0.20)	<0.001***	0.12	(0.07-0.20)	<0.001***
Marital status						
Single	0.93	(0.75-1.15)	0.521	1.50	(1.08-2.09)	0.016*
Not single	1.00			1.00		
Monthly household income (minimum wage)						
<1	0.77	(0.54-1.10)	0.147	1.13	(0.68-1.90)	0.631
1 a 3	0.70	(0.56-0.88)	0.002**	0.98	(0.70-1.38)	0.911
More than 3	1.00			1.00		
History of syphilis:						
Yes	1.23	(0.69-2.19)	0.485	1.33	(0.58-3.04)	0.502
No	1.00			1.00		
History of other STD:						
Yes	1.90	(1.20-3.00)	0.007**	2.70	(1.51-4.84)	0.001**
No	1.00			1.00		
Prenatal care reference pregnancy :						
Yes	1.00			1.00		
No	1.36	(1.04-1.78)	0.020*	2.30	(1.61-3.29)	<0.001***
Number of partners (previous year):						
One	1.00			1.00		
More than one	1.32	(0.95-1.84)	0.100	3.45	(2.35-5.06)	0.001***
Use of a contraceptive method throughout life (never)						
Yes	1.00			1.00		
No	0.88	(0.68-1.15)	0.359	0.76	(0.50-1.15)	0.193
Age of first sexual intercourse						
<16	0.86	(0.67-1.11)	0.244	1.32	(0.90-1.92)	0.153
16-17	0.94	(0.72-1.22)	0.629	1.20	(0.80-1.80)	0.376
18 or more	1.00			1.00		
Age of first pregnancy						
<18	0.87	(0.70-1.08)	0.204	0.94	(0.68-1.30)	0.728
18 or more	1.00			1.00		

¹ Logística multinomial regression comparing separately each group of fetal losses with the group of puerperous women with no fetal losses. * significant p < 0,05; ** significant p < 0,01; *** significant p < 0,001.

¹ Regressão logística multinomial, comparando separadamente cada grupo de perdas fetais com o grupo de puérperas sem perdas fetais. * significativo a p < 0,05; ** significativo a p < 0,01; *** significativo a p < 0,001.

compared to those aged 23 years or more. Other variables associated with the largest losses occurring in both groups analyzed were as follows: absence of a living child, history of STDs other than syphilis, no prenatal care during the reference pregnancy or in the current pregnancy. In their turn, mothers with a household income between 1 and 3 minimum wages, compared to those with 3 minimum wages or more, experienced fewer occurrences of spontaneous fetal loss (OR=0.70, 95% CI: 0.56-0.88). Moreover, women with more than one partner in the previous year had higher occurrence (OR=3.45, 95% CI: 2.35-5.06) of voluntary abortions.

In polytomous multivariate regression analysis, after completing the sequential deletion step (Table 3), several findings from the univariate analysis remained, confirming the association of independent variables with some spontaneous and voluntary fetal losses: absence of a living child; history of STDs other than syphilis; lack of prenatal care during the reference pregnancy and the current pregnancy. We also confirmed that mothers with household income between 1 and 3 minimum wages, compared to those with 3 minimum wages or more, experienced fewer occurrences of spontaneous fetal loss (OR=0.71, 95% CI: 0.57-0.90). Conversely, women with more than one partner in the previous year (OR=3.45, 95% CI: 2.35-5.06) and those whose age at first intercourse was below 16 years (OR=1.56; 95% CI: 1.02-2.37) had a higher incidence of non-spontaneous abortions.

Discussion

This study evaluated the prevalence and factors associated with pregnancy loss, whether spontaneous or voluntary, compared to women with previous pregnancies, but with no prior losses. The database used originated from a representative study of post-partum women in public hospitals (or in those with agreements with the Ministry of Health), in 24 Brazilian states in 2000²⁰⁻²². The main study revealed that among these

puerperae there was a high prevalence of syphilis positivity, a high proportion of them received no prenatal care, and that among those who received prenatal care, a high proportion failed to have VDRL and/or anti-HIV tests performed. The results indicate important weaknesses in the national control of congenital syphilis in the country at that moment, as well as these women's vulnerability to various health outcomes. The condition of a stillborn fetus as reason for admission and the high proportion of reports of fetal loss (23%) preceding the current pregnancy are factors strongly associated with positivity for syphilis²⁰⁻²².

The present analysis includes only women with at least one pregnancy preceding that which was reason for admission and does not consider the outcome of the current pregnancy. A prevalence of at least one voluntary fetal loss of 9.5% was found for the 1,831 studied puerperae. Prevalence in Brazilian studies assessing abortion ranged from 4.5% in a slum in a city in the state of São Paulo in 2008²⁴ to 16.9% in the city of Rio de Janeiro in the mid-1980²⁵. Such distinct prevalence values can be explained by peculiarities in the methodology and data collection, as well as by the social and cultural factors of each site surveyed²⁴. The high number of fetal losses per woman is noteworthy, reaching a maximum of six losses, with an average of 1.64 and a median of 2. Moreover, approximately one third (31%) of losses were voluntary.

As regards the method of analysis, a response model that included more than two outcomes was used. Polytomous logistic regression allowed researchers to observe the outcome in three original categories, making it possible to compare the results obtained for spontaneous losses with those obtained for voluntary losses. The clear effect of prenatal care for both outcomes is striking, as well as the history of STDs other than syphilis as different factors associated with a higher incidence of fetal loss (spontaneous or voluntary). In the case of voluntary loss, socio-demographic factors such as age between 18 and 23 years and ethnicity other

Table 3 – Association between reported fetal losses and selected characteristics of postpartum women in maternity reference Indexed by the National STD / AIDS, according to the reports of fetal losses: multivariate analysis¹. Brazil, 1999-2000.

Tabela 3 – Associação entre relato de perdas fetais e características selecionadas de puérperas atendidas em maternidades de referência cadastradas pelo Programa Nacional de DST/AIDS, segundo relato de perdas fetais: Análise multivariada¹. Brasil, 1999-2000.

Variables	Spontaneous fetal losses			Voluntary fetal losses		
	OR	95% CI	p-value	OR	95% CI	p-value
Age:						
<18	0.78	(0.45-1.37)	0.400	0.53	(0.23-1.21)	
18-23	0.80	(0.63-1.02)	0.070	0.54	(0.37-0.78)	0.001**
Ethnicity						
White	1.00			1.00		
Non-white	0.97	(0.78-1.22)	0.820	1.68	(1.15-2.44)	0.007**
Number of children born alive						
None	1.00			1.00		
1	0.09	(0.06-0.14)	<0.001***	0.07	(0.04-0.12)	<0.001***
>1	0.11	(0.07-0.16)	<0.001***	0.08	(0.05-0.15)	<0.001***
Monthly household income (mw)						
<1	0.77	(0.54-1.12)	0.180	1.11	(0.64-1.91)	0.718
1 – 3	0.71	(0.57-0.90)	0.004***	0.98	(0.68-1.41)	0.899
More than 3	1.00			1.00		
History of other STD:						
Yes	1.81	(1.13-2.89)	0.013*	2.25	(1.50-4.83)	0.008**
No	1.00			1.00		
Prenatal care reference pregnancy						
Yes	1.00			1.00		
No	1.00	(1.04-1.80)	0.026*	1.97	(1.36-2.85)	<0.001***
Number of partners (in the previous year):						
Only one	1,00			1.00		
Age of first sexual intercourse						
<16	0.94	(0.71-1.24)	0.640	1.56	(1.02-2.37)	<0.001***
16-17	1.00	(0.76-1.32)	0.980	1.40	(0.91-2.15)	0.123
18 or more	1.00			1.00		

¹ multinomial logistic regression, comparing separately each group of fetal losses with the group of puerperous women without fetal loss / ¹ Regressão logística multinomial, comparando separadamente cada grupo de perdas fetais com o grupo de puérperas sem perdas fetais.

* significant p < 0,05/ significativo a p < 0.05

** significant p < 0,01/ significativo a p < 0.01

*** significant p < 0,001/ significativo a p < 0.001

than white, as well as variables related to sexual and reproductive history (earlier age of initiation, absence of a living child, having more than one partner) remained associated with the outcome in the final model.

Age of sexual initiation was associated with reports of voluntary loss, suggesting that women who had been sexually active for a longer time were more exposed to pregnancy and to the possibility of voluntary

termination. Having a living child was independently associated with the occurrence of spontaneous and voluntary loss, indicating that zero parity increases the incidence of both outcomes. This may mean that women with no living children may have had difficulties in having children previously - resulting in prior risk of spontaneous loss, as noted in a study in Brazil²⁶.

The fact that the non-white ethnicity variable remained in the final model may indicate issues concerning the greater vulnerability of non-white women to an unwanted pregnancy. Black women are historically more vulnerable to undesirable health outcomes¹⁴, mainly because of their social status. A recent study using data from the PNA confirms this finding of unfavorable outcomes among black women¹⁷. In the case of education, it can be inferred that women with more years of schooling could either have had greater access to the correct use of misoprostol (the most frequent method for interrupting pregnancies in Brazil) or the financial resources to undergo safer procedures with fewer health complications in private clinics. In fact, exploratory studies reveal that women use misoprostol in Brazil in precarious conditions^{17,27}, but that may not be the case with more educated women. Finally, the monthly income between 1 to 3 minimum wages variable was associated independently with lower occurrence of spontaneous loss. This result seems counterintuitive and requires further investigation.

This study has several limitations. A larger number of variables could not be used because missing information on them would lead to the exclusion of a large number of cases, thus affecting the analysis. Exclusions by differences in outcome categories could also lead to biased analyses. However, the most important limitation may be the absence of reporting on the event of "voluntary loss", which may have led to the underestimation of this outcome. According to some authors, a portion of women classified as having had spontaneous losses may have reported a voluntary loss as spontaneous, as already observed in a study

in Brazil²⁸. If this is also true for this study, some associations found for the occurrence of spontaneous loss would be overestimated and, once again, the associations found for voluntary loss underestimated. Moreover, it should be emphasized that the present study was not specifically designed for the purpose of investigating losses, which may lead to some imprecision in key variables for these outcomes. Finally, this is a cross-sectional study, for which the cause/effect relationship could not be fully established.

Although based on a survey conducted in 2000, the results of the present study are still of great importance because little has changed with regards to abortion in Brazil in the last ten years¹². Incidence of induced abortions in Brazil decreased from 4 per 10 births in 1992 to around 3 per 100 live births in 1995, a percentage that remained stable until 2005¹². The present study indicated that women with voluntary losses were non-white, accessed less prenatal care during the reference pregnancy and reported more occurrences of STDs, which also indicates the possibility of reduced access to health services and contraception methods. In this case, it seems that many of these abortions may have been performed in unsafe conditions. Unsafe abortions are preventable and prevention methods are well known, including ample provision of information on contraceptive methods, counseling, and other services especially targeted at patients with a previous history of abortion²⁹. These services are important mechanisms to reduce rates of subsequent abortions, both safe and unsafe²⁹.

Despite evidence that several countries have eased restrictive abortion laws⁸, more than mere legalization is required for there to be more safety in the practice of abortion. Knowledge about new, less restrictive laws has to be disseminated, guidelines for adequate provision of services have to be developed and health professionals have to be interested in obtaining specific training for providing this service⁸. Therefore in Brazil, where no such flexible laws exist, we are a long way from reducing the risk of unsafe

abortions to women. Thus, actions to be taken immediately in public health services need to be guided toward improving family planning services and giving advice on the effective use of contraceptives.

References

1. Diniz D, Medeiros M. Aborto no Brasil: uma pesquisa domiciliar com técnica de urna. *Ciênc Saude Colet* 2010; 15(S1): 959-66.
2. Departamento de Ciência e Tecnologia, Secretaria de Ciência, Tecnologia e Insumos Estratégicos. *20 anos de pesquisas sobre aborto no Brasil. Brasília*: Ministério da Saúde; 2009. (Série B, Textos Básicos de Saúde)
3. Silva RS. O uso da técnica de resposta ao azar (TRA) na caracterização do aborto ilegal. *Rev Bras Estud Popul* 1993; 10(1/2): 41-56.
4. Olinto MT, Moreira-Filho DC. Estimativa de aborto induzido: comparação entre duas metodologias. *Rev Panam Salud Publica* 2004; 15(5): 331-6.
5. Grimes DA, Benson J, Singh S, Romero M, Ganatra B, Okonofua FE et al. Unsafe abortion: the preventable pandemic. *Lancet* 2006; 368(9550): 1908-19.
6. Decreto-Lei nº 2.848 de 7 dezembro de 1940. Código Penal. Diário Oficial da União de 31 de dezembro de 1949.
7. Domingos SRF, Merigh MAB. O aborto como causa de mortalidade materna: um pensar para o cuidado de enfermagem. *Esc Anna Nery Rev Enferm* 2010; 14(1): 177-81.
8. Sedgh G, Singh S, Shah IH, Áhman E, Henshaw SK, Bankole A. Induced abortion: incidence and trends worldwide from 1995 to 2008. *Lancet* 2012; 379(9816): 625-32.
9. Mesce D, Sines E. *Unsafe abortion: facts & figures*. Washington, DC: Population Reference Bureau; 2006.
10. Khan KS, Wojdyla D, Say L, Gülmezoglu AM, Van Look PE. WHO Analysis of causes of maternal death: a systematic review. *Lancet* 2006; 367(9516): 1066-74.
11. Ahman E, Shah I. Unsafe Abortion: Worldwide Estimates for 2000 *Reprod Health Matters* 2002; 10(19): 13-17.
12. Monteiro MFG, Adesse L. Estimativas de aborto induzido no Brasil e Grandes Regiões (1992-2005) [Internet]. Anais do 15º Encontro Nacional de Estudos Populacionais, ABEP; 18-22 de setembro de; Caxambu, Brasil [citado em 29 de agosto de 2012]. Disponível em: <http://www.ipas.org.br/arquivos/ml2006.pdf> [Acessado em 20 de agosto de 2012]
13. Silva RS. O impacto do aborto ilegal na saúde reprodutiva: sugestões para melhorar a qualidade do dado básico e viabilizar essa análise. *Saúde Soc* 1997; 6(1): 53-75.
14. Martins AL. Mortalidade materna de mulheres negras. *Cad Saúde Pública* 2006; 22(1): 2473-9.
15. Olinto MT, Moreira-Filho DC. Fatores de risco e preditores do aborto induzido: estudo de base populacional. *Cad Saúde Pública* 2006; 22(2): 365-75.
16. Menezes G, Aquino EML. Pesquisa sobre o aborto no Brasil: avanços e desafios para o campo da saúde coletiva. *Cad Saúde Pública* 2009; 25(S2): 193-204.
17. Diniz D, Medeiros M. Itinerários e métodos do aborto ilegal em cinco capitais brasileiras. *Cien Saude Coletiva* 2012; 17(7): 1671-81.
18. Vieira LM, Goldberg TBL, Saes SO, Dória AAB. Abortamento na adolescência: um estudo epidemiológico. *Cien Saude Coletiva* 2007; 12(5): 1201-08.
19. Vieira EM. A questão do aborto no Brasil (Editorial). *Rev Bras Ginecol Obstet* 2010; 32(3): 103-4.
20. Guimarães MDC. Estudo de soroprevalência de sífilis entre puérperas: *um estudo multicêntrico nacional* [Relatório técnico final]. Brasília: Ministério da Saúde; 2000.
21. Rodrigues CS, Guimarães MDC. Positividade para sífilis em puérperas: ainda um desafio para o Brasil. *Rev Panam Salud Publica* 2004; 16(3): 168-75.
22. Rodrigues CS, Guimarães MDC, Cesar CC. Missed opportunities for congenital syphilis and HIV perinatal transmission prevention. *Rev. Saúde Pública* 2008; 42(5): 851-8.
23. Hosmer DW, Lemeshow S. *Applied Logistic Regression*: New York: John Wiley and Sons; 2000.
24. Santos TF, Andreoni S, Silva, RS. Prevalência e características de mulheres com aborto provocado – Favela México 70, São Vicente - São Paulo. *Rev Bras Epidemiol* 2012; 15(1): 123-33.
25. Martins IR, Costa SH, Freitas SRS, Pinto CS. Aborto induzido em mulheres de baixa renda: dimensão de um problema. *Cad Saúde Pública* 1991; 7: 251-66.

26. Machado CJ. Impact of maternal age on birth outcomes: a population-based study of primiparous Brazilian women in the city of São Paulo. *J Biosoc Sci* 2006; 38(4): 523-35.
27. Arilha, MM. Misoprostol: pathways, mediation and social networks for access to abortion using medication in the context of illegality in the State of Sao Paulo. *Cien Saude Coletiva* 2012; 17(7): 1785-94.
28. Osis MJD, Hardy E, Faúndes A, Rodrigues T. Dificuldades para obter informações de mulheres sobre aborto ilegal. *Rev Saúde Pública* 1996; 30(5): 444-51.
29. Singh S. Hospital admissions resulting from unsafe abortion: estimates from 13 developing countries. *Lancet* 2006; 368: 1887-92.

Received: 13/12/11
Final version: 31/10/12
Approved: 08/09/12