



# Concordance between intention to use and current use of contraceptives among six-month postpartum women in Brazil: The role of unplanned pregnancy

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## ABSTRACT

**Objective:** to examine the effect of pregnancy planning status in the concordance between intention to use and current use of contraceptives among postpartum women.

**Design and setting:** a prospective study was conducted in 12 primary health care facilities in São Paulo, Brazil, from November 2013 to September 2014.

**Participants:** A total of 264 women aged 15–44 years old completed a face-to-face interview when they were pregnant (baseline), and were interviewed by phone at 6 months postpartum.

**Measurements:** At baseline, participants were questioned about the contraceptive method they would prefer to be using at 6 months postpartum. At 6 months postpartum, they answered about the contraceptive method they were currently using. Pregnancy planning status was measured using the Brazilian Portuguese London Measure of Unplanned Pregnancy. We conducted logistic regression, considering contraceptive preference-use concordance as the dependent variable and the main covariate as pregnancy planning status.

**Findings:** Only 28.9% of postpartum women were using the method they preferred to use when they were pregnant. The agreement between preference and contraceptive use was higher for injectables (60.9%) and lowest for IUD, as nobody who preferred it was actually using it. Women who were not sure about what method they intended to use after childbirth more frequently reported no use at six months postpartum. Multivariate logistic regression showed that postpartum women whose pregnancy was unplanned were less likely to use the contraceptive methods that they intended to use when they were pregnant [aOR=0.36; 95%CI=0.14–0.97].

**Conclusions and implications for practice:** Brazilian women were able to access contraceptives in the postpartum period. However, there is a considerable discordance between their contraceptive intention to use and use at the sixth postpartum month. A higher unmet demand for IUD and sterilization should be highlighted. The pregnancy planning status is associated to postpartum contraceptive preference-use concordance, so interventions before pregnancy may affect postpartum contraceptive use. Women with unintended pregnancies present an important opportunity to offer additional family planning counseling.

## Introduction

Postpartum family planning has the potential to significantly reduce the number of unintended pregnancies and to promote an increase in intergestational intervals (Speroff and Darney, 2005; Thiel de Bocanegra et al., 2014; Moore et al., 2015), which are recommended to be at least 24 months to improve maternal and child health indicators (World Health Organization, 2013). Therefore, the contraceptive needs of postpartum women should be addressed and should be aligned with their reproductive intentions and clinical guidelines

(World Health Organization, 2013).

The first postpartum months are the period in which women are more motivated to prevent pregnancy (Potter et al., 2014; Tang et al., 2014). Although increased contact with health professionals is expected in the first year after childbirth during postpartum, child immunization, and well-child care visits (World Health Organization, 2013), these points of contact with health services may not result in positive outcomes concerning contraceptive use (Speizer et al., 2013; Mody et al., 2014). One reason for the lack of positive outcomes is that amenorrhea, sexual abstinence and breastfeeding are supposed to

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protect postpartum women from pregnancy (Moore et al., 2015). Additionally, in several contexts, many postpartum women have poor access to family planning services, and thus they may not be able to access the contraceptive methods that they intend to use (Yee and Simon, 2011; Tang et al., 2013; Potter et al., 2014; Singh et al., 2014). An analysis of data from the Demographic and Health Surveys in 21 countries found that only 31% of postpartum women were using contraceptives, most of which were short-acting methods (Moore et al., 2015).

Understanding the factors that influence postpartum contraceptive use could inform strategies to reduce unplanned and rapid repeat pregnancies. Although researchers have recognized that sociodemographic factors alone are not predictive of contraceptive choice and use in the postpartum period (Tang et al., 2013), there is extensive literature about the key factors for postpartum contraceptive use that has shown effects of the structure and organization of health services; social and medical norms regarding family planning counseling; the range of contraceptive methods available; the return of menses and the resumption of sexual intercourse (Khan et al., 2008; Kestler et al., 2011; Sonalkar et al., 2014; White et al., 2014; Lauria et al., 2014; Ahmed et al., 2015; Zapata et al., 2015; Zerden et al., 2015; Rutaremwa et al., 2015; Abera et al., 2015). However, studies that evaluated postpartum contraceptive choices showed that women's intentions to use contraceptives and their reproductive intentions have received little attention (Ross and Winfrey, 2001; Tang et al., 2013).

In fact, few studies have examined the role of reproductive intentions on contraceptive use among postpartum women. Unintended pregnancies are associated with many negative outcomes in reproductive health, for both women and children (Cheng et al., 2009), but there is scarce knowledge about their effect on postpartum women's decision making regarding contraceptive use. As the purpose of postpartum family planning is to provide women and couples the ability to initiate and continue to use their intended contraceptive method (World Health Organization, 2013), women with unintended pregnancies present an important opportunity to offer additional family planning counseling (Yee and Simon, 2011).

For this study, we present data from Brazil, a middle-income country with a low fertility rate (1.8 births per woman), a high contraceptive prevalence rate (80.6%) (Brazil Ministry of Health, 2009), and also a high proportion of unintended pregnancies (55.4%) (Viellas et al., 2014). It is unclear whether Brazilian women are using their preferred or intended contraceptive method. The types of contraceptive methods used nationally are basically pills, condoms and female sterilization and reflect poor access to other methods, especially long-acting reversible methods (LARC); this situation may prevent women overall, and postpartum women in particular, from attaining their fertility goals. Consolidating data on the unique reproductive health needs of postpartum women from low- and middle-income countries provides a robust direction to address the public health interest in longer birth intervals (Moore et al., 2015).

In this paper, our objective is to examine the effect of pregnancy planning status in the concordance between intention to use and current use of contraceptives among postpartum women. To identify missed and optimal opportunities to intervene and promote evidence-based public health strategies in postpartum family planning, an important question to address is whether postpartum women are actually using their intended contraceptive method when they were pregnant. If yes, this means that women had the opportunity and were able to access the range of methods appropriate for their life cycle and reproductive needs and plans. If not, this means that the unique reproductive health needs of postpartum women still face barriers to full implementation.

## Methods

### Design

We conducted a prospective study of pregnant women recruited at primary health care facilities (PHCFs) in 2013 in Sao Paulo, Brazil.

### Participants and procedure

Women aged 15–44 years at any stage of pregnancy were eligible to participate in this study and completed interviews at two time points: the first when they were pregnant (baseline), and the second at 6 months postpartum. The baseline interview was conducted as part of a larger study that aimed to assess the determinants of non-use of emergency contraception among women with either unplanned or ambivalent pregnancies (Santos et al., 2014). A convenience sample of pregnant women from all 12 PHCFs from a district in the municipality of São Paulo was selected based on proportional sampling considering the proportion of pregnant women enrolled in each PHCF in 2012. All women waiting for prenatal care on specific weekdays from April to July 2013 at these PHCFs were invited to participate in the study. Those who agreed to participate responded to a 15-minute face-to-face interview. In total, we recruited 474 participants who completed the baseline interviews. The initial baseline questionnaire collected information about the contraceptive method they intended to be using at six months after childbirth as well as their sociodemographic characteristics, including age, education, cohabitation with a partner, and employment, and reproductive events such as the number of pregnancies, previous abortions, pregnancy planning status, and contraceptive use before pregnancy. At the end of the baseline interview, women were invited to answer another questionnaire six months after birth. All of them agreed.

Losses to follow-up were due to changes in phone number. To minimize these losses, we tried to contact women by address; therefore, printed questionnaires were sent by mail. After this approach, some women replied with completed questionnaires.

At six months after childbirth (November 2013 to September 2014), the participants answered questions on the phone about birth history, breastfeeding practices, contraceptive practices and future reproductive intentions. As in another study (Moore et al., 2015), we chose not to exclude women who had not resumed sexual relations because we realized that they could soon be in need of contraception even if they were not necessarily at risk of pregnancy at the time of the survey. Trained nurses conducted all interviews.

Study data were managed in FormsUS electronic data capture tools hosted at the Brazilian Ministry of Health information system, which is open access and available at <http://formsus.datasus.gov.br/site/default.php>.

The institutional Ethics Research Committee approved this study, and formal consent was obtained from all participants. Women under 18 years of age signed an assent form, and their parents signed the formal consent.

### Data analysis

Our main variable was *concordance between contraceptive preference-use*. It was coded yes if the woman was using - at six months after childbirth - the same contraceptive method she preferred when she was pregnant (dichotomous variable). The questions allowed women to report more than one method. For this study, we considered only the most efficient contraceptive reported (Trussell and Guthrie, 2011), i.e. one choice per women at baseline and at six months postpartum.

**Table 1**

Demographic and reproductive characteristics of all participants at baseline (during pregnancy) and at six months postpartum, according to contraceptive preference-use concordance.

| Variables at baseline              | Overall |       | Among women who used the same contraceptive as intended |       | Among women who did not use the same contraceptive as intended |       | p     |
|------------------------------------|---------|-------|---------------------------------------------------------|-------|----------------------------------------------------------------|-------|-------|
|                                    | n       | %     | n                                                       | %     | n                                                              | %     |       |
| Age                                |         |       |                                                         |       |                                                                |       |       |
| 15–24 years                        | 100     | 39.1  | 26                                                      | 35.1  | 74                                                             | 40.7  | 0.662 |
| 25–34 years                        | 120     | 46.9  | 36                                                      | 48.7  | 84                                                             | 46.1  |       |
| 35 years and up                    | 36      | 14.0  | 12                                                      | 16.2  | 24                                                             | 13.2  |       |
| Education                          |         |       |                                                         |       |                                                                |       |       |
| Up to 8 years                      | 66      | 25.8  | 15                                                      | 20.3  | 51                                                             | 28.0  | 0.386 |
| 9 to 12 years                      | 164     | 64.0  | 52                                                      | 70.3  | 112                                                            | 61.5  |       |
| 13 years and up                    | 26      | 10.2  | 7                                                       | 9.4   | 19                                                             | 10.4  |       |
| Skin color                         |         |       |                                                         |       |                                                                |       |       |
| White                              | 77      | 30.1  | 20                                                      | 27.0  | 57                                                             | 31.3  | 0.497 |
| Non-white                          | 179     | 69.9  | 54                                                      | 73.0  | 125                                                            | 68.7  |       |
| Religion                           |         |       |                                                         |       |                                                                |       |       |
| Catholic                           | 106     | 41.4  | 33                                                      | 44.6  | 73                                                             | 40.1  | 0.429 |
| Protestant                         | 83      | 32.4  | 19                                                      | 25.7  | 64                                                             | 35.2  |       |
| Other                              | 9       | 7.4   | 5                                                       | 6.7   | 14                                                             | 7.7   |       |
| None                               | 48      | 18.8  | 17                                                      | 23.0  | 31                                                             | 17.0  | 0.053 |
| Work-paid job                      | 149     | 58.2  | 50                                                      | 67.6  | 99                                                             | 54.4  |       |
| Social status                      |         |       |                                                         |       |                                                                |       |       |
| High                               | 60      | 23.4  | 23                                                      | 31.1  | 37                                                             | 20.3  | 0.184 |
| Medium                             | 177     | 69.1  | 46                                                      | 62.2  | 131                                                            | 72.0  |       |
| Low                                | 19      | 7.5   | 5                                                       | 6.7   | 14                                                             | 7.7   |       |
| Cohabitation with partner          | 218     | 85.2  | 67                                                      | 90.5  | 151                                                            | 82.3  | 0.122 |
| Gestational age                    |         |       |                                                         |       |                                                                |       |       |
| < 14 weeks                         | 64      | 25.0  | 17                                                      | 23.0  | 47                                                             | 25.8  | 0.396 |
| 14–26 weeks                        | 81      | 31.6  | 28                                                      | 37.8  | 53                                                             | 29.1  |       |
| > 26 weeks                         | 111     | 43.4  | 29                                                      | 39.2  | 82                                                             | 45.0  |       |
| Number of pregnancies              |         |       |                                                         |       |                                                                |       |       |
| 1                                  | 99      | 38.7  | 29                                                      | 39.2  | 70                                                             | 38.5  | 0.956 |
| 2                                  | 74      | 28.9  | 22                                                      | 29.7  | 52                                                             | 28.6  |       |
| 3 and more                         | 83      | 32.4  | 23                                                      | 31.1  | 60                                                             | 32.9  |       |
| Contraceptive use before pregnancy | 154     | 60.2  | 42                                                      | 56.8  | 112                                                            | 61.5  | 0.479 |
| Previous pregnancy planning        |         |       |                                                         |       |                                                                |       |       |
| Planned                            | 89      | 34.8  | 34                                                      | 46.0  | 55                                                             | 30.2  | 0.041 |
| Ambivalent                         | 125     | 48.8  | 32                                                      | 43.2  | 93                                                             | 51.1  |       |
| Unplanned                          | 42      | 16.4  | 8                                                       | 10.8  | 34                                                             | 18.7  |       |
| Variables at 6 months postpartum   |         |       |                                                         |       |                                                                |       |       |
| Vaginal delivery                   | 128     | 50.0  | 35                                                      | 47.3  | 93                                                             | 51.1  | 0.581 |
| Resumption of menses               | 179     | 70.2  | 48                                                      | 64.9  | 131                                                            | 72.4  | 0.234 |
| Resumption of sexual intercourse   | 238     | 93.0  | 74                                                      | 100.0 | 164                                                            | 90.1  | 0.005 |
| Exclusive breastfeeding            | 62      | 24.2  | 19                                                      | 25.7  | 43                                                             | 23.6  | 0.729 |
| Current contraceptive use          | 241     | 94.1  | 74                                                      | 100.0 | 167                                                            | 91.2  | 0.011 |
| Future reproductive intention      |         |       |                                                         |       |                                                                |       |       |
| No more children                   | 145     | 56.6  | 41                                                      | 55.4  | 104                                                            | 57.1  | 0.776 |
| Wants to become pregnant again     | 90      | 35.2  | 28                                                      | 37.8  | 62                                                             | 34.1  |       |
| Not sure                           | 21      | 8.2   | 5                                                       | 6.8   | 16                                                             | 8.8   |       |
| Total                              | 256     | 100.0 | 74                                                      | 100.0 | 182                                                            | 100.0 |       |

In Stata 14.0, we first compared women lost to follow-up with women interviewed at six months postpartum using Chi-square ( $X^2$ ) test, and Chi-square test for trend for ordinal variables, considering their age, education, social status, cohabitation with a partner, contraceptive use before pregnancy, number of pregnancies and pregnancy planning status. We then described concordance in contraceptive preference-use according to sociodemographic and reproductive characteristics (variables collected at baseline and at six months postpartum) also using Chi-square ( $X^2$ ) test for dichotomous/ nominal variables, and Chi-square test for trend for ordinal variables.

We analyzed baseline variables, namely age (15–24 years, 25–34 years, and 35 and up); education (up to 8 years; 9 to 12 years and 13 years and up); skin color (white and non-white, which comprised black, brown and Asian); religion (none, Catholic, Protestant, other); work-paid job (no, yes); social status (high, middle and low, according to the Brazilian Economic Classification Criteria, that defines six broad economic classes - A, B1, B2, C1, C2, D and E - by discriminating the family's purchasing power and householder educational level; in this study, we considered high social status all women who were classified in groups A, B1 or B2; middle as groups C1 or C2; and low, D-

**Table 2**

Contraceptive use at six months postpartum according to contraceptive intentions during pregnancy.

| Contraceptive intention to use %(n) |                    | Contraceptive use at 6 months postpartum %(n) |                  |                  |                |                      |                    |                              |
|-------------------------------------|--------------------|-----------------------------------------------|------------------|------------------|----------------|----------------------|--------------------|------------------------------|
|                                     |                    | Injectable                                    | Pill             | Condom           | IUD            | Female sterilization | Male sterilization | No method                    |
| Injectable                          | <b>16.0</b> (41)   | <b>60.9 (25)</b>                              | 9.8 (4)          | 4.9 (2)          | –              | 2.4 (1)              | –                  | 19.5 (8)*                    |
| Pill                                | <b>33.6</b> (86)   | 16.3 (14)                                     | <b>36.1 (31)</b> | 19.8 (17)        | 3.5 (3)        | –                    | –                  | 23.3 (20) <sup>†</sup>       |
| Condom                              | <b>6.3</b> (16)    | 31.2 (5)                                      | 12.5 (2)         | <b>25.0 (4)</b>  | 6.2 (1)        | –                    | 6.3 (1)            | 18.7 (3)                     |
| IUD                                 | <b>10.9</b> (28)   | 28.6 (8)                                      | 25.0 (7)         | 28.6 (8)         | –              | 3.5 (1)              | –                  | 14.3 (4)                     |
| Female sterilization                | <b>19.5</b> (50)   | 26.0 (13)                                     | 18.0 (9)         | 16.0 (8)         | 2.0 (1)        | <b>18.0 (9)</b>      | –                  | 16.0 (8) <sup>§</sup>        |
| Male sterilization                  | <b>5.9</b> (15)    | 26.7 (4)                                      | 26.7 (4)         | –                | 6.7 (1)        | –                    | <b>33.3 (5)</b>    | 6.7 (1)                      |
| Not sure                            | <b>7.8</b> (20)    | 20.0 (4)                                      | 40.0 (8)         | 5.0 (1)          | 5.0 (1)        | –                    | –                  | 30.0 (6)                     |
| <b>Total</b>                        | <b>100.0 (256)</b> | <b>28.5 (73)</b>                              | <b>24.6 (63)</b> | <b>15.6 (40)</b> | <b>2.7 (7)</b> | <b>4.3 (11)</b>      | <b>2.3 (6)</b>     | <b>20.7 (53)<sup>§</sup></b> |

\* 1 woman reported the use of withdrawal.

<sup>†</sup> 1 woman reported the use of emergency contraception.<sup>§</sup> 1 woman reported the use of rhythm; 1 woman reported the use of female condom.<sup>¶</sup> 1 woman reported the use of rhythm; 2 women reported the use of withdrawal.

E) (Brazilian Market Research Association, 2016); cohabitation with a partner (no, yes); gestational age (less than 14 weeks of pregnancy, between 14 and 26 weeks, and more than 26 weeks), number of pregnancies (1, 2 or 3 and more); contraceptive use before pregnancy (no, yes); and previous pregnancy planning status (planned, ambivalent, unplanned). This last variable was derived from the London Measure of Unplanned Pregnancy (Barrett, Smith, and Wellings 2004), Brazilian version (Borges et al. 2016).

We also analyzed variables collected at six months postpartum. These variables included information about childbirth (vaginal or C-section delivery); resumption of menses (no, yes); resumption of sexual intercourse (no, yes); exclusive breastfeeding at six months postpartum (no, yes); postpartum current contraceptive use (no, yes); and future reproductive intentions (no more children, wants to become pregnant again and not sure). Postpartum current contraceptive use referred to the use of contraception at their last sexual intercourse. Moreover, we defined contraceptive preference-use concordance by the preferred contraceptive method during pregnancy and the method women were currently using.

Finally, we conducted logistic regression, considering contraceptive preference-use concordance as the dependent variable and the main covariate as pregnancy planning status. Other covariates were inserted simultaneously into the multivariate model for adjustments (age, social status, number of pregnancies, exclusive breastfeeding and future reproductive intentions). They were chosen due to their well-established influence on postpartum contraceptive use (Pasha et al., 2015; Rutarembwa et al., 2015). We present both the univariate and adjusted analyses. Results of the logistic regression analyses were presented as Odds Ratio (OR) and 95% Confidence Interval (CI). A p-value < 0.050 was considered significant.

## Findings

Among 474 participants who completed the baseline interviews, more than half of the women were found six months after baseline (n = 264, 55.6%). Women lost to follow-up were less educated (p = 0.031), were more frequently classified in low social status (p = 0.028) and fewer reported contraceptive method use before pregnancy (p = 0.015) than other women, but there were no significant differences in their pregnancy planning status (p = 0.132) and other characteristics, such as age (p = 0.072), cohabitation with a partner (p = 0.318) and number of pregnancies (p = 0.914).

None of them refused to participate at this time. Eight women were excluded: two women reported that their pregnancy had ended in an abortion; two women reported neonatal deaths; three women were pregnant again; and one woman had become pregnant again, but the pregnancy was terminated. Therefore, the present analysis focused on 256 participants.

Overall, the majority of postpartum women were younger than 34 years old, were cohabitating with a partner (85.2%), had 9–12 years of schooling (64.0%), were non-white (69.9%), Catholic (41.4%) or Protestant (32.4%), and worked paid jobs (58.2%). Slightly more than a third were in their first pregnancy (38.7%), and 60.2% were using a contraceptive method before pregnancy. Women's current pregnancy was planned by 34.7%. At six months postpartum, 70.2% reported the resumption of menses; the majority had returned to sexual activity (93.0%); and a quarter was exclusively breastfeeding (24.2%). Six months after childbirth, almost every woman had used contraceptives (79.3%), which were mainly injectables (28.5%), pills (24.6%) and condoms (15.6%). When asked about their future reproductive intentions, slightly more than half (56.6%) did not want to have any more children. Regarding the characteristics of women who achieved contraceptive preference-use concordance, we observed that they had a higher proportion of planned pregnancy (p < 0.041). None of the other demographic or reproductive baseline variables were associated with contraceptive preference-use concordance (Table 1).

To assess women's intentions to use contraceptives, we asked them while they were pregnant what type of contraceptive they intended to use after childbirth. One-third answered that they intended to use the pill. Non-reversible methods accounted for 25.4% of women's intentions. Only 6.3% said that they intended to use condoms, and none mentioned traditional methods or implants. On average, we observed 28.9% concordance between contraceptive preference and contraceptive use, which means that less than a third of postpartum women were actually using the method that they reported they intended to use after childbirth. Contraceptive preference-use concordance was higher for injectables (60.9%) and lower for IUDs, as none were actually using IUDs at six months postpartum (concordance equal to zero). Women who were not sure about what method they intended to use after childbirth more frequently reported no use at six months postpartum (30.0%) (Table 2).

Contraceptive preference use-concordance was associated with pregnancy planning status in both the univariate and multiple logistic regression analysis. Postpartum women whose pregnancy was unplanned were less likely to use the contraceptive methods that they intended to use when they were pregnant [aOR = 0.36; 95%CI = 0.14–0.97; p = 0.044]. None of the other covariates were associated with contraceptive preference-use concordance (Table 3).

## Discussion

We asked pregnant Brazilian women what contraceptive method they intended to use after childbirth. At six months postpartum, they were interviewed again, and our results showed that although the majority was using contraceptives, less than a third were using the contraceptive method they intended to use. Our findings demonstrated

**Table 3**

Univariate and multivariate logistic regression analysis of contraceptive preference-use concordance according to pregnancy planning status and other covariates.

| Variables                      | Model               |           |                                    |           |
|--------------------------------|---------------------|-----------|------------------------------------|-----------|
|                                | Univariate analysis |           | Multivariate analysis <sup>a</sup> |           |
|                                | OR                  | 95% CI    | aOR                                | 95% CI    |
| Previous pregnancy planning    |                     |           |                                    |           |
| Planned                        | 1.00                | –         | 1.00                               | –         |
| Ambivalent                     | 0.56                | 0.31–1.00 | 0.55                               | 0.28–1.04 |
| Unplanned                      | 0.38                | 0.16–0.92 | 0.36                               | 0.14–0.97 |
| Age                            |                     |           |                                    |           |
| 15–24 years                    | 1.00                | –         | 1.00                               | –         |
| 25–34 years                    | 1.22                | 0.67–2.20 | 0.91                               | 0.45–1.84 |
| 35 years and up                | 1.42                | 0.62–3.24 | 1.18                               | 0.44–3.12 |
| Social status                  |                     |           |                                    |           |
| High                           | 1.00                | –         | 1.00                               | –         |
| Middle                         | 0.56                | 0.30–1.05 | 0.60                               | 0.31–1.15 |
| Low                            | 0.57                | 0.18–1.81 | 0.66                               | 0.20–2.21 |
| Exclusive breastfeeding        |                     |           |                                    |           |
| No                             | 1.00                | –         | 1.00                               | –         |
| Yes                            | 1.11                | 0.56–2.08 | 1.23                               | 0.63–2.37 |
| Number of pregnancies          |                     |           |                                    |           |
| 1                              | 1.00                | –         | 1.00                               | –         |
| 2                              | 1.02                | 0.52–1.98 | 1.15                               | 0.55–2.39 |
| 3 and more                     | 0.92                | 0.48–1.77 | 1.09                               | 0.48–2.47 |
| Future reproductive intention  |                     |           |                                    |           |
| No more children               | 1.00                | –         | 1.00                               | –         |
| Wants to become pregnant again | 0.87                | 0.49–1.55 | 0.99                               | 0.52–1.91 |
| Not sure                       | 0.69                | 0.23–2.08 | 0.67                               | 0.21–2.08 |

Pseudo R<sup>2</sup> = 0.0332.

Chi-square test = 0.5102.

<sup>a</sup> n = 256.

substantial differences between the contraceptive methods used by Brazilian postpartum women and the methods they intended to use when they were pregnant.

The use of family planning by Brazilian postpartum women was far higher than that observed in 21 other countries, which had a mean proportion of family planning use of 31% (Moore et al., 2015). Although this finding seems to be very positive from the perspective of the possibility of increasing pregnancy intervals, almost 70% were using short-acting methods, such as injectables, pills and condoms. The adoption of short-acting methods by postpartum women has also been observed elsewhere (Mody et al., 2014), although experts emphasize that they are considered less effective in preventing pregnancies (Mumah et al., 2015). Short-acting methods were also the most commonly reported type of contraceptive that women wanted to use after childbirth in this study. Similarly, the highest contraceptive preference-use concordance was achieved among women who intended to use injectables, followed by the pill. This may be due to the wide availability of these types of contraceptives in PHCFs in Brazil and the fact that they can be easily purchased in drugstores without a medical prescription. Although it is not formally approved, this is common practice (Borges et al., 2015).

In contrast, LARC methods were poorly used. None of the postpartum women reported using implants, and very few reported IUDs. Permanent methods were reported slightly more often than LARC. IUD preference-use concordance was also the lowest. None of the pregnant women who expressed the intention to use IUDs after childbirth were actually using one at the sixth postpartum month. At

PHCFs in Brazil, only the copper IUD is available. Women who want to use IUDs face some barriers, such as the need for medical consultation and prescription, and there are few trained providers who can insert IUDs, most of whom are doctors. Other LARC methods, such as hormonal IUDs and implants, are not available at PHCFs, and the latter was not even reported as an option for use after childbearing. We do not know if women did not mention implants because they did not intend to use them or because they were not aware of them. Thus, this situation likely reaffirms women's limited access to these contraceptives rather than their personal choice. This finding differs from others, as postpartum women often report the desire to use highly effective methods (Tang et al., 2013; Sok et al., 2016), even though not all of them can eventually access them (Zerden et al., 2015).

Researchers unanimously report a positive influence of contraceptive counseling and the provision of contraceptive methods in the immediate postpartum period on the subsequent use of contraceptive methods (Wilson et al., 2013; Lauria et al., 2014; Zapata et al., 2015). However, in Brazil, despite the fact that almost all births occur at health care facilities, postpartum contraception care remains inadequate (Matijasevich et al., 2009; Minanni et al., 2009; Bonan et al., 2010; Parreira et al., 2010; Vilarinho et al., 2012; Blanco et al., 2014), and postpartum IUD insertion is thus not common practice. Health providers, especially Brazilian ones, should consider this time an ideal opportunity for IUD insertion (Pasha et al., 2015), both because immediate postpartum insertion is safe and effective and because motivation to delay or prevent future pregnancies is high during this period (Grimes et al., 2010). Even if insertion does not occur during hospitalization due to a lack of time and privacy, health care on the baby, and the heavy workload of hospital practitioners (McCance and Cameron, 2014), IUDs can be inserted from six weeks postpartum (Pasha et al., 2015), which would be realistic in Brazil due to its high coverage of primary health care services (Victora et al., 2011). There is a need to advance and recognize the positive effects of improving the accessibility of LARC methods to postpartum women and women in general. Prioritizing this method, training health professionals other than doctors, such as nurses and midwives, and reducing the number of steps women have to take to obtain this form of contraceptive can increase its use.

Permanent methods were intended to be used by a fourth of the women when pregnant, but only a few could access female or male sterilization. As with women who intended to use IUDs, women who intended to use permanent methods ended up using some other form of contraceptive, which means that they sought a less effective method to prevent pregnancy. Unmet demand for permanent methods immediately after birth has been described in Brazil. The National Family Planning Law (from 1996) legalized surgical sterilization in the public and private services but guidelines placed restrictive criteria for both male and female sterilization: the age (at least 25 years of age) or parity (at least two living children), a minimum interval of 60 days between the procedure request and its performance, and the consent of the spouse, if married (Brazil, 1999). Moreover, due to the frequency C-sections were performed for the exclusive purpose of sterilization (C-sections are widespread throughout Brazil, occurring in 89% of all deliveries in the private sector and 44% in the public sector (Domingues et al., 2014)), these restrictions included the prohibition of postpartum sterilizations as an attempt to reduce the rates of cesarean sections. Even though the restrictions on postpartum sterilization comprise some exceptions, like some severe diseases and successive C-sections, the guidelines establishes an interval of 42 days between the childbirth and the procedure (Potter et al., 2003; Caetano, 2014). In general, this means that postpartum women cannot be sterilized while still in the service for delivery and may not find reasonable to get back to the hospital many days after childbirth.

Few women reported an intention to use condoms after childbirth, but a higher proportion reported having used a condom in the sixth postpartum month. Condoms are widely available in Brazil and can be

easily accessed at PHCFs or bought from drugstores at reduced prices. They are also the third most reported type of contraceptive in use in Brazil, and 70% of all women have already used a condom (Brazil Ministry of Health, 2009). We concluded that women used condoms because they were easy to obtain and not because they truly intended to use them.

Some women were not sure about the type of contraceptive they wanted to use after childbirth. These women were the ones who most frequently reported not using contraceptives at six months postpartum. Further investigations are needed to elucidate how the decision-making process works for women who are uncertain about which contraceptive to use.

The low concordance between contraceptive intentions and contraceptive use among postpartum women is consistent with other studies, such as one conducted in public and private hospitals in Texas, USA, in which the preference to use LARC and sterilization far exceeded their actual use (Potter et al., 2014). The women who participated in our study were all public health system users and faced much of the same barriers to accessing highly effective methods as many other populations in low-, middle- and even high-income countries (Harper et al., 2008; Najafi-Sharjabad et al., 2013; Kumar and Brown, 2016). Although these barriers are well-described elsewhere and are important elements that negatively influence postpartum contraceptive use, we were primarily interested in how intentions regarding one's pregnancy influenced the agreement between contraceptive intentions and use among postpartum women.

To achieve this aim, we classified pregnancies according to their planning status, i.e., planned, ambivalent or unplanned, and followed pregnant women up to six months after childbirth, when we interviewed some of them again and checked their contraceptive practices. We observed that postpartum women with an unplanned pregnancy were less likely to be using the contraceptive they intended to use when they were pregnant. In other words, concordance between contraceptive intention and use was lower among women with an unplanned pregnancy.

Some studies have shown associations between intended pregnancies and other health-related behaviors and birth outcomes (Morin et al., 2002; Gipson et al., 2008; Cheng et al., 2009; Ulep and Borja, 2012; Backhausen et al., 2014; Wado et al., 2014; Kost and Lindberg, 2015; Lindberg et al., 2015; Stern et al., 2016). Although reports from other contexts are not available for a direct comparison, studies on postpartum contraceptive use suggest that pregnancy planning status also plays an important role in the use of contraception. In a longitudinal data with more than 2500 Bangladeshi women, unmet contraceptive needs were observed mainly among women with an unintended pregnancy (Callahan and Becker, 2014). Still, women with an unintended pregnancy were more likely to choose LARC than women with an intended pregnancy (Tang et al., 2013; Singh et al., 2014). The association between unplanned pregnancy and low contraceptive intention-use concordance in this study suggests that there are missed opportunities to promote the use of contraceptives that women intend to use, including highly effective ones. There are many occasions when women can receive contraception counseling such as during prenatal care (Lauria et al., 2014) and during childbearing and postpartum visits; however, our results highlight that contraceptive counseling before conception may influence postpartum contraceptive use, as this type of intervention may prevent unplanned pregnancies. Accordingly, health professionals should recognize the need to offer permanent family planning services because investments in practices that improve the number of women and couples who can plan their pregnancies will surely influence later contraceptive practices.

Women with both unplanned and planned pregnancies accessed the same services at the health care facility, but the first group usually initiates prenatal care later and attends fewer prenatal care appointments, according to a nationally representative survey of childbearing practices in Brazil in 2011 and 2012 (Viellas et al., 2014). This

situation might have contributed to the differences observed in the contraceptive intention-use concordance considering pregnancy planning status. Of course, women with planned pregnancies can also accumulate characteristics that influence the contraceptive intention-use concordance, such as having more reproductive experience, a later age at first pregnancy, a higher education level and a paying job. Nonetheless, none of these characteristics were associated with concordance between contraceptive intentions and contraceptive use, which conflicts with previous studies that observed that a higher social status and higher education improved LARC intention-use concordance among postpartum women (Potter et al., 2014) and that older and multiparous postpartum women were more likely to use sterilization (Pádua et al., 2010).

Our findings also highlight that assessing pregnancy intentions should be incorporated into routine health professional practices (Hall et al., 2016). Once a woman/couple has been asked about her/his short-term pregnancy intentions, health care providers can tailor the contraceptive counseling provided at any health service contact: preconception care, prenatal care, childbearing and postpartum care or any other opportunity, as suggested by (Bellanca and Hunter, 2013), who proposed an initiative that focused on inquiring about pregnancy intentions regardless of women's and couple's requests for family planning services.

Considering the gap in full understanding of how to increase contraceptive protection following childbirth, our study advances the field by considering the pregnancy intention perspective beyond individual demographic and service-related variables. Additionally, in a context with a high prevalence of contraceptive use such as in Brazil (Brazil Ministry of Health, 2009) and in many other middle- and high-income countries, assessing the concordance between contraceptive intentions and use among postpartum women is more useful than a simple assessment of the prevalence of contraceptive use; we expected to observe a large proportion of women using some type of contraception, and we did. One of the strengths of our study also stems from the fact that we used a reliable measure of pregnancy intention, namely, the London Measure of Unplanned Pregnancy (Barrett et al., 2004), which has been validated in many other contexts and has proper psychometric properties (Morof et al., 2012; Hall et al., 2013).

This study has some limitations. The findings may not be widely generalizable to Brazilian women in general because our sample consisted of women attending prenatal care in public PHCFs in Sao Paulo city; therefore, we do not know how pregnancy intentions influence contraceptive intention-use concordance among private health service users. Moreover, we lost slightly less than half of all baseline participants to follow-up, but those who were lost did not differ from those who remained according to pregnancy planning status. Women may have changed preferences at six months after childbirth, but this was not considered. We also did not assess the quality of the services women utilized, but all participants were public health system users, and the guidelines for prenatal and postnatal care are well defined and implemented in Brazil (Brazil Ministry of Health, 2006). In addition, evaluations of the service quality showed a lack of contraceptive counseling both in primary and secondary care levels in Brazil when women were seen during pregnancy or during the childbearing, postpartum, and postabortion period (Blanco et al., 2014; Borges et al., 2015).

## Conclusions

This study provides an overview of the postpartum contraceptive practices of women who are public primary healthcare users in Brazil. The results showed that these Brazilian women were able to access contraceptives in the postpartum period, mainly short acting methods. However, there was considerable discordance between their intentions to use certain contraceptives and the actual use of these methods at six months postpartum, especially for IUDs and sterilization. This is

problematic, as all postpartum women should be able to access the contraceptive method of their choice, particularly highly efficient methods, shortly after giving birth, so access to the full range of contraceptives should be provided, including LARC. This study is an important contribution to the literature, which has consistently demonstrated the importance of prenatal and postpartum family planning counseling for postpartum contraceptive use. Our results advance this topic and confirm that pregnancy planning status is associated with postpartum contraceptive preference-use concordance; therefore, interventions before pregnancy can affect contraceptive postpartum use. Both the univariate and multivariate analyses highlighted that women who reported an unplanned pregnancy were less likely to achieve contraceptive preference-use concordance during the postpartum period compared with their counterparts with a planned pregnancy. Understanding how pregnancy intention affects postpartum contraceptive use can improve the way health care providers deliver family planning services as well as provide insight into how to enhance family planning education, access, and timing (Sok et al., 2016). Concordance between preferred contraceptive method and actual contraceptive method was not related to other variables we considered, such as age, social status, breastfeeding, and future reproductive intention. Further research should identify relevant barriers and interventions to address them to ensure that all women have access to the contraceptive method that they prefer.

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## Clinical Trial Registry and Registration number

None declared/Not applicable.

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