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Oral Cleft Recurrence Risk and Subsequent Maternal Fertility Preferences and Behavior in Brazil

George L. Wehby*, Kwame A. Nyarko, and Jeffrey C. Murray

Abstract

Background—Oral clefts are among the most common birth defects with numerous impacts on affected individuals and families. However, little is known about how being at a greater risk of having an affected child affects subsequent maternal fertility decisions. We investigated differences in fertility preferences and behavior between mothers who are themselves affected with cleft lip with/without cleft palate but have had no affected children and unaffected mothers of an affected child. We also compared these outcomes between unaffected mothers of a first versus another affected child.

Methods—The sample included 1475 Brazilian women interviewed between 2004 and 2009. The outcomes were wanting more children, contraceptive use and type, and maternal age at first child. Comparisons between the various maternal groups were performed using regression analysis adjusting for conceptually relevant demographic, socioeconomic, and geographic factors.

Results—Affected mothers of unaffected children were less likely to use contraceptives than unaffected mothers of affected children by 31% [95% CI: 1–53%]. Among unaffected mothers, those who had a first affected child were 67% [95% CI: 15–144%] more likely to use contraceptives.

Conclusions—The results suggest that having an affected child represents a stronger signal of recurrence risk to the mother than her own cleft status, and that cleft status of the first child is especially important in influencing subsequent maternal fertility decisions in affected families. These findings highlight the importance of adequate counseling of at-risk women about recurrence risks and available care resources and policies that improve access to quality cleft care.

Keywords

birth defects; oral clefts; fertility; contraception; family planning

Introduction

Oral clefts including cleft lip and/or cleft palate are among the most common birth defects worldwide, with occurrence ranging from 1/200 to 1/2500 births depending on race and socioeconomic status (Mossey et al., 2009). Oral clefts have a complex etiology involving genetic and environmental risk factors (Dixon et al., 2011; Shi et al., 2008; Wehby et al.,

*Corresponding Author: George Wehby, Ph.D., Associate Professor & Research Associate, University of Iowa & NBER, Dept. of Health Management and Policy, College of Public Health, University of Iowa, 105 River Street, N248 CPHB, Iowa City, IA 52242, Phone: 319-384-3814, Fax: 319-384-4371, george-wehby@uiowa.edu.

2012a; Wehby and Murray, 2010). However, the etiological pathways of oral clefts remain largely unknown, hindering the development of primary prevention approaches. Oral clefts are associated with adverse consequences to the health and wellbeing of affected individuals throughout most of their lifespan as documented in several previous studies (Wehby et al., 2012a; Wehby and Cassell, 2010). In addition to their impact on affected individuals, oral clefts modify the quality of life and wellbeing of parents and families of affected individuals both psychosocially and financially. Individuals with oral clefts utilize healthcare much more intensively than the general population especially during childhood (Cassell et al., 2008; Wehby et al., 2012a; Weiss et al., 2009), which may impose a financial strain on affected families. Furthermore, elevated risks for behavioral and psychological problems have been reported among children and adolescents with clefts partly due to issues related to dissatisfaction with facial appearance and speech leading to adjustment problems (Kapp-Simon et al., 1992; Thomas et al., 1997; Tyler et al., 2013; Wehby et al., 2012c). These effects may negatively influence the psychosocial wellbeing of parents (Nidey et al., 2013).

Another potential source of stress for families is their risk of cleft recurrence. Having an affected child when the mother is herself affected or having a second affected child for an unaffected mother who has had a prior affected child both occur at birth prevalence far above population frequencies. Oral clefts have a high rate of familial recurrence (Lie et al., 2001; Skjaerven et al., 1999) generally estimated at around 4%, which is close to 40 times higher than the occurrence rate in the general population (Grosen et al., 2010). However, recurrence rates may vary between populations and exceed 4%. In Brazil, recurrence rates have been estimated to be around 7% for affected mothers and 6.7% for having a previously affected child (Wehby et al., 2013).

Theoretically, the high recurrence may affect maternal fertility decisions since recurrence would add additional strain on the quality of life and finances of a family. However, very little is known about the actual effect of being at recurrence risk on maternal fertility preferences and behavior as empirical studies are rare. In a large Norwegian study, Sivertsen et al. (2008) reported a slightly lower fertility rate among affected women (45% became mothers) compared to unaffected ones (48%). However, that study reported no change in subsequent fertility after having a first affected compared to a first unaffected child (irrespective of maternal affected status). A Danish study reported that affected women were more likely to be childless (55%) than unaffected ones (44%) and to have their first child at an older age by more than 2.5 years (Yttri et al., 2011). A few small studies of family planning (Bressmann et al., 1999; Andrews-Casal et al., 1998) and attitudes towards or reports of termination of pregnancy in different populations offer conflicting results, with some reporting no effects (e.g. Wyszynski et al., 2003; Davalbhakta and Hall, 2000), while others reporting a high rate of termination of pregnancy after prenatal diagnosis of oral clefts (Blumenfeld et al., 1999; Bronshtein et al., 1996; Forrester et al., 1998).

The previous studies suggest that while being at risk of oral cleft recurrence may reduce fertility, the impact likely varies between countries and societies and by several individual factors including religiosity, social norms as well as parental perceptions of how having an affected child influences their quality of life. Most of the previous studies have been done in developed countries, and many suffer from very small samples and limited measures of

fertility preferences or behavior. Furthermore, it is unknown how being in different recurrence groups, i.e. affected mother versus unaffected mother of a prior affected child influences fertility preferences and behavior.

In this paper, we compared fertility preferences and behavior of: 1- mothers who themselves have an oral cleft but have not had a child with an oral cleft (referred to as affected mothers) versus mothers who do not have an oral cleft but have had a child with a cleft (referred to as unaffected mothers); and 2- unaffected mothers of a first versus another affected child. The first comparison evaluates how differences in recurrence risk and whether the mother versus the child being affected modifies maternal fertility preferences and behavior. The second comparison sheds light on the importance of the birth order of the affected child for these outcomes, conditional on the number of children at the time of comparison. We studied a large sample of women in Brazil making our study the first large-scale investigation of fertility decisions related to oral clefts using data on revealed behavior and stated preferences in a less developed setting. Therefore, this paper addresses some of the current main gaps in this literature.

Methods

Our data comes from the Oral Cleft Prevention Program (OCP), which was a double blinded randomized clinical trial aimed at investigating the effects of high versus low folic acid supplementation on recurrence of isolated oral clefts (Wehby et al., 2013; Wehby et al., 2012b). The OCP enrolled women of childbearing age who were at-risk of recurrence including women who were themselves affected with isolated oral clefts or unaffected women who have had a prior affected child at multiple craniofacial clinics in Brazil (Wehby et al., 2013; Wehby et al., 2012b). Women were enrolled and interviewed between 2004 and 2009. Since the OCP focused on estimating “effectiveness” rather than “efficacy” of folic acid, women were enrolled into the study regardless of whether they were planning on becoming pregnant or not or wanted more children or not, and irrespective of their fertility behaviors and preferences. The only exception is that women who were permanently sterilized or had a permanently sterilized husband or partner were excluded. Also, women who were pregnant at screening, used certain drugs that may influence cleft occurrence or were allergic to folic acid were excluded. The OCP is further described elsewhere in detail (Wehby et al., 2013; Wehby et al., 2012b).

Several measures of fertility preferences and behavior were collected from the women during interviews with the study staff at the time of enrollment into OCP before randomization (i.e. baseline period of the OCP). We compared the distribution of the following three measures between affected mothers of unaffected children and unaffected mothers of affected children: wanting more children (yes/no), contraceptive use (both any use and type including injectable, intrauterine device (IUD), oral pill or other), and maternal age at the first child (in years). All these comparisons are adjusted for the number of children at the time of enrollment and other demographic, socioeconomic and geographic characteristics as described below in detail.

We excluded from the analysis affected women who had no children at enrollment into OCPP since their fertility preferences and behavior are expected to differ from women who had children. We also excluded affected women who had had an affected child at baseline, and unaffected women who had had more than one affected child, in order to better define risk status and limit the comparison to the following two groups: 1- affected mothers who had not had an affected child at baseline, and 2-unaffected mothers who had had one affected child. A few cases with cleft palate only (affected mothers or children) were excluded due to the low number of these cases and to reduce cleft type heterogeneity in the sample; the OCPP stopped enrolling cases with cleft palate only history soon after initial enrollment phase (Wehby et al., 2013; Wehby et al., 2012b). The final sample included 182 affected mothers and 1293 unaffected mothers. Among the group of unaffected mothers who have had one affected child, we compared wanting more children and contraceptive use between cases when the *first* child (N=380) and those when *another* child was born with oral clefts (N=913), controlling for the number of children at baseline. Figure 1 shows a flowchart of the initial sample of enrolled women and exclusions following the above criteria.

We compared affected and unaffected mothers on wanting more children and contraceptive use using standard logistic regression for the binary measures and multinomial logistic regression for the multi-category measure of contraceptive use type. In these regressions, we controlled for several demographic, socioeconomic, and clinical variables measured in our dataset that are conceptually relevant for fertility decisions and supported in the literature. Since we relied on theory and previous literature, we included these variables regardless of whether they were significant or not in the adjusted regression or if/how they changed the effects of the recurrence risk group, in order to estimate the most flexible and complete specification possible with our dataset that can reduce confounding and improve estimation precision. Specifically, we controlled for the following characteristics of the study women, all measured at enrollment: woman's age, her educational attainment, employment in the past month, marital status, and number of previous children which are important for fertility decisions including in Brazil (Madalozzo, 2012). Some of these variables may also vary between affected and unaffected mothers including education, employment, and marital status (Wehby and Cassell, 2010)). We also include the cleft type of affected mother or child to evaluate its effect on fertility. Since fertility rates vary geographically in Brazil (Madalozzo, 2012), we included 0/1 indicators for the provinces of the study craniofacial clinics where the women were enrolled to account for geographic variation in factors that influence fertility outcomes.

We used a similar model to compare unaffected mothers of first versus other affected child on these outcomes. We compared maternal age at first child between affected and unaffected women using ordinary least squares (OLS) regression adjusting for maternal education, marital status, and the province of the study clinic, assuming these characteristics at the time of enrollment proxy for these same maternal characteristics when the mother had her first child, since we did not observe them at that time. We did not adjust for the other characteristics such as the number of children since these occur subsequent to having the first child.

Results

Table 1 reports the distribution of study variables. The desire to have more children appeared to vary between the various risk groups. About 54% of the affected mothers wanted to have more children, compared to 45% of unaffected mothers. Among unaffected mothers, 53% of those with an affected first child wanted more children, compared to 25% of those with a non-first affected child. However, there are several other differences between these groups emphasizing the importance of regression analysis to control for these differences. For example, affected mothers were more likely to be unmarried than unaffected ones (24% versus 14%). Also, unaffected mothers who have a first affected child were 3 years younger than those who have another affected child, but were more likely to have university education (11% versus 3.7 %).

Tables 2 reports the regression results for comparing wanting more children, contraception use and type, and maternal age at first child between affected and unaffected mothers respectively while adjusting for several baseline demographic and socioeconomic characteristics and geographic location. The logistic regression models are reported as odds ratios. Affected mothers were 31% [95% CI: 1–53%] less likely to use contraceptives compared to unaffected women. In the multinomial logit model for contraception use and type, affected mothers were 40% [95% CI: 10–60%] less likely to use oral contraceptives. Affected mothers were slightly more likely to report wanting more children and to be older when they had their first child than unaffected ones but the differences were not significant.

Table 3 reports the regression results for the comparisons in wanting more children and contraception use and type among unaffected mothers whose first child was affected relative to those who had another child affected. There were significant differences in contraceptive use and type between these two maternal groups. Mothers of a first-affected child were more likely to use contraceptives by 67% [95% CI: 15–144%], including oral (by 75% [95% CI: 17–162%]) and injectable (by 82% [95% CI: 11–198%]) contraceptives. In contrast, a greater proportion of unaffected mothers whose first child was affected reported wanting more children, but the difference was insignificant.

Several covariates were significantly related to the fertility measures. Older mothers were less likely to want more children but also to use contraceptives. As expected, wanting more children decreased and contraceptive use increased with the number of previous children. In the total sample, unmarried mothers were less likely to want more children and use contraceptives compared to married ones and were about a year younger when they had their first child. Unmarried mothers were also less likely to want more children among unaffected mothers. University education was associated with increased use of IUD, injectable, and other (non-oral) contraceptives. Interestingly, type of maternal or child cleft (cleft lip with palate versus cleft lip alone) was not significantly related to the evaluated outcomes.

Discussion

As one of the most common and burdensome birth defects, oral clefts have major implications for affected individuals, their families, societies, as well as healthcare systems.

One of the least studied consequences is influence on maternal fertility. In one of the first studies of fertility preferences and behavior of a large sample of women at risk of oral cleft recurrence in a less developed setting, we find some important differences in contraceptive use based on whether the child or mother is affected and on the birth order of the affected child. Specifically, unaffected mothers who have had an affected child are more likely to use contraceptives than affected ones who have had no affected children. Also among unaffected mothers who had an affected child, those whose first child was the affected child were more likely to use contraceptives. These differences are found controlling for observed conceptually relevant clinical, demographic, socioeconomic, and geographic factors, including the number of children the women had when they were interviewed for the study. Therefore, observable background differences between these maternal groups cannot explain these findings.

One potential explanation for the greater contraceptive use among unaffected mothers who have had an affected child compared to affected mothers who have only unaffected children is that the child being affected signals a greater risk of recurrence to the mother – having an affected child from a future pregnancy – than when the mother is herself affected but has not had an affected child. An additional recurrence risk is not necessarily supported in previous epidemiological studies; however for mothers, having a previous affected child represents a “realized” child outcome that they may be concerned about it recurring in another child. In contrast, affected mothers who have only had unaffected children may feel a lower risk of having a future affected child because of their own cleft status. This may also be driven by differences between parental experiences with raising an affected child versus a parent’s own experience with having oral clefts. Even though affected mothers have themselves gone through the surgical and medical treatments and may have experienced some decline in their own wellbeing as a result of oral clefts, they may perceive a lower burden from oral clefts on the wellbeing of an affected child than an unaffected parent of an affected child because they did not experience this as a parent. This may also in part be due to parental altruism toward their children, and parents being primarily concerned about their children’s wellbeing. However, it may also be driven by adverse effects of having an affected child on the family’s financial and psychosocial wellbeing due to the healthcare needs and concerns about the wellbeing of the affected child.

In contrast, the greater use of contraceptives among unaffected mothers whose first child was affected compared to those whose other children were affected highlights the importance of the first child in influencing subsequent maternal fertility decisions. Since there is no evidence that recurrence risks vary by the birth order of the child, this may be due to a greater “shock” that parents may experience when their first child is affected relative to subsequent children.

The study has important implications for understanding the consequences of oral clefts to affected families and for improving their wellbeing. First, the study clearly indicates that mothers who have an affected child, especially when it is their first child, change their fertility behavior by using more contraceptives. This may reflect a psychological concern about having additional children and “a psychosocial premium” incurred by mothers of affected children that may have several adverse consequences to their and their family’s

wellbeing. Therefore, adequate professional counseling of at-risk women about available resources to care for the affected child and about the actual risk of recurrence in a subsequent child and the potential for reducing the risk based on the latest knowledge about genetic and environmental etiology may help to reduce the psychological burden that these families experience. Another implication is that parents who are themselves affected may play a good counseling role through support groups for parents who have had an affected child by providing a long-term personal experience. Furthermore, the results highlight the importance of devising policies to improve access to quality cleft care, which may reduce any adverse effects from having an affected child on subsequent fertility and other family-level decisions. Even though our study sample had at least some basic access to cleft care (since the mothers were recruited through attending cleft clinics that offer comprehensive care to affected families), many of the study families come from low socioeconomic backgrounds and face geographic and financial barriers (including transportation cost). Access to quality cleft care is likely even more constrained in the general population of at-risk women in Brazil.

The study has several strengths including its large sample, unique setting, measuring both fertility preferences and behavior, and adding knowledge to the limited literature on this topic. However it has some limitations and implications for future research that warrant discussion. First, our data are from women who participated in a study related to prevention of oral cleft recurrence. Even though we only use data from the baseline interview before women were assigned into intervention and control groups and the study had only a few basic exclusion/inclusion criteria, this selective group may not be representative of the entire population of affected women or those who have had affected children, as they may have had a greater preference for having more children than the general population (even though this was not an inclusion criterion). However, it is important to note that the majority (89%) of these women did not become pregnant over their participation in the OCPP and the pregnancy rate was not substantially larger than that of the general population. This was mainly due to the OCPP's design that aimed at testing effectiveness in a generalizable sample instead of only enrolling women who were interested in becoming pregnant. Therefore, it is unlikely that the sample is significantly overrepresented with women who had a strong preference for fertility. Replicating the study in other samples from Brazil and in other countries is important to fully understand the generalizability of the findings and evaluate if and how they vary by population characteristics. We had no group of unaffected women without children and mothers of unaffected children to compare to. These groups would have allowed us to study the fertility preferences and behaviors of both affected women (including those who have no children) and unaffected mothers of affected children relative to the general population and would be important to consider in future research. Given the design of the OCPP, we could not comprehensively compare the fertility preferences and behavior of affected women who had not had a child at the time of enrollment into the study to the other groups who had children; 85% of these women reported wanting children and 43% did not use contraceptives. Also, the group of affected mothers of affected children was too small for a meaningful comparison (54 women). Both of these groups are relevant for future research. An ideal design would use population-based registry data such as those in Denmark or Norway. However, these data systems do not exist

in Brazil. This highlights the importance of building these registry systems for future research. Another data limitation is that we have no data on severity of cleft type (such as unilateral or bilateral clefts) beyond the general type of whether the lip and/or palate are affected. Even though we find this general cleft type indicator not to be significantly related to the evaluated outcomes, a detailed measure of cleft severity may be relevant for fertility choices. We leave this question for future research. Future surveys could also include direct questions about women's perceptions of how being at-risk of oral cleft recurrence affects their fertility decisions, family finances, and other important family outcomes. However, the possibility of report biases may increase when participants are directly asked about relationships between their behaviors and health conditions instead of behaviors alone. Of course, such questions can be carefully designed and their results compared to those from statistical models such as the ones we employ to evaluate report bias. Finally, while we focus on oral clefts, the results may apply to other birth defects with similar health prognosis as oral clefts. However, the literature can certainly benefit from future studies that directly evaluate the effects of other birth defects and child disabilities on subsequent maternal fertility decisions.

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Figure 1.
Flowchart of the Sample Construction

Table 1

Distribution of study variables

Variables	Percent/Mean (SD)			
	All mothers		Unaffected mothers	
	Affected mothers (N=182)	Unaffected mothers (N=1293)	Affected 1 st child (N=913)	Unaffected 1 st child (N=380)
Number of children	1.462 (0.755) ^a	1.828 (1.092) ^a	1.429 (0.788) ^a	2.784 (1.128) ^a
Want another child				
yes	54.4 ^c	44.9 ^c	53.0 ^a	25.3 ^a
no [†]	45.6 ^c	55.1 ^c	47.0 ^a	74.7 ^a
Any contraceptive				
yes	69.2 ^b	79.1 ^b	80.2	76.6
no [†]	30.8 ^b	20.9 ^b	19.8	23.4
Cleft type				
Cleft lip with palate	79.7	76.7	75.7	79.2
Cleft lip only [†]	20.3	23.3	24.3	20.8
Maternal age	27.78 (5.707)	28.21 (6.005)	27.36 (5.854) ^a	30.25 (5.876) ^a
Marital status				
Unmarried	24.2 ^b	14.4 ^b	16.1 ^c	10.3 ^c
Married [†]	75.8 ^b	85.6 ^b	83.9 ^c	89.7 ^c
Education				
Intermediate	47.8	43.2	49.0 ^a	29.2 ^a
University	8.2	8.8	11.0 ^a	3.7 ^a
Fundamental or less [†]	44.0	48.0	40.0 ^a	67.1 ^a
Employed last month				
Yes	52.7	47.9	49.5	43.9
No [†]	47.3	52.1	50.5	56.1
Province				
Pernambuco	9.3 ^b	18.6 ^b	20.6 ^b	13.7 ^b
Bahia	12.6	14.6	15.7	12.1
Paraná	15.4	16.5	17.7	13.4
Rio Grande do Sul	5.5 ^b	13.2 ^b	14.2	10.8
Sao Paulo [†]	57.1	37.1 ^a	31.8 ^a	50.0 ^a

a, *b* and *c* indicate that significantly different characteristics between affected and unaffected mothers at $p < 0.0005$, $p < 0.005$ and $p < 0.05$ respectively.

[†] represents the reference categories in the regression tables. Chi-square tests and t-tests were used to test significance for categorical and continuous variables respectively.

Table 2

Regression results for wanting more children, contraception use and type, and maternal age at first child comparing affected and unaffected mothers

	More Children Odds ratio [95% CI]	Any contraception Odds ratio [95% CI]	IUD	Injectable	Oral	Other	Age at 1st child β (SE)
Affected mother	1.15 [0.82,1.62]	0.69** [0.47,0.99]	1.14 [0.53,2.48]	0.76 [0.45,1.27]	0.60** [0.40,0.90]	1.12 [0.52,2.41]	0.377 (0.380)
Cleft lip with palate	0.97 [0.74,1.26]	0.96 [0.70,1.32]	0.81 [0.45,1.45]	0.77 [0.52,1.15]	1.06 [0.76,1.48]	1.00 [0.51,1.95]	-0.156 (0.294)
Number of children	0.40*** [0.34,0.47]	1.07 [0.93,1.23]	1.43** [1.08,1.88]	1.14 [0.96,1.36]	0.99 [0.85,1.16]	1.28* [0.96,1.72]	N/A
Maternal age	0.97** [0.95,0.99]	0.97*** [0.95,0.99]	0.90*** [0.85,0.95]	1.00 [0.97,1.03]	0.97*** [0.95,0.99]	0.97 [0.92,1.03]	N/A
Unmarried	0.55*** [0.40,0.76]	0.18*** [0.13,0.25]	0.31*** [0.16,0.62]	0.13*** [0.08,0.23]	0.18*** [0.13,0.26]	0.24*** [0.11,0.53]	-0.712* (0.342)
Intermediate education	0.97 [0.74,1.22]	1.12 [0.84,1.50]	1.74* [0.96,3.14]	1.02 [0.69,1.50]	1.07 [0.79,1.45]	1.64 [0.85,3.17]	1.554*** (0.261)
University education	0.97 [0.64,1.49]	1.44 [0.84,2.46]	3.85*** [1.40,10.60]	1.94** [1.01,3.73]	1.01 [0.57,1.80]	3.52** [1.32,9.39]	5.238*** (0.464)
Employed last month	1.21 [0.95,1.52]	1.17 [0.89,1.54]	1.29 [0.74,2.24]	1.07 [0.74,1.54]	1.17 [0.87,1.56]	1.76* [0.97,3.19]	0.759*** (0.254)
Pernambuco	0.65*** [0.47,0.91]	0.66** [0.46,0.95]	2.73*** [1.33,5.61]	0.77 [0.49,1.24]	0.52*** [0.35,0.78]	0.53 [0.21,1.31]	2.308*** (0.359)
Bahia	0.54*** [0.38,0.76]	0.68* [0.46,1.01]	3.08*** [1.47,6.43]	0.71 [0.43,1.18]	0.49*** [0.32,0.75]	1.47 [0.72,3.04]	1.027*** (0.383)
Paraná	1.06 [0.76,1.47]	0.98 [0.66,1.46]	0.29 [0.06,1.30]	0.43*** [0.24,0.78]	1.26 [0.84,1.89]	0.49 [0.18,1.37]	-0.187 (0.363)
Rio Grande do Sul	1.03 [0.71,1.48]	2.04*** [1.23,3.41]	2.73* [0.99,7.57]	1.09 [0.55,2.14]	2.36*** [1.40,3.99]	1.79 [0.68,4.72]	-0.017 (0.406)

Note:

*
p < 0.1,

**
p < 0.05,

p < 0.01.

Reference categories are as indicated in Table 1.

Table 3
Regression results for wanting more children and contraception use and type among unaffected mothers

	More Children Odds ratio [95% CI]	Any contraception Odds ratio [95% CI]	Contraception type Odds ratio [95% CI]	IUD	Injectable	Oral	Other
First affected child	1.32 [0.93,1.86]	1.67*** [1.15,2.44]		0.91 [0.44,1.91]	1.82** [1.11,2.98]	1.75*** [1.17,2.62]	1.49 [0.66,3.41]
Cleft lip with palate	0.96 [0.73,1.28]	1.02 [0.73,1.42]		0.86 [0.46,1.61]	0.79 [0.52,1.21]	1.12 [0.79,1.60]	1.15 [0.55,2.40]
Number of children	0.43*** [0.35,0.53]	1.20** [1.01,1.42]		1.43** [1.02,2.01]	1.30*** [1.05,1.61]	1.11 [0.93,1.34]	1.44** [1.01,2.04]
Maternal age	0.97** [0.95,1.00]	0.97** [0.95,1.00]		0.90*** [0.85,0.95]	1.00 [0.97,1.03]	0.97** [0.94,1.00]	0.97 [0.91,1.02]
Unmarried	0.60*** [0.42,0.84]	0.20*** [0.14,0.29]		0.41** [0.20,0.84]	0.15*** [0.08,0.26]	0.20*** [0.14,0.29]	0.23*** [0.09,0.58]
Intermediate education	0.93 [0.71,1.21]	1.19 [0.87,1.63]		2.39*** [1.25,4.56]	1.04 [0.68,1.59]	1.10 [0.79,1.54]	1.92* [0.92,3.98]
University education	0.96 [0.61,1.51]	1.27 [0.72,2.25]		3.83** [1.22,12.03]	1.85* [0.93,3.69]	0.86 [0.46,1.59]	3.34** [1.11,10.04]
Employed last month	1.23 [0.96,1.58]	1.12 [0.83,1.51]		1.33 [0.73,2.41]	1.05 [0.71,1.56]	1.10 [0.80,1.51]	1.61 [0.84,3.11]
Pernambuco	0.66** [0.47,0.94]	0.56*** [0.37,0.82]		2.70** [1.22,5.98]	0.68 [0.41,1.12]	0.43*** [0.28,0.66]	0.35** [0.12,1.00]
Bahia	0.58*** [0.40,0.84]	0.61** [0.40,0.92]		2.78** [1.21,6.36]	0.67 [0.39,1.16]	0.43*** [0.27,0.68]	1.31 [0.59,2.88]
Paraná	1.04 [0.73,1.48]	1.01 [0.65,1.56]		0.37 [0.08,1.74]	0.43** [0.22,0.83]	1.28 [0.81,2.01]	0.44 [0.14,1.40]
Rio Grande do Sul	0.96 [0.65,1.41]	1.76** [1.04,3.00]		2.90* [1.00,8.44]	0.97 [0.48,1.96]	1.99** [1.16,3.43]	1.71 [0.63,4.67]

Note:

*
p < 0.1,

**
p < 0.05,

p < 0.01.

Reference categories are as indicated in Table 1.