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# Preference for caesarean attitudes toward birth in a Chilean sample of young adults

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### ABSTRACT

**Background:** Little empirical research exists about what motivates birth mode preferences, and even less about this topic in Latin America, where obstetric interventions and caesareans are some of the highest worldwide.

**Aim:** To identify factors associated with caesarean preference among Chilean men and women who plan to have children and to inform childbirth education and informed consent procedures.

**Methods:** An online cross-sectional survey measuring attitudes toward birth was administered to graduate students at a large public university in Chile. Eligible students were under the age of 40 and had no children but intended to have children. Logistic regression modelling was used to determine which sociodemographic factors, knowledge and beliefs were associated with caesarean preference.

**Findings:** Among eligible students, 730 responded and 664 provided complete answers to the variables of interest. Respondents had a mean age of 28.8; 38% were male and 62% female. Positive attitude toward technological intervention (Odds Ratio 7.4, 95% Confidence Interval 3.9–14.0), high risk perception of vaginal birth (Odds Ratio 1.8, 95% Confidence Interval 1.1–2.8), family history of caesarean (Odds Ratio 1.9, 95% Confidence Interval 1.0–3.8) and high fear of birth (Odds Ratio 3.7, 95% Confidence Interval 2.0–6.8) were associated with caesarean preference.

**Discussion:** Preference for caesarean birth was highly associated with positive attitudes toward technological intervention and may be related to a lack of knowledge about the realities of caesarean and vaginal birth.

**Conclusions:** Patient-centered education on the relative benefits and risks of birth modes has the potential to influence preferences toward vaginal birth.

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### Statement of significance

#### Problem or issue

The 44.3% rate of caesarean birth in Latin America is higher than optimal for maternal and infant health.

#### What is already known

The attitudes and preferences of childbearing adults can influence the health care they receive, and therefore influence their health outcomes.

#### What this paper adds

Preferences for surgical birth are associated with a positive attitude toward technological medical intervention, with a

high risk perception of vaginal birth, and with fear of birth. These associations are present among both men and women intending to have children.

### 1. Introduction

During the last decades, caesarean birth rates have increased steadily around the world, especially in middle and high income countries, despite evidence indicating diminishing maternal and perinatal benefits when caesarean rates exceed 10–15%.<sup>1</sup> Moreover, there is growing literature which links caesarean birth to negative outcomes for both women and children.<sup>2</sup> Not only does caesarean birth have physiological consequences for women and

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infants, but it also influences women's experiences of birth and mothering. Bryanton and her team found that Canadian women with planned caesarean deliveries had significantly more negative perceptions of their birth experiences than women with either a vaginal birth or emergency caesarean.<sup>3</sup> A Chilean multi-site birth care study arrived at similar conclusions: one of the factors significantly associated with lower women's satisfaction was having a caesarean birth.<sup>4</sup>

Latin America and the Caribbean present the highest rates of caesarean birth of any region in the world (44.3% in 2015).<sup>1</sup> Within the region, large disparities in rates of obstetrical interventions occur between low, and middle-and-high income countries, ranging from 13.3% to 55.6% in South America,<sup>5</sup> with the latter presenting an over-use of childbirth interventions which has been described as the problem of 'too much, too soon' in maternity care.<sup>6</sup> Such is the case in Chile, a high income country with very high rates of obstetric interventions. While the Organisation for Economic Co-operation and Development reported that the country reached an estimated rate of 46% of caesarean births in 2015,<sup>7</sup> national reports show an even higher rate, of 50% for the same year (40.9% in public and 69% in private healthcare settings).<sup>8</sup> The disparity between public and private health systems can be at least partially explained by differences in the organization of care in each system, and financial incentives in the private domain that lead to routine caesareans.<sup>9,10</sup> In public hospitals, the work load is organized and paid according to shifts; professional midwives are the main caregivers during low risk pregnancies and births, supervised by the on-duty obstetricians. Yet in private clinics, obstetricians are the main care providers throughout pregnancy and birth, and they receive payment per birth attended.<sup>11</sup> The high rate of caesareans in the private sector is especially worrying due to the rising and continuous privatization of childbirth. During the last decade the number of births in the private sector grew from 21% to 32%, driven in part by deficiencies in the public system.<sup>11</sup>

In 2015, 99.68% of births in Chile were attended by health professionals in hospitals/clinics,<sup>12</sup> with no official or regulated out-of-hospital alternatives; therefore, hospital births comprise nearly all births in the population. Routine interventions during childbirth are very high, as shown by two studies. Binfa and colleagues<sup>13</sup> carried out an observational study in nine major regional public maternity hospitals, with low-risk primiparous and multiparous women who laboured in the hospital before birth (field work carried out from 2010 to 2014; n=1882 births). The Chilean Observatory of Obstetric Violence<sup>14</sup> carried out an internet survey about childbirth experiences, with 2800 reported births for the period 2009–2013. Both studies arrived at similar results: between 81.5% and 84% of women were deprived of food during labour; episiotomy rates were between 56.4% and 58.3%; artificial rupture of membranes was reported in 48.4%–59.1% of cases; pharmacological pain relief between 66.2% and 71.7%; and births in lithotomy position among 79.7%–80.7%. These outcomes reveal a highly interventionist birth culture.

While there are many factors that may influence whether a woman has a caesarean, personal preference for caesarean is an important factor that could contribute to the acceptance of or request for a caesarean in the absence of medical indications. A previous study in Chile showed that preference for caesarean birth was greater among participants who gave vaginal birth a higher pain rating, and those who preferred caesarean birth perceived it to be safer<sup>9</sup>; in Brazil caesarean preference has been found to be related to perceived quality of care and social power.<sup>15</sup> Understanding what motivates preference for caesarean could point to opportunities for education or improved processes of informed consent.

Several studies have suggested that partner birth mode preference influences the preference of a pregnant woman and

actual mode of birth.<sup>16,17</sup> Birth mode preferences of future fathers may therefore be highly relevant in reducing caesarean rates. However, most studies examining birth mode preference have not considered men's preferences or how the motivations for men's preferences might differ from those of women. The current study attempts to fill this gap.

Nulliparous women with pregnancy intentions (and their partners) are the next generation of birth care consumers. The present study examines attitudes toward birth, including fear and perceptions of risk, among male and female Chilean university students with no prior birth, and specifically how these attitudes relate to preference for caesarean birth.

## 2. Methods

Data were collected with a cross-sectional survey at a major public university in Chile from December of 2015 to January of 2016. The survey was developed in English and translated into Spanish by a Chilean professor, then back translated at a Canadian university by a bilingual midwifery student whose native language is English. The study protocol was approved by institutional review boards at the University of British Columbia where the survey instrument was developed and at the University of Chile where the survey was administered (Protocol number 027\_06/2015). The study was part of an international investigation of childbirth attitudes prior to pregnancy. Data was collected in eight OECD countries, including Chile, using the same survey tool.<sup>18</sup>

Students were eligible to participate in the study if they were under 40 years old and did not have children but wanted to have children in the future. A total of 8745 graduate students were invited to respond to the self-administered online survey through an email sent from the university. A reminder email was sent to the students 10 days after the original email and the survey was open for seven weeks. Both male and female students were invited to respond. variables

### 2.1. Dependent variable

Respondents were asked, assuming a low-risk pregnancy and that they could choose the type of birth for their baby, if they would prefer a vaginal or caesarean birth (for themselves or for their partner). Vaginal birth was defined as birth by vagina, with or without interventions like forceps and local or regional anesthesia; caesarean birth was defined as surgical birth of an infant through an incision in the abdomen and uterus of the mother. Respondents who chose caesarean birth were assigned a value of 1 and those who chose vaginal birth a value of 0.

### 2.2. Independent variables

#### 2.2.1. Fear of birth

Fear of birth was measured with a 10-item scale developed by Stoll and colleagues,<sup>19</sup> shown to have high internal consistency and high convergent validity (Fig. 1) with a two-item visual analog scale of fear of birth adapted from Haines and colleagues.<sup>20</sup> The Childbirth Fear Prior to Pregnancy (CFPP) scale included three dimensions: (1) fear of complications of birth (three items regarding fear that harm will come to the baby and the belief that birth is risky) (2) fear of pain and losing control (five items about fear of labour pain and fear of panic) and (3) fear of physical changes in the mother as a result of birth (two items about fear of what will happen to the mother's body during and following birth). Scale scores were generated for all respondents who completed all questions in the scale. Respondents who discontinued the survey before completing the full scale were excluded from this analysis. Respondents with a score on the scale at or above the 75th

Statements	
1	I am worried that I will experience pain during labor.
2	I could find myself unable to breathe during the pain of childbirth.
3	I am worried that I might get into a panic and not know what to do during labor and birth.
4	I am worried about blood.
5	I am worried that the baby might move in the wrong way.
6	I am worried that my partner will be out of control during labor and birth.
7	I am worried about losing consciousness during labor and birth.
8	I think I am not strong enough to give birth.
9	I am worried that I will have a difficult time giving birth naturally.
10	I am worried that my partner's body will be so sore he can't walk after birth.

Fig. 1. Fear of birth scale.<sup>19</sup>

percentile were considered to have high fear of birth. The three sub-dimensions of fear were also explored separately to see whether specific fears had different associations with the dependent variable, i.e., birth mode preference. Respondents with a score on each subscale at or above the 75th percentile were defined as having high fear on that dimension. Cronbach alpha was greater than 0.7 for the complete scale and sub-scales.

### 2.2.2. Family history of caesarean

Respondents were asked if their mother or sisters had a caesarean birth. Those who answered “Yes” were considered to have a family history of caesarean (and assigned a value of 1). Those answering “No” or “Unsure” were coded as having no family history (value of 0).

### 2.2.3. Confidence in knowledge of birth

Confidence in knowledge of birth was measured on a six-item Likert scale based on the statement “I feel confident in my level of knowledge about pregnancy and birth.” Respondents who answered “Agree” or “Strongly agree” were considered to have confidence in their knowledge about birth and were assigned a value of 1. All other response options were given a value of 0.

### 2.2.4. Positive attitude toward technological intervention at birth

Positive attitude toward technological intervention was measured using a six-item Likert scale (Cronbach's alpha: 0.77), ranging from “Strongly agree” to “Strongly Disagree”. Statements included “Technology protects the baby from danger” and “Medical technology is necessary for the birth of the baby” with one reverse-coded item, “Technology should be reserved for women who need it.” Scores were generated for all respondents who completed all questions in the scale. Respondents who discontinued the survey before completing the full scale were excluded from this analysis. Respondents with a scale score at the 75th percentile or above were coded as having a positive attitude toward technological intervention at birth.

### 2.2.5. Perception of vaginal birth risk

Respondents were presented with eight possible complications of birth, based on a review of the literature, including incontinence, maternal infection, and problems with lactation and maternal-infant bonding. They were asked to respond which mode of birth was associated with a higher risk of each complication: caesarean, vaginal, or both. Those who responded that vaginal birth was riskier for each complication received a point. Respondents with scores in the top 25th percentile were classified as believing vaginal birth to be riskier compared to caesarean. While two of the complications presented are more likely to occur in a vaginal birth, most of the complications are either more highly associated with caesarean, or no more likely in vaginal birth than caesarean.

Therefore, those respondents who were classified as having a high risk perception of vaginal birth had at least some misperceptions of the risks of vaginal birth compared to the scientific literature.

### 2.2.6. Socio-demographic characteristics

Data were collected on age, gender, and whether respondents had private or public health insurance. All respondents were graduate students, so education level was homogeneous.

## 3. Analysis

The dependent variable was preference for caesarean birth, analyzed as a dichotomous variable. Caesarean preference was analyzed using bivariate logistic regression with all independent variables to determine whether there was an association between each variable, including fear of birth, attitudes toward technology, and family history of caesarean. All variables significant at the  $\alpha < 0.05$  level were included in a multivariable regression for the purpose comparing the relative magnitude of each variable's association with the outcomes when adjusting for the other variables. Age and gender were also included in multivariate models. Two models were generated for calculating odds of caesarean preference: one with overall fear of birth as an independent variable, and one with the three dimensions of fear of birth as separate independent variables. Covariates were checked for collinearity and found to be independent. Variables were also examined for interaction effects; specifically, it was hypothesized that gender may modify the relationship between the independent variables and the attitudes toward caesarean. Both logistic and robust Poisson regressions were fit with similar results. Only the logistic regression results are reported here.

## 4. Results

While 931 (10.6%) of graduate students responded to the survey, 201 respondents did not meet the eligibility criteria. Of the 730 who met the eligibility criteria, 664 provided complete answers to both birth mode preference and at least one of the independent variables. The survey was long, so some respondents began to answer the questions and then stopped before they reached the fear of birth scale. These respondents were excluded from the regression analyses, as fear of birth was the principal independent variable of interest. These respondents did not differ significantly by gender or birth mode preference from other respondents.

Table 1 shows the characteristics of the sample, which included 427 women (64.3%) and 237 men (35.6%); the women had an average age of 28.8 and men had a similar mean age of 28.9. A high percentage of the sample (65.1%,  $n = 432$ ) reported having private insurance while 21.1% ( $n = 140$ ) reported having public insurance.

Table 1  
Demographic characteristics of respondents.

	N = 664 N, (%)
Gender	
Male	237 (35.6)
Female	427 (64.3)
Age, mean (SD)	28.8 (3.7)
Insurance type	
Private insurance	432 (65.1)
Public insurance	140 (21.1)
Other/none	92 (14)
Family history of caesarean	
Yes	396 (61.6)
No	247 (38.4)

This proportion contrasts with the much lower figure of 17–18% of the Chilean population that has private insurance and 78% with public insurance (the remaining under the Armed Forces insurance program).<sup>21</sup> The majority of respondents (61.6%,  $n = 396$ ) reported that a mother or sister had undergone a caesarean section.

When asked about their preference for birth mode, about 10% of the overall sample (11.2% of women,  $n = 48$  and 6.8% of men,  $n = 16$ ) said they would prefer a caesarean assuming a healthy pregnancy and birth with no complications.

The 664 participants with complete responses are included in the regression analyses. In bivariate analyses, neither confidence in birth knowledge nor type of insurance was associated with preference for caesarean. Four variables, high fear of birth (OR 3.7; 95% CI 2.0–6.8), positive attitude toward technological intervention (OR 7.4; 95% CI 3.9–14.0), family history of caesarean (OR 1.9; 95% CI 1.0–3.8) and high risk perception of vaginal birth (OR 2.2; 95% CI 1.2–4.0), were positively associated with preference for caesarean in the bivariate and multivariate regression models. Being male had a marginally significant association with preference for vaginal birth and age was unrelated to birth mode preference. No differences in preference were noted between respondents who had public versus private health insurance. No interaction effects among variables were observed.

In the logistic regression model with the three components of fear of birth as independent variables, positive attitude toward technological intervention, family history of caesarean and high risk perception of vaginal birth remained significantly associated with preference for caesarean. However, only two of the three components of birth fear were associated with caesarean preference: fear of pain (OR 2.2; 95% CI 1.2–4.5) and fear of physical changes resulting from birth (OR 2.4; 95% CI 1.3–4.5). (See Table 2). Fear of complications was not significantly associated with caesarean preference (OR 1.5; 0.80–2.8). No interaction effects among variables were observed.

Respondents were also asked why they preferred the birth mode that they did. The reported reasons for preferring caesarean birth are shown in Table 3. The most frequent reason given was a fear of labour pain (70.1%), followed by a desire to maintain vaginal integrity (51.7%) and being able to plan the birth (51.7%). Although not a majority, 23% of respondents said they preferred caesarean at least in part because they believed that caesarean is “better/safer/healthier for the mother” and 18.4% believed that it was “better/safer/healthier for the baby.”

## 5. Discussion

Ten percent of this cross-sectional study of highly educated Chilean students reported a preference for caesarean birth,

consistent with rates reported in previous studies in Chile. A 2006 study found that 9.4% of Chilean pregnant women surveyed preferred a caesarean birth with no differences between those being attended in private and public care settings.<sup>9</sup> Interestingly, in our study of largely non-pregnant, nulliparous men and women, the rate was very similar, although it was conducted at least 10 years later. Rates of preference for caesarean from students in the current sample were also similar to those of their international counterparts. In an analysis based on data from all 8 countries included in the cross-country study ( $n = 3616$  women), 10.8% of students preferred caesarean birth in a hypothetical low risk pregnancy.<sup>18</sup> Fear of labour pain was the most commonly cited reason for preferring a caesarean birth among women, followed by the desire to avoid physical damage and to maintain vaginal integrity.<sup>18</sup> Respondents from Chile also reported no significant difference in preference by insurance type, despite the higher rate of caesarean birth in private care settings in Chile (69% compared to 40.9% in public settings in 2015).<sup>8</sup> Although men were less likely to report a preference for caesarean birth overall, the factors associated with caesarean preference among men were similar to those for women; previous research by Stoll et al found some similarities by gender, but found that positive attitude toward technological intervention and epidural analgesia were only significantly associated with caesarean preference for female respondents.<sup>22</sup> Future research could further investigate gender dynamics in factors that influence birth knowledge and preferences.

Other important factors related to caesarean preference were identified, including positive attitude toward technological intervention in birth, which had the greatest odds ratio of all covariates. Several authors have written about the medicalization of birth in Chile<sup>23,24</sup> and recent studies have found high prevalence of labour management and intervention (artificial oxytocin and/or rupture of membranes, episiotomy, and caesarean) in healthy women giving birth in public hospitals across Chile.<sup>13,14</sup> The current result suggests that normalization of technological intervention in birth may motivate preferences for caesarean in Chile. In contexts where levels of obstetric interventions (and caesarean) are high, technology may be perceived as a tool to mediate the inherent risk of birth, perhaps without regard to other risks associated with the interventions. Trust in technology may also reflect an underlying lack of confidence in the ability to successfully birth vaginally. It has been argued that the popular discourse around birth in the Western world has painted natural birth as unattainable.<sup>25</sup> In this context, technological intervention may be perceived as necessary to the successful resolution of pregnancy. Anthropologists in Chile have written on the “technocratic” approach to birth that prevails in the country, where

**Table 2**  
Preference for caesarean birth: logistic regression.

	Unadjusted Odds ratio (95% CI)	Model 1 Odds ratio (95% CI)	Model 2 Odds ratio (95% CI)
Gender (Male v. female)	0.67 (0.39–1.1)	0.49 (0.25–0.99)	0.53 (0.26–1.1)
Age	0.96 (0.90–1.0)	0.97 (0.90–1.1)	1.0 (0.92–1.1)
Positive attitude toward technological intervention (yes v. no)	8.4 <sup>a</sup> (4.7–15.2)	7.4 <sup>b</sup> (3.9–14.0)	7.2 <sup>c</sup> (3.8–13.5)
High risk perception of vaginal birth (yes v. no)	2.7 <sup>a</sup> (1.6–4.6)	1.8 <sup>b</sup> (1.1–2.8)	2.1 <sup>c</sup> (1.2–3.8)
Family history of caesarean (yes v. no)	1.9 <sup>a</sup> (1.1–3.4)	1.9 (1.0–3.8)	1.9 (1.0–3.8)
High fear of birth (score of 39 or above)	6.5 <sup>a</sup> (3.7–11.1)	3.7 <sup>b</sup> (2.0–6.8)	–
Fear of complications	3.1 <sup>a</sup> (1.8–5.2)	–	1.5 (0.80–2.8)
Fear of physical changes	4.8 <sup>a</sup> (2.8–8.3)	–	2.4 <sup>c</sup> (1.3–4.5)
Fear of pain or losing control	4.1 <sup>a</sup> (2.4–7.0)	–	2.2 <sup>c</sup> (1.2–4.2)

<sup>a</sup> Statistically significant in an unadjusted model.

<sup>b</sup> Statistically significant in the model with overall high fear of birth.

<sup>c</sup> Statistically significant in model with fear of birth dimensions.



**Table 3**

Reasons given for preference for caesarean birth.

Rank	Reason given, ranked by frequency	N = 87 N (%) <sup>a</sup>
1	Fear of labour pain	61 (70.1)
2	To avoid damage to my body (or my partner's body)/ to maintain vaginal integrity	45 (51.7)
2	Caesarean birth allows me to plan the birth	45 (51.7)
4	Quickness of the procedure	33 (37.9)
5	Fear of mistreatment by medical personnel during vaginal birth	20 (23.0)
5	Caesarean birth is better/safer/healthier for the mother	20 (23.0)
5	Family history of caesarean birth	20 (23.0)
8	Caesarean birth is better/safer/healthier for the baby	16 (18.4)
8	I (my partner) could be too narrow for vaginal birth	16 (18.4)

<sup>a</sup> Respondents could select more than one reason; therefore, percentages do not to sum to 100%.

women are treated as defective machines which must be controlled by technology to produce a “high-quality product”: a baby.<sup>23,24</sup> It is interesting to note that in the integrated analysis of attitudes toward childbirth technologies from all 8 countries included in the cross-country survey, Chilean students scored near the middle of their peers from other countries when the items that measure attitudes towards childbirth technology and interventions were ranked, despite having the highest rates of elective interventions from all countries.<sup>26</sup> This finding contradicts the assumption that attitudes towards childbirth technology somehow mirror obstetric practices, suggesting non-conformism or resistance to the interventionist practices. This could be influenced by the visible public debate about ‘obstetric violence’ which has been happening in recent years in Latin America and in Chile.<sup>27</sup>

Alternatively, technology or intervention may be perceived as a marker of quality of care. A 2002 study attributed preference for caesarean section in Brazil to a fear of receiving substandard birth care related to a perception of unequal access to medical technology.<sup>15</sup> In this case, the preference for caesarean could be motivated by a desire to receive the highest quality care, which is conflated with high levels of intervention. Nonetheless, this issue may be less relevant in Chile where skilled birth attendance is nearly universal,<sup>28</sup> and especially in the current sample where all respondents live in the capital city and most have private insurance, entitling them to the most expensive care.

Fear of birth, as measured by a validated 10-item instrument, was significantly associated with preference for caesarean; men and women reporting fear of birth had almost four times the odds of preference for caesarean over vaginal birth. This finding is consistent with previous research in countries around the world.<sup>18,19,29–32</sup> In this sample, fear of labour pain and fear of physical changes (but not fear of complications) were linked to significantly increased odds of preferring caesarean birth among students from 8 OCED countries, controlling for socio-demographic factors and psychological profile (i.e. depression, anxiety and stress).<sup>18</sup> We found the same link between fear of physical changes, and fear of pain and losing control in the Chilean sample. This finding provides insight into what aspects of birth are frightening and how they relate to a preference for caesarean. We hypothesize that the possibility of medical complications may be too abstract or hypothetical for a population who has not yet experienced pregnancy or childbirth for it to significantly impact birth mode preference.

Other studies have documented that women prefer caesarean birth because they think it is safer for mother and baby.<sup>29,33</sup> In the current study, women who perceived vaginal birth as riskier than caesarean had almost twice the odds of preferring a caesarean as those who did not share this view, adjusting for other variables, although this belief is not supported by the weight of the evidence, which has shown significant associations between caesarean birth and increased risk of myriad maternal and infant morbidities.<sup>2</sup> It is still unclear from this result, however, whether a misinformed perception of risk associated with vaginal birth is the underlying

reason for caesarean preference, or whether an inaccurate perception of risk is used to justify the preference. In the latter case, educational intervention would have limited efficacy. Previous research with US students who planned to have children (n = 601) supports the former case, however. The probability of preferring a caesarean birth among young US women was increased if they perceived childbirth as risky; but importantly, the risk was decreased by half if students were well-informed about the risks of caesarean birth.<sup>31</sup> These factors also may be part of an iterative process or justification for their views. Indeed, Angeja et al. found that whatever women expressed as their birth mode preference, they believed that this mode was the safer option.<sup>9</sup>

Family history of caesarean was also associated with preference for the procedure in Chilean and US students.<sup>18</sup> In this study, respondents with an immediate family member who had undergone caesarean were 1.9 times more likely to prefer caesarean birth. The experience of a close relative with caesarean may make this mode seem like a desirable option or may minimize the perception of associated risk. In another survey of Chilean women from the Metropolitan Region, 11% of women who had had one or more caesarean births reported changing their birth mode preference to caesarean since becoming a mother,<sup>34</sup> indicating that mothers who have experienced caesarean may be contributing to its normalization. This finding is consistent with the fact that the Chilean students declare that experiences and stories of family members are the most influential source of information that shape their attitudes towards pregnancy and birth.<sup>26</sup> Other sources of information that influence Chilean students' attitudes are the experiences and stories of friends, followed by visual media.<sup>26</sup>

Nevertheless, when considering sources of information on birth, we should keep in mind the salience of interactions with health care practitioners. Qualitative studies in Chile have found that women's personal preferences for birth were overshadowed by their interactions with the health care system at the time of birth, when women were inclined to acquiesce to medical opinion in the interest of their babies.<sup>23,24,35</sup> These studies highlight the influence of information management by medical professionals on final decisions about birth care, alluding to the malleability of women's birth preferences and the power medical professionals exert over labouring women. A recent survey by the Chilean Observatory of Obstetric Violence concludes that attendance of prenatal education workshops (which in Chile are mostly focused on physiological birth), both in public and private health settings, is associated with a reduction of obstetric interventions and caesarean: women who attended public health prenatal workshops had half the probability of having a caesarean section (33% versus 66%), while women in private health reduced the probability of caesarean by more than two thirds (23% versus 76%).<sup>14</sup> These finding, in conjunction with those of the current study, suggest that education could influence birth mode intentions among men and women in Chile.

There is much debate about the ethics of primary elective caesarean birth. Those who argue for its ethical acceptability focus on the bodily autonomy of pregnant women and studies which found negative pelvic floor outcomes associated with vaginal birth,<sup>36</sup> while those who argue against it emphasize its association with increased maternal, neonatal, and child morbidity.<sup>37</sup> Furthermore, studies demonstrate heterogeneity in the medical community regarding willingness to perform the procedure as an elective surgery.<sup>38</sup> Concerns have also been raised about whether true informed consent is being obtained before primary elective caesarean.<sup>39</sup>

Informed consent requires understanding of the procedure to be performed and its possible repercussions, and the current results suggest that there may in fact be an information problem about the risks of caesarean. Respondents with high risk perception of vaginal birth based on at least some misperceptions had greater odds of preferring caesarean, suggesting that this preference may be influenced by inflated perceptions of vaginal birth risk when compared to the caesarean risk. The results of our analysis suggest the possibility of a link between having more or more accurate information (as measured by appropriate risk assessment of vaginal birth) and being less likely to prefer a caesarean in the absence of a medical indication.

The results of the current study are largely consistent with previous research investigating reasons for caesarean birth preference based on self-reports of women, including the association of fear of labour pain and physical changes with preference for caesarean birth.<sup>29–32</sup> A positive attitude toward technological intervention during birth also emerged as the independent variable with the highest odds of caesarean preference. The link between positive attitudes towards childbirth technology and preferences for caesarean has been documented in other settings with young people who plan to become pregnant.<sup>26</sup>

Importantly, the frequency of caesarean birth preference in this sample (10%) is much lower than the national rate of caesarean birth (50%),<sup>8</sup> but this level is consistent with other studies examining birth mode preference in more heterogeneous samples.<sup>9</sup> While some caesareans arise due to medical indication, the rate of 50% is well above the WHO estimated maximum level associated with decreases in maternal, neonatal and infant mortality of 10–15%.<sup>1</sup> Therefore, there are clearly other factors influencing caesarean rates, such as professional practice styles, increasing pressure to avoid legal liability for malpractice, as well as economic, organizational, social and cultural factors,<sup>1</sup> which are beyond the scope of the current study but must be considered in the design of any effort to reduce unnecessary caesarean birth in Chile and worldwide.

### 5.1. Strengths and limitations

Strengths of the study include the use of the validated Childbirth Fear – Prior to Pregnancy (CFPP) scale to investigate fear of birth in relation to birth mode preference.<sup>19</sup> The inclusion of men and the sampling frame (i.e. all graduate students were invited to participate) are additional strengths. The study is one of the first to examine birth mode preference in Chile and provides insight into attitudes that may influence preference for non-medically indicated caesarean. Nonetheless, the findings are not necessarily widely applicable, since the sample was drawn from post-graduate students, most of whom have private health insurance and are more educated and likely more affluent compared to other people their age. Moreover, the survey had a relatively low response rate (11%) among all post-graduate students at the university. It is impossible to know how the respondents differed from non-respondents, but it is possible that those who had the strongest feelings about birth preference were

more likely to respond. The response rate might not be low among those who met the inclusion criteria for the study, but we did not have data available on the eligibility of all graduate students at the school to estimate a true response rate. Furthermore, the cross-sectional application of the study did not allow exploration of possible temporal or causal links among variables.

## 6. Conclusions

This study highlights the need for education about the actual risks of vaginal and caesarean birth, which seem not to be well-understood among respondents in our sample. Education may also reduce generalized fear of birth that may have arisen from a lack of information about childbirth or from negative portrayals of childbirth in the media or by the normalization of caesarean birth from women who have lived them. Furthermore, increased knowledge may improve self-efficacy and prepare birthing families to self-advocate for natural birth. Equipped with knowledge and self-efficacy, families could be better able to resist the structural and cultural factors of the health care system that contribute to unnecessary caesarean births. Future research should examine the effects of education on birth attitudes and fear of birth, as well as self-efficacy. The study results suggest that men's and women's preferences and attitudes are related to the same factors, and therefore, educational strategies should target both men and women. Nonetheless, further research on these gender dynamics could provide insight relevant to targeted education. Future research in fully representative samples could be built into other existing data and surveillance systems to optimize response rates.

Recent research indicates promising effects of comprehensive prenatal education workshops on rates of intervention and operative birth.<sup>14</sup> Such workshops could be offered to non-birthing partners as well. Education could also be offered through mass media and internet platforms, since these are a principal source of Chileans' information on birth.<sup>32</sup>

The current study expands the scant literature on birth mode preference in Latin America, and specifically in Chile, which has one of the highest rates of caesarean birth in the world and is therefore a priority setting for interventions aimed at reducing unnecessary caesareans. The study also highlights several areas for further investigation, including women's views of technology and anxiety around birth possibly motivated by aesthetic concerns, measured here as fear of physical changes during childbirth. Perhaps most importantly, the directionality of the causal relationship between risk perception and birth mode preference should be investigated, as well as its interaction with medical information management by providers. The efficacy of education directed toward expectant parents will likely be constrained by the messages received by their own health care providers. In light of this, education on risks might be bolstered by improved protocols for informed consent of caesarean birth. Indeed, it is not our intention to place the burden of change on families or obscure the role of structural factors; however, the highly medicalized culture of birth care has been resistant to improvement in this area and the role of health care consumers in effecting change should not be ignored. Education has the potential to provide families with the tools to advocate for the care they want. However, it is ultimately the ethical responsibility of the health care system to minimize risks and ensure true informed consent for medical procedures undertaken.

## 7. Ethical statement

The research detailed in the attached manuscript underwent ethical review by the Research Ethics Committee of the Faculty of

Social Sciences of the University of Chile. It was assigned project number 027\_06/2015 and was approved in Santiago, Chile on the 17th of August of 2015.

## Conflict of interest

None declared.

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