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Obstetrical providers' preferred mode of delivery and attitude towards non-medically indicated caesarean sections: a cross-sectional study

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Shortened running title: Providers’ attitudes on non-medically indicated caesarean

Abstract

Objective: To describe obstetrical providers' delivery preferences and attitudes toward caesarean section without medical indication, including on maternal request, and to examine the association between provider characteristics and preferences/attitudes.

Design: Cross-sectional study.

Setting: Two public and two private hospitals in Argentina.

Population: Obstetrician-gynecologists and midwives who provide prenatal care and/or labor/delivery services.

Methods: Providers in hospitals with at least 1,000 births per year completed a self-administered, anonymous survey.

Main Outcome Measures: Provider delivery preference for low-risk women, perception of women's preferred delivery method, support for a woman's right to choose her delivery method and willingness to perform caesarean section on maternal request.

Results: One hundred and sixty-eight providers participated (89.8% coverage rate). Providers (93.2%) preferred a VD for their patients in the absence of a medical indication for caesarean section. While 74.4% of providers supported their patient's right to choose a delivery method in the absence of a medical indication for caesarean section and 66.7% would perform a caesarean section upon maternal request, only 30.4% would consider a non-medically indicated caesarean section for their own personal delivery or that of their partner. In multivariate adjusted analysis, providers in the private sector (OR 4.70, 95% CI 1.19-18.62) and obstetrician-gynecologists (OR 4.37, 95% CI 1.58-12.09) were more willing than providers working in the public/both settings and midwives, respectively to perform a caesarean section on maternal request.

Conclusions: Despite the ethical debate surrounding non-medically indicated caesarean sections, we observe very high levels of support, especially by providers in the private sector and obstetrician-gynecologists, consistent with the high caesarean section rates in Argentina.

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Keywords: Caesarean section, obstetricians' attitude, maternal request, non-medically indicated caesarean section, cesarean section/utilization, cesarean section/epidemiology

Tweetable abstract:

Non-medically indicated c-section? 74% of sampled Argentine OB providers support women's right to choose

Introduction

Women in every region of the world, except Africa, are delivering by caesarean section (CS) at rates above which the World Health Organization (WHO) considers medically indicated⁽¹⁾. In 2014, 40.2% of women in Latin America and the Caribbean (LAC) delivered via CS, the world's highest rate⁽¹⁾. Should current trends continue, the CS rate in the LAC will reach 50% by 2025^(1, 2). The international rise in CS rates has been attributed to an increase in non-medically indicated CS, including CS on maternal request (CSMR)^(1, 3-11). Evidence suggests, however, that women prefer to delivery vaginally and CSMR rates are unlikely to account for the CS trends, and rather, the remaining variables, providers and health system, are likely synergistically driving the increase in non-medically indicated CSs⁽¹²⁻¹⁹⁾. In an analysis of CS rates of 120 Latin American institutions, "being a private as opposed to a public institution, having some economic incentive for CS as opposed to no incentive, and having 50 maternity beds" explained 48% of the variability among risk-adjusted CS rates⁽¹⁵⁾.

Given evidence highlighting the indubitable role of providers in determining mode of delivery, performing a CSMR and ensuring true informed consent for a non-medically indicated procedure, providers' attitudes on the topic remain of significant interest. There is considerable variability in provider's attitudes towards a woman's right to choose her mode of delivery: 38% versus 54% of samples of providers surveyed in Denmark and United States, respectively, support a woman's right to choose^(20, 21). Similarly, willingness to perform a CSMR ranged from 15% to 79% in samples of providers surveyed in Spain and the United Kingdom, respectively⁽²²⁾. This variation in provider attitudes towards medically-unjustified CS reflects an unresolved debate over the available evidence comparing modes of delivery in low risk women, women's reproductive rights, providers' ethical responsibilities and societal implications from a shift in resources^(17, 23).

Countries with CS rates significantly above the recommended WHO threshold are priority locations for exploring the opinions of obstetrical providers towards non-medically indicated CS^(4, 24). With CS rates estimated between 29-60%, Argentina can serve as an apt model for understanding this phenomenon⁽²⁴⁾. This paper aims to describe a sample of Argentine obstetrical providers' preferred mode of delivery for low-risk women, their perception of women's preferred mode of delivery and their attitudes toward CS without medical indication, including CSMR. Provider factors associated with such preferences and attitudes will also be examined.

Methods

Setting: This paper describes the delivery preferences and attitudes of a sample of obstetrical providers in Argentina. Between March 2016 and 2017, a cross-sectional study was conducted in one public and one private hospital in the province of Buenos Aires, one private hospital in the province of Santa Fe and one public hospital in the province of Tucumán. Hospitals with at least 1,000 deliveries per year were eligible and selected based on prior research collaboration and desire to participate. Both public and private hospitals were included to capture diverse patient populations in

these distinctive clinical settings. All the hospitals included have an affiliation with academic institutions. The hospital self-reported caesarean section rates in the four hospitals were: 61.8%, 51%, 46.6% and 37.3% during the year the study was conducted. The private healthcare system in Argentina is predicated on higher socioeconomic status and patients have prepaid or employer-funded health insurance⁽²⁵⁾. In the private setting, there is care continuity between antenatal and delivery care, as such, the same Obstetrician-gynecologist (Ob-Gyn) usually cares for a woman during pregnancy and performs her delivery. Therefore, the private setting is associated with more personalized care. Public hospitals are funded by the state and patients receive free care regardless of insurance status. In the public setting, women are attended by a variety of providers, including midwives, throughout their pregnancy and delivery. In Argentina, approximately 99% of births occur in hospitals and 55% of women deliver in the public setting^(26,27).

Participants: Ob-Gyns and midwives who provide antenatal care (ANC) and/or labor and delivery services and have delivery decision-making power were eligible to participate. Senior medical staff/administration in each hospital developed a census of all providers meeting this criterion.

Variables: Demographic factors gathered about the providers in the study include: age (stratified by 35 years old and younger, and older than 35 years), gender, type of healthcare practitioner, position in hospital (staff member or resident), hospital subsector (public, private or both subsectors), years working in the field and personal reproductive history (if they or their partner has biological children, and if so, the delivery method(s) of said biological children). Because of the linear correlation in our study between age and the number of years since receiving degree, this single variable was used to capture both (as was done in Kwee, 2004)⁽²⁸⁾. Age was treated as a dichotomous variable to align with our hypothesis that attitudes and opinions will be established when the provider has worked independently for a number of years. In general, providers in Argentina who are 35 years old completed residency training four to five years ago, representing adequate time since residency training for a provider to form their own

opinions, preferences and practices. Thirty-five years old was chosen as the cut-off age at which attitudes and preferences would be well formulated. Analysis by hospital was considered, but the individual hospital sample sizes were too small to power results. The two private hospitals had 17 and 43 providers, respectively. The two public hospitals had 71 and 37 providers, respectively.

Preparatory phase: This study involved a preparatory phase to develop the survey questionnaire (see Appendix S1) given that no core outcome set (COS) exists for this topic. In this phase (April to September 2015), qualitative data was gathered from Focus Group Discussions (FGDs) and In-Depth Interviews (IDIs) with 10 health providers total from one private and one public hospital in the province of Buenos Aires. The FGDs and IDIs were used to develop a survey following standard methodology⁽²⁹⁾. In December 2015, the survey was verified in a pilot phase with a convenience sample of four providers selected from these hospitals. This preparatory phase is described elsewhere⁽³⁰⁾. The survey is available as a supplement (S1).

Procedures: At each hospital, a hospital employee serving as the site coordinator was in charge of the site's research activity and personally invited eligible providers to participate and administered the consent process. In order to ensure anonymity, the survey was self-administered and returned in a sealed envelope to the site coordinator and the census of eligible providers, including eligible non-respondents, did not register provider characteristics.

Statistical analysis: The sample size was constrained by the provider population size in the four participating hospitals. Each hospital aimed to survey at least 80% of eligible providers to ensure survey validity. Descriptive, bivariate and multivariate analyses were performed to describe opinions, preferences and health care professional characteristics (age, gender, sector, profession and reproductive history) and to examine the relationship between these opinions/preferences and provider characteristics. Crude and adjusted odds

ratios (ORs) and 95% confidence intervals (CIs) were computed using logistic regression. Adjusted ORs were adjusted for professional characteristics a priori considered covariates of interest (age, gender, sector, profession and biological children) based on literature review and qualitative data. Outcome measures (provider delivery preference for low-risk women, their perception of women's preferred delivery method, their support for a woman's right to choose her delivery method and their willingness to perform caesarean section on maternal request) were dichotomized into '1' as 'Yes, CS or Yes, I agree' and '0' as 'VD, don't agree, don't know, or don't want to answer', depending on the specific wording of the question. Given that only Ob-Gyn providers were surveyed in the private setting, a sensitivity analysis was conducted to evaluate this interaction. All analyses were done using STATA Version 14.0.367. Study data were collected and managed using REDCap electronic data capture tools hosted at the Institute for Clinical Effectiveness and Health Policy (IECS)⁽³¹⁾.

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Results

Table 1 summarizes the characteristics of the enrolled providers. Of the 187 eligible providers in the four hospitals, 168 providers were enrolled (89.8% participation rate). The remaining 19 providers did not consent to participate. Twenty-seven percent of providers only work in the public

sector, 25.6% only work in the private sector and 47.0% work in both sectors. The majority of providers surveyed was female (59.5%), over 35 years of age (63.7%), and trained as Ob-Gyns physicians (76.8%). Trainees comprised 21.4% of the total sample. Of the 105 (62.5%) of providers with biological children, 43.8% of these providers (or their partners) had delivered only via vaginal delivery (VD), 41.9% had delivered only via CS and 14.3% had delivered via both VD and CS. All of the providers in the private sector and 84.8% of the providers working in both the public and private sector were Ob-Gyns.

Almost all providers (92.3%, n=155) expressed a preference for a VD for their patients in the absence of a medical indication for a CS (Table 2). Three providers (1.8%) indicated a preference for a CS and 10 providers (6.0%) indicated that they did not have a preference. Regarding perceived patient preference, 42.9% (n=72) of providers believe that women prefer a VD, 35.7% (n=60) believe that women prefer a CS and 21.4% (n=36) believe that their patients have no preference for mode of delivery. Regarding non-medically indicated CSs, 74.4% (n=125) of providers believe that their patients should have the option and 66.7% (n=112) of providers would perform a CSMR. Additionally, 30.4% (n=51) of providers would consider a non-medically indicated CS for themselves or their partner (Table 2).

In the unadjusted analysis, there were statistically significant differences in provider attitudes towards CS by provider age, gender, sector, profession and history of biological children (Table 3). Providers who are Ob-gyns (OR 9.18, 95% CI 4.07-20.71), work in the private sector only (OR 4.52, 95% CI 1.26-16.23), male (OR 4.24, 95% CI 1.99-9.03), personally delivered (or their partner) only by VD (OR 3.80, 95% CI 1.53-9.44), older than 35 years of age (OR 2.39, 95% CI 1.23-4.65) and have biological children (OR 2.20, 95% CI 1.14-4.25) were significantly more willing to perform a CSMR. On the contrary, providers working only in the public sector (OR 0.13, 95% CI 0.06-0.30) were significantly less willing to perform a CSMR. The comparison groups are detailed in the Table 3.

In the multivariate analysis adjusted for age, gender, sector, profession and history of biological children, the relationship with willingness to perform a CSMR was strengthened for providers who only work in the private sector (OR 4.70, 95% CI 1.19-18.62) and have biological children (OR 3.00, 95% CI 1.11-8.09) and was attenuated, but remained significant for Ob-Gyns (OR 4.37, 95% CI 1.58-11.82) (Table 4). The inverse relationship remained, but was attenuated for providers who only work in the public sector (OR 0.25, 95% CI 0.10-0.66). In a sensitivity analysis involving only Ob-Gyn providers conducted to ascertain a potential interaction with sector, the results were unchanged (results not presented).

Discussion

Main Findings

Obstetrical providers in four hospitals in Argentina prefer VD for their patients without a medical indication for CS. Congruently, two-thirds of providers would *not* consider a non-medically indicated CS for their (or their partner's) delivery. Over one-half of providers believe women prefer CSs or have no delivery mode preference. Furthermore, three-quarters of providers support a woman's right to choose her delivery mode and two-thirds would perform a CSMR. In adjusted analysis, providers trained as Ob-Gyns, in the private sector and with children were more willing to perform CSMR than providers trained as midwives, in the public or both sectors and without children, respectively.

Strengths and limitations: Given the potential for social desirability/response bias, all surveys were self-administered. Informed consent included a discussion of the survey's confidentiality to site coordinators and anonymity to researchers. To limit survey bias, the survey tool was developed and validated in qualitative and pilot phases. Several factors prevent generalizability across Argentina or other settings. Although chosen via a convenience sample and with sample sizes

limited by eligibility, all eligible providers (or a smaller representative sample when staff size was very large) were invited to participate and a minimum site recruitment rate of 80% was set and achieved (89% overall), limiting nonresponse bias and strengthening the sample's representativeness. The four hospitals represent a diversity of obstetrical providers, however, we did not explore how organization policies and ethos, including how the hospitals' affiliation with academic institutions, could have biased results or evaluate why hospitals declined participation. Finally, large confidence intervals due to small sample sizes limit interpretation.

Interpretation

Comparable to the providers surveyed, >89% of nulliparous Argentine women surveyed in their third trimester preferred VD^(25, 30). Our results highlight an inconsistency between providers' stated preference for VD and their practices, reflective of a complex culture of decision-making and competing incentives^(4, 16, 17, 32). This inconsistency has been documented in other countries, including Brazil^(13, 16). We acknowledge that it is unknown whether provider attitudes are associated with their CS rates. However, even if personal CS rates data were available, they are not always applicable. For example, due to duty shift changes in public hospitals, different providers may make decisions and perform deliveries.

Furthermore, evidence supports that, even with variation by healthcare system and population, providers significantly impact the delivery mode decision^(12, 15, 17, 30). An indirect measure that provider attitudes are likely associated with high CS rates comes from the observation that working in private hospitals is associated with higher CS rates, as corroborated by our results. Qualitatively, a sample of pregnant women in the Argentine public sector reported viewing "mode of delivery not as a choice, but as a medical decision" and "often had the decision made for them by their physician"⁽³³⁾. Furthermore, our results demonstrate a gap between providers' desire to support women's autonomy (74%) and their awareness of women's preferences (only 45% of providers

believe their patients prefer VD). Of a sample of low-risk, nulliparous, private-sector Argentine women preferring VD in their third trimester, 11% had a documented scheduled CS; 13% of which had medical indications⁽²⁵⁾. Of a sample of private-sector Brazilian women preferring VD during their third trimester, 34% delivered via scheduled CS⁽³⁴⁾.

In our study, providers were more supportive of women's right to choose (74%) and more willing to perform non-medically indicated CSs (66%) than providers surveyed in studies in Turkey⁽³⁵⁾, Denmark⁽²⁰⁾, the United States⁽²¹⁾, and Israel⁽³⁶⁾, reporting rates of support and willingness between 38-57%. Providers were comparable to providers surveyed in Australia (77% willing)⁽³⁷⁾ and the United Kingdom (79% willing)⁽²²⁾. Factors associated with the greatest support for CSMR, Ob-Gyn profession and private sector, have been documented in surveys and/or cohort studies in Canada, Brazil and Australia^(34, 38-40). The interaction between profession and hospital sector is entangled because private hospitals often only have Ob-Gyns. The private-only providers in our sample were all Ob-Gyns. Regardless, the association between profession and CSMR support is predictable. Ob-Gyns train as interventionists and surgeons in high-acuity situations, whereas midwives traditionally train to manage low-risk pregnancies^(2, 6, 17). Accordingly, midwives are consistently less favorable towards CSMR^(6, 38).

Varying CS rates between public and private sectors have been attributed to contextual differences. In cultures valuing technology and intervention, CSs are often associated with improved care quality, higher socioeconomic status and greater patient autonomy^(17, 32, 40, 41). However, if Argentine private sector women truly had more autonomy, private sector CS rates (>50%) would be lower, given evidence of women's preference for VD^(24, 25, 33). Public sector-only providers were significantly less willing to perform CSMR, consistent with a public-sector cultural dynamic of less patient autonomy, including a lack of provider choice⁽³³⁾.

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Finally, the impact of providers' personal birth experience on preferences is inconsistent between studies^(20, 42, 43). While a sample of Danish providers who had VD were less supportive (OR=0.49) of CSMR, a sample of German providers highly supported CSMR whether nulliparous (67%) or only had CS (69%)^(20, 43). While our sample size limits analyses by delivery mode(s), providers with children were more willing to perform CSMR than providers without children and less likely to believe their patients prefer CS. In contrast, a sample of Scottish providers with children were significantly *less* likely than providers without children to prefer non-medically indicated CSs, and with a sample of German providers who were almost equally supportive of CSMR whether nulliparous or with history of CS^(42, 43).

The growing prevalence of non-medically indicated CSs raises a complex ethical debate^(5, 11, 17, 38, 44-50). In 1998, the International Federation of Gynecology and Obstetrics (FIGO) declared using "available evidence" that, "performing CS for non-medical reasons is ethically not justified" and "physicians have the responsibility to inform and counsel women in this matter."^(8, 23, 51) The 2004 Argentine Law for Humane/Respectful Birth mandates the legal right to a "natural childbirth, respectful of biological and psychological times, avoiding invasive practices and provision of medications that are not justified by the state of health of the parturient or the person to be born"⁽⁵²⁾. Other bodies support physicians offering or declining CSMR based on their risk/benefit analysis⁽⁵³⁾. However, multiple factors, including imbalanced physician incentives and a lack of randomized controlled trials comparing delivery modes in low-risk women, hinder an objective risk/benefit analysis. While an ethical framework equating reproductive rights with increased delivery choice and autonomy is argued, others reason that rights are better promoted with objective, evidenced-driven information and counseling for making informed decisions^(17, 47, 48).

Conclusion: Despite overwhelming provider preference for VD for low-risk women, provider factors may contribute to excessive CS rates: 1) support for women's autonomy to choose non-medically indicated CSs, 2) willingness to perform a CSMR, 3) perception that women prefer CS or

lack a preference, despite contradicting evidence. These factors may bias the patient-provider delivery decision-making process to favor CS, especially with private-only sector/Ob-gyn providers, who were significantly more supportive of women's autonomy and CSMR. Further research is warranted to understand causes and implications of rising rates of non-medically indicated CSs and explore providers and pregnant women interactions with regard to pertinent medical and ethical concerns. Given that 10 of the 25 countries with the highest CS rates in the world are in LAC, our findings can inform international efforts to reduce CS rates^(1, 4, 19).

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Feasibility of 'Mode of Delivery Trial' Study Group

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Disclosure of Interests

None of the authors have interests to disclose. The ICMJE disclosure forms are available to view as online supporting information.

Contribution to Authorship

JR, MA, FA and JMB conceived and designed the study.

JR, MA, VP, RAC, AEF, HBK, JDM, MM, MLM, GMT, ABP, LR, JAS, MT and SV implemented the study and collected the data.

JR, MA, FA and JMB developed the plan of analysis and interpreted the data.

JR, MA, FA and JMB analyzed the data.

JR and JMB drafted the manuscript.

All of the authors provided critical revisions of and approved the manuscript.

Details of Ethics Approval

Ethical approval was obtained from the following participating research organizations and hospitals including: Tulane University Human Research Protection Program approved the study on March 9, 2015 (Protocol ID: 14-632629). Comité de Ética en Investigación de Centro de Educación Médica e Investigaciones Clínicas “Norberto Quirno” (CEMIC) approved on March 30, 2015 (Protocol ID: 939). Comité de Bioética “Dr Vicente Federico del Giúdice” de Hospital Nacional Profesor Alejandro Posadas approved the study on April 24, 2015 (Protocol ID: 008 EMnP1S1/15). The Duke University Health System IRB for Clinical Investigation approved a reliance agreement on May 27, 2016 (Protocol ID: Pro00072429). Instituto de la Maternidad y Ginecología Nuestra Señora de las Mercedes accepted the study on September 21, 2016 and accepted approval by CEMIC ethics committee. Sanatorio de la Mujer en Rosario, Argentina relied on the approvals by Hospital CEMIC and Hospital Posadas, approved the study on April 1, 2016.

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References

1. Betrán AP, Ye J, Moller AB, Zhang J, Gulmezoglu AM, Torloni MR. The Increasing Trend in Caesarean Section Rates: Global, Regional and National Estimates: 1990-2014. *PLoS One*. 2016;11(2):e0148343.
2. Althabe F, Belizán JM. Rising Trend in Non-Indicated Caesarean Deliveries: Can the Trend be Reversed? *Paediatr Perinat Epidemiol*. 2017;31(4):263-6.
3. Vogel JP, Betrán AP, Vindevoghel N, Souza JP, Torloni MR, Zhang J, et al. Use of the Robson classification to assess caesarean section trends in 21 countries: a secondary analysis of two WHO multicountry surveys. *Lancet Glob Health*. 2015;3(5):e260-70.
4. Villar J, Valladares J, Wojdyla D, Zavaleta N, Carroli G, Velazco A, et al. Caesarean delivery rates and pregnancy outcomes: the 2005 WHO global survey on maternal and perinatal health in Latin America. *The Lancet*. 2006;367(9525):1819-29.
5. NIH Consens Sci Statements. NIH State-of-the-Science Conference Statement on Cesarean Delivery on Maternal Request. 2006.
6. Klein MC. Quick Fix Culture: The Cesarean-Section-on-Demand Debate. *Birth*. 2004;31(3).
7. Kingdon C, Baker L, Lavender T. Systematic Review of Nulliparous Womens Views of Planned Cesarean Birth- The Missing Component in the Debate about a Term Cephalic Trial. *Birth*. 2006;33(3):229-37.
8. Souza JP, Gülmezoglu AM, Lumbiganon P, Laopaiboon M, Carroli G, Fawole B, et al. Caesarean section without medical indications is associated with an increased risk of adverse shortterm maternal outcomes- the 2004-2008 WHO Global Survey on Maternal and Perinatal Health. *BMC Med*. 2010;8(71).
9. Betrán AP, Gulmezoglu AM, Robson M, Merialdi M, Souza JP, Wojdyla D, et al. WHO global survey on maternal and perinatal health in Latin America: classifying caesarean sections. *Reprod Health*. 2009;6:18.
10. Zhang J, Liu Y, Meikle S, Zheng J, Sun W, Li Z. Cesarean delivery on maternal request in southeast China. *Obstet Gynecol*. 2008;111(5):1077-82.
11. Betrán AP, Torloni MR, Zhang JJ, Gulmezoglu AM. WHO Statement on Caesarean Section Rates.

BJOG. 2016;123(5):667-70.

12. Laurer JA, Betrán AP, Merialdi M, Wojdyla D. Determinants of caesarean section rates in developed countries- supply, demand and opportunities for control. World Health Organization; 2010.
13. Faúndes A, Pádual KS, Osisl MJD, Cecatti JC, Sousa MH. Opinião de mulheres e médicos brasileiros sobre a preferência pela via de parto. *Rev Saúde Pública*. 2004;38(4):488-94.
14. Colomar M, Cafferata ML, Aleman A, Castellano G, Elorrio EG, Althabe F, et al. Mode of childbirth in low-risk pregnancies: Nicaraguan physicians' viewpoints. *Matern Child Health J*. 2014;18(10):2382-92.
15. Taljaard M, Donner A, Villar J, Wojdyla D, Faundes A, Zavaleta N, et al. Understanding the factors associated with differences in caesarean section rates at hospital level: the case of Latin America. *Paediatr Perinat Epidemiol*. 2009;23(6):574-81.
16. Dweik D, Girasek E, Meszaros G, Toreki A, Kereszturi A, Pal A. Non-medical determinants of cesarean section in a medically dominated maternity system. *Acta Obstet Gynecol Scand* 2014;93(10):1025-33.
17. Gamble J. A Critique of the Literature on Women's Request for Cesarean Section. *Birth*. 2007;34(4):331-40.
18. Mazzoni A, Althabe F, Liu NH, Bonotti AM, Gibbons L, Sanchez AJ, et al. Women's preference for caesarean section: a systematic review and meta-analysis of observational studies. *BJOG*. 2011;118(4):391-9.
19. Cavallaro FL, Cresswell JA, Ronsmans C. Obstetricians' Opinions of the Optimal Caesarean Rate: A Global Survey. *PLoS One*. 2016;11(3):e0152779.
20. Bergholt T, Osterberg B, Legarth J, Weber T. Danish obstetricians' personal preference and general attitude to elective cesarean section on maternal request: A nation-wide postal survey. *Acta Obstet Gynecol Scand*. 2004;83:262-6.
21. Bettes BA, Coleman VH, Zinberg S, Spong CY, Portnoy B, DeVoto E, et al. Cesarean Delivery on Maternal Request Obstetrician Gynecologists' Knowledge, Perception, and Practice Patterns. *Obstet Gynecol*. 2007;109:57-66.
22. Habiba M, Kaminski M, Da Fre M, Marsal K, Bleker O, et al. Cesarean section on request: a comparison of obstetricians' attitudes in eight European countries. *BJOG*. 2006;113(6):647-56.
23. Schenker JG, Cain JM. FIGO Committee Report. FIGO Committee for the Ethical Aspects of Human Reproduction and Women's Health. *Int J Gynecol Obstet*. 1999;64:317-22.
24. Paleari L, Gibbons L, Chacón S, Ramil V, Belizán JM. Tasa de cesáreas en dos hospitales privados con normativas diferentes- abierto y cerrado. *Ginecol Obstet Mex*. 2011;80(4):263-9.
25. Mazzoni A, Althabe F, Gutierrez L, Gibbons L, Liu NH, Bonotti AM, et al. Women's preferences and mode of delivery in public and private hospitals: a prospective cohort study. *BMC Pregnancy Childbirth*. 2016;16:34.
26. Ministerio de Salud de la Nación. Estadísticas Vitales: Información Basica. In: Salud. DdEeld, editor. Buenos Aires, República Argentina: Programa Nacional de Estadísticas de Salud.; 2015. p. 57.
27. Ministerio de Salud de la Nación. Estadísticas Vitales: Información Basica. In: Salud. DdEeld, editor. Buenos Aires, Argentina: Programa Nacional de Estadísticas de Salud.; 2014. p. 20.
28. Kwee A, Cohlen BJ, Kanhai HH, Bruinse HW, Visser GH. Cesarean section on request: a survey in The Netherlands. *Eur J Obstet Gynecol Reprod Biol*. 2004;113(2):186-90.
29. Fowler FJ. *Survey Research Methods* (4th edition). Thousand Oaks: SAGE Publications, Inc.; 2012.
30. Amyx M. Cesarean sections among low risk women: Effects of planned Cesarean compared to planned vaginal delivery and sources of influence on patient preference. [Unpublished dissertation]. In press

2017.

31. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap) - A metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform.* 2009;42(2):377-81.
32. Domingues RM, Dias MAB, Nakamura-Pereira M, Torres JA, d'Orsi E, Pereira AP, et al. Processo de decisão pelo tipo de parto no Brasil: da preferência inicial das mulheres à via de parto final. *Cadernos de Saúde Pública.* 2014;30(suppl 1):S101-S16.
33. Liu NH, Mazzoni A, Zamberlin N, Colomar M, Chang OH, Arnaud L, et al. Preferences for mode of delivery in nulliparous Argentinean women: a qualitative study. *Reprod Health.* 2013;10(2):1-7.
34. Potter JE, Hopkins K, Faúndes A, Perpétuo I. Women's Autonomy and Scheduled Cesarean Sections in Brazil: A Cautionary Tale. *Birth.* 2008;35(1):33-40.
35. Arikan DC, Ozer A, Arikan I, Coskun A, Kiran H. Turkish obstetricians' personal preference for mode of delivery and attitude toward cesarean delivery on maternal request. *Arch Gynecol Obstet.* 2011;284(3):543-9.
36. Gonen R, Tamir R, Degani S. Obstetricians' Opinions Regarding Patient Choice in Cesarean Delivery. *Obstet Gynecol.* 2002;99(4):577-80.
37. Robson SJ, Tan WS, Dear KBG. Estimating the Rate of Cesarean Section by Maternal Request: Anonymous Survey of Obstetricians in Australia. *Birth.* 2009;36(3):208-12.
38. Reime B, Klein MC, Kelly A, Duxbury N, Saxell L, Liston R, et al. Do maternity care provider groups have different attitudes towards birth? *BJOG.* 2004;111(12):1388-93.
39. Turner CE, Young JM, Solomon MJ, Ludlow J, Benness C, Phipps H. Vaginal delivery compared with elective caesarean section: the views of pregnant women and clinicians. *BJOG.* 2008;115(12):1494-502.
40. Barros A JD, Santos IS, Matijasevich A, Rodrigues Domingues M, Silveira M, Barros FC, et al. Patterns of deliveries in a Brazilian birth cohort: almost universal cesarean sections for the better-off. *Rev Saude Publica.* 2011;45(4):635-43.
41. Camara R BM, Ferrari J, Lima L, Amim Junior K, Braga A, et al. Cesarean section by maternal request. *Rev Col Bras Cir.* 2016;43(4):301-10.
42. MacDonald C, Pinion SB, MacLeod UM. Scottish female obstetricians' views on elective caesarean section and personal choice for delivery. *J Obstet Gynaecol.* 2002;22(6):586-9.
43. Faas-Fehervary P, Schwarz K, Bauer L, Melchert F. Cesarean section on demand: influence of personal birth experience and working environment on attitude of German gynaecologists. *Eur J Obstet Gynecol Reprod Biol.* 2005;122(2):162-6.
44. McFarlin BL. Elective cesarean birth: issues and ethics of an informed decision. *J Midwifery Womens Health.* 2004;49(5):421-9.
45. Christilaw JE. Cesarean section by choice: constructing a reproductive rights framework for the debate. *Int J Gynaecol Obstet.* 2006;94(3):262-8.
46. Druzin ML, El-Sayed YY. Cesarean delivery on maternal request: wise use of finite resources? A view from the trenches. *Semin Perinatol.* 2006;30(5):305-8.
47. Minkoff H, Powderly KR, Chervenak F, McCullough LB. Ethical dimensions of elective primary cesarean delivery. *Obstet Gynecol.* 2004;103(2):387-92.
48. Minkoff H. The ethics of cesarean section by choice. *Semin Perinatol.* 2006;30(5):309-12.
49. Karlstrom A, Nystedt A, Johansson M, Hildingsson I. Behind the myth--few women prefer caesarean section in the absence of medical or obstetrical factors. *Midwifery.* 2011;27(5):620-7.

50. American College of Obstetricians and Gynecologists. Cesarean Delivery on Maternal Request. Committee Opinion No. 559. *Obstet Gynecol.* 2013;121:904-7.
51. International Federation of Obstetrics and Gynecology. FIGO statement on Caesarean Section. 2007.
52. Ley de Parto Humanizado. 25929. Argentina: Online; 2004.
53. American College of Obstetricians and Gynecologists. Ethical Decision Making in Obstetrics and Gynecology. Committee Opinion No. 390. *Obstet Gynecol.* 2007;110(6):1479-87.

Table 1: Provider demographic characteristics (N=168)

		n (%)
Age	≤ 35 years	61 (36.3)
	> 35 years	107 (63.7)
Gender	Female	100 (59.5)
	Male	68 (40.5)
Profession		
	Obstetrician-Gynecologist (Ob/Gyn)	129 (76.8)
	Certified Ob-Gyn	97 (75.0)
	Resident in third or fourth year	32 (25.0)
	Midwife	39 (23.2)
	Certified Midwife	35 (89.7)
	Resident in third or fourth year	4 (10.3)
	Years since receiving degree ¹ Median (IQR)	12 (5 - 19)
Work Sector		
	Public only	46 (27.4)
	Private only	43 (25.6)
	Both sectors	79 (47.0)
Biological children		
	No biological children	63 (37.5)
	Yes biological children	105 (62.5)
Mode of delivery of biological children (n=105)		

Only vaginal delivery	46 (43.8)
Only caesarean section	44 (41.9)
Both vaginal delivery and caesarean section	15 (14.3)

1. Missing 1 from years since receiving degree.

Table 2: Providers' preferred method of delivery, perception of women's preferred mode of delivery and attitudes towards non-medically indicated caesarean section (n=168)

	Vaginal delivery	Caesarean section	No particular preference
	n (%)	n (%)	n (%)
I prefer the following mode of delivery for my patients in the absence of a medical indication for caesarean section*:	155 (92.3)	3 (1.8)	10 (6.0)
I believe that the majority of my patients prefer the following mode of delivery*:	72 (42.9)	60 (35.7)	36 (21.4)
	Yes	No	Do not know/ want to answer
	n (%)	n (%)	n (%)
I believe women should be able to choose their delivery method, in the absence of a medical indication for a caesarean section.	125 (74.4)	31 (18.5)	12 (7.1)
I would perform a non-medically indicated caesarean section on maternal request.	112 (66.7)	36 (21.4)	20 (11.9)
I would consider having a non-medically indicated caesarean section for myself or my partner.	51 (30.4)	106 (63.1)	11 (6.6)

*Do not know/want to answer was an option. Received no responses.

Table 3: Attitudes towards caesarean section, by provider characteristics (crude odds ratios, 95% confidence interval)

Provider characteristics		n	I believe that women prefer a caesarean section as their preferred mode of delivery.		I believe women should be able to choose their delivery method, in the absence of a medical indication for a caesarean section.		I would perform a non-medically indicated caesarean section on maternal request.		I would consider having a non-medically indicated caesarean section for myself or my partner.	
			Crude OR, 95% CI	Crude OR, 95% CI	Crude OR, 95% CI	Crude OR, 95% CI				
Age	Age ≤ 35	61	1.00	--	1.00	--	1.00	--	1.00	--
	Age > 35	107	0.40	0.21-0.78	1.78	0.87 - 3.61	2.39	1.23 - 4.65	1.55	0.76-3.15
Gender	Female	100	1.00	--	1.00	--	1.00	--	1.00	--
	Male	68	0.73	0.07-8.23	1.58	0.76-3.27	4.24	1.99-9.03	0.93	0.47-1.82
Sector	Both	79	1.00	--	1.00	--	1.00	--	1.00	--
	Public only	46	2.32	1.10-4.88	0.77	0.35-1.67	0.13	0.06-0.30	0.83	0.39-1.80
	Private only	43	0.12	0.03-0.43	4.00	1.28-12.49	4.52	1.26-16.23	0.34	0.12-0.85
Profession	Midwife	39	1.00	--	1.00	--	1.00	--	1.00	--
	Obstetrician-Gynecologist	129	0.65	0.31-1.34	2.63	1.22-5.65	9.18	4.07-20.71	1.61	0.70-3.69

	Certified provider	132	1.00	--	1.00	--	1.00	--	1.00	--
	Resident	36	1.38	0.65-2.94	1.55	0.63-3.86	0.85	0.40-1.85	0.85	0.38-1.93
Biological children	No, biological children	63	1.00	--	1.00	--	1.00	--	1.00	--
	Yes, biological children	105	0.44	0.23-0.84	1.12	0.55-2.29	2.20	1.14-4.25	0.9	0.46-1.77
Delivery method for self or partner	No biological children	63	1.00	--	1.00	--	1.00	--	1.00	--
	Only had vaginal delivery	46	0.27	0.11-0.65	1.76	0.68-4.51	3.80	1.53-9.44	0.45	0.18-1.15
	Only had caesarean section	44	0.76	0.35-1.66	1.11	0.46-2.67	1.71	0.77-3.84	1.79	0.80-3.97
	Had both vaginal delivery and caesarean section	15	0.28	0.07-1.07	0.42	0.13-1.34	1.20	0.38-3.78	0.54	0.14-2.12

Table 4: Crude and adjusted odds ratios (OR) of provider willingness to perform a caesarean section upon maternal request, by provider characteristics

Provider characteristics	n	I would perform a non-medically indicated caesarean section on maternal request.				
		Crude OR, 95% CI		Adjusted OR ^a , 95% CI		
Age						
Age ≤ 35	61	1.00	--	1.00	--	
Age > 35	107	2.39	1.23 - 4.65	1.41	0.53-3.74	
Gender						
Female	100	1.00	--	1.00	--	
Male	68	4.24	1.99-9.03	1.11	0.41-3.03	
Sector¹						
Both	46	1.00	--	1.00	--	
Public only	43	0.13	0.06-0.30	0.25	0.10-0.66	
Private only	79	4.52	1.26-16.23	4.70	1.19-18.62	
Profession						
Midwife	39	1.00	--	1.00	--	

Obstetrician-Gynecologist (Ob/Gyn) 129 9.18 4.07-20.71 **4.37** **1.58-12.09**

Biological children

No, biological children 63 1.00 -- 1.00 --

Yes, biological children 105 2.20 1.14-4.25 **3.00** **1.11-8.09**

a. Adjusted model includes all variables once (age, gender, sector, profession and biological children).

Bolded for significance