

# Continuous intrapartum support to reduce primary cesarean

Luz Maria Cardona-Torres (✉ [cardonaluzmaria@outlook.com](mailto:cardonaluzmaria@outlook.com))

Instituto Mexicano del Seguro Social <https://orcid.org/0000-0002-5188-3996>

Rafael Leyva-Jimenez

Instituto Mexicano del Seguro Social

---

## Research article

**Keywords:** Cesarean delivery rate, Continuous intrapartum support, labor

**Posted Date:** October 10th, 2019

**DOI:** <https://doi.org/10.21203/rs.2.15896/v1>

**License:**   This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

---

# Abstract

**Background** The average percentage of births by cesarean section worldwide in 2014 was 18.6% (range: 1.4% to 56.4%), and in Latin America and the Caribbean 40.5% [range: 5.5% - 55.6%]. In Mexico, the cesarean delivery rate remained above 40% in the period from 2008 to 2015, and without signs of decreasing, the World Health Organization recommends up to 15% maximum. The objective of the study was to decrease the rate of deliveries by cesarean, through continuous intrapartum support during the active phase until birth.

**Methods** Experimental study, open label, carried out in a public health institution in Mexico, during July-December 2018, with a study population of N = 115 women in labor (nulliparous, term, singleton, vertex) and under 40 years old, was formed a control group (n = 55) who received routine maternity care and a study group (n = 60), who received continuous intrapartum support during the active phase until birth by a professional nurse with a university degree.

**Results** In the study group, the cesarean delivery rate was 1.7% (1 of 60), significantly lower than that of the control group, which was 29.1% (16 of 55) [ $\chi^2 = 17.13$ ,  $df = 1$ ,  $N = 115$ ,  $p < .001$ ], with a risk ratio of 0.06 (95% CI: 0.01 to 0.42), the absolute risk reduction was 27.4%, (95% CI: 15% to 40%), also, the hours of labour were significantly lower with a median of 6.7 hours in the study group versus a median of 13.4 hours in the control group,

**Conclusion** Continuous intrapartum support provided by a professional nurse in the active phase helps to reduce the rate of cesarean deliveries, as well as to reduce the time of labour in women (nulliparous, term, singleton, vertex) under 40 years of age.

## Background

The average percentage of births by cesarean section worldwide in 2014 was 18.6% (range: 1.4% to 56.4%), and in Latin America and the Caribbean 40.5% [range: 5.5% - 55.6%] (1). In Mexico the average cesarean rate from 2008 to 2014 was 44.4% (2), in 2015 it was reported as 45%, (3), rates above the recommended range by the World Health Organization (WHO) that establishes a maximum of 15% (4).

Cesarean section has not been proven to be safer than normal vaginal delivery, nor to reduce the risk of complications such as urinary incontinence and uterine prolapse, (5) the cesarean section is not superior to normal vaginal delivery in terms of preserving sexual function normal (6) on the contrary, when the cesarean section rate exceeds the value of 15%, reproductive health risks begin to exceed the benefits (7).

The potential disadvantages found in observational studies, include a major risk in the morbidity or mortality of the mother (8), intraoperative risks, such as infection, organ damage or the need for blood transfusion, postpartum risks such as thromboembolic complications, complications related to subsequent pregnancies, such as uterine rupture, infertility, abnormalities of the placenta, a series of risks have also been described for babies born by elective cesarean section such as bronchial asthma, diabetes mellitus type I, or allergic rhinitis (9). Women who give birth by caesarean section are less likely to breastfeed or delay the initiation of breastfeeding. (10) (11), also cesarean sections are associated with a greater use of resources and duration of breastfeeding shorter compared to vaginal births (11).

It is better that the birth occurs through a normal vaginal delivery; However, it is common that childbirth to cause in the mother, anxiety (12), fear (13) or great physical strain (14), as well as mothers who experience pain, exhaustion and negative feelings in a stressful and prolonged delivery could delay the start of the breastfeeding. (15) Of the American women who require an initial cesarean delivery, more than 90% will have a subsequent cesarean, (16) The choice of a cesarean delivery in the first pregnancy results in a 0.3% increase in the risk of having a maternal adverse outcome. (17).

In addition, medically unnecessary cesarean deliveries increase health costs (18). It is estimated that if all medical interventions due to a previous diagnosis of cesarean section were reduced annually in Mexico, it would mean a reduction of 20.8% in cesarean sections in the country (19).

Different strategies have been devised to try to reduce cesarean deliveries, as the evaluation of prenatal classes (20), the QUARISMA trial (21), BASNEF model (22), avoiding the diagnosis of arrest of dilation before 6 cm (23), intervention to reduce both the incidence of anal sphincter tears and rate of cesarean sections (24), as well as continuous intrapartum support, which has been associated with better patient satisfaction and a statistically significant reduction in the rate of cesarean sections (25) (26) (27) (28) (29), in previous studies this support has been provided by a doula and her husband (30), midwives (31), female relative (32), relatives and professional staff (33).

Bohren in his systematic review of the Cochrane database, indicates that it is not clear how to provide effective support in labor, since there are questions about the impact of the type of provider of labor support, about the impact under a variety of environmental conditions, about the moment of measurement of the effects (early vs active labor), also on the relative impact of the different models of labor support, as the model of support only during the intrapartum period or the model of support during the antenatal, intrapartum and postpartum periods.

In Mexico, continuous intrapartum support is not common, the Mexican Institute of Social Security (IMSS) is the institution with the largest number of beneficiaries in the country, and due to limited economic, human and infrastructure resources, it is difficult to provide such support.

Therefore, it is necessary to find ways to carry out continuous intrapartum support in a simple and economical way to reduce the rate of caesarean sections in low-income countries.

## Methods

The objective of the present study was to evaluate the intervention of intrapartum continuous support by a professional nurse with a university degree to reduce the nulliparous, term, singleton, vertex (NTSV) cesarean birth rate, in women pregnant less than 40 years in the General Hospital of Zone 4 (HGZ 4) of the Guanajuato delegation of the IMSS, Mexico

**Study Design.** Experimental study, open label, participants were systematically randomized to the control group and the study group, the study was approved by the Research and Ethics Committee in Health Research of HGZ 4, was registered at the US National Institutes of Health (ClinicalTrials.gov) # NCT04086277, in addition, adheres to the CONSORT (Consolidated Standards of Reporting Trials) guidelines.

**Study population.** The groups were integrated by women in labor (nulliparous, term, with a single product, vertex presentation, under 40 years, in active phase) who wanted to participate and were treated in the labor and delivery unit, from Monday to Sunday, during The three shifts in HGZ No.4 of the IMSS in the period July-September 2018 for the control group and October-December 2018 for the study group, patients with maternal, fetal or mixed cesarean section indications were excluded.

**Sample and sampling.** The sample size was calculated with the G-Power 3.1.9.2 program, for difference of means in two independent proportions (z test), with two tails, assuming, according to local statistical data, that the outcome of Caesarean section in nulliparous with usual obstetric care was 45% and in nulliparous with emotional support it was 20%, with 95% confidence and 80% of power, the sample size was 54 patients per group,

Each group was integrated and studied at different but consecutive times to guarantee the independence of the information collected, due to the lack of capacity of the labor and delivery unit, to carry out the study of the groups in a parallel design, for each group was used systematic random sampling with a systematic jump of an element, each day the first participating patient was chosen and then the systematic jump was applied, one not, one yes, every day until the sample was completed, the principal investigator recruited and assigned the patients to the groups, finally, 55 women were included in the control group and 60 in the study group.

**Procedure.** The control group received the usual obstetric care, without continuous intrapartum support. The study group received the usual obstetric care plus continuous intrapartum support that was provided by a Bachelor of Nursing and Obstetrics who received prior training by a professional doula.

Continuous intrapartum support was based on three basic aspects: 1) emotional support, 2) physical support and comfort measures and 3) information and advice.

The emotional support consisted in establishing an affective communication between the patient and the nurse in order to dispel fears and doubts and instill security in an environment of understanding, availability, respect and intimacy.

The physical support and comfort measures were provided through massage, tactile contact, assistance to adopt different positions for pain relief and the use of aromatherapy with essences of jasmine, mint and lavender.

The information and advice was characterized by providing the patient with information about the development of labor and the medical procedures used, as well as guiding the woman in breathing and relaxation techniques.

**Measurement of variables.** The primary outcome was the cesarean delivery rate, the characteristics of interest for the initial homogeneity of the control group and the study group were maternal age, dilation at the time of admission, Body Mass Index (BMI) before and during delivery, years of Education, as secondary outcomes in labor and delivery, labor time was measured, labor induction (oxytocin), obstetric analgesia and Apgar score in the first and fifth minute.

**Statistical analysis.** In the verification of the initial characteristics between the control group and the study group, and of the secondary outcomes, the statistical tests used depended on the scale of measurement of the variables and the statistical assumptions of each test (Student's t test or Mann-Whitney U test, Chi-square test or Fisher's exact test), in the numerical data to check the assumption of normality the Shapiro-Wilk test was used, the Mann-Whitney U test was used only when the assumption of normality was clearly violated, otherwise the student's t test was used, since it is a robust test for the assumption of normality, to evaluate the primary outcome, the clinical usefulness of the intrapartum continuous support the rate (%) of cesarean deliveries was used, estimating the risk ratio, the absolute risk reduction, odds ratio and the number needed to treat, all the statistical tests were contrasted with a significance of  $p < 0.05$  for two tails with 95% confidence intervals, the statistical analysis was performed in the Statistical Package for Social Sciences IBM SPSS version 24.

## Results

The total sample was 115 pregnant women, under 40 years (NTSV) who participated in the study, 55 in the control group without continuous intrapartum support and 60 in the experimental group with continuous intrapartum support.

**Baseline characteristics.** The two groups were homogeneous with respect to the initial interest characteristics (Table 1), since no statistically significant differences were found for maternal age ( $p = 0.436$ ), dilatation on admission ( $p = 0.120$ ), BMI before ( $p = 0.214$ ) and during delivery ( $p = 0.058$ ), and years of education greater than or equal to 10 years ( $p = 0.596$ ).

Table 1 Baseline characteristics of the groups

	Study group n = 60	Control group n = 55	P value
Maternal age (years, mean $\pm$ SD)	23.1 (14 - 34 )	23.0 (14 - 39 )	0.424
Admission dilation (cm, median, range)	4 (1 - 9)	3 (0 - 8)	0.141
BMI before delivery ( $\text{kg}/\text{m}^2$ , mean $\pm$ SD)	24.1 $\pm$ 4.1	25.3 $\pm$ 4.8	0.144
BMI during delivery ( $\text{kg}/\text{m}^2$ , mean $\pm$ SD)	28.6 $\pm$ 4.1	29.9 $\pm$ 4.4	0.087
Years of education ( $\geq 10$ years, n, %)	36 (60.0)	35 (63.6)	0.689

Student's t test was performed for BMI before and during delivery, Mann-Whitney U-test for maternal age and admission dilation, Chi-square for years of education.

**Primary outcome.** In the study group, the cesarean delivery rate was 1.7% (1 of 60) [Table 2], significantly lower than that of the control group, which was 29.1% (16 of 55) [ $X^2 = 17.13$ ,  $df = 1$ ,  $N = 115$ ,  $p < .001$ ], with a risk ratio of 0.06 (95% CI: 0.01 to 0.42), the absolute risk reduction was 27.4%, (95% CI: 15% to 40%), resulting in a number needed to treat of 3.65 (95% CI: 2.51 to 6.67). From the point of view of vaginal deliveries, there was an odds ratio of 24.21 (95% CI: 3.08 to 189.99), that is, there was 24 times more chance of having a vaginal delivery with intrapartum support than without intrapartum support.

Table 2 Outcome of labor

Group	Cesarean delivery	Vaginal delivery	Total
Study n (%)	1 (1.7)	59 (98.3)	60 (100)
Control n (%)	16 (29.1)	39 (70.9)	55 (100)

$X^2 = 17.13$ ,  $df = 1$ ,  $n = 115$ ,  $p < .001$

**Secondary outcomes.** The hours of labor were significantly lower ( $p = 0.0001$ ) in the group with continuous intrapartum support (median = 6.7 hours, 95% CI: 6.0-8.1), than those in the group without continuous intrapartum support (median = 13.4 hours, 95% CI: 10.7 - 16.1), with respect to the other variables, no significant statistical differences were found between the groups (Table 3), use of oxytocin ( $p = 0.206$ ), obstetric analgesia ( $p = 0.475$ ), apgar score < 7 at minute 1 ( $p = 1.000$ ) and minute 5 (no statistical test was performed since the result did not vary).

Table 3 Results of labor and delivery of the groups

	Study group n = 60	Control group n = 55	P value
Labor (hours, median, range)	6.7 (0.9 - 22.2)	13.3 (1.4 - 30.0)	0.0001
Induction of labor (oxytocin) n (%)	47 (78.3)	48 (87.3)	0.206
obstetric analgesia n (%)	8 (13.3)	10 (18.2)	0.475
Apgar score <7 at 1 minute (n,%)	1(1.7)	0 (0%)	1.000
Apgar score <7 at 5 minute (n,%)	0 (0%)	0 (0%)	+

Chi-square test was performed for cesarean delivery, induction of labor and obstetric analgesia, Mann-Whitney U-test for labor, Fisher's exact test for apgar score <7 at minute, +Apgar score < 7 at 5 minute no statistical test was performed (was a constant)

## Discussion

The continuous intrapartum support provided by professional nursing staff is an intervention that favored vaginal deliveries in the active phase and decreased labor time in NTSV patients, in a statistically significant manner.

The results found exceed the rate of reduction of cesarean deliveries reported by previous studies based on interventions or programs more complex, such as the QUARISMA trial (19) (Quality of Care, Obstetrics Risk Management, and Mode of Delivery) who reduced the Caesarean rate from 23.5% to 21.8% (difference 1.7%) in low-risk women, the BASNEF model (20) reports a reduction in the cesarean rate from 60% to 25.7% (difference 34.3%), being its final rate of cesarean delivery much greater than that recommended by WHO.

Even the study reported by Rosenbloom JI, et al, who proposed that the rate of cesarean delivery could be lowered by avoiding the diagnosis of arrest of dilation before 6 cm, had

adverse results, with an increase in cesarean deliveries from 15.8% in 2010 to 17.7% in 2014 and the intervention to reduce both the incidence of anal sphincter tears and the cesarean delivery section rate (22) reports a decrease in the cesarean delivery rate from 17.7% to 15.0%.

Previous studies of one-to-one support have been provided by a doula and husband (28), by midwives (29), female relative (30), family members and professional staff (31).

In the study conducted by McGrant (28), nulliparous women in the third trimester were enrolled at childbirth education classes, 420 met enrollment criteria, 224 women was randomly assigned to the experimental group, a doula arrived shortly after hospital admission and remained throughout the labor and delivery.

Together with the pregnant woman and her male partner, the doula group had a cesarean delivery rate significantly lower than the control group (13.4% vs. 25.0%,  $p = 0.002$ ), and fewer women in the group of doulas received epidural analgesia (64.7% versus 76.0%,  $p = 0.008$ ),

In our study, the sample size was smaller and randomization was not done due to budget issues, as well as, women did not receive educational classes for childbirth, but a more significant reduction in cesarean rates was observed (1.7% compared to 29.1%  $p < 0.01$ ), and low percentages of obstetric analgesia use, 13.3% (8 of 60) for the study group and 18.2% (10 of 55), for the control group, without significant difference.

In the randomized trial reported by Kashanian et al, (29), one-to-one intrapartum support was provided by a midwife; participants were nulliparous women who had not received labor education classes in the intervention group ( $n = 50$ ), continuous support was provided during delivery, the control group ( $n = 50$ ) did not receive continuous support, the number of deliveries by cesarean delivery (8% versus 24%,  $p = 0.026$ ) were significantly lower in the intervention group in comparison with the control group, our study was very similar in terms of sample size and education classes were not given for delivery, however, the reduction in cesarean delivery rate was higher than that reported by Kashanian.

Khresheh (30) in her nonrandomized comparative study with 226 NTSV women, reported continuous intrapartum support provided by a female relative, without nursing knowledge, or medicine, without finding statistically significant differences between groups for mode of delivery and duration of labor, contrary to the results of the present study in which the intrapartum continuous support was provided by a professional in the health area, without any previous relationship with the patient.

The objective of Wang et al (31), in their cross-sectional study was to evaluate the benefits of the continuous support provided by family members and professional hospital staff, during delivery in China, 362 nulliparous women were included, who requested for themselves to receive continuous support or one-on-one support, with vaginal delivery and 362 nulliparous women with routine maternal care in the hospital, Wang showed that the cesarean rate was significantly lower in women with supportive care compared to women with routine maternal care in the hospital (3.3% versus 24%), an absolute risk reduction of 20.7% against 27.4%

of the present study, the main result of Wang's study was that the duration of labor in the group with delivery care was significantly lower compared with that of the group with routine hospitalization (median: 1.5 h versus 3.05 h,  $p < 0.0001$ ). these results were much lower than those found in the present study (median: 6.7 h versus 13.4 h) and those reported by Bohren, that of 13 studies taken into account for the duration of labor, 6 had significantly lower means in the support group and an average of 6.97 h for the groups with support and an average of 8.46 h for groups without support

An important feature of this study was to focus on the active phase (3 cm to 4 cm of dilation) until delivery, since it is the longest and the contractions of the uterus increase in frequency and are more painful, Bohren mentions that the period of support is very varied, some programs of doulas begin during pregnancy and end after three months' post-partum, other programs begin from admission and end in childbirth.

Given the critical situation of the pregnant during the active phase, another characteristic important was that the intrapartum continuous support was given only by a trained health professional (nurse with a bachelor's degree), Bohren in the randomized clinical trials that

took into account, indicated a wide variety of people who provide support, from health professionals (nurses, midwives) to friends or strangers with some or no training in labor support.

Comparing the results with other studies in general, Bohren reported that in 24 trials there were a lower probability of birth by caesarean section with an average risk ratio of 0.75 (95% CI: 0.64 to 0.88) with evidence of low quality, in this study the risk ratio was lower 0.06 (95% CI: 0.01 to 0.42), with respect to labor time, Bohren indicated a decrease in the group with support with respect to the group without support with a difference of means of -0.69 hours (95% CI: -1.04 to -0.34) in 13 trials, with low quality evidence, in this study we reported the median = 6.7 hours in the group with support and median = 13.4 hours in the group without support, comparing the sample size of the group with support, Bohren take into account 24 trials, with low quality evidence, reporting a median for the sample size of 150.50 (Range: 20 to 3,454) for the group with support, and with 29% of trials with samples less than or equal to 58, in the present study the sample size for group with support was of 60.

It is recommended a standardization in the operational definition of the concepts to be measured, so that the results in clinical trials are more comparable, like the Robson classification system, recommended by the WHO (4), in addition, it is recommended to carry out more randomized clinical trials, with large samples, in countries with medium and low income, focused on the active phase and with support provided by a professional nurse giving priority to humanized delivery.

## **Conclusions**

Continuous intrapartum support provided by a professional nurse (with a university degree) in the active phase is an effective intervention to reduce the rate of cesarean deliveries, and the time of labor in pregnant women under 40 years of age, (nulliparous, term, singleton, vertex).

## **Abbreviations**

NTSV: Nulliparous, Term, Singleton, Vertex.

HGZ 4: General Hospital of Zone 4.

IMSS: Mexican Institute of Social Security.

## **Declarations**

Ethics approval and consent to participate: An informed consent was signed by all participants in the study. The study was approved by the committee of research and ethics in health research of the IMSS, with registration 15 CI 11 007 027 in the Federal Commission for the Protection against Sanitary Risks of the Government of Mexico, according to its ethical standards that meet the standards of the Declaration of Helsinki of 1964 and its subsequent amendments.

Consent to publication: Not applicable.

Availability of data and materials: All the data generated in this study is available in the following link <https://i0000.clarodrive.com/s/B87gCxXmS4DgyqK> or be required to the author by correspondence (email: cardonaluzmaria@outlook.com).

Competing interests: The authors declare that they have no competing interests

Funding: This study was financially supported nonprofit by Health Research Fund (FIS/IMSS/PROT/G17/1662) of Mexican Institute of Social Security, Government of Mexico.

Authors' contributions: LC conceived and designed this study, collected data and prepared the manuscript; L C and R L analyzed and interpreted the results; All authors read and approved the final manuscript.

Acknowledgements: The researchers thank the pregnant women, medical and nursing staff in the labor and delivery unit, who participated in this study of the General Hospital of Zone 4, IMSS, Mexico.

# References

1. Betran 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 January; 11(2).

---

2. Secretaria de Salud, Gobierno de México. Indicadores ODS de SALUD. [Online].; 2017 [cited 2019 01 10. Available from: <https://datos.gob.mx/busca/dataset/indicadores-ods-de-salud>.

---

3. EL UNIVERSAL. EL UNIVERSAL. [Online].; 2019 [cited 2019 01 7. Available from: <https://www.eluniversal.com.mx/articulo/periodismo-de-datos/2017/01/22/nacen-por-cesarea-la-mitad-de-los-mexicanos>.

---

4. World Health Organization and Human Reproduction Programme. WHO Statement on Caesarean Section Rates. Statement. Geneva, Switzerland: World Health Organization, Department of Reproductive Health and Research ; 2015.

---

5. Wiley J. ¿Debo tener una cesarea? Journal of midwifery & women´s health. 2013 August; 58: p. 485-486.

---

6. Kahramanoglu I, Baktiroglu M, Hamzaoglu K, Kahramanoglu O, Verit F, Yucel O. The impact of mode of delivery on the sexual function of primiparous women: a prospective study. Archives of Gynecology and Obstetrics. 2017 April; 295(4): p. 907-916.

---

7. Academic HRC. Tasas de cesareas: analisis de los estimados regionales y nacionales. Revista Panamericana de Salud Publica. 2007; 21(4): p. 251.

---

8. Lavender T, Hofmeyr G, Neilson J, Kingdon C, Gayte G. Cesarean section for non-medical reason at term. Cochrane Pregnancy and Childbirth Group. 2012 March.

---

9. Mylonas I, Friese K. DEUTSCHES ÄRZTEBLATT INTERNATIONAL. [Online].; 2015 [cited 2019 Marzo 24. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4555060/>.

---

10. Pérez Rios N, Ramos Valencia G, Ortiz A. Parto por cesárea como una barrera para la iniciación de la lactancia materna. La experiencia de Puerto Rico. 2008 Agosto; 24: p. 293.

---

11. Hobbs A, Mannion C, Mc. Donald S, Brockway M, Tough S. The impact of caesarean section on breastfeeding initiation, duration and difficulties in the first four months postpartum. BMC Pregnancy and Childbirth. 2016 April; 16(90).

---

12. Salehi A, Fahami F, Beigi M. The effect of presence of trained husbands beside their wives during childbirth on women´s anxiety. Iranian Journal of Nursing and Midwifery Research. 2016 November-December ; 21.

---

13. Storksen T, Garthus-Niegel S, Adams S, Vangen S. Fear of childbirth and elective caesarean section: a population-based study. BMC Pregnancy and Childbirth. 2015 September; 15(2015): p. 221.

---

14. Dixon L, Skinner J, Foreur M. The emotional journey of labor- Women's perspectives of the experience of labor moving towards birth. Midwifery. 2013 March;(2014).

---

15. Dimitraki M, Tsikouras P, Manav B, Giaka T, Koutlaki N, Zervoudis S, et al. Evaluation of the effect of natural and emotional stress of labor on lactation and breast-feeding. Acch Gynecol Obstet. 2016; 293(2016).

---

16. Sprong Y, Berghella V, Wenstrom KD, Mercer BM, Saade GR. Preventing the First Cesarean Delivery: Summary of a Joint Eunice Kennedy Shriver National Institute of Child Health and Human Development, Society for Maternal-Fetal Medicine, and American

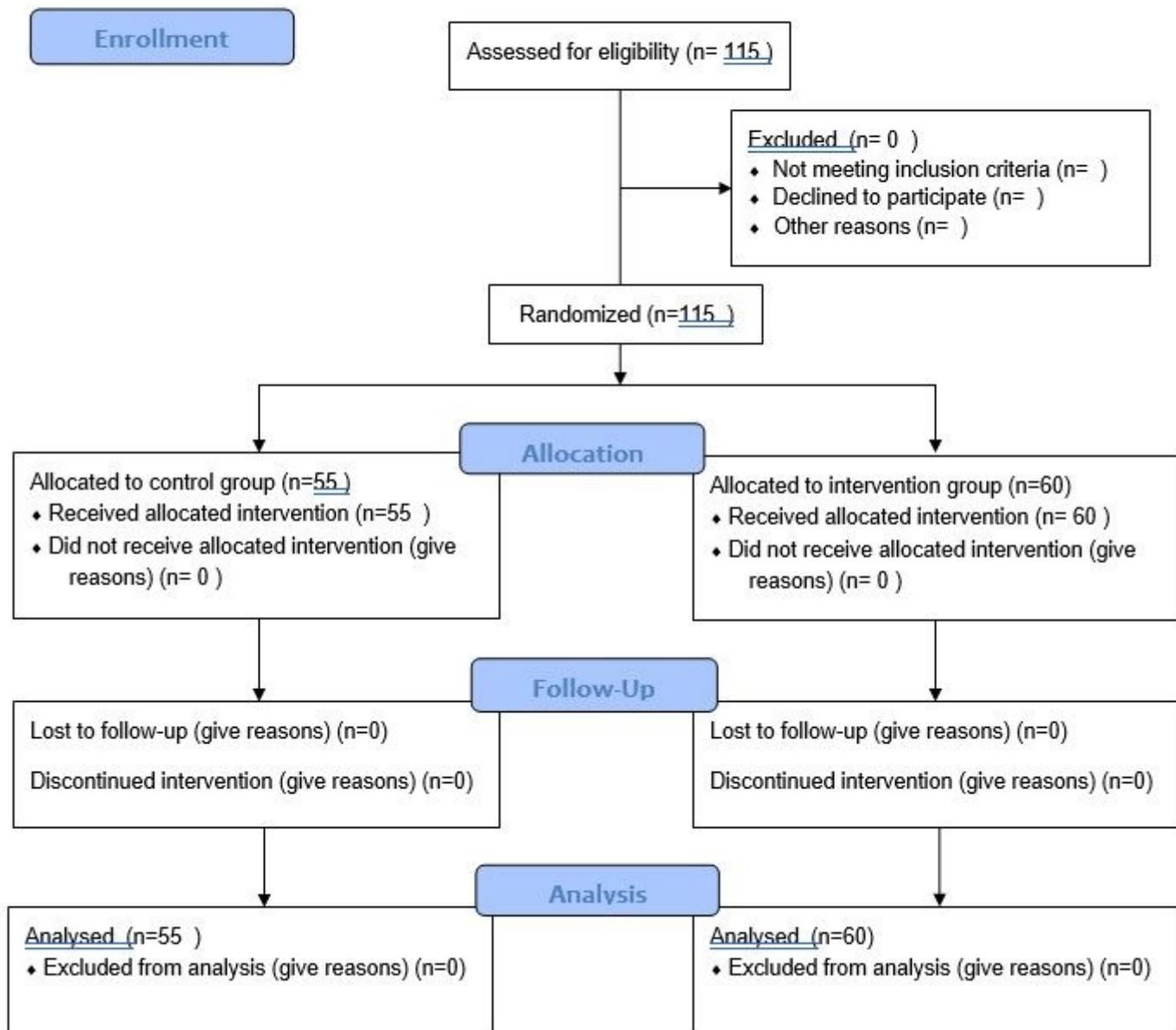
College of Obstetricians and Gynecologists Workshop. *Obstet Gynecol.* 2012 November; 120(5): p. 1181-1193.

17. Miller ES. Consequences of a Primary Elective Cesarean Delivery Across the Reproductive Life. *Obstetrics and gynecology.* 2013 Abril; 121(4).
18. Barclay L. Intervention Significantly Reduces Cesarean Delivery Rates. [Online].; 2017 [cited 2019 Marzo 3. Available from: <https://www.medscape.org/viewarticle/847116>.
19. Ruíz Sánchez J, Espinoza y Sosa S, Vallejos-Parés A, Durán- Arenas L. Cesárea: Tendencias y resultados *Perinatol. Reprod. Hum. Perinatol. Reprod. Hum.* 2014 marzo; 28(1).
20. Cantone D, Pelullo C, Cancellieri M, Attena. Can antenatal classes reduce the rate of cesarean section in southern Italy? *Women Birth.* 2017 Apr; 30(2): p. e683-e688.
21. Chaillet N, Dumont, A, Abrahamowicz M, Pasquier J, Audibert F, Monnier P. A Cluster-Randomized Trial to Reduce Cesarean Delivery Rates in Quebec. *The New England Journal of Medicine.* 2015 APRIL;(372): p. 1710-1721.
22. Arefi Z, Hekamatpou D, Orouji MA, Shaahmadi Z, Khushemehri G, Shaahmadi F. The Effect of Educational Intervention based on BASNEF Model on Decreasing the Cesarean Section Rate among Pregnant Women in Khomain Country. *J. Family Reprod Health.* 2015 Sep; 9(3): p. 101-105.
23. Rosenbloom JI, Stout MJ, Tuuli MG, Woolfolk CL, López JD, Macones GA. New labor management guidelines and changes in cesarean delivery patterns. *Am J Obstet Gynecol.* 2017 Dec; 217(6): p. 689.e1-689.e8.
24. Pirhonen J, Samuelsson E, Pirhonen T, Odeback A, Gissler M. Interventional program to reduce both the incidence of anal sphincter tears and rate of Caesarean sections. *European Journal of Obstetrics and Gynecology and Reproductive Biology.* 2018; 223: p. 56-59.
25. Obstetric care consensus. Safe Prevention of the Primary Cesarean Delivery. [Online].; 2014 [cited 2019 Marzo 25. Available from: <https://www.acog.org/Clinical-Guidance-and-Publications/Obstetric-Care-Consensus-Series/Safe-Prevention-of-the-Primary-Cesarean-Delivery?IsMobileSet=false>.
26. Bohren M, Hofmeyr G, Sakala C, Fukuzawa R, Cuthbert A. Continuous support for womwn during childbirth. *Cochrane Library: Database of Systematic Reviews.* 2017; 2017(7).
27. Kabakian-khasholian T, Portela A. Companion of choice at birth: factors affecting implementation. *BMC Pregnancy and Childbirth.* 2017 Agosto; 17(2017).
28. Hodnett ED, Gates S, Hofmeyr J, Sakala C. *Cochrane Library.* [Online].; 2013 [cited 2019 April 14. Available from: [https://www.cochrane.org/CD003766/PREG\\_continuous-support-women-during-childbirth](https://www.cochrane.org/CD003766/PREG_continuous-support-women-during-childbirth).
29. Lunda P, Minnie CS, Benadé P. Women's experiences of continuous support during childbirth: a meta-synthesis. *BMC Pregnancy and Childbirth.* 2018 May; 18(1): p. 167.
30. McGrath SK, Kennell JH. A Randomized Controlled Trial of Continuous Labor Support for Middle-Class Couples: Effect on Cesarean Delivery Rates. *BIRTH ISSUES IN PERINATAL CARE.* 2008 May; 35(2): p. 92-97.
31. Kashanian M, Javadi F, Haghighi MM. Effect of continuous support during. *Int J Gynaecol.* 2010 FEBRUARY; 109(3): p. 198-200.
32. Khresheh R. Support in the first stage of labor from a female relative: the. *Midwifery.*

33. Wang M, Song Q, Xu J, Hu Z, Gong Y, Lee AC, et al. Continuous support during labor in childbirth: a Cross-Sectional study in a university teaching hospital in Shanghai, China. BMC Pregnancy and Childbirth. 2018; 18(480).

## Figures

**CONSORT 2010 Flow Diagram**



**Figure 1**

CONSORT 2010 Flow Diagram

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [CONSORT2010Checklist.doc](#)