Pregnant women's knowledge and use of evidence-based practices during labor and childbirth after participating in a health education intervention: Senses of Birth

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Pregnant women’s knowledge and use of evidence-based practices during labor and childbirth after participating in a health education intervention – Senses of Birth

by

Luísa da Matta Machado Fernandes

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ABSTRACT

Background: Senses of Birth (SoB) is a health education intervention in Brazil that addresses reproductive rights, the benefits and risks of normal birth and cesarean, and use of evidence-based practices (EBP) during labor and childbirth, aiming to reduce unnecessary cesareans in the country. This mixed-method study had three objectives: 1) evaluate the impact of the SoB intervention on pregnant women’s perceived knowledge about normal birth, cesarean, and use of EBP in childbirth; 2) identify socio-demographic factors, obstetric characteristics, and aspects of women’s perceived knowledge that influence women’s use of EBP; and 3) analyze the outcomes, barriers and facilitators/strategies to use EBP described by women and understand their correlation with socio-demographic factors, obstetric characteristics and women’s perceived knowledge. Method: 1,287 pregnant women answered a post-test survey, immediately after their visit to the exhibition, between March 2015 and March 2016, in four different cities. 555 women answered an online follow-up survey after giving birth. Quantitative analyses were performed, including T-tests, ANOVA, logistic and linear regression. A qualitative analysis using discourse analysis was also performed. To further understand women’s use of EBP experience, a triangulation of methods was used. Results: The mean score (MS) of perceived knowledge after the intervention was higher than the mean score before experiencing the SoB for all three knowledge domains: Normal Birth (MS Before= 3.71 x MS After= 4.49), Cesarean (MS Before= 3.54 x MS After= 4.26) and EBPs (MS Before= 3.14 x MS After= 4.14). The results suggest that the SoB intervention was more effective for low income women (B = 0.206; p < 0.001 for EBP), women without private health insurance (OR 2.47, 95% CI: 1.49-4.09 for normal birth), women with private prenatal care (OR 2.42, 95%
CI: 1.59-3.66 for normal birth), women experiencing their first pregnancy (OR 1.92, 95% CI: 1.31-2.82 for EBP; OR 1.37, 95% CI: 1.03-1.84 for normal birth; OR 1.37, 95% CI: 1.03-1.84 for cesarean), and women in their first or second trimester at the time of the intervention (OR 1.64, 95% CI: 1.13-2.39 for EBP; OR 1.48, 95% CI: 1.11-1.97 for normal birth; OR 1.85, 95% CI: 1.40-2.41 for cesarean). In this study, the majority of women used intrapartum EBPs, with the exception of the doula support (26%). Using the intrapartum EBPs was associated with high mean score of knowledge before the intervention; giving birth in a public hospital (p ≤ 0.05); and having a vaginal birth (p ≤ 0.05). Some practices were also associated with socioeconomic characteristics: women among the lower-income range (2 to < 5 MW) were less likely to use a birth plan (35.1%, p ≤ 0.05) and have midwife care (40.1%, p ≤ 0.01) compared to women with more than 10 MW; being a black woman was correlated with not using a birth plan (59.3%, p ≤ 0.01), and not having doula support (56.7%, p ≤ 0.01); and women who had more than 13 years of formal education were associated with use of a birth plan (83.3%, p ≤ 0.01), freedom of mobility during labor (84.3%, p ≤ 0.05) and freedom of choice of position at delivery (83.3%, p ≤ 0.01). Midwife care (95.9%, p ≤ 0.05) and doula support (97.9%, p ≤ 0.05) were also associated with women who believed they were able to have a normal birth after participating in the SoB intervention. Women who answered the open-ended questions on the follow-up survey and were included into the qualitative analysis perceived an increase in knowledge for EBP Knowledge domain after participating in the SoB intervention. Positive outcomes were described related to the use of EBPs, such as satisfaction and respect of their choices, while negative outcomes were referred by women who did not use the practices. Barriers identified by women mainly referred to low quality of care, especially no woman-centered care to support and incentivize/promote the use of EBPs, while facilitators
reported reinforced the need to implement EBPs protocols at hospitals but also the importance of individualized care and respect, reinforcing the “acolhimento” practices. **Conclusion:** The study showed opportunities to increase knowledge among Brazilian pregnant women for the three knowledge domains, and a need to focus the discussion on how to achieve a positive experience of birth using EBP. This study corroborates previous findings that Brazilian women have restricted access to intrapartum EBPs, and although recent policies have improved the offers, there are still systemic barriers that make it difficult for women to achieve a positive childbirth experience. Increased perceptions of knowledge about normal birth, cesarean and EBP gave the women a chance to critically reflect upon the maternal care scenario in Brazil and advocate for their choices, desires, and rights. Nonetheless, it is clear that health education is an essential element to increase the use of WHO and MS recommended practices. However, it cannot be used isolated from systemic changes that overcome barriers identified by women, including co-responsibility with the changes by hospitals/institutions and health professionals. The intervention gains relevance considering the lack of evidence of the efficacy of non-clinical interventions to reduce unnecessary cesareans in middle and low-income countries prioritizing women. Therefore, this study can guide policy decisions and program implementation to improve maternal health care by explicitly considering women's voices and experiences. As long as we continue to value only authoritative knowledge and not involve the women in their own health care decisions, the health system will continue to be organized outside of their priorities.

**Keywords:** Maternal Health, Childbirth, Health Education, Cesarean Section, Evidence-based Medicine, Women’s Knowledge
ACKNOWLEDGMENTS

It turns out that a Dr.Ph. is not only about writing a thesis, publishing articles, presenting, defending, and completing credits. When I decided to do my Ph.D. outside my home country, I had no idea the challenges that would entail, how much I would learn and gain, or what I would have to leave behind. With that in mind, I will take this opportunity to register and practice something I learned during the past four years: “Being grateful and expressing this gratitude”.

As any chapter in my life, “thank you(s)” have to start with my parents and my brother. For the simple fact that I always felt safe knowing I could go anywhere in the world because I would still be able to come back home. Thank you for the countless phone calls, what’s app messages, and support with bureaucratic stuff (trust me, it is a lot between both countries). However, mainly, thank you for the many flights between Brazil-U.S.-Mexico-Malawi. I renewed my energy in each one of those encounters.

Anyone who knows me has heard how big and important my extended family is (meaning uncles, aunts, cousins, and grandparents). I am grateful every day for the love and bond we share, for every moment of happiness I could share with you either virtual or present. Also, I have never been more grateful in my life when I was scared of losing someone and could see that the ones who stayed could play the part I eagerly wanted to play.

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As the years went through, I found other people who helped me decide to stay, to finish this project. Moreover, it likely kept my mental health in check. The needed “Sunday Brunches” with the “Barefoot Girls” and monthly dinners with the DrPH ladies will be the two most missed events after I am gone. SPUR CrossFit was my community, my safe space, and not just a place for the workout of the day.

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LIST OF ABBREVIATIONS

ANS - National Supplementary Health Agency

BB – Birth in Brazil Study

C-sections - Cesarean delivery

CI – Confidence Interval

DF – Distrito Federal

EBP - Evidence-based Practice

IRB – Institutional Review Board

MDG - Millennium Development Goal

MG – Minas Gerais

MMR - Maternal Mortality Rate

MW - Minimum wages

NB - Normal Birth

NHP - National Humanization Policy

OR - Odds ratio

PAHO - Pan American Health Organization

PI – Pregnancy Information

PNAISM - National Policy for Integral Health Care

RJ - Rio de Janeiro

SD – Sociodemographic

SDG - Sustainable Development Goals
SoB - Senses of Birth

Std. Deviation – Standar Deviation

SUS – Unified Health System

TLTL - “too little, too late”

TMTS - “too much, too soon”

TPB - Theory of Planned Behavior

UN - United Nations

WHO - World Health Organization
PREFACE

This dissertation will discuss the effect of a health education intervention implemented in Brazil on women's knowledge about intrapartum evidence based-practices, normal birth and cesarean, and behavior of using the intrapartum EBP. The volume includes the two journal article manuscripts produced, public health relevance, description of the methods, and detailed information about the intervention, named Senses of Birth. Therefore, the unique format deserves a brief preface to guide the reader and facilitate an understanding of the overall volume.

Chapter 1 of this dissertation, named “Introduction”, presents the public health central issue addressed, introduces the research questions, and a brief summary of the literature topics and theory of planned behavior which support the intervention and are relevant for this study. The goal here is to give the reader an overview of the topics that will be discussed in each manuscript. The second chapter details the method of the dissertation, combining information regarding both manuscripts. The method chapter provides a full overview of data collection, variable preparation, and data analysis of quantitative and qualitative methods used. Supportive figures, tables, and diagrams are displayed to facilitate the understanding of all variables and methods used. Results and discussion of the findings will only be presented as part of each article (chapter 3 and 4), that can be read as stand-alone papers.

Chapter 3 is Manuscript 1, named "Changes in perceived knowledge about childbirth among pregnant women participating in the Senses of Birth Intervention in Brazil: A cross-sectional study." This article intended to answer research question 1: “What is the impact of Senses of Birth intervention on pregnant women’s perceived knowledge about normal birth, cesarean, and
the use of evidence-based practices during labor and childbirth?”. The article was submitted to the BMC Pregnancy and Childbirth Journal. It is currently under review and publicly available on Research Square (https://www.researchsquare.com/article/626b405e-4ce5-41bb-81af-9962b4dc1b7c/v1).

Chapter 4 is Manuscript 2, named "Brazilian women’s experience with evidence-based practices in childbirth after participating in the Senses of Birth Intervention: A mixed-methods study.", intends to answer research questions 2 and 3: What factors influence women’s use of evidence-based practices during labor and childbirth and how women describe their childbirth experience considering the use or not the practices? This manuscript will be submitted to a journal shortly after the dissertation defense.

Finally, chapter 5 presents a brief summary of all findings, potential implications of the results, future research and policy recommendations considering the current health and political scenario in Brazil.

Appendixes are a complement of this dissertation and could be useful for readers who are looking to replicate a similar health education intervention or evaluation. Appendix 1 and 2 presented the completed translated surveys used for data collection. Appendix 3 is the complete codebook of the qualitative analysis, including themes, characterizing codes and exemplifying quotations.
CHAPTER 1 - INTRODUCTION

This dissertation evaluated the impact of a health education and cultural intervention in Brazil, named Senses of Birth (SoB), on pregnant women’s perceived knowledge about normal birth, cesarean and intrapartum evidence-based practices (EBP). Furthermore, the dissertation analyzed what factors impacted women’s use of EBP during labor and childbirth and how they described their childbirth experience when using the practices. Although using evidence-based practices during labor and childbirth are recommended to improve birth outcomes (1–6), they are still underused practices (7–11). Therefore, understanding the limitations and facilitators of their use can ultimately improve Maternal and Child Health (MCH).

Strategies to reduce maternal morbidity and mortality have been the focus of the maternal and child health community, and they have partially been successful, but are still far from what was expected (12,13). Between 1990 and 2015, the Maternal Mortality rate (MMR) was significantly reduced around the world but did not achieve the Millennium Development Goal (MDG). Twenty-six countries made no progress at all and twelve, including the United States, increased the MMR (13,14). In 2015, the Maternal Mortality rate in Brazil was 62/100.000 live births, a significant decrease when compared with the 142/100.000 live births registered in 1990, but not enough to achieve the MDG goals of 70% reduction (15,16). The patchy advancement led the United Nations (UN) to create the Sustainable Development Goals (SDG), and to a new call to action regarding maternal health care: beyond offering care and access it is necessary to provide care that "supports the safe physiological process of labor with the lowest level of intervention possible, to reduce over intervention, and support woman-centered care” (12,17,18).
Research Questions

This cross-sectional study used a mixed-method quantitative and qualitative analysis to address three research questions proposed:

1- What is the impact of Senses of Birth intervention on pregnant women’s perceived knowledge about normal birth, cesarean, and the use of evidence-based practices during labor and childbirth?

2- What factors influence women’s use of evidence-based practices during labor and childbirth?

3- How do women describe their childbirth experience considering their use or not of the intrapartum EBPs?

Brazil’s Maternal Health Care System

The Brazilian maternal health care system is mostly interventionist, approaching labor and childbirth as a medical event and not as a normal physiologic process with its own social and cultural aspects (8,19). Maternal care in Brazil is a medical-centered system that tends to accelerate labor and delivery, disrespecting the women (8,19). The decrease by 52% in the MMR from 1990 to 2015 reflects significant improvements in the maternal health care system in Brazil (14), however, still presents a need to be reduced. The improvements are driven by the access to skilled health professionals during labor and prenatal care. Brazil has an average of 1.78 live births per woman (20). In 2014 99.4% of pregnant women had at least one prenatal care consult, and 67% had seven or more appointments, with an estimated rate of 99% of births attended by skilled health professionals (21).
Brazil’s C-section rate has increased since the year 2001, and in 2009 exceeded for the first time the number of vaginal deliveries, reaching 57% in 2014 (21–23). In 2017, the cesarean rate was 55.7% (24); however, the situation is even more alarming when we look at the differences between the public and private care. Fifty-eight percent of births in Brazil happen in the private sector, among which 83% of the deliveries are cesareans, while in the public sector the C-section rate is 40% (20,25). The high rate of cesarean offers a glimpse of the interventionist system in the country and justifies the need for the Senses of Birth Intervention.

Since 1985, the World Health Organization (WHO) recommends that C-section rates should be between 10 to 15% (26). Several studies have shown that C-section rates higher than 15% are associated with an increase in maternal mortality and morbidity, including a higher chance of a prolonged hospital stay, hysterectomy caused by postpartum hemorrhage, postnatal treatment with antibiotics, cardiac arrest, and increased risk of neonatal intensive care admission for infants (26–31).

Reasons behind the higher rates are multifactorial, including socio-inequalities, cultural preferences, clinical recommendations not based on the best scientific evidence, underuse of evidence-based practices, practice of defensive medicine, lack of midwife availability/support, value/cost of procedures, increased use of technology, and increased medicalization of childbirth (14,32–36).

Currently, 74% of the population depends exclusively on the public health care system to access health care, and 26% are enrolled in private health insurance (37). Brazil has a national universal public health care system known as the Unified Health System, frequently referred by its acronyms “SUS.” SUS performs all public health functions and provides direct care, based on government-owned services or providers contracted by the government, and it is funded through
taxes and social contributions (37,38). The public system coexists with a private health system, regulated by the National Supplementary Health Agency (ANS), mainly supported by employer-funded private insurance offering only direct care, but also including individual health insurance and direct payment for care services (37,38).

To improve the quality of maternal health care in Brazil and considering women’s health and reproductive rights, the federal government implemented a series of policies, strategies, and regulations. The main policies and resolutions are presented below. It is within this scenario that SoB was created and implemented.

The National Policy for Integral Health Care (PNAISM) was developed for the Technical Area of Women's Health of the Ministry of Health in 2004, facing the challenge to improve the health of women in the country (39). The PNAISM document incorporates maternal care in a gender, integral and reproductive approach, with emphasis on obstetric care, reproductive planning, care and counseling on unsafe abortion and cases of domestic and sexual violence (39). Six years after this policy was developed, the Ministry of Health instituted the “Stork Network,” which is a strategy that aims to implement a network of care to assure women the right to reproductive planning and humanized care during pregnancy, childbirth and the postnatal period, as well as guaranteeing children the right to a safe birth and healthy growth and development (40). The Stork Network seeks to operationalize the policies already in place, promoting the articulation of the points of service in a network of comprehensive care, using multidisciplinary teams, updated protocols, and monitoring health indicators with target-coupled funding (9,41).

Although PNAISM and the Stork Network have had an impact on the public and private health system, more specific regulations for the private system have proven necessary. ANS has issued resolutions such as the RN 368 of January 2015, which ensures women have access to the
data pertaining to the percentages of cesarean and normal birth per health facility and physician, and implements the use of the partograph and the information letter (31). Different tailored programs have also been created in partnership with private hospitals, such as the Healthy Birth program that engaged hospitals in creating quality measures related to vaginal birth and use of EBPs (42).

**The Senses of Birth Intervention**

The Senses of Birth is a health education and health promotion intervention implemented in different Brazilian cities to educate pregnant women and their community support about the reality of maternal health care in Brazil, and the benefits and risks of normal birth and cesarean (43). Ultimately, the itinerant intervention intends to contribute to the reduction of unnecessary cesareans and iatrogenic preterm birth (43). An array of themes surrounding maternal health care are discussed in the intervention, including pregnancy, preparing for the childbirth, risks and benefits of the type of birth, myths surrounding childbirth, breastfeeding, reproductive rights, obstetric violence, and recommended EBP (43–45).

The intervention uses different technologies to create an experience where all visitors are actively engaged, simulating a pregnancy and birth. It is assembled in public spaces, such as parks, shopping malls, and university campuses to reach a diverse group of people and invite everyone to join the experience. First, the visitors see themselves becoming pregnant, where a sensor captures the person’s image and projects a pregnancy development. In the sequence, as a pregnant person, the visitor can shop for childbirth products (43–45). The market is a parody on the contemporary tendency of consumerism and immediacy, due to the practicality and commodification of childbirth (43–45). They are inspired by real products, caricatures of increasing artificiality, and emptying of
the senses of birth (e.g., Schedule C-section, photographers, beauty salon services, a party in the room after the C-section, artificial milk) (43–45).

The following setting invites visitors to watch the dynamic dialogue between a pregnant woman, a mother with a newborn, a friend, an obstetrician, a doula, and a midwife (43–45). The dialogue brings to light myths about birth, accurate informational data, plays with common bits of advice the expectant mother receives and generates questions regarding expectations for the birth (43–45). Finally, the visitor is invited to end the journey as a baby on the path to be born (43–45). The group walks through the womb and vaginal canal with sensory stimulation, creating an individual emotional experience (43–45).

The visit is 20 minutes long, and after that, all are invited to see the pictures, movies, and join a group discussion regarding the topic (43–45). Those group discussions engage the local community and grassroots movements that will bring speakers and provide support for the debates (43–45). The website and social media are used to maintain a continuous source of information for anyone interested (43–45).

**Theory of Planned Behavior**

SoB used the Theory of Planned Behavior (TPB) to support the development of a culturally appropriate intervention and to ground data collection tools developed for the project evaluation (43–45). Different authors have explored the TPB as a good fit to understand maternal health care practices and pregnant women’s behavior (46–49).

Theory of Planned Behavior is used to understand determinants of behavior over which individuals do not exert complete control (50); therefore, it can support the understanding of a woman's use of EBP during labor and childbirth. The author argues that behavior can be directly
influenced by the intention to engage in that behavior and the perceived control the individual has over the behavior in question (50,51). The intention to perform a behavior is composed of the sum of attitudes, subjective norms, and perceived control over the behavior, constructs of the TPB (50,52).

Attitudes reflect someone's personal opinion or the value attributed to the behavior, that is if the behavior is good or bad or can bring positive or negative outcomes (50,52). An opinion about behavior can be formed based on experiences, examples, and knowledge regarding the possible outcomes (50,52). Women’s attitudes regarding childbirth and use of EBP are then formed by the amount of appropriate information regarding risks and benefits they have, as well as their previous experience and/or examples from their communities. A positive attitude, there is, a believe that using an intrapartum EBP will contribute to a favorable or desirable outcome can positively impact on the decision to use the practices.

Subjective norms refer to the social expectations and desires around a specific behavior, and how motivated is the person to adhere to those expectations (50,52). That is, what the community, family and/or friends surrounding a woman expect regarding the childbirth; and how likely is that woman to attend to those expectations, will influence her intention to use the intrapartum EBP. Subjective norms can be facilitators or barriers for women to use the intrapartum EBP.

Finally, the perceived behavioral control is primarily the individual’s perceived self-efficacy, that is the confidence in their ability to perform the behavior (50,52). Such perception of control is built by internal factors (knowledge acquired and skills learned), and external factors (practical resources available, opportunities to use them, and the presence of other supportive conditions) (50–52). For a woman to perceive that she can control the behavior of using the
intrapartum EBP, therefore, increasing her intention to use it, she will need knowledge, skills, resources, and opportunities to increase her self-efficacy. The internal and external factors can facilitate or make it challenging for a woman to use an EBP. Knowledge and/or qualified information about the behavior is a component of the attitude and perceived behavioral constructs. The constructs impact the woman's intention to perform a behavior, that is, to use the intrapartum EBPs. Based on the constructs of the TPB, a proposed theoretical framework of the SoB Intervention was built (Figure 1) and will serve as the framework of analysis of this dissertation.

**Figure 1 – Proposed theoretical framework of Senses of Birth Intervention and its impact on birth outcomes**
A woman's perception of birth and decisions for type of birth are a combination of embodied knowledge and authoritative biomedical knowledge (53,54). Obstetricians have the authoritative power, that is based on the techno-science knowledge, and are the dominant discourse because they have the sanction of society (55). Women have the embodied power that leads to self-determination, knowledge based on empowerment (55). Women referred to the embodied knowledge as access to information, understanding, intuition, and familiarity with the physical and psychological aspects of birth, as an integral part of the control and characterized as the final domain of a “good” birth (34).

In the capitalist patriarchic society, the biology of women's bodies has been used as a justification to bound women to the home, infer that women should engage solely with reproductive functions (giving birth), keeping them restricted of choices and distant of the political life (56). Women fighting for their reproductive rights have questioned this behavior; however, it can be seen as part of the maternal health care system (56). Today, physicians continue to treat pregnant women with a paternalist view, affirming that they prefer a cesarean delivery, even though the majority of studies show women prefer a vaginal birth at the beginning of pregnancy (57–59). Obstetricians discredit women's preferences, arguing that they do not know what is best for their babies, considering that the choice should be based on the unborn child’s perceived needs and not the woman's choice (54,57,60).

Different sociologists recognize that the maternal health care model in the Western world is organized around an ideology of technological progress and the authoritative biomedical knowledge (54,60,62,63). Nevertheless, biomedical knowledge is also shaped and influenced by cultural factors (54). It is proposed that scientific knowledge, including, biological and medical knowledge, is not just a set of authoritative beliefs and methodological principles, but is part of a
sophisticated apparatus of power (61). The complex and heterogeneous network of power produces and coexists in tensions with a diverse group of subaltern positions (61). Struggles of subaltern groups may provide alternatives to the dominant forms of knowledge and understanding, on behalf of their autonomy, emancipation or even survival, against the prevailing worldview. Therefore, the knowledge of the subaltern groups is a threat to those that hold power (61).

**Evidence-based Practices during labor and childbirth**

Evidence-based practices use the best available research results to guide health care, and when applied to maternal care can decrease maternal morbidity and mortality and reduce health inequalities (12). Increasing the use of best practices during labor and childbirth can optimize maternal, fetal, and newborn outcomes, support effective and respectful care, and assist providers and women’s decisions (3,12,54). However, they are not new knowledge or a new set of recommendation, although the maternal mortality and morbidity results show that the implementation still needs to be reinforced (56).

In 1985, the Pan American Health Organization (PAHO) Fortaleza Declaration recommended: women’s participation in the design and evaluation of policies; freedom of movement during labor; continuous presence of a companion of the woman's choice; end of enemas, trichotomies and amniotomy; elimination of routine episiotomy, and labor induction without clinical recommendation (64). The document also pleads that there is no justifiable reason for a C-section rate higher than 10 to 15% (64).

In 1996, WHO published the "Care in Normal Birth: a practical guide," defining normal birth as "spontaneous in onset, low-risk at the start of labor and remaining so throughout labor and delivery", and stated that in a normal birth, valid reasons should be identified before any
interference with the natural process (65). The Practice Guide detailed the EBP to be used during prenatal care, intrapartum and postnatal care ordinary in the conduct of normal childbirth and classified them, dependent on their usefulness, effectiveness, and harmfulness (65). As the available evidence evolves with research, WHO has updated its guidelines and recently published the “WHO recommendations: Intrapartum care for a positive childbirth experience” (66).

The new recommendations are in line with the SDG 3 and focus on "ensuring that women and their babies not only survive labor complications if they occur but also that they thrive and reach their full potential for health and life" (66). WHO recognizes that 22 years after its definition of normal birth and practice guidelines, the concept of "normality" in labor and childbirth is not universal or standardized. Although a lot has been done to improve outcomes for mothers and babies, the increasing medicalization of the maternal care system widens the gap between high and low resource settings and distances the interventions from women-centered care (66).

A systematic review of 51 high-quality, evidence-based practices identified among 163 guidelines published between 2010 and 2015 worldwide, presented EBP for the intrapartum period in 5 groups: 1) respectful care, communication, birth companions; 2) assessment and monitoring of labor progress; 3) pain relief; 4) care during the first and second stage of labor; and 5) care during the third and fourth labor stage (12).

The EBP focus of this dissertation addresses the five groups found in the existing childbirth guidelines/protocols and were discussed with pregnant women during the SoB intervention. A brief literature review of the scientific evidence that supports the effectiveness and recommendation of such practices are presented: 1) Doula support; 2) Midwife Care; 3) Having a birth companion of the woman's choice during labor and delivery; 4) Using a Birth Plan; 5) Using non-pharmacological methods of pain relief; 6) Freedom of mobility and choice of position throughout labor and
delivery.

1) Doula support

Traditionally, the word doula is identified as a Greek word, meaning “woman caregiver of another woman,” "servant to the mother," and "mothering the mother" (67). Today, the name is commonly used to define a trained paraprofessional in the maternity care system, a community health worker who provides skilled and intimate continuity of care throughout the childbearing year, including support during pregnancy, labor, and birth, as well as assistance during the transition to parenthood in the initial postpartum period (67).

Different guidelines recognize doulas as one-to-one support for women during labor and childbirth (66,68,69). An ethnographic study found that doulas provide physical support to their clients during prenatal and postpartum meetings; help with getting into different laboring positions, massage, counter-pressure, water therapy, helping them walk around and holding legs during pushing (11).

A systematic meta-analysis Cochrane review of 23 randomized control trial studies, from 16 countries, involving 15,288 women, gathered evidence considering different groups of birth outcomes (2). The study concluded that women who had the presence of a doula during labor were more likely to have a spontaneous vaginal birth, showed reduced Cesarean rates by an average of 28%, and their deliveries were shorter (MD -0.58 hours) (2). It was also found that women with doula support were less likely to have intrapartum analgesia, to report dissatisfaction, and need regional analgesia (2). Women with a doula had triple the odds of reporting non-medical techniques for labor induction, compared with women without such support (1).

2) Midwife Care
The role of the midwife in supporting care during pregnancy, birth, and the postpartum period is well established in many countries, but there is a global shortage of human resources and inequity in their distribution (70). An extensive review conducted by WHO showed that midwifery care can increase patient safety and is effective in the reduction of maternal and neonatal mortality (70). Therefore, WHO recommends that midwife-led continuity-of-care models, throughout antenatal, intrapartum, and postnatal are implemented in context-specific situations (66). Maternal quality standards state that hospitals should ensure that women in established active labor have one-to-one care and support from an assigned midwife, in order to promote shorter the length of delivery and reduce the number of birth using vacuum or forceps (69).

Midwives have their practice grounded in the knowledge that supports women to sustain the normal progress of labor and, their presence during labor and childbirth is associated with lower C-section rates (71). Midwife led-management received no recommendation for or against the use, and the existent evidence was considered good (3). The analyses of six trials with 16,500 low-risk women led the authors to conclude that midwife care was related to one less cesarean delivery per 100 births (3).

3) Companion of choice during labor and delivery

The continuum support during labor and delivery is a safe and effective intervention that can improve maternal and newborn outcomes, ensuring a better experience during labor, increasing women’s satisfaction with the experience, and working as a protective measure for violence during birth (72,73). WHO considered the companion of choice for all women throughout labor and childbirth a recommended best practice in its recommendations for a positive childbirth experience (66).
Women who had a companion at any point of the labor and birth described it as a good experience, making them feel calm (72). Women who did not have a companion present during labor and delivery had a 3.51 times greater likelihood of being dissatisfied with care received compared with those who had a companion with them at all times (10).

4) Using a Birth Plan

The Birth Plan is a written document that expresses a woman’s desires and expectations concerning childbirth and improves communication with health professionals. Birth plans are recommended as a practice to promote a positive childbirth experience (65,66,68,74,75) Women who use a birth plan are more likely to have a normal birth and choose their position during labor and delivery, and less likely to receive an enema and perineum shaving (74).

It can be a platform for women to inform preferences and desires during birth, guarantee rights, ensure informed consent, and increase communication with health professionals (65,75). WHO also recommends that birth plans need to be individualized according to the woman’s needs and preferences (66). A Birth Plan should reflect the woman’s expectation regarding the labor, delivery, and postpartum period, considering the information she received, with time to reflect over them (74).

Health systems that use and value the Birth Plan as a tool to improve quality of care see women as global and regional stakeholders for their health care, advocating for evidence-based, quality and respectful care (13). The American Journal of Obstetrics and Gynecology recently issued a call to action to their readers, urging them to move away from the one-sided checklist Birth Plan, towards one that involves an ongoing conversation in which patients and providers have the chance to discuss their philosophies (76). Evidence shows that women who had a birth plan
had a higher chance to have a normal birth, decrease use of enema and perineum shaving, had more liberty to choose their position during labor and delivery, had infants with a later clamping of the umbilical cord and increased skin to skin contact immediately after birth (74).

5) **Using of non-pharmacological methods to pain relief**

A systematic review in 2010 found 12 randomized controlled trials in six different countries and concluded that for each non-pharmacological pain relief method it is necessary to define in which phase of the dilation period, latent or active, it should be implemented (77). Immersion in water was most effective when used after 3 centimeters of cervical dilation; massage was shown to be effective in pain relief, anxiety, and stress during the first stages of labor (77). Other methods, such as aromatherapy and breathing exercises, did not show a direct impact on pain management. However, they were related to reduced stress levels and anxiety of childbirth and promoting satisfaction and preventing hyperventilation (77).

One thousand four hundred forty-eight women were included in the meta-analysis of 14 trials involving the use of acupuncture, audio-analgesia, acupressure, aromatherapy, hypnosis, massage, and relaxation (78). All practices showed a decreased need for pharmacological pain relief, including epidural analgesia, and increased satisfaction with pain management during labor (78), suggesting a potential cost-saving situation without any prejudice for the clinical outcomes (1).

WHO recommends relaxation techniques, including progressive muscle relaxation, breathing, music, mindfulness, and other methods, for healthy pregnant women requesting pain relief during labor (66). The use of such techniques can prevent the use of analgesia and a cascade of unnecessary interventions, being part of the continuous quality care (66).
6) Freedom of mobility and choice of position throughout labor and delivery

Results of a systematic review involving 5,218 women in 25 trials indicate that women that adopted an upright position during the first stage of labor versus the ones in bed care had a shorter length of labor, and were less likely to have a cesarean and to use an epidural (6). WHO states that women should be encouraged to move around during labor, adopt an upright position of their choice, and be informed of the benefits of doing so, considering their personal preferences (66).

WHO considers that it is important that any particular position is not forced and recommends health professionals encourage the adoption of a position of individual choice, including upright positions, for women without epidural analgesia (66). The upright position, including sitting, semi-recumbent, kneeling, and squatting, was considered a practice with good published evidence and was strongly recommended during the second stage of labor (3).

The clinical benefits of the upright position described in the trials were a reduction in duration of the second stage of labor, reduction in assisted deliveries and episiotomies, less aortovagal compression, improved fetal alignment, and larger anterior-posterior and transverse pelvic outlets (3,79). The evidence suggests that upright birth positions during the second stage of labor might reduce episiotomy and instrumental vaginal births but might also be associated with increased risk of postpartum hemorrhage and second-degree tears (66).
CHAPTER 2 - METHODS

This dissertation is a cross-sectional study with a mixed-method approach to analyze the Senses of Birth Intervention impact on Brazilian women’s perceived knowledge about normal birth, cesarean, evidence-based practices, and their use of EBP during labor and childbirth. The study is part of the research project named “Senses of Birth: Effects of the interactive exhibition in changing perceptions on labor and childbirth,” funded by Bill and Melinda Gates Foundation, approved by the Federal University at Minas Gerais Institutional Review Board (IRB) - COEP/UFMG, 934.472 - and by the University at Albany IRB - Protocol Number: 18-X-209-01. All women participating in this study provided informed consent.

Data Collection

Data were collected through two self-administered questionnaires at two different points in time. The first one (Appendix 1) was a paper-based post-test survey applied immediately after the pregnant women participated in the Senses of Birth intervention, between March 2015 and March 2016 in 3 different states and four different cities of Brazil: Belo Horizonte/MG; Rio de Janeiro/RJ and Niterói/RJ; and Brasília/DF. The second one (Appendix 2) was an online-based follow-up survey emailed to those women after their date of birth, between June 2015 and January 2016.

The post-test survey took approximately 20 minutes to complete, and trained interviewers were available to assist the pregnant women if needed. The instrument contained questions on socioeconomic and demographic characteristics; previous and current pregnancy; preference for the type of birth, feelings regarding childbirth and perceived knowledge about normal birth, cesarean, evidence-based practices for childbirth and delivery, and obstetric violence. All questions were multiple choice, and the survey asked for women's perception about each topic before and
immediately after exposure to the intervention. The follow-up survey took approximately 30 minutes to be completed, contained open-ended, and optional closed-ended questions. The survey inquired about last childbirth experience, use of evidence-based practices during labor and childbirth, breastfeeding, obstetric violence, and memory of the exhibition.

**Inclusion and exclusion criteria**

All pregnant women were identified at the beginning of the intervention and invited to answer the post-test survey immediately after it. The majority of women agreed to answer it, and a refusal rate was not registered due to the open-space dynamic of the intervention. Women under 18 years old were excluded. One thousand and eighty-seven (1287) pregnant women completed the post-test survey.

All women that answered the post-test survey were invited to answer the follow-up survey, initially through email. A woman was excluded if she didn’t respond after two follow-up emails, with a 30 day interval, and three follow up calls. Five hundred and fifty-five (555) women answered, resulting in a response rate of 43.12%. On average, women answered the follow-up survey three months after giving birth (57.4%), ranging from 0 to 29 months, with 95.2% of women responding within seven months of childbirth. Answers from the post-test survey and follow-up survey were linked through a unique identifier.

The qualitative analysis used a subset sample of women that answered the follow-up survey. Two hundred and fifty-eight (258) women, 44% of those who answered the follow-up survey, were included. Exclusion of women for the qualitative analysis was related to the content of the open-ended responses, following two criteria: a) Answering two or fewer sentences to the question "Tell us a little about your birth experience."; b) Blank answers or "no comments" statements without
substantial information regarding the childbirth to the subsequent open-ended questions.

**Figure 2 – Data Collection timeline and sample**

Variables selection

Five groups of variables were used for the quantitative analysis of this dissertation, as presented below (Figure 3).

1) **Socio-demographic characteristics (SD).** Participants were asked to report their: age (19 - 34 years and ≥ 35 years), education (≤ 12 years, > 12 years), private health insurance (yes, no), and monthly family income (< 2 minimum wages (MW), 2 to < 5 MW, and 5 to < 10 MW, and ≥10 MW). The minimum wage at the time of the intervention was approximate U$224.14. The race was self-reported and categorized as white, black (pardo/black) or other (Asian and indigenous).
2) **Pregnancy Information (PI).** Participants were asked about the following topics regarding their pregnancy: prenatal care coverage (SUS {public health system}), and Private [Private Health Insurance and/or Out of Pocket payment]), gestational age when visiting the exhibition (1st and 2nd trimester, 3rd trimester), and first pregnancy (yes, no).

3) **Obstetric Characteristics.** Participants were asked about the following details regarding their childbirth: birth hospital (SUS {public health system}, and Private [Private Health Insurance/Out of Pocket]), type of birth (vaginal birth, and cesarean), perceived ability to have a normal birth (yes, no), and first pregnancy (yes, no).

4) **Perceived Knowledge.** Participants were asked to self-report their knowledge, before (retrospectively) and after the intervention, with regard to: normal birth; cesarean; risks of normal birth; risks of cesarean; doula support; midwife care; right to have companionship of her choice throughout the hospital stay and during labor and childbirth; access to non-pharmacological birth pain relief methods; birth plan; childbirth best practices; social organizations that advocate for humanized and evidence-based care; Brazil's C-section rate; the Ministry of Health (MS) and World Health Organization (WHO) guidelines for labor and childbirth care; and obstetric violence. Answers could be chosen from a Likert scale, with the possible answers ranging from none (1); poor (2); fair (3); good (4); and very good (5).

5) **Use of Evidence-Based Practices (EBP).** Participants were asked if they used each of the evidence-based practices during labor and delivery: Birth Plan (yes, no [no, don’t know]); companionship during childbirth (yes, no [no, partially]); doula support (yes, no); midwife care (yes, no); freedom of mobility during labor (yes, no); choice of position during delivery (yes, no); use of non-pharmacological methods for pain relief (yes [exclusively and the use
combined with pharmacological methods], no [no pain relief methods used or used only pharmacological methods]).

The EBP for continuum support is observed here under two variables: doula support and companionship during childbirth. In 2005 Brazil published an act ensuring that it is every woman’s right to have a companion of her choice during all stages of childbirth in every public and private hospital or birth homes, without any additional costs for the patient (80). Non-pharmacological methods of pain relief used by the women in this study were massage, ball, shower, bathtub, electrodes (TENS), music, meditation, and breathing techniques. Freedom of mobility during labor was characterized as walking, dancing, and crouching. Choice of position during delivery was characterized as any choice other than supine (traditional gynecological position), described by women as using a stool, use of bars, kneeling, semi sitting with support, and sitting upright.

The qualitative analysis used seven selected open-ended questions regarding a woman's birth experience, use of evidence-based practices, and recollection of the Senses of Birth experience (Figure 3). Open-ended questions that inquired about obstetric violence and postpartum experience were not included. The first open-ended question allowed women to tell their childbirth experience freely and was mandatory. All the other ones were optional and unfolded from a closed-ended question. All questions and answers were in Portuguese, the women's native language. Women’s responses were translated and analyzed in English by bilingual researchers; any necessary adjustments for clarity were made. The answers were analyzed as a group, forming a single interview for each woman.
### Figure 3 – List of Selected Quantitative and Qualitative Variables

#### Socio-demographic characteristics
- Age
- Education
- Health insurance
- Monthly family income
- Race

#### Pregnancy Information
- Prenatal care coverage
- Gestational age when visiting the exhibition
- First pregnancy

#### Childbirth Information
- Birth hospital
- Type of birth
- Perceived ability to have a normal birth

#### Perceived Knowledge (Before and After)
- Normal birth;
- Cesarean;
- Risks of normal birth;
- Risks of cesarean;
- Doula support;
- Midwife care;
- Right to have companionship of her choice throughout the hospital stay
- Access to non-pharmacological birth pain relief methods;
- Birth plan;
- Childbirth best practices;
- Social organizations that advocate for humanized and evidence-based care;
- Brazil's C-section rate
- Ministry of Health and World Health Organization guidelines;
- Obstetric violence

#### Use of Intrapartum EBP
- Birth Plan
- Companionship of choice during childbirth
- Doula support;
- Midwife care;
- Freedom of mobility during labor
- Choice of position during delivery
- Use of non-pharmacological methods for pain relief

#### Open-ended questions used for the qualitative analysis
- Tell us a little about your birth experience
- Did you make a Birth Plan during pregnancy? If not, why?
- If you had a Birth Plan, do you consider that the health care received corresponded to your desires? Please comment
- What methods of pain relief did you use during labor? Please comment
- Have you had any memory of the Senses of Birth during labor/delivery? Please comment
- Has the Senses of Birth influenced your childbirth in any way? Please comment
- If so, was the influence of SoB positive? Please comment
Preparing quantitative perceived knowledge variables

A factor analysis using principal domain analysis as the extraction method and the varimax rotation with Kaiser normalization was performed to identify clusters of perceived knowledge variables with shared variance. Three clusters, named here as domains, were identified. Domain 1 included eleven knowledge variables focused on Evidence-based Practice (EBP), including: doula support; midwife care; right to have a companionship of her choice throughout the hospital stay, during labor and childbirth; access to non-pharmacological birth pain relief methods; birth plan; childbirth best practices; organizations that defend the humanized and evidence-based care; Brazil's C-section rates; MS and WHO guidelines for labor and childbirth care; obstetric violence. Domain 2 included two knowledge variables focused on Normal Birth (NB), including the variables “knowledge about normal birth” and “knowledge about risks of normal birth.” Domain 3 included two knowledge variables focused on Cesarean Knowledge, including the variables “knowledge about cesarean” and “knowledge about risks of cesarean” (Figure 4).

The continuous variables ranging from 1 to 5 points were combined to create two mean scores for each of the three domains: the mean score of knowledge before SoB and one for the mean score after SoB. Subsequently, the mean score variables were used to create change scores by subtracting the mean score after from the mean score before the intervention, resulting in a continuous variable for each domain ranging from -5 to 5 (Figure 4).

For further analysis, the change score variables were transformed into dichotomous variables representing an increase or no increase in knowledge. Women who presented a change score from 0.1 to 5 were classified as “perceived increase in knowledge after the intervention,” while women with a change score between -5 and 0 were grouped as "no perceived increase in knowledge after the intervention."
Figure 4 - Perceived Knowledge Variables and mean knowledge variables created

<table>
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<tr>
<th>Normal Birth Domain</th>
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<td></td>
<td>Normal Birth Before</td>
<td>NB Mean score before</td>
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<td></td>
<td>NB risk Before</td>
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<tr>
<td></td>
<td>Normal Birth After</td>
<td>NB Mean score after</td>
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<td></td>
<td>NB Risk After (current)</td>
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<tr>
<td>Cesarean Domain</td>
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<tr>
<td></td>
<td>Cesarean Before</td>
<td>CS Mean score before</td>
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<td></td>
<td>Cesarean Risk Before</td>
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<tr>
<td></td>
<td>Cesarean After</td>
<td>CS Mean score after</td>
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<td></td>
<td>Cesarean Risk After (current)</td>
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<tr>
<td>EBP Domain</td>
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<td>Doula Support and Midwife Care Before</td>
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<tr>
<td>Birth Plan and MS/WHO recomd. Before</td>
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<td>Cesarean Rate Obst. Violence Before</td>
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<tr>
<td>Non-pharmac. pain relief and Best practices Before</td>
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<td>Companionship right and Birth Humanization Org. Before</td>
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<tr>
<td>Doula Support and Midwife Care After</td>
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<td>Birth Plan and MS/WHO recomd. After</td>
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<td>Non-pharmac. pain relief and Best practices After</td>
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<tr>
<td>Companionship right and Birth Humanization Org. After</td>
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</table>

NB Change Score (Mean score after minus mean score before)
CS Change Score (Mean score after - mean score before)
EBP Change Score (Mean score after - mean score before)
**Analytical Plan**

To understand the impact of the Senses of Birth intervention on pregnant women’s perceived knowledge regarding normal birth, cesarean and intrapartum EBP, a quantitative analysis was conducted using the socio-demographic, pregnancy information, and perceived knowledge domains about normal birth, cesarean and EBP knowledge domains.

All variables were described with total N and frequency. Associations between social-demographic, pregnancy information variables, and the perceived impact on knowledge were assessed using chi-square tests, ANOVA, logistic, and linear regression. The magnitude of associations in the logistic regression models was evaluated through the odds ratio (OR) and their respective confidence intervals at 95%. Model adjustments were evaluated using the Hosmer and Lemeshow test. The magnitude of associations in the linear regression models was evaluated using the Beta values, with statistical significance set at alpha = 0.05. Model adjustments were evaluated using the R-square test, and multicollinearity was tested, and the residual analysis performed. A paired T-test was used to compare the mean score knowledge before with the mean score knowledge after the intervention for each domain.

To understand the impact of SoB on women's behavior of using the intrapartum EBP and which variables were contributing factors, the second set of quantitative analysis was performed using the social-demographic, childbirth information, perceived knowledge domains, and use of EBP variables. All variables were described with total N and frequency. Associations were identified using chi-square and ANOVA tests. The association was considered statistically significant with P-value ≤ 0.05, and variation of means was observed for the ANOVA tests. The distribution of all variables was normal. Table 1 represents the quantitative tests performed, variables used for each one, and the correspondent research question and article.
<table>
<thead>
<tr>
<th>Group of variables</th>
<th>Article 1</th>
<th>Article 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Factor Analysis</td>
<td>Anova test</td>
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<td>Socio-demographic characteristic</td>
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<td>X</td>
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<td>X</td>
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<tr>
<td>Childbirth Information</td>
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<tr>
<td>Perceived Knowledge Before</td>
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<tr>
<td>Perceived Knowledge After</td>
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<td>Pair 1</td>
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<td>EBP Knowledge Domain Mean Score After</td>
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<td>Pair 1</td>
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<td>Pair 2</td>
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<td>Normal Birth Knowledge Domain Mean Score After</td>
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<td>Pair 2</td>
</tr>
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<td>Pair 3</td>
</tr>
<tr>
<td>Cesarean Knowledge Domain Mean Score After</td>
<td></td>
<td>Pair 3</td>
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<tr>
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<tr>
<td>Normal Birth Knowledge Domain Change Score</td>
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<tr>
<td>Cesarean Knowledge Domain Change Score</td>
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<tr>
<td>Use of EBP</td>
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</table>
To understand women's experiences with the use of intrapartum EBP, the qualitative analysis was performed. An inductive open-coding analytic process was conducted, with motivated line-by-line reading without previously established categories allowing the researcher to identify events that could become the basis of categorization. Themes and categories emerged from the codes with an agreement between two researchers (Figure 5). Each of the seven themes were related with the three categories. Each category contained 10 to 25 unique characterizing codes. The complete code dictionary with definitions and quotation frequency can be found in appendix 3.

**Figure 5 - Themes, Categories, and examples of characterizing codes that emerged from the women's interviews during the qualitative analysis coding phase**

<table>
<thead>
<tr>
<th>Themes</th>
<th>Categories</th>
<th>Characterizing codes (examples)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doula</td>
<td>Use of EBP Outcomes</td>
<td>Satisfaction</td>
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<td>Midwife</td>
<td>Barriers to use EBP</td>
<td>Acolhimento</td>
</tr>
<tr>
<td>Companionship of choice</td>
<td>Strategies and or facilitators to use EBP</td>
<td>Self-efficacy</td>
</tr>
<tr>
<td>Birth Plan</td>
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<td>Disrespected</td>
</tr>
<tr>
<td>Freedom of mobility during labor</td>
<td></td>
<td>Hospital protocol</td>
</tr>
<tr>
<td>Choice of position at delivery</td>
<td></td>
<td>Hospital ambiance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Method not offered</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Individualized care</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trust</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Choice/desire respected</td>
</tr>
</tbody>
</table>

The discourse analysis was the last step of the analytical plan. Discourse analysis was used as a triangulation strategy, mixing the results of the quantitative analysis and qualitative analysis
The methodology considered the socio-cultural and political contexts in which women interact, creating the possibility to understand why the EBPs were used or not from the woman's perspective. Recognizing that the use of EBP during labor and childbirth is not exclusively dependent on women's behavior but is also influenced by many different external factors will be relevant for further analysis. The statistical program IBM SPSS Statistics 20R was used for the quantitative analysis and Atlas.ti version 8.3.1 was used for the qualitative analysis. The in-depth description of the analysis, results, and discussion can be found in article 1 and article 2.

**Strengths and Limitations**

The SoB results described here gain relevance when viewed in the context of a previous international literature review showing a lack of evidence for the efficacy of non-clinical interventions to reduce unnecessary cesareans in middle and low-income countries. Few studies about intrapartum EBP included a large sample of Brazilian women and allowed them to freely describe their experience regarding intrapartum EBPs. Therefore, hearing the voices of well-informed Brazilian women is a differential for this study, since it can indicate women-centered care to overcome barriers and increase strategies/facilitators for the use of EBP, promoting, in the long-run, cultural change of the social norms that surround childbirth.

The large sample of pregnant women answering the post-test survey allowed adequate statistical power to detect an intervention impact on perceived knowledge and diminished the influence of an information bias. Nonetheless, there are limitations inherent to a cross-sectional design, where participants answered about before and after knowledge perception at a single point in time, without a non-exposed comparison group. The questionnaire was not applied before the
exhibition to avoid disclosing the themes introduced during the intervention, possibly influencing their answers later, and to decrease the number of pregnant women that refused to answer or provide an incomplete questionnaire, considering the length of time spent to answer all questions. To increase the accuracy and control for a possible confirmation bias, the self-applied perceived knowledge variables used a Likert scale instead of binary answers. The online self-applied survey format made it possible to gather a large sample of answers; although the instrument does not promote data collection as in-depth as small interview groups. On the other hand, the mixed-method analysis promoted a richer exploration of the theme, allowing an in-depth exploration of the women’s experiences and meanings for the use of EBP.

It is hypothesized that women who participated were already sensitized regarding the childbirth topic, therefore, it is likely that Brazilian women with lower perceived knowledge were underrepresented in our sample. Therefore, considering the higher impact of the intervention among women that started with lower perceived knowledge, it is possible that the impact of this intervention is underestimated. Additionally, women describing their childbirth experience might be influenced by intrinsic social desirability to focus only on positive outcomes of the birth. However, the anonymity of responses and engagement of women with the topic likely diminishes this influence over the results.
CHAPTER 3 – ARTICLE 1

CHANGES IN PERCEIVED KNOWLEDGE ABOUT CHILDBIRTH AMONG PREGNANT WOMEN PARTICIPATING IN THE SENSES OF BIRTH INTERVENTION IN BRAZIL: A CROSS-SECTIONAL STUDY.

Background

The increasing rates of cesarean delivery (C-sections) in high-income and medium-income countries are a global concern (12,81). The high rates contrast with the worrisome low rates in low-income countries, stressing the gaps of access to adequate quality maternal care and the over-medicalization of childbirth (81,82). United Nations (UN) Sustainable Development Goals (SDG) call for a new era of accountability, challenging the health systems to identify and eliminate the preventable maternal morbidity and mortality associated with inadequate access to services, or the delivery of services that are “too little, too late” (TLTL) (12,17,83). The SDGs also question the opposite extreme reality of the over-medicalization of regular antenatal, intrapartum, and postnatal care, referred to as “too much, too soon” (TMTS) (12,17,83).

The SDG #3 - to reduce global maternal mortality to less than 70 per 1,000 live births without any country with double of the global average, and the SDG #5 - gender equality – ensuring access to reproductive health and reproductive rights (18) can be approached through the lens of the new World Health Organization (WHO) recommendations for intrapartum care (66). WHO

presents a comprehensive document that creates a platform for pregnant women with respectful, individualized, woman-centered, and effective clinical and non-clinical practices to optimize birth outcomes for the woman and her baby (66,83). The protocol reinforces that evidence-based practices can be effective strategies for both scenarios – TMTS and TLTL – to ensure women's reproductive rights (12).

Data from 137 countries revealed that every year in the world there is a need for 0.8–3.2 million C-sections in low-income countries and an excess of 4.0-6.2 million C-sections performed in middle and high-income countries (84,85). In Latin America, the average C-section rate is 33 cesareans per 100 live births, 49% of those considered elective (30,85). Brazilian C-section rates have been increasing since the year 2001, and by 2009 exceeded the number of vaginal deliveries, reaching 57% in 2014 (21–23), up to 47.2% of those were classified as unnecessary (84).

Since 1985, WHO recommends that C-section rates should be between 10 to 15% (26). Medically indicated cesareans are useful to save maternal and infant lives. However, several studies have shown that C-section rates higher than 15% are associated with an increase in maternal mortality and morbidity, including a higher chance of a more prolonged hospital stay, hysterectomy caused by postpartum hemorrhage, postnatal treatment with antibiotics and cardiac arrest for women, and increased risk of neonatal intensive care admission for babies, among others (26–31).

Reasons behind the higher rates are multifactorial, including socio-inequalities, cultural preferences, clinical recommendations not based on the best scientific evidence, underuse of evidence-based practices, practice of defensive medicine, lack of midwife availability/support, value/cost of procedures, increased use of technology, and increased medicalization of childbirth (14,32–36).

Countries with alarming cesarean rates such as Brazil, Dominican Republic, Egypt, Taiwan,
China, India, and Iran have similar non-clinical factors identified as contributors to the high rates (86–91). Researchers found that social and cultural beliefs of women, families and communities in those countries result in a viewpoint that a cesarean is a safer delivery mode for mother and child when compared to a vaginal birth. More specifically, common perceptions in these countries include: women are not physically and mentally prepared for a vaginal childbirth, vaginal birth can impact a woman’s future sexual life, medical interventions are regular unavoidable procedural practices in vaginal birth, and the process of birth is unimportant (33,53,92,93).

The Brazilian maternity health care system is mostly interventionist, an example of a “too much, too soon” approach where labor and childbirth is considered a medical event instead of a normal physiologic process with its own social and cultural context (8,19). Brazil’s C-section rate was 55.7% in 2017 (24). Fifty-eight percent of births in Brazil happen in the private sector, among which 83% of the deliveries are cesareans, while in the public sector the C-section rate is 40% (20,25). Additional reasons for the high rates of cesarean in Brazil might be related to the model of care and physicians’ beliefs and behavior. Studies show that, frequently, the relationship between women and obstetricians is asymmetrical and physician centered, with no place for women’s choices and preferences (88,94,95).

The technocratic model of childbirth is the hegemonic model around the world, centered on the physician’s knowledge, hospital procedures and a high technological system (60,62,96). On the other hand, the humanistic model emphasizes the connection between mind and body, focusing on a soft approach, balancing between the need of the institution and individual/tailored continuum of care (60,62). In Brazil, the humanistic model is advocated for by community-based movements since the beginning of the 1990s (96), and concepts of the model have been incorporated into public policies as the most recent "Stork Network", a strategy that aims to implement a network of care
to assure women the right to reproductive planning and humanized care during pregnancy, childbirth and the postnatal period, as well as guaranteeing children the right to a safe birth and healthy growth and development (40). However, the changes were not sufficient to oppose a TMTS system, with practices strongly anchored by medical authoritative knowledge.

Authoritative knowledge is a set of scientific-based information, more commonly available for physicians and other health care professionals, and embodied knowledge is based on the individual perception/intuition and practical experience (54,63). Knowledge is a distinct domain of control, and control is often linked to a broad notion of a “good” birth (34). Women's perceptions of birth and decisions for type of birth are a combination of embodied knowledge and authoritative knowledge since the technocratic and the humanistic models coexist in most maternal care models around the world (53,54,60). Women might exercise control of the body during childbirth with use of evidence-based practices such as pain management (non-pharmacological methods), feeling supported or cared for (one-to-one support/companionship), and active informed consent including respect of her wishes by the health professional attending the childbirth (birth plan) (34).

Although using EBPs during labor and childbirth are recommended to improve birth outcomes (1–6), they are still underused practices (7–11), while the poor maternal mortality and morbidity rates show that their implementation still needs to be reinforced (97–99). EBPs during labor and childbirth, also known as best practices, can be effective strategies for both scenarios TMTS and TLTL, and to ensure women's reproductive rights (12).

Considering the urgent need to reduce unnecessary cesareans in Brazil and the multifactorial reasons for the increasing rates, a health education and health promotion intervention named Senses of Birth (SoB) was implemented in three different states of Brazil between 2015 and 2017 (43). SoB aimed to contribute to the reduction of unnecessary C-sections and iatrogenic
prematurity in Brazil (43) by addressing cultural preferences shaped by generations of women that suffered a negative experience in childbirth. (43). SoB is an interactive exhibition where visitors (women, men, children, adolescents) are invited to walk through the pregnancy and childbirth process, first as a pregnant woman and later as the newborn (43). During the experience the visitor is engaged in themes related to normal birth, risks of cesarean, best practices during childbirth, obstetric violence, the Ministry of Health (MS) and World Health Organization (WHO) recommendations, and the Brazilian humanization movement (43).

This study evaluates the impact of the SoB intervention on pregnant women, with regard to their perceived knowledge about normal birth, cesarean, and their use of evidence-based practices (EBP) during labor and childbirth.

Method

Data and sample

The study is a quantitative analysis of the impact of the Senses of Birth exhibition on pregnant women’s perceived knowledge about types of birth and the use of evidence-based practices during childbirth. It is part of the research project named "Senses of Birth: Effects of the interactive exhibition in changing perceptions on labor and childbirth," funded by Bill and Melinda Gates Foundation, approved by the Federal University at Minas Gerais IRB (COEP/UFMG, 934.472) and by the University at Albany Institutional Review Board (IRB Protocol Number: 18-X-209-01).

One thousand two hundred and eighty-seven (1,287) pregnant women answered a structured questionnaire, supported by trained interviewers, immediately after their visit to the exhibition between March 2015 and March 2016, in three different states and four different cities
of Brazil (Belo Horizonte/MG; Rio de Janeiro/RJ and Niterói/RJ; and Brasília/DF), using the convenience sampling method and a cross-sectional design. The self-administered questionnaire inquired about the women’s changes in perceptions, feelings, preferences, and knowledge related to normal birth, cesarean, evidence-based practices, and obstetric violence, before and after visiting Senses of Birth. Data were also collected regarding socioeconomic and demographic characteristics, and experiences with previous and current pregnancies. All pregnant women who attended the intervention were invited to answer the questionnaire, excluding those under 18 years old. All women participating in this study provided informed consent.

Measures

Four groups of variables were selected for analysis. They were categorized or scored for analysis in this study as follows:

1) **Socio-demographic characteristics.** Participants were asked to report their: age (19 - 34 years and ≥ 35 years), education (≤ 12 years, > 12 years), private health insurance (yes, no), and monthly family income (< 2 minimum wages (MW), 2 to < 5 MW, and 5 to < 10 MW, and ≥10 MW). The minimum wage at the time of the intervention was approximately U$224.14. Race was self-reported and categorized as white, black (pardo/black) or other (Asian and indigenous).

2) **Pregnancy Information.** Participants were asked about the following topics regarding their pregnancy: prenatal care coverage (SUS {public health system}), and Private [Private Health Insurance and/or Out of Pocket payment]), gestational age when visiting the exhibition (1st and 2nd trimester, 3rd trimester), and first pregnancy (yes, no).
3) **Perceived Knowledge.** Participants were asked to self-report their knowledge, before (retrospectively) and after the intervention, with regard to: normal birth; cesarean; risks of normal birth; risks of cesarean; doula support; midwife care; right to have companionship of her choice throughout the hospital stay, during labor and childbirth; access to non-pharmacological birth pain relief methods; birth plan; childbirth best practices; social organizations that advocate for humanized and evidence-based care; Brazil's C-section rate; the Ministry of Health (MS) and World Health Organization (WHO) guidelines for labor and childbirth care; and obstetric violence. Answers could be chosen from a Likert scale, with the possible answers ranging from none (1); poor (2); fair (3); good (4); and very good (5).

*Preparing variables*

A factor analysis using principal domain analysis as the extraction method and the varimax rotation with Kaiser normalization was performed to identify clusters of perceived knowledge variables with shared variance. Three clusters, named here as domains were identified. **Domain 1** included eleven knowledge variables focused on Evidence-based Practice (EBP), including: doula support; midwife care; right to have a companionship of her choice throughout the hospital stay, during labor and childbirth; access to non-pharmacological birth pain relief methods; birth plan; childbirth best practices; organizations that defend the humanized and evidence-based care; Brazil's C-section rates; MS and WHO guidelines for labor and childbirth care; obstetric violence. **Domain 2** included two knowledge variables focused on Normal Birth (NB), including the variables “knowledge about normal birth” and “knowledge about risks of normal birth.” **Domain**
included two knowledge variables focused on **Cesarean Knowledge**, including the variables “knowledge about cesarean” and “knowledge about risks of cesarean.”

The continuous variables ranging from 1 to 5 points were combined to create two mean scores for each of the three domains: one mean score of knowledge before SoB and one for the mean score after SoB. Subsequently, the mean score variables were used to create change scores by subtracting the mean score after from the mean score before the intervention, resulting in a continuous variable for each domain ranging from -5 to 5.

For further analysis, the change score variables were transformed into dichotomous variables representing *increase* or *no increase* in knowledge. Women who presented a change score from 0.1 to 5 were classified as “perceived increase in knowledge after the intervention”, while women with a change score between -5 and 0 were grouped as “no perceived increase in knowledge after the intervention”.

**Analysis**

Associations between social-demographic (SD) and pregnancy information (PI) variables were analyzed with chi square tests to identify differences between groups that changed and did not change perceived knowledge before and after the SoB intervention for each of the three knowledge domains. ANOVA tests were performed to identify associations between SD and PI variables and amounts of change in the mean score knowledge before the intervention. All scores presented normal distribution. A paired T-test was used to compare the mean score knowledge before with the mean score knowledge after the intervention for each domain.

These associations were also assessed by multivariate analyses. A logistic regression model was used to identify variables that were independently associated with “increased perceived knowledge” after the intervention. A linear logistic regression was performed to analyze the
independent variables associated with amounts of change in perceived knowledge for each domain. All selected variables were kept in the linear and regression models regardless of the previous statistical association, considering the comparability between models and the literature support of the variables. The magnitude of associations in the logistic regression models was evaluated through odds ratio (OR) and their respective confidence intervals at 95%. Model adjustments were evaluated using the Hosmer and Lemeshow test. The magnitude of associations in the linear regression models were evaluated using the Beta values, with statistical significance set at alpha = .05. Model adjustments were evaluated using the R-square test. Multicollinearity was tested, and the residual analysis performed. The statistical program IBM SPSS Statistics 24R was used for the data analysis.

Results

Pregnant women who participated in this study were predominantly 19 to 34 years old (81.8%), black (54.2%), with more than 13 years of education (68.4%), had a family monthly income between 2 to < 5 minimum wages (MW) (32.2%), were primiparous (50.9%), in the first or second trimester on the day of the exhibition (60.9%), had private health insurance (74.7%), and private prenatal care coverage (65.0%) (Table 2).

Most of the women who attended the exhibition perceived an increase in their knowledge for all three domains: 85% for evidence-based practices, 68.5% for normal birth, and 63.7% for cesarean. Women with ≤ 12 years of education were more likely to have perceived increased knowledge on normal birth (35.9% x 22.4% p< 0.001). The same was true for the perceived knowledge on EBP and cesarean. Black women were more likely to perceive an increase in knowledge for normal birth and cesarean. Women within the lower ranges of income (< 2 MW and
2 to < 5 MW) were more likely to perceive an increase in knowledge for all three knowledge domains.

Women who visited the exhibition during the 1st and 2nd trimester of pregnancy were more likely to perceive an increase in knowledge for EBP (62.3% x 53.1% p = 0.016), normal birth (63.7% x 55.3% p= 0.003), and cesarean (65.6% x 52.9% p< 0.001). A similar trend was observed for first pregnancy, with higher chances to increase perceived knowledge on EBP (51.3% x 36.5% p= 0.020) and cesarean (53.1% x 42.1% p< 0.001) (Table 2). Women without private health insurance were more likely to perceive an increase in knowledge for normal birth (29% x 17.1% p< 0.001) (Table 2).
Table 2 - Socio-demographic characteristics and pregnancy information of pregnant women who participated in the Senses of Birth intervention according to change in perceived knowledge after the intervention for the domains of evidence-based practices

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Total</th>
<th>EBP Knowledge Domain</th>
<th>Normal Birth Knowledge Domain</th>
<th>Cesarean Knowledge Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Increase N (%)</td>
<td>Non-Increase N (%)</td>
<td>P-Value</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19 - 34 years</td>
<td>1043</td>
<td>891 (82.2)</td>
<td>152 (79.6)</td>
<td>0.00</td>
</tr>
<tr>
<td>≥ 35 years</td>
<td>232</td>
<td>193 (17.8)</td>
<td>39 (20.4)</td>
<td>7</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>1275</td>
<td>1084 (85.0)</td>
<td>191 (15.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 12 years</td>
<td>398</td>
<td>352 (32.8)</td>
<td>46 (24.7)</td>
<td></td>
</tr>
<tr>
<td>&gt; 12 years</td>
<td>869</td>
<td>720 (67.2)</td>
<td>140 (75.3)</td>
<td>6</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>1258</td>
<td>1072 (85.2)</td>
<td>186 (14.8)</td>
<td></td>
</tr>
<tr>
<td><strong>Income</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 2 MW</td>
<td>282</td>
<td>249 (23.9)</td>
<td>33 (19.2)</td>
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<tr>
<td>2 to &lt; 5 MW</td>
<td>380</td>
<td>337 (32.2)</td>
<td>43 (25.0)</td>
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<tr>
<td>5 to &lt; 10 MW</td>
<td>293</td>
<td>242 (24.9)</td>
<td>51 (29.7)</td>
<td>1</td>
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<tr>
<td>≥10 MW</td>
<td>224</td>
<td>179 (19.0)</td>
<td>45 (26.2)</td>
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<td><strong>TOTAL</strong></td>
<td>1179</td>
<td>1007 (85.4)</td>
<td>172 (14.6)</td>
<td></td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>White</td>
<td>587</td>
<td>494 (45.9)</td>
<td>93 (48.4)</td>
<td></td>
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<tr>
<td>Black and</td>
<td>691</td>
<td>594 (54.6)</td>
<td>99 (51.6)</td>
<td>0.24</td>
</tr>
<tr>
<td>Others</td>
<td>1280</td>
<td>1088 (85.0)</td>
<td>192 (15.0)</td>
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<td><strong>First Pregnancy</strong></td>
<td></td>
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<tr>
<td>Yes</td>
<td>593</td>
<td>506 (50.9)</td>
<td>65 (36.5)</td>
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<tr>
<td>No</td>
<td>571</td>
<td>480 (49.1)</td>
<td>113 (63.5)</td>
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<td><strong>TOTAL</strong></td>
<td>1164</td>
<td>986 (84.7)</td>
<td>178 (15.3)</td>
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<td><strong>Private Health Insurance</strong></td>
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<tr>
<td>Yes</td>
<td>958</td>
<td>810 (74.7)</td>
<td>148 (77.1)</td>
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40
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<th>SUS (Public)</th>
<th>Private</th>
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<td>(24.3)</td>
<td>814</td>
<td>1282</td>
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<tr>
<td></td>
<td>280</td>
<td>(25.7)</td>
<td>692</td>
<td>1090</td>
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<tr>
<td></td>
<td>44</td>
<td>(22.9)</td>
<td>112</td>
<td>192</td>
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<td>Prenatal Care Coverage</td>
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<td>550</td>
<td>878</td>
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<td></td>
<td>69</td>
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<td>216</td>
<td>(26.5)</td>
<td>519</td>
<td>816</td>
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<td>439</td>
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<td></td>
<td>(65.2)</td>
<td>127</td>
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<tr>
<td>Pregnan cy Trimester at the time of the exhibition</td>
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<td>(68.5)</td>
<td>312</td>
<td>1282</td>
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<td>(3.4)</td>
<td>444</td>
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<td>179</td>
<td>1023</td>
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<td></td>
<td></td>
<td>(32.2)</td>
<td>387</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(63.1)</td>
<td>758</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(36.9)</td>
<td>444</td>
</tr>
</tbody>
</table>

1 Monthly Minimum Wage in 2015: R$788.00 = US$224.14
2 Total varies because of missing data for each variable
3 SUS – Unified Health System
^P value ≤ 0.1        *P value ≤ 0.05     **P value ≤ 0.001
Before the intervention, the majority of women considered themselves to have a mean score above 3.0 for all three knowledge domains. Mean scores were highest for the Normal Birth Knowledge domain (mean = 3.71, SD = 0.94), followed by the Cesarean Knowledge Domain (mean = 3.54, SD = 0.98) and the EBP Knowledge Domain (mean = 3.15, SD = 1.08) (Table 3). In general, perceived knowledge before the intervention for each domain was higher among women who were over 35 years old, had more than 12 years of schooling, with higher income, white, with private health insurance, and in their 3rd trimester of pregnancy.
Table 3 - Mean knowledge about evidence-based practices (EBP), normal birth, and cesarean of pregnant women before visiting the Senses of Birth intervention by socio-demographic characteristics and information on pregnancy

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>EBP Knowledge Domain</th>
<th>Normal Birth Knowledge Domain</th>
<th>Cesarean Knowledge Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Deviation</td>
<td>P-value</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19-34 years</td>
<td>3.12</td>
<td>1.079</td>
<td>0.037*</td>
</tr>
<tr>
<td>≥ 35 years</td>
<td>3.28</td>
<td>1.081</td>
<td>0.037*</td>
</tr>
<tr>
<td>TOTAL</td>
<td>3.15</td>
<td>1.081</td>
<td>0.037*</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 12 years</td>
<td>2.48</td>
<td>0.888</td>
<td></td>
</tr>
<tr>
<td>&gt; 12 years</td>
<td>3.45</td>
<td>1.028</td>
<td>0.000**</td>
</tr>
<tr>
<td>TOTAL</td>
<td>3.14</td>
<td>1.082</td>
<td>0.000**</td>
</tr>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 2 MW</td>
<td>2.50</td>
<td>0.910</td>
<td></td>
</tr>
<tr>
<td>2 to &lt; 5 MW</td>
<td>3.00</td>
<td>1.050</td>
<td></td>
</tr>
<tr>
<td>5 to &lt; 10 MW</td>
<td>3.48</td>
<td>1.010</td>
<td>0.000**</td>
</tr>
<tr>
<td>≥ 10 MW</td>
<td>3.78</td>
<td>0.906</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>3.15</td>
<td>1.082</td>
<td>0.000**</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>3.35</td>
<td>1.053</td>
<td></td>
</tr>
<tr>
<td>Black and Others</td>
<td>2.96</td>
<td>1.071</td>
<td>0.000**</td>
</tr>
<tr>
<td>TOTAL</td>
<td>3.14</td>
<td>1.080</td>
<td>0.000**</td>
</tr>
<tr>
<td><strong>First Pregnancy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3.23</td>
<td>1.127</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>3.11</td>
<td>1.048</td>
<td>0.044*</td>
</tr>
<tr>
<td>TOTAL</td>
<td>3.17</td>
<td>1.090</td>
<td>0.044*</td>
</tr>
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<td><strong>Private Health Insurance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3.32</td>
<td>1.055</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>2.62</td>
<td>0.984</td>
<td>0.000**</td>
</tr>
<tr>
<td>TOTAL</td>
<td>3.15</td>
<td>1.081</td>
<td>0.000**</td>
</tr>
<tr>
<td><strong>Prenatal Care Coverage</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUS (Public)</td>
<td>2.96</td>
<td>1.110</td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td>3.26</td>
<td>1.048</td>
<td>0.000**</td>
</tr>
<tr>
<td>TOTAL</td>
<td>3.15</td>
<td>1.079</td>
<td>0.000**</td>
</tr>
<tr>
<td><strong>Pregnancy Trimester at the time of the exhibition</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st or 2nd</td>
<td>3.08</td>
<td>1.039</td>
<td></td>
</tr>
<tr>
<td>3rd</td>
<td>3.36</td>
<td>1.097</td>
<td>0.000**</td>
</tr>
<tr>
<td>TOTAL</td>
<td>3.19</td>
<td>1.070</td>
<td>0.000**</td>
</tr>
</tbody>
</table>

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Welch Test of Equality of Means – P value ≤ 0.05
Levene Statistics – P value ≥ 0.05
Tukey Test – P value ≤ 0.05

*P value ≤ 0.05 **P value ≤ 0.001

*** P value was not reported since variables did not meet assumption criteria of distribution of means
The mean score of perceived knowledge after the intervention was higher than the mean score before experiencing the SoB for all three knowledge domains among pregnant women, as observed in Figure 6. Results of the dependent (paired) sample t-tests indicated that there were significant differences in pregnant women's perceived knowledge of evidence-based practices (p ≤ 0.001), normal birth (p ≤ 0.001), and cesarean (p ≤ 0.001).

**Figure 6 - Mean for knowledge about evidence-based practices, normal birth and cesarean among pregnant women before and after participating in the Senses of Birth intervention**

Multivariate logistic regression analysis showed that women in their first pregnancy were 92% more likely to experience an increase in knowledge about EBP than women with a previous pregnancy (OR 1.92, 95% CI: 1.31-2.82); primiparous women were 37% times more likely to increase knowledge about normal birth (OR 1.37, 95% CI: 1.03-1.84), and 63% times more likely to increase knowledge about cesarean (OR 1.63, 95% CI: 1.23-2.16). Women in their 1st or 2nd
trimester of pregnancy were also more likely than women in their 3rd trimester to increase knowledge in all three domains (OR 1.64, 95% CI: 1.13-2.39 for EBP; OR 1.48, 95% CI: 1.11-1.97 for normal birth; OR 1.85, 95% CI: 1.40-2.41 for cesarean). Lower income was also associated with the odds of increasing knowledge about normal birth and cesarean, but not for EBP (Table 4). Women without private health insurance (OR 2.47, 95% CI: 1.49-4.09), and those that had private prenatal care (OR 2.42, 95% CI: 1.59-3.66) were more likely to experience increases in normal birth knowledge. Multicollinearity for income and education was tested, and no substantive results were observed.
Table 4 - Logistic regression model testing associations between socio-demographic and information on pregnancy variables and the odds of increasing perceived knowledge regarding evidence-based practices (EBP), normal birth and cesarean among pregnant women

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>EBP Knowledge Domain&lt;sub&gt;3,4&lt;/sub&gt;</th>
<th>Normal Birth Knowledge Domain&lt;sub&gt;5&lt;/sub&gt;</th>
<th>Cesarean Knowledge Domain&lt;sub&gt;6&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total: N = 944</td>
<td>Total: N = 944</td>
<td>Total: N = 944</td>
</tr>
<tr>
<td></td>
<td>OR  CI 95% Wald (P-value)</td>
<td>OR  CI 95% Wald (P-value)</td>
<td>OR  CI 95% Wald (P-value)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19-34 years</td>
<td>0.89 0.564 - 1.223 (0.636)</td>
<td>1.0 0.720 - 0.023 (0.879)</td>
<td>0.9 0.653 - 0.191 (0.662)</td>
</tr>
<tr>
<td>≥ 35 years</td>
<td>1.00</td>
<td>1.0</td>
<td>1.00</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 12 years</td>
<td>1.45 0.818 - 2.164 (0.202)</td>
<td>1.4 0.969 - 3.302 (0.069)^*</td>
<td>1.3 0.911 - 2.254 (0.133)^*</td>
</tr>
<tr>
<td>&gt; 12 years</td>
<td>1.00</td>
<td>1.0</td>
<td>1.00</td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 2 MW</td>
<td>1.88 0.865 - 2.546 (0.111)^*</td>
<td>2.6 1.488 - 10.745 (0.001)**</td>
<td>1.4 0.864 - 2.073 (0.150)</td>
</tr>
<tr>
<td>2 to &lt; 5 MW</td>
<td>1.68 0.966 - 3.377 (0.066)^*</td>
<td>2.2 1.504 - 14.765 (0.000)**</td>
<td>1.7 1.161 - 7.115 (0.008)^*</td>
</tr>
<tr>
<td>5 to &lt; 10 MW</td>
<td>1.13 0.696 - 0.254 (0.614)</td>
<td>1.5 1.063 - 5.147 (0.023)^*</td>
<td>1.4 1.008 - 4.001 (0.045)^*</td>
</tr>
<tr>
<td>≥10 MW</td>
<td>1.00</td>
<td>1.0</td>
<td>1.00</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black and Others</td>
<td>1.09 0.747 - 0.229 (0.633)</td>
<td>0.9 0.698 - 0.165 (0.685)</td>
<td>1.1 0.895 - 1.401 (0.230)</td>
</tr>
<tr>
<td>White</td>
<td>1.00</td>
<td>1.0</td>
<td>1.00</td>
</tr>
<tr>
<td>First Pregnancy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1.92 1.312 - 11.218 (0.001)**</td>
<td>1.3 1.028 - 4.618 (0.032)^*</td>
<td>1.6 1.234 - 11.784 (0.001)**</td>
</tr>
<tr>
<td>No</td>
<td>1.00</td>
<td>1.0</td>
<td>1.00</td>
</tr>
<tr>
<td>Private Health Insurance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.25 0.650 - 0.460 (0.498)</td>
<td>2.4 1.493 - 12.372 (0.000)^**</td>
<td>1.3 0.818 - 1.245 (0.264)</td>
</tr>
<tr>
<td>Yes</td>
<td>1.00</td>
<td>1.0</td>
<td>1.00</td>
</tr>
<tr>
<td>Prenatal Care Coverage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.34</td>
<td>0.793 -</td>
<td>1.205</td>
</tr>
<tr>
<td>-----------</td>
<td>------</td>
<td>---------</td>
<td>-------</td>
</tr>
<tr>
<td>Private</td>
<td>4</td>
<td>2.278</td>
<td>(0.272)</td>
</tr>
<tr>
<td>SUS (Public)</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**P value \leq 0.001  *P value \leq 0.05  **P value \leq 0.1

<table>
<thead>
<tr>
<th>Pregnancy Trimester at the time of the exhibition</th>
<th>1.64</th>
<th>1.131 -</th>
<th>6.809</th>
<th>1.4</th>
<th>1.106 -</th>
<th>6.987</th>
<th>1.8</th>
<th>1.403 -</th>
<th>18.916</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st or 2nd</td>
<td>3</td>
<td>2.385</td>
<td>(0.009)*</td>
<td>77</td>
<td>1.973</td>
<td>(0.008)*</td>
<td>53</td>
<td>2.406</td>
<td>(0.000)**</td>
</tr>
<tr>
<td>3rd</td>
<td>1.00</td>
<td></td>
<td></td>
<td>1.0</td>
<td></td>
<td></td>
<td>1.0</td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

‡Monthly Minimum Wage in 2015: R$788.00 = US$224.14
‡Total varies because of missing data – Method of Listwise deletion
‡Reference category: Impact on knowledge (yes)
‡Hosmer and Lemeshow Test X²=8.451; df= 8; P-value = 0.391. R² de Nagelkerke= 0.056
‡Hosmer and Lemeshow Test X²=8.913; df= 8; P-value = 0.350. R² de Nagelkerke= 0.099
‡Hosmer and Lemeshow Test X²=11.056; df= 8; P-value = 0.198. R² de Nagelkerke= 0.067
‡P value \leq 0.1  *P value \leq 0.05  **P value \leq 0.001
The linear regression model (Table 5) showed that for all three knowledge domains, women with lower income experienced greater increases in perceived knowledge than their high-income peers. Women with < 2 MW income experienced a greater increase in EBP knowledge than women with ≥ 10 MW by 0.206 (B = 0.206; p < 0.001). The same pattern was found regarding education and its association with EBP and normal birth knowledge, but not with cesarean knowledge. Greater increases in knowledge were also found to be associated with first pregnancy (for normal birth and cesarean knowledge), no private insurance, private prenatal care, and 1st or 2nd trimester at the time of the intervention.

In supplemental analyses, each linear regression model was re-run after controlling for variation in the baseline knowledge (before). An association between the “before knowledge” and the change in knowledge was observed for all domains: EBP (B = -0.076; p < 0.000), normal birth (B = -0.729; p < 0.001), and cesarean (B = -0.676; p < 0.000). Furthermore, the majority of SD and PI variables were no longer associated with increases in knowledge. The variables remaining statistically significant for the associations for each domain were the 2 to < 5 MW (B = 0.101; p < 0.000) for the EBP domain; ≤ 12 years of education (B = -0.115; p < 0.000) and first pregnancy (B = 0.049; p < 0.05) for the cesarean domain.

These findings seem to suggest that there was an increase in knowledge for women with low knowledge before, regardless of their socio-demographic or pregnancy information. Multicollinearity for income and education was tested, and no substantive changes was observed.

A summary of the results is available in Table 6.
Table 5 - Linear regression testing associations between socio-demographic and information on pregnancy variables and levels of change in perceived knowledge about evidence-based practices (EBP), normal birth and cesarean for pregnant women

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>EBP Knowledge Domain 3,4 (Total: N = 940)</th>
<th>Normal Birth Knowledge Domain 3,5 (Total: N = 944)</th>
<th>Cesarean Knowledge Domain 3,6 (Total: N = 938)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B (P-value)</td>
<td>B (P-value)</td>
<td>B (P-value)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19-34 years</td>
<td>-0.012 (0.695)</td>
<td>-0.011 (0.729)</td>
<td>-0.019 (0.560)</td>
</tr>
<tr>
<td>≥ 35 years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 12 years</td>
<td>0.142 (<strong>0.000</strong>)</td>
<td>0.111 (0.007*)</td>
<td>0.067 (0.109*)</td>
</tr>
<tr>
<td>&gt; 12 years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 2 MW</td>
<td>0.206 (<strong>0.000</strong>)</td>
<td>0.140 (0.007*)</td>
<td>0.092 (0.088*)</td>
</tr>
<tr>
<td>2 to &lt; 5 MW</td>
<td>0.237 (<strong>0.001</strong>)</td>
<td>0.164 (<strong>0.000</strong>)</td>
<td>0.142 (0.002*)</td>
</tr>
<tr>
<td>5 to &lt; 10 MW</td>
<td>0.077 (0.053*)</td>
<td>0.083 (0.040*)</td>
<td>0.098 (0.018*)</td>
</tr>
<tr>
<td>≥10 MW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black and Others</td>
<td>0.040 (0.210)</td>
<td>0.049 (0.137*)</td>
<td>0.079 (0.010*)</td>
</tr>
<tr>
<td>White</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Pregnancy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0.044 (0.162)</td>
<td>0.063 (0.05*)</td>
<td>0.096 (0.021*)</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private Health Insurance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>0.154 (<strong>0.000</strong>)</td>
<td>0.191 (<strong>0.000</strong>)</td>
<td>0.102 (0.004*)</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prenatal Care Coverage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td>0.146 (<strong>0.001</strong>)</td>
<td>0.139 (<strong>0.001</strong>)</td>
<td>0.097 (0.024*)</td>
</tr>
<tr>
<td>SUS (Public)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pregnancy Trimester at the time of the exhibition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st or 2nd</td>
<td>0.100 (<strong>0.001</strong>)</td>
<td>0.087 (0.006*)</td>
<td>0.093 (0.026*)</td>
</tr>
<tr>
<td>3rd</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*aMonthly Minimum Wage in 2015: R$788.00 = US$224.14
*bTotal varies because of missing data – Method of Listwise deletion
*cChange Score Variable - Continuous scale (-5 to 5)
*dR-square = 0.130
*eR-square = 0.091
*fR-square = 0.052
*P value ≤ 0.05  **P value ≤ 0.001  ^P value ≤ 0.1
Table 6 - Logistic regression and linear regression summary of socio-demographic and pregnancy information variables association with knowledge outcomes about evidence-based practices, normal birth and cesarean among pregnant women

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>EBP Knowledge Domain Total N = 940</th>
<th>Normal Birth Knowledge Domain Total N = 944</th>
<th>Cesarean Knowledge Domain Total N = 938</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Logistic Regression Linear Regression</td>
<td>Logistic Regression Linear Regression</td>
<td>Logistic Regression Linear Regression</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19 - 34 years</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>≥ 35 years</td>
<td>Reference</td>
<td>Reference</td>
<td>Reference</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 12 years</td>
<td>-</td>
<td>**</td>
<td>^</td>
</tr>
<tr>
<td>&gt; 12 years</td>
<td>Reference</td>
<td>Reference</td>
<td>Reference</td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 2 MW</td>
<td>^</td>
<td>**</td>
<td>*</td>
</tr>
<tr>
<td>2 to &lt; 5 MW</td>
<td>^</td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>5 to &lt; 10 MW</td>
<td>-</td>
<td>*</td>
<td>**</td>
</tr>
<tr>
<td>≥10 MW</td>
<td>Reference</td>
<td>Reference</td>
<td>Reference</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black and Others</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
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<td>Private Health Insurance</td>
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<td>SUS (Public)</td>
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<td>Pregnancy Trimester at the time of the exhibition</td>
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^P value ≤ 0.1 *P value ≤ 0.05 **P value ≤ 0.001 - P value ≥ 0.1
Discussion

SoB impact on women’s knowledge

Most pregnant women in this study experienced an increase in perceived knowledge about normal birth, cesarean and EBP after participating in the SoB intervention. Prior studies that have evaluated the impact of a health education intervention on women’s preference, knowledge, skills and behavior have found that culturally appropriate maternity care has positive effects on increasing knowledge, stronger attitude, perceived behavior control, and the use of skilled maternity care among women (33,49,100). Recent findings from the “Lancet Series of Optimizing Caesarean Section Use” also showed that non-clinical health-care interventions to reduce unnecessary C-sections are most effective when prioritizing human relationships, promoting respectful and collaborative care, and addressing women's beliefs and attitudes (98).

The SoB Intervention provides women with scientific evidence-based information, becoming a viable and valid source of women’s authoritative knowledge set, as conceptualized by different authors (54,63). The intervention also empowers women to use their embodied knowledge promoting a combination of both sets of knowledge, possibly increasing women’s perception of control of the childbirth and reinforcing the decision about type of birth.

Interactive activities through the intervention provide women with the chance to experience the embodied knowledge and the new set of authoritative knowledge. Increasing access to knowledge and information can empower women to challenge the authoritative and technocratic medical knowledge, providing them with the sense of self-efficacy to overcome fear, increase control, and access tools to achieve a positive experience of birth and satisfaction. Increasing women’s knowledge might create opportunities for a meaningful conversation with health
professionals that could lead to improved support for their preference for type of birth and use of evidence-based practices to achieve a positive birth experience (53,59,93,101,102).

*The use of EBP during childbirth to reclaim women’s control over their body*

Before the intervention, women who participated in SoB knew more about the benefits and risks of a normal birth and a cesarean than they knew about EBP. Understandably, they perceived a higher increase in their knowledge about EBP after experiencing SoB. That difference might indicate that there is a wide or popular perception about the benefits of normal birth and risks of cesarean among Brazilian society, even while facing the technocratic model of care. However, information regarding best practices during childbirth, women's rights and resources to achieve a positive birth experience are clearly not disseminated adequately. These results are consistent with the literature showing a low awareness of reproductive rights, including the recommendations of evidence-based practice among Brazilian women (10,72,103,104).

Providing access to information about EBP for women can be a strategy to achieve a positive childbirth experience and a tool to regain control over their bodies. The Senses of Birth intervention intentionally engaged social movements and organizations that defend humanized birth in every city it was assembled, promoting social mobilization and community discussion. That prompted many women who were already interested and engaged in social movements to visit the exhibition. Nonetheless, the results showed that even among highly interested women there is a clear need and opportunity to invest in and increase Brazilian women’s knowledge about normal birth, cesarean, and EBP during childbirth. Previous studies identified that Brazilian women had low access to adequate information or educational practices during prenatal care, which reinforces a vertical and medical centered model of care that does not value health education as a potential quality measure/standard element of care (103,105).
The lower average scores on EBP knowledge before the intervention were expected when taking into account the low rates of use of best practices among Brazilian women, shown by other studies (9,10). The Birth in Brazil survey found that only 3.4% of the live births between 2011 and 2012 used practices recommended by the WHO during labor and childbirth (9), mainly used in public hospitals (SUS) and primiparous women (8,72).

Creating tailored health education interventions

This study strongly suggests that the SoB intervention was more effective for low income women, without private health insurance, with private prenatal care, in their first pregnancy and in their first or second trimester at the time of the intervention. Similar findings were observed in a study that compared two different health education interventions focused on women’s decision process and preference for type of birth (106).

The results of the current SoB evaluation suggest that there is an important group to be prioritized for interventions in the country: primiparous, low-income women, at the beginning of pregnancy, without private health insurance. However, in Brazil, that would not include a group of women most likely to have an unnecessary cesarean. White, high income women with more than 12 years of education, with private prenatal care are the characteristics of Brazilian women most likely to give birth in a private hospital, therefore, exposed to higher rates of C-section (95). Different studies found that women are more likely to have a C-section if they receive private care, have limited access to midwives as primary caregivers and/or have experienced a previous cesarean (33,107,108). Those women had a higher perceived knowledge about normal birth and cesarean before the intervention than their counterparts did. However, this knowledge does not seem sufficient to impact the type of birth outcome, even though higher knowledge about the risks of C-
section increases the chance of women waiting for labor onset and avoiding scheduling an elective surgery (109).

Pregnant Brazilian women frequently prefer a vaginal birth when asked during pregnancy, according to the Birth Brazil Survey which found a rate of 70.8%, and a metaanalysis review with 28 different studies which found an overall prevalence of 72.8% preference for vaginal birth (59,94). However, 40% expect to have a C-section when arriving at the hospital to give birth (110). Women that expect or prefer a C-section justify it by fear of fetal distress and mortality, excessive pain or fear of trauma to the vagina (86–88,110). Decisions based on fear suggest lack of knowledge or misinformation on how to have a safe birth for mother and child, and also a society with an instilled distrust of the body’s ability to undertake labor and safely deliver a child without a negative impact on a woman’s sexual life. Discussing the use of EBP might be an important aspect to achieve a positive childbirth experience, changing women’s perception of fear of normal birth and understanding that a cesarean is the safest type of birth. Women’s voices and values need to be incorporated into a comprehensive childbirth model to reduce unnecessary C-sections (87,111).

Although there were no significant differences between white and black women regarding increases in knowledge, white women arrived at the intervention with higher perceived knowledge, also observed by studies about women’s decision process for type of birth (106). This is of special concern in Brazil, considering the country’s social and racial inequalities with black women being more likely to have worse childbirth outcomes, led by social inequalities during pregnancy and throughout a lifetime exposure to discrimination and stress when accessing healthcare (112–115). Given the opportunity and access to information, black women have the same chances to increase their knowledge about normal birth, cesarean and evidence-based practices as white women, which
might increase their chances to achieve positive childbirth outcomes. Health education can be seen as one strategy to promote a positive childbirth experience, however, closing the black-white gap in birth outcomes will not happen without a multi-sectoral policy intervention looking for health inequalities and systemic racism not only immediately before and during pregnancy, but also through the lens of a life-course approach (114,116).

The observed opportunities to increase Brazilian pregnant women’s knowledge regarding all three domains can lead to questions about the quality of information women are currently receiving during prenatal care. Considering these study findings, women in the private and public health system are likely to increase their knowledge about normal birth after participating in an effective health education intervention. The current literature also supports the idea that women exposed to adequate antenatal care are more likely to increase awareness and knowledge regarding signs of obstetric dangers, benefits of normal birth and screening tests; however, few women have such access (117). Childbirth education and experience give mothers more nuanced understandings of the birth process (118). Women from different countries consider education about childbirth important, and point out that it should include not only risks and benefits of type of delivery, but also information about labor process and procedures (87,119–122).

It is recognized that implementing scientific knowledge into practice requires systemic change, and evaluating translational interventions is essential to better direct policy makers and healthcare professionals’ decisions (123). In particular non-clinical and multicultural interventions, tailored to local context, addressing women and health professionals’ beliefs, attitudes, knowledge, and skills, as well the limitation of the health system, are needed (98). Therefore, health education interventions that can provide information, while promoting community engagement and giving
women tools for empowerment, such as the SoB, are needed to change the maternal health care scenario.

A maternal health care system as proposed by WHO to achieve SDG 3 and 5 (83) can only happen if we include women’s voices and empower them to advocate for evidence-based care, regaining control over labor and childbirth. A reproductive justice model of childbirth, focusing on building a health system that supports full reproductive health and rights, has the power to engage women in their care and reduces the impact of social inequalities on adverse birth outcomes, as demonstrated in the literature for the Zika epidemic experience (124).

Strengths and Limitations

The large sample of pregnant women answering the questionnaire allowed adequate statistical power to detect an intervention impact on perceived knowledge and diminished the influence of an information bias. Nonetheless, there are limitations inherent to a cross-sectional design, where participants answered about before and after knowledge perception at a single point in time, without a non-exposed comparison group. The questionnaire was not applied before the exhibition to avoid disclosing the themes introduced during the intervention, possibly influencing their answers later, and to decrease the number of pregnant women that refused to answer or provide an incomplete questionnaire, considering the length of time spent to answer all questions. To increase the accuracy and control for a possible confirmation bias, the self-applied perceived knowledge variables used a Likert scale instead of binary answers.

Pregnant women in this study were primarily black, had more than 13 years of education, an income of 2 to < 5 MW, and had private health insurance. The majority of Brazilian women of childbearing age are black, with less than 8 years of study, income of less than 2 MW, and use the public health system (125,126) It is also hypothesized that women that participated were already
sensitized regarding the childbirth topic, therefore, it is likely that Brazilian women with lower perceived knowledge were underrepresented in our sample. Therefore, considering the higher impact of the intervention among women that started with lower perceived knowledge, it is possible that the impact of this intervention is underestimated.

The SoB results described here gain relevance when viewed in the context of a previous international literature review showing a lack of evidence for the efficacy of non-clinical interventions to reduce unnecessary cesareans in middle and low-income countries, especially when focused on women (127). In contrast, single focus interventions that target one factor to reduce unnecessary cesareans have shown small impacts or low effectiveness (98), which might be related to the multifactorial reasons related to the TMTS and TLTL scenario. Further analysis should be conducted to understand the impact of the intervention on actual behavior, including the type of birth and use of EBP.

**Conclusion**

The present study demonstrated that a tailored health education intervention can impact pregnant women’s perceived knowledge of normal birth, cesarean and evidence-based practices. Results show that there are groups of Brazilian women with significantly lower knowledge regarding the included themes that should be prioritized, however, there are opportunities and a need to increase knowledge among all groups of women. Evidence-based practice perceived knowledge was lower when compared with normal birth and cesarean, presenting a demand to discuss with women how to use tools and resources to achieve a positive birth experience and satisfaction.
Previous studies have shown the need to invest in high quality tailored maternal health education to improve birth outcomes, and the need to invest in non-clinical interventions focused on women. The findings can be used to better direct public policies regarding childbirth care, a women-centered health care system, health professional continued education, and implementation of different health education interventions. Senses of Birth Intervention has presented itself as an effective strategy to contribute to the shaping of a women-centered health care system.
CHAPTER 4 – ARTICLE 2

BRAZILIAN WOMEN’S EXPERIENCE WITH EVIDENCE-BASED PRACTICES IN CHILDBIRTH AFTER PARTICIPATING IN THE SENSES OF BIRTH INTERVENTION: A MIXED-METHODS STUDY.

Background

Access to evidence-based care for all women is considered a fundamental reproductive right, based on the notion that quality maternal care and delivery should be humane and dignified (12). The current global health agenda highlights that women and children should not only survive birth but thrive and reach their full potential for health and life (66,83).

A positive childbirth experience includes the use of evidence-based practices that promote a safe environment for labor and delivery, with support from trained health professionals, which results in positive clinical outcomes for mother and baby (66). No less relevant, the experience should fulfill a woman’s prior personal and socio-cultural beliefs and expectations, promoting a sense of personal achievement and control through childbirth, and allowing for participation in all decision-making processes, with true informed consent (66). Positive childbirth experiences are consistent with at least two of the Sustainable Development Goals (SDG): Goal #3 that intends to ensure healthy lives and promote well-being for all at all ages; and Goal #5 which addresses gender equality, focused on ensuring universal access to sexual and reproductive health and reproductive rights (18).

The use of evidence-based maternity care is recommended by the Pan-American Health Organization (PAHO) and WHO since 1985 and 1996, respectively, reinforced by the guidelines in 2018 (64–66,97). Evidence-based practices (EBP) are derived from the use of the best available research results to guide health care practices (65). Increasing the use of EBP during labor and
childbirth can optimize maternal, fetal, and newborn outcomes, support effective and respectful care and assist providers and women’s decisions (3,12,65). Different maternal care EBP are categorized into antenatal, intrapartum, and postnatal, considering the evidence available for each practice and the regional/cultural country differences (69,82,128,129). Nationwide studies about the use of maternal care EBP are limited. Brazil has reported an overall 3.4% use of recommended practices during childbirth (23). Around the world, intrapartum EBP use ranges from 3.4% to 43% among live births (7–11,130).

This study aimed to understand the use of intrapartum EBP and its social context, considering the experiences of Brazilian women who participated in a health education intervention, the Senses of Birth (SoB).

Maternal care scenario in Brazil and the use of intrapartum EBP

Brazil has a universal public health system, the Unified Health System (known as “SUS”). SUS is a tax-funded health care system based on government-owned services, while also relying upon nonprofit and for-profit provider contractors when needed. SUS offers universal coverage, comprehensive care, and equity of access to health services within a regionalized hierarchical and decentralized system without any additional costs to the population (37,131,132). Concomitantly, a national agency regulates the private health system, which is funded by employers or individuals who buy private insurance and/or use out-of-pocket payments for services under a specific set of requirements and a defined provider network (37,38).

Currently, 74% of the population depends exclusively on SUS to access health care, and 26% are enrolled in private health insurance (37). However, 58% of births in Brazil occur at private hospitals, with a considerably higher average of cesarean rates than the national average (83% vs.
Brazil's high cesarean rate offers a glimmer of its medically-centered and highly interventionist maternal health care model (8,19). The country has an average of 1.78 live births per woman (20). Moreover, most of the women have access to health facilities and skilled health professionals, with 99.4% of pregnant women having at least one prenatal care consult and an estimated rate of 99% of births attended by skilled health professionals (21).

Despite the high rate of women accessing maternal care, there are regional differences that impact access and quality of care, and when combined with social inequalities, contribute to situations where a “too little too late” (TLTL) scenario is the reality in Brazil (12,133). TLTL refers to the lack of access to appropriate and timely care (12,133). In contrast to the TLTL approach, the “too much too soon” (TMTS) scenario of maternal care intervention, also potentially dangerous, is often encountered in Brazil (12,90,133). TMTS is defined as unnecessary early maternal health interventions that reduce the likelihood of spontaneous birth (12,133). The TMTS scenario is often a symptom of health care policies that approach labor and childbirth as a medical event and not as a normal physiologic process with its own social and cultural aspects (12).

The Birth in Brazil Study, a nationwide hospital-based study that interviewed over 23,000 mothers and reviewed hospital records on live births between 2011 and 2012, found that only 3.4% of live births used best practices recommended by the World Health Organization during labor and childbirth (9,23). Meanwhile, non-recommended practices were frequently used, such as the use of the Kristeller (a maneuver used by professionals to pull the baby), identified in 36.5% of the vaginal deliveries (9). Moreover, most women having a vaginal birth did not adopt an upright position, and 90% of the low-risk women gave birth in the lithotomy position (9).

Even with rights ensured by law, only 18.8% had the continuous support of a companion of their choice, and 24.5% had no companionship at all (72,80). One-third of Brazilian women used
non-pharmacologic pain relief methods during labor (8). Freedom of mobility during labor was observed in only half of the vaginal births, while primiparous women in public hospitals had the highest chance of using those practices (4,10).

Only a third of the facilities included in the Birth in Brazil Study had midwives as part of the birth team, which translated into 16.2% of the vaginal births cared for by midwives (4). Facilities with midwives as part of the birth team had a lower cesarean rate (41.4%) when compared to the overall national average (58%) (4,20). Other hospital-based studies across the country found that 72% of women did not have a choice of position at delivery, and 28% gave birth in a lithotomic position (134,135). Only 0.5% of women who gave birth were informed about their freedom of mobility, 0.2% discussed the participation of the companionship of their choice, and 2.6% had a choice of position at delivery (134,135).

The current maternal national health policy, named "Stork Network", was instituted in 2011 as a strategy to implement a network of care that supports women's reproductive rights and promotes humanized care during pregnancy, childbirth, and postnatal period, and guarantees the newborn's right to a safe birth and healthy development (40). The Stork Network reasserts other maternal and childbirth health policies already in place, promoting the articulation of the points of service in a network of comprehensive care, using multidisciplinary teams, updated protocols, and monitoring health indicators with target-coupled funding (9,41).

A critical feature of the policy is promoting humanized care and services that ensure "acolhimento" (literally translated as “welcoming”), integrating the maternal care with the National Humanization Policy (NHP). “Acolhimento” is an ethical posture that implies listening to the patient and their complaints, recognition of their role in the health and illness process, and accountability for resolution, with the activation of knowledge-sharing networks (136).
"Acolhimento” is a commitment to respond to the needs of patients seeking health services (136). The concept, when applied to the maternal health care spectrum, intends to incorporate a set of practices, combined with the health professionals’ postures and hospital ambiance, that is, an environment and infrastructure that promote or support a positive childbirth experience (134,137).

The Senses of Birth – A health education intervention

The Senses of Birth (SoB) intervention was created to address the overmedicalization of maternal care and excessive cesarean rates in Brazil. The SoB is an interactive health education intervention implemented in Brazil to promote normal birth by discussing evidence-based practices and the risks of cesarean and normal birth (43). The intervention, set in public spaces, is provided to the public as an experience of pregnancy and childbirth, using interactive techniques, and encouraging discussions with health professionals and local social movements (43,44). It prioritizes not only pregnant women but also the general public, to impact the subjective and social norms concerning childbirth (43,44).

The normal birth concept promoted by the SoB project is described in the literature as "normal spontaneous vaginal delivery" (138). The concept, defined in 1996 by WHO, presents an alternative perspective that goes beyond the dichotomy of vaginal birth versus cesarean delivery (65). Vaginal delivery of spontaneous onset between 37 and 42 weeks of pregnancy, remaining a low-risk throughout labor and delivery, in which evidence-based interventions are used to avoid interference with the natural process (65). Although the concept is widely disseminated, WHO recognizes that 22 years after its definition, the concept of "normality" in labor and childbirth is not universal nor standardized, creating barriers to a positive childbirth experience around the world and leading to worse maternal and child health outcomes (66).

The need for understanding why EBP are underused, considering Brazil’s health care
system organization and cultural aspects motivated this study to explore the experiences of women that participated in the intervention. The intrapartum evidence-based practices discussed in the SoB intervention, and part of this study are: 1) birth plan; 2) one-to-one continuous support, including doula support and/or a companionship of choice throughout childbirth; 3) midwife care; 4) use of non-pharmacological pain relief methods; 5) freedom of mobility throughout labor; and 6) choice of position at delivery.

Intrapartum Evidence-based Practices.

Between 2010 and 2015 there were 163 childbirth guidelines published around the world that recommended different EBP to promote respectful care, increased communication, ensure appropriate informed consent, guarantee that reproductive rights are respected, and support a positive childbirth experience (12). Evidence supporting the practices discussed in this paper are presented below.

The Birth Plan is a written document that expresses a woman’s desires and expectations concerning childbirth and improves communication with health professionals. Birth plans are recommended as a practice to promote a positive childbirth experience (65,66,68,74,75) Women who use a birth plan are more likely to have a normal birth and choose their position during labor and delivery, less likely to receive an enema and perineum shaving (74).

A continuous, uninterrupted, one-to-one support for women throughout childbirth is recommended by WHO to achieve a positive childbirth experience, and this is typically support provided by any companion of the women's choice, such as members of family and friends, and/or a doula - a trained community health worker who provides skilled and intimate continuity of care throughout the childbearing year (3,66–69). The uninterrupted presence of a companion of choice during all stages of labor and delivery is a reproductive right in Brazil, published into law in 2005
The practice is associated with an increase in satisfaction with childbirth, less use of medical interventions, and lower risk for obstetric violence (45,139,140).

Women with doula support during childbirth are more likely to have a spontaneous vaginal birth, reducing cesarean rates by an average of 28%, shorter duration of labor, and tripling the odds of reporting non-medical techniques for labor induction (1,2,141). Also, women with doula support are less likely to have intrapartum or regional analgesia and are less likely to report dissatisfaction (2,141–143).

Midwives have their practice grounded in the knowledge that supports women to sustain the normal progress of labor and, the midwife-led continuity-of-care model is recommended in specific settings to support low-risk childbirth (66,68,71,91). In Brazil, midwifery care has been incorporated into nursing schools, becoming a specialty of training (144). Currently, obstetric nurses have a higher presence than midwives in Brazil, although there is a shortage of both professionals (144,145). This paper will use midwife as a proxy for obstetric nurses in Brazil, allowing integration with international literature, focusing on the similarities of care provided by both health professionals (145). Midwife care is associated with higher levels of women's satisfaction with childbirth, reduction of medical interventions such as vacuum or forceps, reduced duration of labor, increased patient safety during childbirth, lower cesarean rates, and reduced maternal and neonatal mortality (3,69–71,95,146–148).

The use of non-pharmacological methods of pain relief in all stages of labor, such as immersion in water, massage, aromatherapy, breathing exercises, acupuncture, audio-analgesia, acupressure, hypnosis, and relaxation techniques were assessed by different studies including meta-analyses and randomized controlled trials in six different countries (77,78,149). The results show a direct impact of effective pain management and decreased need for pharmacological pain relief,
including epidural analgesia (1,77,78,150,151). The practices also promote childbirth satisfaction, reducing stress levels and anxiety, and preventing maternal hyperventilation during childbirth (1,77,78).

Women should be encouraged to walk, dance, move, and adopt the most individually comfortable position during childbirth (6,66,68). These practices are correlated with reduced use of oxytocin or need for labor augmentation techniques, better management of pain, and lower odds of using epidural analgesia and having an intrapartum cesarean (6,66,68,149).

WHO recommends that health professionals encourage women’s adoption of an upright position, including sitting, semi-recumbent, kneeling and squatting for women without epidural analgesia; and that no particular position at delivery should be forced (3,66). The clinical benefits of the upright position are a decrease in duration of the second stage of labor, reduction in instrument-assisted vaginal birth deliveries and episiotomies, lower chances of maternal aortovagal compression syndrome, and improved fetal alignment (3,79,147).

Women’s knowledge and use of EBP

Considering the positive impact of intrapartum EBP use on childbirth outcomes, there is a need to improve its use among Brazilian women. As observed by previous results of this study, Brazilian women have moderate knowledge about normal birth and cesarean, and weak knowledge about EBP, and perceived increase for all three knowledge domains after the SoB intervention (152). Using EBP is a behavior that is not entirely under the pregnant woman's control. Therefore, the Theory of Planned Behavior (TPB) can be used to understand this behavior, as other scholars have done to understand childbirth and preference for the type of birth (46–49), although no studies were found focusing on the use of intrapartum EBP. The theory states that behavior can be directly influenced by the intention to engage in that behavior (50,51). The intention to perform a behavior
is composed of the sum of attitudes, subjective norms, and perceived control over the behavior, constructs of the TPB (50,52).

Attitudes reflect someone's personal opinion or the value attributed to the behavior, that is if the behavior is good or bad or can bring positive or negative outcomes (50,52). An opinion about behavior can be formed based on experiences, examples, and knowledge regarding the possible outcomes (50,52). Women’s attitudes regarding childbirth and use of EBP are then formed by the amount of appropriate information regarding risks and benefits they have, as well as their previous experience and/or examples from their communities. A positive attitude, that is, an opinion that using an intrapartum EBP will contribute to a favorable or desirable outcome, can positively impact the decision to use the practices.

Subjective norms refer to the social expectations and desires around a specific behavior, and how motivated is the person to adhere to those expectations (50,52). That is, what the community, family and/or friends surrounding a woman expect regarding the childbirth; and how likely is the woman to attend comply with such expectations, will influence her intention to use the intrapartum EBP. Subjective norms can be facilitators or barriers for women to use the intrapartum EBP.

Finally, the perceived behavioral control is primarily the individual’s perceived self-efficacy, that is the confidence in their ability to perform the behavior (50,52). Such perception of control is built by internal factors (knowledge acquired and skills learned), and external factors (practical resources available, opportunities to use it, and the presence of other supportive conditions) (50–52). For a woman to perceive that she can control the behavior of using the intrapartum EBP, therefore, increasing her intention to use it, she will need knowledge, skills, resources, and opportunities to increase her self-efficacy. The internal and external factors can
facilitate or create challenges for a woman to use an EBP.

Individual knowledge and/or appropriate information about the behavior is a component of the attitude and perceived behavioral constructs. The constructs impact the women's intention to perform a behavior, that is, to use the intrapartum EBPs. Therefore, the objective of this study was to identify the impact of the SoB intervention on women’s behavior (using intrapartum EBP), considering the observed increase of perceived knowledge about normal birth, cesarean and EBP after the intervention (152).

The impact of the SoB intervention on women's perceived knowledge indicates that there is a need to improve information regarding normal birth and cesarean, and an even higher need to discuss the use of evidence-based practices with pregnant women (152). Studies have shown that prenatal care education has a positive effect on women’s confidence, ability to handle the birth process, diminish fear, decrease anxiety, increased self-efficacy, and higher perceived control during labor (49, 102, 120, 153). On the other hand, Brazilian authors indicated that poor prenatal care education practices might reinforce a medical-centered model of care, that does not value health education as a potential qualifying element of care (103, 105).

**Barriers to the use of intrapartum EBP**

Since 1996, WHO Best Practices and studies discussing the barriers to implement the EBP can be found in the literature; nonetheless, the overwhelming majority of studies identifying barriers have focused on the health professional perspective and/or medical records data (135, 154–157), with only a few studies including the women’s perspectives (134, 158, 159).

A systematic review of the literature found eleven types of barriers to use evidence-based care during labor and childbirth: (1) lack of a set of robust maternity performance measures with buy-in of key stakeholders to use them for measuring; (2) perverse incentives of payment systems;
(3) adverse effects of the malpractice system; (4) primary reliance on specialists for providing maternity care to a predominantly healthy, low-risk population; (5) limited reliance on best evidence in leading guidelines for maternity care; (6) loss of core childbearing knowledge and skills among health professionals; (7) limited attention to harms and iatrogenesis; (8) challenge of translating research into practice; (9) adverse effects of pressure from the health care industry; (10) inadequate informed consent processes and women's lack of preparation for making informed decisions; and (11) limitations of views put forth in media and popular discourse (160). Scholars have also pointed out that the lack of internal hospital policies, staff availability and/or necessary supplies, and inadequate infrastructure are barriers to use the EBP, as well as the lack of professional continuing education, and willingness to change their practices as explanations of the observed low use of the EBP during labor and childbirth (135,154–157).

Lack of women's knowledge about the practice and lack of awareness or knowledge about rights in childbirth were identified as barriers for doula support, having the companionship of choice and using a birth plan (72,104,134,161). Workforce shortage, workforce diversity, out of pocket costs, and integration with a birth team were barriers related to midwife care and doula support (67,70,162,163). The need for adequate hospital infrastructure and appropriate hospital protocols appeared as barriers to implement the companionship law in Brazil (72,104).

The few studies that addressed EBP from women’s perspectives found that they describe the use of EBP as a strategy to feel safe, supported, and reassured (134,158,159). On the other hand, a source of dissatisfactory childbirth experience was the disruption of birth plans and inadequate support from maternity providers (134,158,159). Barriers to using the practices were insufficient knowledge, lack of support and/or preparedness of companions, not having choices and desires respected, health professionals not offering the methods, and poor hospital
Thus, this study proposed to describe who are the Brazilian women that used the intrapartum EBP after participating in the SoB intervention, and identify the social-demographic characteristics, childbirth information and perceived knowledge factors that impacted their behavior. Furthermore, the study also explored women’s experience related to intrapartum EBP, allowing their voices to guide the paper through the identification of outcomes, barriers, and facilitator/strategies they perceived.

**Methods**

**Data and sample**

The study uses a mixed-methods research design to analyze the use of intrapartum evidence-based practices among women who visited the Senses of Birth intervention while pregnant and responded to a follow-up survey after giving birth. This study is part of the research project named "Senses of Birth: Effects of the interactive exhibition in the perception changes on labor and childbirth” (43). The Federal University at Minas Gerais Institutional Review Board (IRB) - COEP/UFMG, 934.472 - and the University at Albany IRB - Protocol Number: 18-X-209-01 - approved the study.

One thousand two hundred and eighty-seven (1287) pregnant women answered a paper-based post-test survey, immediately after the intervention, and were invited to join the online follow-up survey. Five hundred and fifty-five (555) women answered the follow-up questionnaire between June 2015 and April 2016, with a response rate of 43.12%, in three different states and four different cities of Brazil (Belo Horizonte/MG; Rio de Janeiro/RJ and Niterói/RJ; and
Brasília/DF) (43). Two hundred and fifty-eight (258) women, 44% of those who answered the follow-up survey, were also included in the qualitative sample (Figure 7).

Only women who answered the post-test survey and follow-up survey were included in the present study. Women who did not respond to the follow-up survey after three emails and three phone call attempts were excluded. Furthermore, a subset of women's responses to open-ended question was analyzed for the qualitative portion of the study, and two exclusion criteria were applied: a) Answering two or fewer sentences to the question "Tell us a little about your birth experience."; b) Blank answers or "no comments" statements without substantial information regarding the childbirth to the subsequent open-ended questions. All women provided written informed consent.

**Figure 7 – Sample of women who joined the follow-up study phase and were included in the quantitative and qualitative analysis**

- 1287 pregnant women
- 555 women
- 258 women
- 43.13% response rate - Women who answered the follow-up survey and included in the quantitative analysis of this study
- 44% of women who answered the follow-up survey and included in the qualitative analysis

Intrapartum EBP use study sample

On average, women answered the follow-up survey three months after giving birth (57.4%),
ranging from 0 to 29 months, with 95.2% of women responding within seven months of childbirth. The follow-up survey was an online self-administered structured questionnaire and was used to collect quantitative and qualitative data. The instrument contained questions about labor and childbirth experience, use of the EBP during childbirth, obstetric violence, breastfeeding, and memory of the educational intervention. The post-test survey was used to collect socioeconomic, demographic, and perceived knowledge information and personal identifiers linked the responses of both instruments.

Quantitative Measures

Four groups of variables were selected for the quantitative analysis in this study:

1) **Socio-demographic (SD) characteristics.** Participants were asked to report their: age (19 to 34 years old and ≥ 35 years old), race (white and black [Pardo/black] and other [Asian and indigenous]), education (≤ 12 years, > 12 years), private health insurance (yes, no), and monthly family income (< 2 minimum wages (MW), 2 to < 5 MW, and 5 to < 10 MW, and ≥ 10 MW). One minimum wage at the time of the intervention was approximate U$224.14.

2) **Obstetric Characteristics.** Participants were asked about the following details regarding their pregnancy: first pregnancy (yes, no), type of hospital (SUS {public health system}, and Private [Private Health Insurance/Out of Pocket]), type of birth (vaginal birth, and cesarean), perceived ability to have a normal birth (yes, no).

The variable “type of hospital” classified the maternity hospitals women gave birth in regarding their source of funding, a specific classification relevant to Brazil’s health system organization. “SUS” refers to public or non-profit hospitals integrated with the public health system, funded by the government, without any direct payment of patients for any care.
"Private" refers to private or non-profit hospitals not funded by the government, with the care paid for by privately owned health insurance or out of pocket by the patients. Mixed hospitals were included in the public health system for this analysis.

3) **Perceived Knowledge.** Participants were asked to self-report their knowledge, before and after the intervention, with regard to: normal birth; cesarean; risks of normal birth; risks of cesarean; doula support; midwife care; companionship of her choice throughout the hospital stay, during labor and childbirth; access to non-pharmacological birth pain relief methods; birth plan; childbirth best practices; organizations that defend the humanized and evidence-based care model; Brazil’s C-section rate; Ministry of Health (MS) and WHO guidelines for labor and childbirth care; and obstetric violence. Response options were chosen from a Likert scale, with the possible answers ranging from none (1) to very good (5).

The perceived knowledge variables were grouped into three different domains, based on the results of factor analysis of a previous study (152). The domains are 1) EBP Knowledge, 2) Normal Birth Knowledge, and 3) Cesarean Knowledge. Each knowledge domain presents a mean score before the intervention and a mean score after the intervention for the sum of all variables in that domain, possibly ranging from 1 to 5 points (152). A separate change score was calculated for each domain, representing the women’s perceived variation of knowledge using the difference between the mean after and the mean before, possibly ranging from -5 to 5 (152).

4) **Use of Intrapartum Evidence-Based Practices (EBP).** Participants were asked whether or not they used each of the evidence-based practices during labor and delivery: Birth Plan (yes, no [no, don’t know]); companionship during childbirth (yes, no [no, partially]); doula
support (yes, no); midwife care (yes, no); freedom of mobility during labor (yes, no); choice of position during delivery (yes, no); use of non-pharmacological methods for pain relief (yes [exclusively and the use combined with pharmacological methods], no [no pain relief methods used or used only pharmacological methods]).

The EBP for continuum support is observed here under two variables: doula support and companionship during childbirth. Non-pharmacological methods of pain relief used by the women in this study were massage, birth ball, shower, bathtub, electrodes (TENS), music, meditation, and breathing techniques. Freedom of mobility during labor was characterized as walking, dancing, and crouching. Choice of position during delivery was characterized as any choice other than supine (traditional gynecological position), described by the woman as using a stool, use of bars, kneeling, semi-sitting with support, and sitting upright.

Quantitative Analysis

To understand who are the women that used the EBP, what social factors impacted their use, and the impact of the intervention on the use of EBP, different quantitative analyses were performed. To identify how social-demographic (SD) factors, childbirth information (CI), and perceived knowledge were associated with the use of evidence-based practices during labor and childbirth, chi-square and ANOVA tests were performed. The association was considered statistically significant with P-value ≤ 0.05. All scores presented normal distribution. The statistical program IBM SPSS Statistics 24R was used for data analysis.

Qualitative Measures

The qualitative data were collected through seven open-ended survey questions listed below
(Figure 8). All questions and answers were in Portuguese, the women's native language. Women’s responses were translated and analyzed in English by bilingual researchers; any necessary adjustments for clarity were made. However, cultural references were kept in Portuguese and explained in the sequence. The first question was required to proceed with the survey; the subsequent ones were responded to if the respondent desired. The open-ended questions followed the closed-ended questions, allowing women to express their opinions, feelings, and perspectives. The set of open-ended written responses of each woman was the unit of analysis. As proposed by Yin (2006), the group of answers constitutes a single case of a contemporary event, creating the possibility to explore the use of EBPs from the women's perspectives.

**Figure 8 - Open-ended questions answered by women on the follow-up SoB survey**

<table>
<thead>
<tr>
<th>Qualitative Measures</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tell us a little about your birth experience</td>
</tr>
<tr>
<td></td>
<td>Did you make a Birth Plan during pregnancy? If not, why?</td>
</tr>
<tr>
<td></td>
<td>If you had a Birth Plan, do you consider that the health care received corresponded to your desires? Please comment</td>
</tr>
<tr>
<td></td>
<td>What methods of pain relief did you use during labor? Please comment</td>
</tr>
<tr>
<td></td>
<td>Have you had any memory of the Senses of Birth during labor/delivery? Please comment</td>
</tr>
<tr>
<td></td>
<td>Has the Senses of Birth influenced your childbirth in any way? Please comment</td>
</tr>
<tr>
<td></td>
<td>If so, was the influence of SoB positive? Please comment</td>
</tr>
</tbody>
</table>

**Qualitative Analysis**

To explore women's experiences regarding the use of intrapartum EBP, identifying barriers, facilitators, and strategies, a qualitative analysis of the open-ended questions was performed. An inductive open-coding analytic process was conducted, with motivated line-by-line reading without
previously established categories allowing the researcher to identify events that could become the basis of categorization. A second researcher reviewed all the codes and quotations in order to validate the codes and make sure coding was consistent through all interviews. Themes and categories emerged from the codes with an agreement between the two researchers. Disagreements were discussed until a consensus was reached. The software used for the qualitative analysis was Atlas.ti version 8.3.1.

Each EBP described by women was considered a theme, and any reference to those was coded: birth plan, doula support, midwife care, companionship during childbirth, freedom of mobility during labor, choice of position during delivery, and/or use of non-pharmacological methods for pain relief. Forty-five characterizing codes emerged from the open-coding analysis and were grouped into three categories: Outcomes, Barriers, Facilitators/Strategies. Outcomes refer to the group of codes that describe the woman’s perspective of using or not using one or more EBP. Barriers refer to the group of codes that describe barriers a woman identified to use or not use at least one EBP, and Facilitators/Strategies refer to the group of codes that describe what elements the women identified as a support for the use of EBP.

Discourse Analysis (DA) was used to support triangulation of analysis, advancing the understanding of women’s experience with intrapartum EBP. DA is an interpretivist and constructionist methodology that proposes the understanding of a discursive plan that articulates language and society, considering the construction of identities and social relations between people and systems of knowledge and beliefs (165–167). Women’s surveys were categorized regarding the type of birth, type of hospital, and perceived EBP knowledge, enhancing the potential for the triangulation analysis.
Results

The qualitative and quantitative results are presented in an integrated manner, seeking to describe the women who participated in the SoB intervention and answered the follow-up survey. What influences the use of EBP are described using the women’s experience as a north. The categories that emerged from the qualitative analysis guide the display of results: Outcomes, Barriers, and Facilitators/Strategies to use the intrapartum EBP.

Women’s characteristics

Women who participated in the follow-up study were predominantly younger than 34 years old (82.7%), black (53.2%), with more than 13 years of education (76.3%), had a family monthly income between 2 to < 5 minimum wages (MW) (32.6%), and had private health insurance (78.8%) (Table 7). Considering all 555 women who participated in the follow-up, 54.1% had a vaginal birth, 63.9% gave birth at a private hospital, 47.9% were primiparous, and after the SoB intervention, 93.6% believe they were capable of having a normal birth (Table 7). The women also perceived an increase in knowledge after the intervention for all the domains: EBP Knowledge (85.4%); Normal Birth Knowledge (65.8%); and Cesarean Knowledge (64.2%) (Table 7).

Among the 258 women who were included in the qualitative analysis, a subset of the total sample, 58.2% had a vaginal birth, and 66.8% gave birth in a private hospital (Table 7). The majority of women perceived an increase in knowledge after the intervention about evidence-based practices (83.2%), normal birth (63.7%) and cesarean (63.8%) (Table 7). Women who did not perceive an increase in knowledge after the intervention included those who had lower knowledge before SoB and did not increase, but also the ones who already ranked high on the scale of perceived knowledge before the intervention and did not perceive changes after it.
Table 7 - Characteristics of women who participated in the SoB intervention follow-up interview and the sample of women who were included in the qualitative analysis

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Follow-up Survey</th>
<th>Qualitative sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>555 Total N (%)</td>
<td>258 Total N (%)</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19 - 34 years</td>
<td>455 (82.7)</td>
<td>214 (83.9)</td>
</tr>
<tr>
<td>≥ 35 years</td>
<td>95 (17.3)</td>
<td>41 (16.1)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>550</td>
<td>255</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 12 years</td>
<td>131 (23.7)</td>
<td>46 (18.0)</td>
</tr>
<tr>
<td>&gt; 12 years</td>
<td>421 (76.3)</td>
<td>209 (82.0)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>552</td>
<td>255</td>
</tr>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 2 MW</td>
<td>102 (19.7)</td>
<td>36 (15.3)</td>
</tr>
<tr>
<td>2 to &lt; 5 MW</td>
<td>169 (32.6)</td>
<td>80 (34.0)</td>
</tr>
<tr>
<td>5 to &lt; 10 MW</td>
<td>135 (26.0)</td>
<td>63 (26.8)</td>
</tr>
<tr>
<td>≥ 10 MW</td>
<td>113 (21.8)</td>
<td>56 (23.8)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>519</td>
<td>235</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>257 (46.6)</td>
<td>121 (47.5)</td>
</tr>
<tr>
<td>Black and Others</td>
<td>295 (53.2)</td>
<td>134 (52.5)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>552</td>
<td>255</td>
</tr>
<tr>
<td><strong>Private Health Insurance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>436 (78.8)</td>
<td>209 (81.6)</td>
</tr>
<tr>
<td>No</td>
<td>117 (21.2)</td>
<td>47 (18.4)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>553</td>
<td>256</td>
</tr>
<tr>
<td><strong>Type of Hospital</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUS1 (Public)</td>
<td>200 (36.1)</td>
<td>85 (32.2)</td>
</tr>
<tr>
<td>Private</td>
<td>354 (63.9)</td>
<td>171 (66.8)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>554</td>
<td>256</td>
</tr>
<tr>
<td><strong>Type of Birth</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal</td>
<td>300 (54.1)</td>
<td>149 (58.2)</td>
</tr>
<tr>
<td>Cesarean</td>
<td>255 (45.9)</td>
<td>107 (41.8)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>555</td>
<td>256</td>
</tr>
<tr>
<td><strong>First Pregnancy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>234 (47.9)</td>
<td>119 (52.7)</td>
</tr>
<tr>
<td>No</td>
<td>255 (52.1)</td>
<td>107 (47.3)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>489</td>
<td>226</td>
</tr>
<tr>
<td><strong>Able to have normal birth</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>516 (93.6)</td>
<td>13 (5.1)</td>
</tr>
<tr>
<td>No</td>
<td>35 (6.4)</td>
<td>242 (94.9)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>551</td>
<td>255</td>
</tr>
<tr>
<td><strong>Normal Birth Knowledge Domain</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased perceived</td>
<td>366 (65.9)</td>
<td>163 (63.7)</td>
</tr>
<tr>
<td>No increased perceived</td>
<td>189 (34.1)</td>
<td>93 (36.3)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>555</td>
<td>256</td>
</tr>
<tr>
<td><strong>Cesarean Knowledge Domain</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased perceived</td>
<td>436 (78.8)</td>
<td>162 (63.8)</td>
</tr>
<tr>
<td>No increased perceived</td>
<td>197 (35.8)</td>
<td>92 (36.2)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>550</td>
<td>254</td>
</tr>
<tr>
<td><strong>EBP Knowledge Domain</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased perceived</td>
<td>455 (85.4)</td>
<td>203 (83.2)</td>
</tr>
<tr>
<td>No increased perceived</td>
<td>78 (14.6)</td>
<td>41 (16.8)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>533</td>
<td>244</td>
</tr>
</tbody>
</table>

1 Total varies due to missing data for each variable.
2 Monthly Minimum Wage in 2015: R$788.00 = US$224.14
3 SUS – Unified Health System
Women’s perceived outcomes of using intrapartum EBP

The majority of women used the evidence-based practices presented in the intervention: birth plan (55.2%), companionship during childbirth (81.6%), midwife care (54.2%), freedom of mobility during labor (57.7%), choice of position during delivery (57.2%) and non-pharmacological pain relief methods (74.2%) (Table 8). Doula support was used by 26.9% (Table 8). The use of the intrapartum EBP had a similar distribution for women that were included into the descriptive analyses as can be observed in Table 2. Furthermore, all women included in the qualitative analysis referred to at least one of the evidence-based practices in their open-ended answers.

Table 8 - Use of EBP among women who participated in the SoB intervention follow-up interview and the sample of women who were included in the qualitative analysis

<table>
<thead>
<tr>
<th>EBP</th>
<th>Follow-up Survey</th>
<th>Qualitative sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>555 Total</td>
<td>N (%)</td>
</tr>
<tr>
<td>Birth Plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>306 (55.2)</td>
<td>143 (56.1)</td>
</tr>
<tr>
<td>No</td>
<td>248 (44.8)</td>
<td>112 (43.9)</td>
</tr>
<tr>
<td>Total</td>
<td>553</td>
<td>255</td>
</tr>
<tr>
<td>Companionship during Childbirth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>453 (81.6)</td>
<td>206 (83.4)</td>
</tr>
<tr>
<td>No</td>
<td>83 (15.5)</td>
<td>41 (16.6)</td>
</tr>
<tr>
<td>Total</td>
<td>536</td>
<td>247</td>
</tr>
<tr>
<td>Doula Support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>146 (26.9)</td>
<td>74 (29.7)</td>
</tr>
<tr>
<td>No</td>
<td>396 (73.1)</td>
<td>175 (70.3)</td>
</tr>
<tr>
<td>Total</td>
<td>542</td>
<td>249</td>
</tr>
<tr>
<td>Midwife Care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>294 (54.2)</td>
<td>157 (63.1)</td>
</tr>
<tr>
<td>No</td>
<td>248 (45.8)</td>
<td>92 (36.9)</td>
</tr>
<tr>
<td>Total</td>
<td>542</td>
<td>249</td>
</tr>
<tr>
<td>Freedom of Mobility during labor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>248 (57.7)</td>
<td>139 (71.2)</td>
</tr>
<tr>
<td>No</td>
<td>182 (42.3)</td>
<td>56 (28.7)</td>
</tr>
<tr>
<td>Total</td>
<td>430</td>
<td>195</td>
</tr>
<tr>
<td>Choice of Position at delivery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>246 (57.2)</td>
<td>129 (66.2)</td>
</tr>
<tr>
<td>No</td>
<td>184 (42.8)</td>
<td>66 (33.8)</td>
</tr>
<tr>
<td>Total</td>
<td>430</td>
<td>195</td>
</tr>
<tr>
<td>Non-Pharmacological Pain Relief Methods</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>316 (74.2)</td>
<td>160 (82.5)</td>
</tr>
<tr>
<td>No</td>
<td>110 (25.8)</td>
<td>34 (17.5)</td>
</tr>
<tr>
<td>Total</td>
<td>426</td>
<td>194</td>
</tr>
</tbody>
</table>

*Total varies due to missing data for each variable.
Outcomes of using the intrapartum EBP were described by women with a positive connotation, mainly by those who had a vaginal birth. Vaginal birth was associated on a bivariate analysis with the use of all the EBP studied: birth plan (58.8%, \( p \leq 0.05 \)); companionship of choice during childbirth (56.7%, \( p \leq 0.05 \)), doula support (80.8% \( p \leq 0.01 \)); midwife care (64.6%, \( p \leq 0.01 \)); freedom of mobility during labor (69.4%, \( p \leq 0.01 \)); choice of position during delivery (68.7%, \( p \leq 0.05 \)); and use of non-pharmacological methods for pain relief (70.9%, \( p \leq 0.01 \)) (Table 9). Two participants who had a vaginal birth in different types of hospitals and different perceived knowledge described the outcomes of using different EBPs:

"I had a natural birth in the water, really calming. My husband was accompanying me, and my doula, so it was very comforting and pleasurable" (Vaginal Birth; Private Hospital; No Increased EBP Knowledge Perceived).

"My desire for childbirth as natural as possible was respected, even considering the duration of the labor. Because I was a first-time mother, I went to the hospital very early, in the early stages of pain. Also, the support provided by the hospital structure and its staff went far beyond our expectations." (Vaginal Birth; Public Hospital; Increased EBP Knowledge Perceived).
### Table 9 - Obstetric characteristics associated with the use of intrapartum evidence-based practices among women who participated in the Senses of Birth intervention follow-up survey

<table>
<thead>
<tr>
<th></th>
<th>Type of Hospital</th>
<th>Type of Birth</th>
<th>First Pregnancy</th>
<th>Able to have a Normal Birth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Public Hospital</td>
<td>Private Hospital</td>
<td>N (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td><strong>Birth Plan</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>115 (37.5)</td>
<td>190 (62.3)</td>
<td>180 (58.8)</td>
<td>126 (41.2)</td>
</tr>
<tr>
<td>No</td>
<td>85 (34.3)</td>
<td>163 (65.7)</td>
<td>120 (48.4)</td>
<td>128 (51.6)</td>
</tr>
<tr>
<td>Tot</td>
<td>200 (36.2)</td>
<td>353 (63.8)</td>
<td>300 (54.2)</td>
<td>254 (45.8)</td>
</tr>
<tr>
<td><strong>Companionship during Childbirth</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>168 (37.2)</td>
<td>284 (62.8)</td>
<td>257 (56.7)</td>
<td>196 (43.3)</td>
</tr>
<tr>
<td>No</td>
<td>21 (25.3)</td>
<td>62 (74.7)</td>
<td>27 (32.5)</td>
<td>56 (67.5)</td>
</tr>
<tr>
<td>Tot</td>
<td>189 (35.3)</td>
<td>346 (64.7)</td>
<td>284 (53.0)</td>
<td>252 (47.0)</td>
</tr>
<tr>
<td><strong>Doula Support</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>76 (52.4)</td>
<td>69 (47.6)</td>
<td>118 (80.8)</td>
<td>28 (19.2)</td>
</tr>
<tr>
<td>No</td>
<td>119 (30.1)</td>
<td>277 (69.9)</td>
<td>178 (44.9)</td>
<td>218 (55.1)</td>
</tr>
<tr>
<td>Tot</td>
<td>195 (36.0)</td>
<td>346 (64.0)</td>
<td>296 (54.6)</td>
<td>246 (45.4)</td>
</tr>
<tr>
<td><strong>Midwife Care</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>146 (49.8)</td>
<td>147 (50.2)</td>
<td>190 (64.6)</td>
<td>104 (35.4)</td>
</tr>
<tr>
<td>No</td>
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<td>199 (80.2)</td>
<td>106 (42.7)</td>
<td>142 (57.3)</td>
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<tr>
<td>Tot</td>
<td>195 (36.0)</td>
<td>346 (64.0)</td>
<td>296 (54.6)</td>
<td>246 (45.4)</td>
</tr>
<tr>
<td><strong>Freedom of Mobility during labor</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>127 (51.4)</td>
<td>172 (69.4)</td>
<td>76 (30.6)</td>
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<tr>
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<td>135 (74.2)</td>
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<td>77 (42.3)</td>
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<tr>
<td>Tot</td>
<td>167 (38.9)</td>
<td>262 (61.1)</td>
<td>277 (64.4)</td>
<td>153 (35.6)</td>
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<tr>
<td><strong>Choice of Position at delivery</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
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<td>130 (53.1)</td>
<td>169 (68.7)</td>
<td>77 (31.3)</td>
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<td>132 (71.7)</td>
<td>108 (58.7)</td>
<td>76 (41.3)</td>
</tr>
<tr>
<td>Tot</td>
<td>167 (38.9)</td>
<td>262 (61.1)</td>
<td>277 (64.4)</td>
<td>153 (35.6)</td>
</tr>
<tr>
<td><strong>Non-Pharmacological Pain Relief Methods</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>154 (48.9)</td>
<td>161 (51.1)</td>
<td>224 (70.9)</td>
<td>92 (29.1)</td>
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<tr>
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<tr>
<td>Tot</td>
<td>165 (38.8)</td>
<td>260 (61.2)</td>
<td>274 (64.3)</td>
<td>152 (35.7)</td>
</tr>
</tbody>
</table>

*Public Hospital are the SUS (Unified Health System) Hospitals
*Tot varies due to missing data for each variable

P ≤ 0.1 **P ≤ 0.05*** **P ≤ 0.001
Overall, 27.2% of women had a scheduled cesarean, that is, never initiated labor before entering the surgical birth center. Therefore, these women have a limited possibility to use the described EBPs. Nonetheless, among the 253 women who had a cesarean, 40.3% had an intrapartum cesarean, initiated labor before the surgery, and could have the opportunity to use the practices during labor. Even within this scenario, women who had a cesarean identified many barriers to using the intrapartum EBP. The only EBP not mentioned by women who had a cesarean was the choice of position at delivery. Women who had a cesarean and perceived it as an autonomous decision or a needed intervention, described the use of EBP, such as the companionship of their choice, with a positive connotation, as exemplified below.

"I felt calm during childbirth because the doctor was reliable, and she accompanied me during prenatal care. My husband was by my side the whole time. A cesarean section was performed after a decision I made with my husband and my doctor." (Cesarean; Private Hospital; Increased EBP Knowledge Perceived).

Remarkably, using one or more EBP promoted a positive childbirth experience, which women described as feeling satisfied with the birth and as having a comforting/calming experience during childbirth. Women who had a vaginal birth expressed feeling safe with the presence of midwives and doulas, and that expectations regarding the childbirth were attended to when using a Birth Plan. Two different quotations from women who gave birth in private and public hospitals represent the positive childbirth experience.

"Since I had the doula by my side the whole time, I felt very safe! I had a massage, used the ball and the shower, played background music, and had freedom of movements." (Vaginal Birth; Public Hospital; Increased EBP Knowledge Perceived).

“We were walking down the hallway to help the labor progress. It felt so good to see the people there and to overcome the pain that came. I felt like a warrior.” (Vaginal Birth; Private Hospital; No Increased EBP Knowledge Perceived).
The one-to-one continuous support practices (doula and companionship of choice) were considered by women who had a vaginal birth as practices that demystified normal birth, enriched childbirth experience and helped them overcome fears. It is noticeable that the majority of women described the use of EBP as a bundle of practices, especially non-pharmacological pain relief methods, freedom of mobility during labor, and choice of position during delivery. The bundle of practices reflects a woman's positive childbirth experience and a feeling of “acolhimento,” represented by these two women that perceived an increase of knowledge about EBP after SoB:

"It felt free, exactly how I wanted. The cool thing was the doulas also suggested things that I did not think would help me, and it did, like using the birth ball."
(Vaginal Birth; Increased EBP Knowledge Perceived).

"I was "acolhida" by the nurse that answered all my questions and respected what I wanted"
(Vaginal Birth; Public Hospital; Increased EBP Knowledge Perceived).

The use of different EBP gave women the perception of self-efficacy, strength, and courage. The experience is described as gaining control over their bodies. They also described having their desires respected, and expectations attended to when the practices were used, independently of the type of birth. Two women describe their feeling of control over their bodies, choices respected, and self-efficacy:

“I let my body guide the birth; there was nothing that would interfere with it. I ate, walked, lay down, did everything I wanted during labor. I felt safe, calm, and I loved feeling and observing my body working.”
(Vaginal Birth; Private Hospital; No Increased EBP Knowledge Perceived).

“They left me free to do whatever I wanted; it was my own labor. It was a wonderful moment.”
(Vaginal Birth; Public Hospital; Increased EBP Knowledge Perceived).

Women who had a cesarean or a vaginal birth without access to an EBP described their experience with dissatisfaction and not receiving the expected care, as summarized by these two
examples below. Not having the companionship of choice at all time was associated with increased anxiety, loneliness, fear, frustration, and dissatisfaction.

"I was taken to the surgical unit, anesthetized, and left unaccompanied for almost two hours until delivery. I did not like this period, being in a cold room, alone and anxious for my first childbirth." (Cesarean; Private Hospital; Increased EBP Knowledge Perceived)

"I wanted a vertical position, but in the expulsive, I ended up in lithotomy." (Vaginal Birth; Private Hospital; Increased EBP Knowledge Perceived)

Not having a birth plan or having the birth plan disrespected was described as regret by women that had a cesarean. Frequently, women who did not use a birth plan or non-pharmacological pain relief methods also described not having a choice of position at delivery, no doula support or companionship of choice at all times. Two different women that had a cesarean, in a private hospital and perceived an increase in knowledge about EBP after SoB describe negative outcomes associated with not using the Birth Plan.

“I showed my birth plan to the doctor, but it was not followed. I also explained it to my husband, but I think he did not understand it, so the birth plan was not respected.” (Cesarean; Private Hospital; Increased EBP Knowledge Perceived).

When I learned [about the birth plan] I was already living a moment of so many changes that I could not do it, I regret not having done it, but I really did not know before the intervention." (Cesarean; Private Hospital; Increased EBP Knowledge Perceived).

Perceived barriers to using Intrapartum EBP

Women regularly described the hospital conduct, protocols, and EBP not being offered as reasons for not using one or more EBP. Furthermore, women described not being offered the non-pharmacological methods for pain relief as the reason for not using this practice, which happened in public and private hospitals, indicating that women would have used it if the hospital had as a practice to offer the methods. Birth plan, choice of position at delivery, and freedom of mobility
throughout labor were also EBP not used for lack of choice or for not being offered, as we can see in the report of these three women.

“Nothing was offered at the hospital, only anesthesia.” (Vaginal Birth; Private Hospital; Increased EBP Knowledge Perceived).

"Because I was not given the option. When you arrive and are admitted to a maternity ward, there is an implicit agreement that you will follow the on-call attendant choices. The pregnant woman is not heard concerning her expectations or wishes." (Vaginal Birth; Private Hospital; Increased EBP Knowledge Perceived).

“They made me feel comfortable about choosing what I wanted to do, but they did not offer me those options. I stayed quiet on the bed.” (Cesarean; Private Hospital; Increased EBP Knowledge Perceived).

Nonetheless, giving birth in a private hospital was a barrier to use EBP. Women who gave birth in private hospitals were more likely to not use the evidence-based practices such as: not having a companionship of choice during childbirth (47.7%, p ≤ 0.05), doula support (69.9% p ≤ 0.01); midwife care (80.2%, p ≤ 0.01); freedom of mobility during labor (74.2%, p ≤ 0.01); choice of position during delivery (71.7%, p ≤ 0.01); use of non-pharmacological methods for pain relief (90.0%, p ≤ 0.01) (Table 9).

The inadequate hospital ambiance is observed when the environment and infrastructure are not prepared to offer the use of EBP and was commonly described by women who gave birth in private hospitals, although a few women also encountered the same problem in public hospitals. Rigid hospital protocols or professional conduct, frequently not based on evidence, were also part of the overall inadequate hospital ambiance and described by women as a barrier for using the practices. Three women described similar experiences with barriers to using EBP while having had different types of birth and giving birth in different types of hospitals:
“After my admission, I was informed that the delivery suite was closed down and would I have to go through labor in a common room, with no access to non-pharmacological methods of pain relief.” (Cesarean; Private Hospital; Increased EBP Knowledge Perceived).

“I just wanted to give birth in the water, but the reference hospital is not prepared for it.” (Vaginal Birth; Public Hospital; Increased EBP Knowledge Perceived).

“I wanted to give birth in the bathtub, but the doctor said “você não é peixe” to be in the water.” (Vaginal Birth; Private Hospital).

(Cultural reference: The doctor did not agree with the women giving birth in the water, using an offensive language to persuade her. The doctor stated that the woman was not a fish to want to give birth in the water.)

Having private health insurance was correlated with not using non-pharmacological pain relief methods (91.7% p ≤ 0.01), using a chi-square analysis (Table 10). Having to pay out of pocket, adding cost to the childbirth, on top of the already paid private health insurance, were reported barriers only at private hospitals. The additional cost created barriers to accessing non-pharmacological pain relief methods, such as freedom of mobility during childbirth and choice of position at delivery. A woman describes in detail her lack of choice facing the cost barrier:

"I wanted to have a completely natural birth, give birth in the bathtub, but I was informed that I should pay a doctor to stay only with me if I wanted it that way. Since I did not have the financial conditions, and I already pay private health insurance, I chose to follow the health plan coverage” (Vaginal Birth; Private Hospital).

Socioeconomic disparities were found to be a barrier for using a birth plan, midwife care, and doula support, without controlling for other confusing factors. Women among the lower-income range (2 to < 5 MW) were less likely to use a birth plan (35.1%, p ≤ 0.05) and have midwife care (40.1%, p ≤ 0.01) compared to women with more than 10 MW (Table 10). Moreover, being a black woman was correlated with not using a birth plan (59.3%, p ≤ 0.01), and not having doula support (56.7%, p ≤ 0.01) (Table 10). Furthermore, women who did not have doula support and
midwife care described a lack of choices and lack of individual support during childbirth as barriers. Those two barriers were reported by women in public and private hospitals, as observed with the quotation of the two women below.

"I just missed having a doula. There [the private maternity hospital] has doulas, but the problem was there was only one doula working that day. She was going back and forth between another woman who was giving birth at the same time and me. I think that [support] was lacking." (Vaginal Birth; Private Hospital; Increased EBP Knowledge Perceived)

"When I needed to start pushing the baby, I was lying in the regular position because the hospital indicates that it has to be this way. There were no midwives to help me" (Vaginal Birth, Public Hospital, Increased EBP Knowledge Perceived).
Table 10 - Socio-demographic characteristics associated with the use of intrapartum evidence-based practices among women who participated in the Senses of Birth intervention follow-up survey

<table>
<thead>
<tr>
<th>Age</th>
<th>Education</th>
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<th>Race</th>
<th>Private Health Insurance</th>
</tr>
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<td>Total N = 552:</td>
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<td>Total N = 552:</td>
<td>Total N = 553:</td>
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<td><strong>N</strong></td>
<td><strong>%</strong></td>
<td><strong>N</strong></td>
<td><strong>%</strong></td>
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<tr>
<td><strong>P</strong></td>
<td><strong>value</strong></td>
<td><strong>P</strong></td>
<td><strong>value</strong></td>
<td><strong>P</strong></td>
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<td>387</td>
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<td>323</td>
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<tr>
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<td>496</td>
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<td>Yes</td>
<td>205</td>
<td>37.5</td>
<td>206</td>
<td>37.8</td>
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<td>62.5</td>
<td>349</td>
<td>62.2</td>
</tr>
<tr>
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<td>100.0</td>
<td>555</td>
<td>100.0</td>
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<tr>
<td></td>
<td>Tot.</td>
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<td>74</td>
<td>89</td>
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<td><strong>Choice of Position at delivery</strong></td>
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<td></td>
<td></td>
<td></td>
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<td>206</td>
<td>84.1</td>
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<td>80.7</td>
<td>19.3</td>
<td>7</td>
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<td>82.6</td>
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<td><strong>Non-Pharmacological Pain Relief Methods</strong></td>
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<td>265</td>
<td>84.9</td>
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<td>5</td>
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<tr>
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<td>613</td>
<td>82.5</td>
<td>17.5</td>
<td>20.5</td>
</tr>
</tbody>
</table>

2. Total varies due to missing data for each variable

^P value ≤ 0.1        *P value ≤ 0.05     **P value ≤ 0.001
The lack of continuous support was frequently mentioned as a barrier and associated with dissatisfaction. The intermittent presence of the woman's companion of choice is also against Brazilian 2005 law, and women’s discontent can be exemplified by the three reports below, regardless of the type of birth or type of hospital:

"When the pain started to get stronger, I was taken to a delivery room. I was left alone there for one hour. The pain was intense; I was afraid; I called for my mother who was outside because she and my friend could not go in. It was my first birth, I looked around the room, and nothing I thought, imagined or witnessed about humanized birth was happening in that cold, large, lonely room" (Vaginal Birth; Private Hospital).

“The cesarean section had no complications, but they did not let my sister-in-law in.” (Cesarean; Public Hospital; Increased EBP Knowledge Perceived)

"The only thing I did not like in the hospital was that I could not have a companion until my doctor arrived. My husband only came in to stay with me after my doctor arrived. It was over one hour without support. That was the traumatic part." (Vaginal Birth; Public Hospital; Increased EBP Knowledge Perceived).

Lack of orientation by a health professional during prenatal care was typically described as a reason for not using an EBP, as exemplified by this woman who could not bond with her prenatal care doctor due to the rotation of professionals:

"I did not even talk to my prenatal doctor, who was a family doctor about [the birth plan]. Each month I saw a different doctor. There was no time to bond with anyone." (Cesarean; Public Hospital; Increased EBP Knowledge Perceived).

Women reported not writing a birth plan for different reasons: disbelief that it would be followed; a perception that it should only be used for normal birth; a lack of self-efficacy; to avoid creating an expectation related to the birth; and lack of bond with the obstetrician. Some women reported having discussed the plan with her birth team or companions, but not creating a written document or in-depth plan, or not presenting it at the time of childbirth at the hospital. Lack of time
during pregnancy and need of the EBP not recognized were also frequently described as reasons for not writing a birth plan, as we can see in the examples below described by two women that had a cesarean at different types of hospitals:

“I just talked to the doctor about my expectations, but this was not documented in a birth plan. I think I felt embarrassed to make one.” (Cesarean; Private Hospital; Increased EBP Knowledge Perceived).

"Because I knew [the birth plan] was not going to be followed, [being in a] public hospital and all. Off course I wanted to do it and follow it." (Cesarean; Public Hospital; Increased EBP Knowledge Perceived).

Facilitators and Strategies to use the intrapartum EBP

Women reported that having their choices and desires respected was an important facilitator since it gave them the possibility to use their preferred practices. Women that believed they were able to have a normal birth after the SoB intervention were more likely to have doula support (97.9%, \( p \leq 0.05 \)), and midwife care (95.9%, \( p \leq 0.05 \)) (Table 9). Receiving individualized care was a strategy usually associated with the presence of doulas and midwives and was described as an incentive to the use of non-pharmacological methods for pain relief, freedom of mobility during labor, and choice of position at delivery. Having family support was a facilitator commonly described in conjunction with having the woman's desires and choices respected. The following are examples of the support some of the women received to use different practices:

"I did not use analgesia, although, sometimes, I asked for it. Since I had the plan not to use it, I had a lot of support from the doctor, my husband, and the midwife. This support was fundamental [not to use the analgesia]. I also used the bathtub, but at some point, it was not enough. The bathtub in the hospital brought me a lot of relief." (Vaginal Birth; Private Hospital; No Increased EBP Knowledge Perceived).

“This moment is unforgettable and helped a lot to push my baby. I felt my little one be born. My [husband] was holding me inside the bathtub, helping me, gave
me strength and support.” (Vaginal Birth; Private Hospital; No Increased EBP Knowledge Perceived).

“The midwife was available all the time. Very attentive. Then I did squats because she told me it would help to dilate.” (Vaginal Birth; Public Hospital).

Having the method offered and accessible was a critical facilitator described, often related to the adequate hospital ambiance, appropriated infrastructure, and individualized support offered, as described below by three women who had different types of birth and hospital:

"Over time, the pain grew stronger, and [the doula] suggested the shower as a form of relief. The shower was a wonder for pain, the Pilates ball too. I went to the bathtub with seven centimeters of dilation." (Vaginal Birth; Private Hospital; No Increased EBP Knowledge Perceived).

"It was beautiful!! My husband accompanied me all the time, and the facilities already had all the structure, so I did not have to use invasive methods to relieve the pain. Although in the end, when I was exhausted, I seriously considered using anesthesia." (Vaginal Birth; Public Hospital; Increased EBP Knowledge Perceived).

“The hospital has a labor and delivery room, where I had access to all the equipment for pain relief. My doula and companions were always massaging and encouraging.” (Cesarean; Private Hospital; No Increased EBP Knowledge Perceived).

Having private health insurance was associated with the use of a birth plan (84.0%, p ≤ 0.01) and midwife care (84.6%, p ≤ 0.01) (Table 9), probably representing the group of women that decided to pay out of pocket for a humanized birth team. The two women below explained that they were only able to use EBPs because they had with them a birth team of choice at a private hospital:

"So, [the birth plan was respected] only because I was with a private team, to tell you the truth. I had a doula that was with me the whole time.” (Vaginal Birth; Private Hospital; No Increased EBP Knowledge Perceived).

"It corresponded [to my birth plan] because I had my [private/out-of-pocket] doctor with me, without her I don't know if it would have corresponded. My
doctor respected my wishes all the time." (Vaginal Birth; Private Hospital; Increased EBP Knowledge Perceived).

Discussing the birth plan with health professionals and trusting the health professionals were described as strategies/facilitators to have the birth plan respected. However, a few times, the trust and previous discussion with the obstetrician were reasons the women had no written birth plan, as one woman describes:

"So, she knows my choices and desires, I did not fill that sheet, but for me, it was like a birth plan." (Vaginal Birth; Public Hospital; Increased EBP Knowledge Perceived).

Age and education were also found to be facilitators to use the EBP, when observing a bivariate analysis. Women who were younger than 34 years old were more likely to have midwife care (87.6%, p ≤ 0.01) and use of non-pharmacological pain relief methods (84.9%, p ≤ 0.05) than women over 35 years (Table 10). Women who had more than 12 years of formal education were more likely to use a birth plan (83.3%, p ≤ 0.01), had freedom of mobility during childbirth (84.3%, p ≤ 0.05), and choose the position during delivery (83.3%, p ≤ 0.01) than women with lower education (Table 10).

The Senses of Birth intervention presented itself as one of the facilitators to use the EBP, described by women and represented by their mean score of knowledge. All women who used evidence-based practices during childbirth presented a higher mean knowledge after the SoB intervention compared to their knowledge before the intervention for the Normal Birth, Cesarean, and EBP knowledge components (Table 5). The perceived mean knowledge before SoB was higher for women that used EBP in all three domains, except for having midwife care when associated with knowledge of normal birth and cesarean (Table 11). Three women that perceived an increase in EBP knowledge after the intervention, describe the impact on their behavior:
"In fact, the Senses of Birth was part of my birth plan. All the information I got at the intervention was part of my entire pregnancy": (92:3) (Cesarean; Private Hospital; Increased EBP Knowledge Perceived).

“[The interventions influence me], because the information was excellent. About the doula.” (Vaginal Birth; Public Hospital; Increased EBP Knowledge Perceived).

It influenced me; I already knew that the presence of a companion was important, and after participating in the Senses of Birth, this idea was more evident to me. (Cesarean; Private Hospital; Increased EBP Knowledge Perceived).

Women’s perceived knowledge and the use of intrapartum EBP

An increase in knowledge was not only perceived by women that used the EBPs. Women who did not use the evidence-based practices also presented an increase in mean of knowledge after the intervention for all components, consistently presenting higher change scores (Table 11). Nonetheless, it was found that women who did not use EBP had a mean score before SoB lower than the ones that used EBP and presented a lower mean score after SoB when compared with women that used EBP, even when presenting a higher change score (Table 11).
Table 11 - Women’s knowledge about EBP, normal birth, and cesarean of pregnant women before and after participating the Senses of Birth intervention by use of intrapartum evidence-based practices

<table>
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<th></th>
<th>Normal Birth Knowledge</th>
<th>Cesarean Knowledge</th>
<th>EBP Knowledge</th>
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<td>P value</td>
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Mean scale before or after the SoB Intervention varies from 1 to 5 points
*Welch Robust Test of Equality of Means - P-value ≤ 0.05
tLevene Statistics - Test of Homogeneity of Variances - P-value ≥ 0.05
aAll variables meet assumption criteria of distribution of means. All variables presented a normal distribution
bP value ≤ 0.1 cP-value ≤ 0.05 **P-value ≤ 0.001

95
The change score represents women’s perception of knowledge variation after the intervention. The results of a positive change score are relevant because women started the intervention with a wide range of means, especially for the EBP Knowledge component, as can be observed by the standard deviation (Table 11). Despite that, all women had a positive change score for all three knowledge domains, that is, perceived an increase in knowledge (Figure 9). The association of the change score with each of the intrapartum EBPs was observed among women who used and the ones who did not use the practices.

The total change score for EBP Knowledge ranged from 0.895 for the use of non-pharmacological methods of pain relief to 0.965 for doula support and midwife care (Figure 9). Normal Birth knowledge total change score ranged from 0.684 for the use of non-pharmacological methods of pain relief to 0.729 for the use of a birth plan (Figure 9). Cesarean Knowledge change score ranged from 0.694 for freedom of mobility during labor, and choice of position at delivery to 0.720 for the birth plan, doula support and midwife care (Figure 9).

The EBP Knowledge total change score was higher than the change scores for Normal Birth Knowledge and Cesarean knowledge, indicating women perceived a higher knowledge increase for EBP when compared with Normal Birth and Cesarean knowledge. Nevertheless, the perceived increase in knowledge was not associated with the use of practices, since the change scores are higher among women that did not use it. The difference is expected since women who did not use the practices started with a lower mean score before the intervention when compared with the ones that used it. The change score among women that did not use the EBPs was higher than the change score for women that used the EBPs — indicating that acquiring knowledge of the intervention was not sufficient to overcome barriers to using the intrapartum EBPs.
Figure 9 – Women's mean change score* for EBP, Normal Birth and Cesarean knowledge domain by women that used (yes), did not use (no) and the total sample the intrapartum evidence-based practices

*Mean change score is the women’s mean score for the perceived knowledge component after the SoB subtracted by the mean score before the SoB – possibly ranging from -5 to 5
Discussion

In this study, the majority of women used intrapartum EBPs, with the exception of the doula support. Using the intrapartum EBPs was associated with high mean score of knowledge before the intervention; giving birth in a public hospital; and having a vaginal birth. Some practices were also associated with socioeconomic characteristics: women who had a higher income were more likely to use a birth plan and midwife care; being white was associated with the use of doula support; and having more than 13 years of formal education was associated with use of a birth plan, freedom of mobility during labor and freedom of choice of position at delivery. Midwife care and doula support were also associated with women who believe they were able to have a normal birth after participating in the SoB intervention.

Women who answered the open-ended questions on the follow-up survey and were included in the qualitative analysis perceived an increase in knowledge after participating in the SoB intervention. Positive outcomes were described related to the use of EBPs, such as satisfaction and choices respected, while negative outcomes were referred by women who did not use the practices. Barriers identified by women mainly referred to low quality of care, especially no woman-centered care to support and incentivize/promote the use of EBPs, while facilitators and strategies reported reinforced the need to implement EBPs protocols at hospitals but also the importance of individualized care and respect, reinforcing the “acolhimento” practices.

Using the intrapartum EBPs

Women in this study used the EBP more often than women nationwide as registered by the Birth in Brazil Study in 2014 (data collection in 2011-2012) (4,9,72), which can be partially attributed to the impact of the SoB intervention on women’s knowledge, since women that
participated in the SoB were more likely engaged and with higher knowledge about EBP, normal birth and cesarean, when compared with the national sample from the BB Study. Doula support was the intrapartum EBP with the lowest frequency of use among women who participated in the SoB (26.9%). Nonetheless, the percentage of women with doula support was higher than reported by women in the BB study, by only 0.1% (72). This noticeable percentage of doula support during childbirth among women in this SoB study is similar to midwife care, 54.4%, while in 2011 only 7.7% registered a midwife as part of the birth care team (4). The uninterrupted presence of a companion of choice was also higher among women who participated in the SoB (81.6%) compared to the national BB study, 18.8% (72).

The BB study reported that 91.7% of Brazilian women who had a vaginal birth gave birth laying down (lithotomic position), while 57.2% of all women who visited SoB chose another position at delivery (8). In the BB study only 26.7% of women had access to non-pharmacological pain relief methods, compared to 74.4% in this study (8).

A recent nationwide study evaluated the implementation of the Stork Network in public hospitals and the Healthy Birth program in private hospitals, with data collected in 2017, two years after this study about the SoB intervention (42). Among women who had a vaginal birth, 69.2% reported having freedom of mobility during childbirth in public hospitals (42), while in SoB, 71.9% of women who had vaginal or cesarean in public hospitals reported having freedom of mobility.

In this study, 93.3% of women who gave birth in public hospitals and 61.9% who gave birth in private hospitals used non-pharmacological methods for pain relief during labor, regardless of the type of birth. Meanwhile the 2017 national study found that women who had a vaginal birth used non-pharmacological methods for pain relief during labor, 56.7% in public hospitals and 57.1% in private hospitals (42). The 2017 study showed that among women who had a vaginal
birth at public hospitals, 27.3% had midwife care during childbirth while only 18% at private hospitals (42). In this study 74.9% of women reported midwife care in public hospitals and 42.5% in private hospitals, considering both vaginal birth and cesarean. Health policies and tailored programs implemented since 2012 have shown important results on improving maternal outcomes, including increasing the use of intrapartum EBP. However, this usage is still low and does not ensure a positive childbirth experience for the majority of Brazilian women. Women that participated in the SoB still used the EBP more frequently, which can indicate an impact of the intervention supporting women to overcome barriers that the policies and programs in place have not yet achieved.

The primary outcome of EBP use reported by women was satisfaction regardless of type of birth. Satisfaction with the childbirth experience is one of the outcomes WHO describes when recommending a positive childbirth experience (66), and can contribute to a positive attitude towards using the EBPs.

As expected, having a vaginal birth was associated with the use of all the intrapartum EBP, which also allowed women who had a vaginal birth more opportunities to identify the barriers, facilitators, and describe strategies used. In Brazil, the United States, and Spain, higher rates of doula support, midwife care, and use of a birth plan were each associated with having a vaginal birth (3,74,141,168). On the other hand, women who had an intrapartum cesarean also identified a wide range of barriers for using EBP, such as no access to pharmacological pain relief methods, lack of individualized care, no companionship during childbirth and choices disrespected. The constant description of barriers by women in this study, more frequent than facilitators, may indicate that women knew better care could be provided and would like or regret they did not have access to it.
Women described a desire to reclaim a positive experience in birth, in agreement with findings from other studies that interviewed women in Brazil. Those studies found that a positive childbirth experience allowed women to recreate childbirth as a human experience and regain confidence over their body’s ability to give birth, creating new possibilities of experience where before there was only the precarious choice between unnecessary cesarean or a violent vaginal childbirth (97,169). If a choice does not include women’s value, and patient safety it will not promote autonomy, and without autonomy, there is no informed decision making (170,171).

*Intrapartum EBP use and the “Acolhimento” concept implemented*

Women who participated in the qualitative analysis described the use of intrapartum EBP as a bundle; that is, one practice integrated to one or more practices. For example, continuous support of care from a doula and/or companionship of choice, and individualized care was accompanied by the use of non-pharmacological pain relief methods. Furthermore, women that use non-pharmacological pain relief methods also refer to freedom of mobility during labor and describe choice of position at delivery.

The literature supports this reported and observed association of evidence-based practices since doula support and midwife care have been identified as reliable predictors of using non-pharmacological methods of pain relief and freedom of mobility during labor (1,8,36,69). Studies show that women with doula support are less likely to use intrapartum pharmacological analgesia, and had a shorter length of labor (1,2). Also midwives are described as the health professionals most likely to use massage as a pain relief method, and in a study with Brazilian women, 14.7% of their chosen companions applied massage (134). Midwife care has also been associated with a shorter length of labor and decreased the number of deliveries using a vacuum or forceps (69).
Evidence suggests that upright birth positions during the second stage of labor reduce episiotomy and instrumental vaginal births (3,66).

When women in this study describe the use of a set of practices resulting in a favoring environment that supports their choices and desires, they are describing the "acolhimento" prescribed by the National Humanization Policy. The adequate birth ambiance and hospital protocols that offer and support the use of the EBP described as a facilitator by women in this study can also be found as components of the NHP (96). Therefore, fully implementing the policy created in 2000 (137), might significantly impact the increase in the use of intrapartum EBP. Results that could be enhanced with the implementation of policies that promote integrated care, the Stork Network, and programs focused at the private sectors, the Healthy Birth, which the latest assessment has shown an increase of use of best practices (42).

*Women’s knowledge, self-efficacy and the use of intrapartum EBP*

The group of women who participated in this study can be identified as a group of well-informed women since the average of perceived knowledge before and after the SoB intervention was higher than 3.01 in 5.0 for all three knowledge components related to any of the EBP (Table 4). The mean knowledge regarding normal birth, cesarean and EBP after the intervention was higher than the perceived knowledge before SoB, with a significant association for the use of all EBP (table 4) which allows us to infer that this was a group of women who acquired improved awareness of their rights and choices. The literature indicates that access to quality information during prenatal care increases women’s self-efficacy and perceived control (49,102,120,153), allowing women to question unnecessary interventions, move away from exclusively medical-centered care, and avoid the repetition of a TMTS model.
Self-efficacy and choices respected were two robust strategies/facilitators to use EBP described by women in this study, giving the women the chance of becoming protagonists of their childbirth. A woman can only be the childbirth protagonist when she has access to an autonomous choice, including the knowledge of her body, beliefs, and values respected (170). This same active transformation, regaining autonomy, and becoming the protagonist of the birth was described by women engaged with the Brazilian childbirth humanization movement to overcome barriers to have a positive childbirth experience (169).

Studies of interventions based on the TPB with pregnant women identified that women with a higher perceived self-efficacy reported higher awareness of their health status and well-being during pregnancy, and advocated for their rights, choices, and needs more frequently (120,172). Increased self-efficacy was found to be associated with lower use of analgesia intrapartum and having doula support in different studies (172,173).

Increase in knowledge about normal birth, cesarean, and evidence-based practices is associated with a positive impact on women’s use of EBP and were also described by women as strategies to use intrapartum EBP. Previous studies show that women’s knowledge about childbirth risks is a predictor for choosing to try a vaginal birth after cesarean (109). A different study found that knowledge gave women the chance to understand the childbirth physiology, to overcome fears and deconstructing myths around it (169), corroborating the women’s report on this study that they felt safe and had comforting/calming experiences when using the intrapartum EBPs. However, knowledge increase is not a determinant for using intrapartum EBP.

The change score results showed that women who did not use the EBP had a higher change score in knowledge for normal birth, cesarean and EBP; that is, those women who perceived an impact on knowledge did not necessarily use the EBP. However, it is also true that women who
did not use the EBP had a lower mean score before the intervention than the women that used the practices. Therefore, although the intervention had a greater impact on them, they might not have achieved a threshold of knowledge sufficient to impact the behavior or to overcome the identified barriers.

Considering most of the women (49.1%) who answered the follow-up survey were in their third trimester of pregnancy when visiting the SoB, the result could be explained by their perceived lack of time between knowledge increase and changing previous arrangements for the childbirth, as exemplified by this woman: “I actually learned about [the Birth Plan] when I went to the intervention. However, I was already seven months pregnant, and I didn't even had time to do it anymore” (Cesarean; Private Hospital; Increased EBP Knowledge Perceived). Previous arrangements for the childbirth include systemic changes such as choosing a hospital that follows EBP protocols and/or has a normal childbirth ambiance, changing physicians for a birth team that supports normal childbirth, hiring a doula, and creating/using a birth plan.

Furthermore, we could observe that women who did not use the EBP had a low self-efficacy perception when explaining their reasons, as exemplified by this woman: "I couldn't do [the Birth Plan], and I think I didn't give it the due importance either. My pregnancy was a moment when I became a very insecure person. Even to choose baby clothes I spent hours thinking. And the plan required empowerment that I didn't have. The idea to have a birth plan was, by itself, something very new for me” (Vaginal Birth; Public Hospital; Increased EBP Knowledge Perceived). Therefore, women who did not use EBPs may have needed more information to recognize the benefits of the practices or to receive information sooner during pregnancy, with greater or more opportunity and time to increase self-efficacy. The lack of self-efficacy, fear, and anxiety was a barrier to use some of the EBPs described by women in this study.
The barriers to using intrapartum EBP - a systemic view

The majority of barriers described by women reflected institutional, professional, or health system barriers, corroborating findings of studies that used other stakeholders and health record data as sources (135,154–157,160). The lack of hospital ambiance for using EBP and rigid hospital protocols not based on evidence are described barriers by women in this study. They frequently refer to not having been offered a practice, such as non-pharmacological pain reliefs, and describe having their choices disrespected with a justification that the hospital protocol/rule did not support moving during labor or choosing a position during delivery, among other choices. Hospital protocols or health professionals’ recommendations against the companion present during delivery were reasons described for not having companionship of their choices with them at all times, that is, having their rights disrespected, which was also observed by 81.4% of the women in a different Brazilian study (134).

Private hospitals were associated with failing to use intrapartum EBP (P-value ≤ 0.05), which is worrisome since 54% of childbirths in Brazil occur at private hospitals with an average of 83% cesareans (20,24,25). Additionally, financial costs to use EBPs was a barrier described only by women who gave birth in private hospitals. Few studies discuss the use of EBP in Brazil and type of hospital. However, different authors have discussed the increased rates of cesarean in the private sector, creating a paradox of care, in which low-risk women have more interventions (95,174,175). Therefore, the low use of EBP at private hospitals corroborates the high rates of cesarean, indicating that women have fewer opportunities to have a positive childbirth experience in those settings. Those women are being denied the opportunity to access resources that can help achieve a positive experience of childbirth. At the same time, there is an important need for investments in the public sector, as observed by a recent nationwide evaluation of the Stork
The difference between private and public hospital access to the use of EBP might also reflect the non-compliance of private hospitals with the national policies, such as the Stork Network and the Humanization Policy, as observed by different studies regarding the implementation of maternal and child health policies (15,22,41). Although there is a national agency that oversees private hospitals and health insurance, the reach of the agency for enforcing national policies and guidelines is lower, when compared to the influence those have over the public system. The adherence of private hospitals to programs that promote the adoption of evidence-based clinical protocols, such as the Healthy Birth program, is still low (42).

Results might also indicate a different implementation of policies and access to the health system around the country since women from four different cities participated in the study. Regional differences of using intrapartum EBPs were observed in public and private hospitals by a national assessment of the Stork Network police and the Healthy Birth program (42). Although the majority of women participating in this study were in Belo Horizonte (63.5%), the three other cities are major urban centers with different investments in the public system. Further analysis within each city and the maternal health care system would be needed to understand the differences, which was not the focus of this study.

Women who gave birth in a public hospital reported not believing a birth plan would be respected as a barrier to using it. The disbelief among women that a birth plan could be respected in a public hospital is worrisome, indicating that women perceive a lack of autonomy and choice to access care in a public hospital. Not having a written document for the birth plan minimizes the importance of a birth plan as a platform of communication to ensure informed consent and protect women’s reproductive right. The Humanization Movement organizations have used the birth plan
in Brazil as an intervention or a strategy to increase women’s knowledge and self-efficacy, ensuring women could receive qualified information and open a channel of communication with the prenatal care physician (169,176). It is also an important instrument to generate interest among women to use other EBP, incentivize critical reflection about obstetric care, and engage the family/companion of choice (177). Therefore, if women do not believe the Birth Plan will be followed or there is no need to create a written document, it becomes a barrier to use not only for this practice but all others that could be introduced and discussed with it.

The belief that a birth plan would only be respected if a woman can pay for a private birth team is confirmed by the fact that 84% of women that had a birth plan, had private health insurance. On the other hand, having private health insurance was associated with no support of a midwife and no use of non-pharmacological pain relief methods during childbirth, which could be explained by the overmedicalization of childbirth in Brazil, alongside a physician-centered model of care (95,178). Although much has been done to improve outcomes for mothers and babies, the increasing medicalization of the maternal care system widens the gap between high and low resource settings and distances the interventions from women-centered care (66).

Women in this study have described the need for more information as a barrier to use intrapartum EBP. However, this barrier should also be seen as part of a large systemic barrier and not an individualized lack of information. Women associate the lack of information regarding the EBP with lack of appropriate prenatal care with time for orientation and conversations and lack of bond with the prenatal care considering the no fixation of a physician at the primary care level in the public sector. It is known that women who receive incomplete information regarding childbirth cannot express their preferences and were more likely to be subjected to severe pain and describe stress during childbirth (179). Different studies indicated that well-informed women could not only
present their preferences and choices, but also advocate for their reproductive rights, increase their autonomy and self-efficacy, and defend themselves from obstetric violence and discrimination (45,169,180).

Social inequalities and the use of intrapartum EBP

The majority of Brazilian women of childbearing age are black, with less than eight years of education, an income of less than 2 MW, and use the public health system (125,126). Thus, the study sample differs from the population representing a group with more years of formal education, higher family income, and higher use or access to private health insurance, representing women that looked for a positive childbirth experience. Nonetheless, social inequalities were observed regarding race, income, and education, corroborating the literature that indicates Brazilian women have different access to maternal care impacted by social, racial, and income inequalities (181).

Brazilian women who attended the SoB and have lower income were more likely not to use the birth plan and have midwife care during childbirth. Although not observing the use of EBP, the Birth Brazil survey found that high income was associated with higher childbirth satisfaction (140). Other studies found that a lower socioeconomic status reflected a lack of choice during childbirth (179).

In this study, black women had lower chances to have a birth plan and doula support. The Birth Brazil survey found that low-risk black women were less likely to have freedom of mobility during labor and use non-pharmacological pain relief methods when compared to white women (8). Black women having access barriers to EBPs and care was also reflected by the National Gender Statistics report where the group had lower access to prenatal care and less consults when compared to white women, a significant racial inequality, even though the country has high
coverage of prenatal care (182).

Women with more years of formal education were associated with using a birth plan, describing freedom of mobility during labor and freedom of choice of position at delivery. Being white and more than 12 years of formal education was associated with having the companionship of choice during childbirth, use of non-pharmacological pain relief methods, and having freedom of mobility during labor (8,72).

Different authors correlated limitation of women's autonomy with social inequalities and different levels of care offered in different settings (171,183). The same was described by women in SoB when referring to barriers at private or public hospitals. For example, additional financial cost, was a barrier only described by women who gave birth in private hospitals.

Improvements to decrease inequalities with social programs and public policies have impacted the country’s scenario in recent decades, with clear improvements in the conditions that directly affect the health of women and children implemented in the past decade (41). Nonetheless, structural changes are needed to ensure that low-income women, with fewer years of formal education, and who are black have the same access to EBP and opportunities to have a positive childbirth experience. Health education can be one of the strategies to support women using EBP. However, it is not sufficient to reduce an inequality gap of a lifetime of social inequalities that combine with structural societal racism and that are structural barriers to accessing quality care (112–116).

Strengths and Limitations

Women who answered the follow-up survey presented a high perceived knowledge before and after the intervention, indicating that they were a group of engaged women with the maternal
health care topic. Therefore, it is likely that Brazilian women with lower perceived knowledge were underrepresented in our sample. Nonetheless, hearing the voices of well-informed Brazilian women is a strength of this study, since it can indicate women-centered care to overcome barriers and increase strategies/facilitators for the use of EBP, promoting, in the long-run, cultural change of the social norms that surround childbirth. Few studies have included a large sample of Brazilian women and allowed them to describe their experience regarding intrapartum EBPs freely. The large sample was possible to be used because of the online self-applied survey; although the instrument does not promote data collection as in-depth as small interview groups. On the other hand, the mixed-method analysis promoted a richer exploration of the theme, allowing an in-depth exploration of the women’s experiences and meanings for the use of EBP.

Nonetheless, women describing their childbirth experience might be influenced by intrinsic social desirability to focus only on positive outcomes of the birth. However, the anonymity of responses and engagement of women with the topic likely diminishes this influence over the results.

**Conclusion**

This study corroborates previous findings that Brazilian women have restricted access to intrapartum EBPs, and although recent policies have improved the access to EBP’s, there are still systemic barriers that make it difficult for women to achieve a positive childbirth experience. Furthermore, women who gave birth at the private hospital had less access to the practices, although they have also expressed their desire to use EBPs as actively as women who gave birth in public hospitals.

Women who used the intrapartum EBP described a sense of control over their bodies and
empowerment to advocate for the practices they chose. This bolsters the idea that promoting positive childbirth experiences can create new paths to exercise reproductive rights, childbirth, motherhood, sexuality, and positive perception of the woman’s body capacity. Women saw the strategies to overcome the barrier to use EBP as a path to become the protagonist of their childbirth and regain a sense of lost autonomy provoked when the care is not centered on the patient.

Increased perceptions of knowledge about normal birth, cesarean and EBP gave the women a chance to critically reflect upon the maternal care scenario in Brazil and advocate for their choices, desires, and rights. Nonetheless, it is clear that health education is an essential element to increase the use of WHO and MS recommended practices. However, it cannot be used isolated from systemic changes that overcome barriers identified by women, including the implication of institutions/hospitals and health professionals.

Although this was not an evaluation of the existing public policy or programs in the private sector, the results suggest investing in implementing evidence-based protocols, adequate hospital ambiance for normal birth, including "acolhimento", infrastructure and health professional training are needed to increase women’s access to intrapartum EBP. Therefore, this study can guide policy decisions and program implementation to improve maternal health care by explicitly considering women's voices and experiences. As long as we continue to value only outside experience and not involve the women in their own care decisions, the health system will continue to be organized outside of their priorities.
CHAPTER 5 – FINAL CONSIDERATIONS

Summary of Findings

This study suggests that a high proportion of pregnant Brazilian women had some knowledge about normal birth and cesarean before the SoB intervention. Additionally, all women perceived an increase in their knowledge after the intervention. On the other hand, women's perceived knowledge about intrapartum evidence-based practices started at a lower average before the intervention and also increased after it. These results show that, while there is a need to increase the availability of quality information, the risks and benefits of normal birth and cesarean are already being discussed with women during pregnancy. In spite of this, women lack knowledge about how to achieve a positive childbirth experience since the majority of them are not aware of intrapartum EBP, and how the practices can be a tool/pathway to have the childbirth they desire.

Moreover, the SoB intervention results showed that women are interested in learning about childbirth, and there is room to improve knowledge about normal birth, cesarean, and EBP. The SoB intervention model was found to have the greatest impact among women within the lowest tier of income, without private health insurance, who had private prenatal care, are experiencing their first pregnancy, and were in their first or second trimester at the time of the intervention. These results indicate that woman-centered interventions are needed and can have an effective impact on the priority population. However, the results also suggest that it is important to identify the subgroups to be prioritized with the intervention, and that tailoring is needed to effectively reach key subgroups of women.

The social inequalities in Brazil impact access to quality care for poor, uneducated, and black women. Therefore, the SoB was most effective for a priority population in need. Even so, it
is crucial to consider that women most vulnerable to having a cesarean delivery at private hospitals are women with private health insurance, higher income, and more years of formal studies. Therefore, the need to identify how to engage wealthier, highly educated women in EBP health education is urgent. Furthermore, considering the results showed primiparous women were more likely to be impacted by SoB, it is essential to engage multiparous women within health education interventions to discuss the need for vaginal births after a cesarean (VBAC) and decrease unnecessary cesareans.

The results also show that women who participated in the SoB intervention were more likely to use the intrapartum EBP more often than what was observed nationally. The EBP that was used least frequently was doula support (26.6%). For the other EBPs, 55% to 81% of women in the follow-up survey reported use of them. Use of the intrapartum EBPs was associated with a high mean score of knowledge about normal birth, cesarean and EBP before the intervention, giving birth in a public hospital, and having a vaginal birth. Perceived knowledge after the intervention was not a determining factor for women to use the practices. This suggests that there are barriers that women face to using EBP that are outside of their control. The majority of barriers to use of EBPs identified by women are due to the health system organization, including the lack of institutional and professional training about evidence-based protocols, the EBP not being offered, inadequate hospital ambiance, lack of individual support, and the absence of the companionship of choice, doulas and midwives. The qualitative results indicated that women with an increase in knowledge about EBP consistently identify outcomes of using the practices and strategies and facilitators to use them.

Moreover, the findings show that giving birth in a private hospital was a barrier to the use of intrapartum EBPs, without controlling for confusing factors. Nonetheless, the finding is relevant
because it reinforces the systemic barrier women described and indicates the need to prioritize programs that impact private hospitals concerning not only decreasing unnecessary cesarean rates but also increasing the use of EBPs. Other societal-structural factors were also identified as barriers to the use of EBPs, indicating the need to see the use of EBPs as part of a broader quality of care for pregnant women who are impacted by life-course barriers those women face. Women among the lower-income range (2 to < 5 MW) were less likely to use a birth plan and have midwife care compared to women with more than 10 MW. Being a black woman was correlated with not using a birth plan and not having doula support when compared with white women. Having more than 13 years of formal education was associated with the use of a birth plan, freedom of mobility during labor, and freedom of choice of position at delivery.

Overall, the results indicate that this woman-centered health education intervention had positive results. However, increasing women's knowledge is not sufficient to overcome the systemic barriers they face to achieve a positive childbirth experience. A change to a health system that prioritizes women's needs and well-being will only be possible with co-responsibility of policymakers, institutions, and health professionals' part of the maternal care.

Recommendations for future research

The findings of the dissertation point to a path for future research. The fact that women who participated in the intervention were likely more knowledgeable about normal birth, cesarean, and EBP, then the overall population should be further explored to understand how to tailor interventions to other groups. There is a need to consider the influence of the paradox of care in
Brazil among Brazilian women during pregnancy and what other factors might influence their behavior beyond the intervention and systemic ones explored here.

The use of evidence-based practices among Brazilian women should be explored considering each method individually, controlling for other factors that could be impacting its use. Multivariate analysis should be performed to understand further the associations indicated in manuscript two. Differentiating the use of the practices between women that had intrapartum cesareans and those who had scheduled cesareans is also important since it might show a different set of barriers and strategies for each type of birth. Furthermore, analyzing women's childbirth experience considering the type of birth and type of hospital should be a next step for the qualitative analysis, indicating what the impacts of the observed barriers over their possibilities to achieve a positive childbirth experience are. Women's childbirth experience could also be explored considering the different cities' data was collected, and the current state of implementation of the maternal health care policies and strategies in the city.

Finally, developing a cost-effective analysis comparing the expenses with the health intervention and the potential savings for the health system considering the type of birth and use of EBP among women could strengthen the argument for scale-up women-centered intervention and systemic changes.

**Potential policy implications**

*The need for woman-centered health interventions*

This dissertation was motivated by the opportunity to amplify women's voices and experiences about childbirth and EBPs. Therefore, the study discussed women's knowledge and what can increase their ability to advocate for their choices. It also showed the opportunity for
research grounded in women’s own knowledge about their experience and not merely external actors or standardized medical records. As a result, this dissertation gives voice to women who desire a positive childbirth experience. However, because of the health system structure, women’s desire for a positive birth experience was denied.

The sparse number of woman-centered studies that focus on intrapartum EBP is alarming (111). How have we been discussing practices that impact women's experience during childbirth and establishing clinical protocols that influence women's health directly without considering their experiences? If we want to build genuinely patient-centered health systems, there is an urgent need to include more women, not only in research, but as the center of health interventions, policy, and program designs.

The findings are not a surprise for anyone who engages with the grassroots movement and community-based organizations in Brazil that advocate for normal birth. Different groups have advocated for a humanized childbirth care model that implies professional respect of birth physiology, judicious use of clinical interventions, recognition of social and cultural aspects of childbirth, and offers the necessary emotional support (19,180).

However, few studies evaluate woman-centered interventions to decrease unnecessary cesareans and improve health outcomes, and even fewer studies that explore women's use of EBP from their own perspective, especially with a large sample (134,158,159). Therefore, this study contributes to systematizing that collective knowledge, adding to women’s embodied knowledge, and making the information available for health professionals and policymakers that should use it to tailor interventions, policies, and care models.
Health Education Policy Recommendations

Women-centered health education interventions should be scaled up to achieve lower cesarean rates and increase the use of EBP as part of a health care model that respects women's choices, autonomy, and reproductive rights. Health education interventions that are supported by tailored behavioral theories and include a robust evaluation of short term and long-term results can contribute to advance on the implementation and strength of the National Policy Health Education and Continuing Education (PNEPS). The policy proposes a health system that not only provides care but also provides the needed training for workers and information for patients (185). Recently, it is proposed to rethink the policy, promoting teaching and learning spaces on a constant exchange between health professionals and patients - practice and theory (186), consistent with the SoB intervention format.

The Theory of Planned Behavior is a fitting theory to support health education interventions that are women-centered and focused on EBP. The SoB offered information about EBP, increasing women's perceived knowledge, and positively contributing to their perceived behavior control and attitudes. Women believed that using the intrapartum EBP's would contribute to a positive childbirth experience; they also had the skills and abilities to use the practices. Therefore, women looked for strategies and facilitators that would allow them to overcome the barriers and use the practices. However, considering the barriers to use the EBPs women identified, behavior change will not be sufficient to increase the use of practices. Systemic interventions using models that account for social economic factors such as the ecological model should be articulated with the Theory of Planned Behavior.

The SoB intervention also engaged participants other than pregnant women, thus engaging the community support around pregnancy. Engaging the social network surrounding the pregnant
women is consistent with the TPB which indicates that a change in the social norms of a social network, or the Brazilian society more generally, can also impact women's behavior. This feature of the intervention was not directly assessed in the current studies, although preliminary results are observed in previously published articles (43,44), indicating the intervention did positively impact both pregnant women and their social support networks. The normative belief that vaginal birth is dangerous and painful is so intertwined with most Brazilians’ concept of childbirth that the unnecessary interventions, disrespects to reproductive rights, and obstetric violence is seen as unavoidable unless a cesarean is performed (45,139,187). Therefore, education about EBPs as a path to achieve positive childbirth experiences can change the perspectives of not only pregnant women and health care professionals but also the population at-large.

Cultural changes take time and effort and should be supported by robust outcome evaluations. The in-depth evaluation of this study, using a post-survey (short term measures) and a follow-up survey (long term measures), can also contribute to future health education evaluation arrangements. The mixed-method composition using a qualitative analysis ensures that the priority population perspective is not lost. The evaluation can contribute to a better understanding of the priority population needs, tailoring practices, care, and future health professionals' training.

*Sustainable Development Goals and Reproductive Justice*

The recommendations to achieve the SDG #3 include prioritizing quality maternal health services that respond to local needs and meet emerging challenges and accelerating progress through evidence, advocacy, and accountability (13). Interventions such as SoB can contribute to SDG #3 recommendations, but not without the maternal health field understanding that we need to advance the discussion of childbirth outcomes by including women's voices and considering a reproductive justice model (the focus of SDG #5). The reproductive justice model comes from a
social justice framework and expands a rights-based discourse to emphasize a systemic analysis that illuminates the inequality of opportunities women face (188). To achieve a woman-centered quality maternal care model, gender equality (SDG 5) will need to be addressed in conjunction with maternal health (SDG 3).

Policymakers should incorporate the principals of reproductive justice when planning interventions and reforming models of care. A reproductive justice model of care that prioritizes women would have as core constructs ensuring access to quality health care and facilitating change through critical conversations about challenging issues involving social determinants of health. It would also promote spaces in which leaders, including health care professionals and local community female leaders, across diverse sectors, can create equitable conditions that ensure optimal reproductive choices and outcomes for women and their families (189,190). A reproductive justice model includes women-centered education, community and emotional support, and empowerment.

_Brazil’s political scenario and impact on reproductive rights_

In Brazil, women have a false choice: between an invasive vaginal birth versus a supposedly clean, safe and painless cesarean delivery. Brazilian women are steered into choosing the "lesser evil" while they should have the opportunity to exert their autonomy and control over their bodies, choosing the healthiest option for mother and baby. A positive childbirth experience is part of women’s reproductive rights.

Currently, women's reproductive rights are being threatened. The political scenario of restricted federal health funding by the Brazilian government elected in 2018 can adversely impact maternal and child health outcomes, threatening SUS sustainability and its ability to fulfill the constitutional mandate of providing equitable health care for all (191). The defunding of SUS will
unavoidably decrease the quality of care, restrict access, and drive pregnant women towards the private health system, which is currently poorly regulated and responsible for the highest rates of cesarean.

Furthermore, the government is pushing a conservative agenda advances on historical achievements of women's movements. In May of 2019, the Ministry of Health issued a statement declaring the term "Obstetric Violence" does not add value to maternal care policies and is misinterpreted. For that reason, strategies to abolish the term from any policies, documents, or resolutions coming from the federal government will be implemented (192). This decision was motivated by a request of the National Association of Physicians that understand the term as prejudicial to gynecologists’ practices. The decision went against the international plea in defense of women's reproductive rights and was received in Brazilian society as a setback.

The term obstetric violence was first defined in 2007 by a Venezuelan law: “Obstetric violence is understood as the appropriation of the body and reproductive processes of women by health personnel, which is expressed in dehumanizing treatment, in an abuse of medicalization and pathology of natural processes, resulting in loss of autonomy and ability to decide freely about their bodies and sexuality, negatively impacting the quality of life of women” (193). However, human rights disrespect during childbirth is recognized by the UN since 1995, during the 4th World Conference on Women led by the Committee on the Elimination of Discrimination against Women (194) and the prevention and elimination of childbirth disrespect and abuse restate by WHO in 2015 (195).

The term was first used in Brazil in 2010 by the women's movement and has been incorporated into public policy and academic production ever since (187). Shortly after Brazil's decision to abolish the term, the UN adopted it for the first time on a special report about human
rights and reproductive health (196). Naming the violence that many women have suffered is essential to advance on recognizing, reporting, and preventing it. It contributes to an understanding that the action violates not only the rights of women to live a life free from violence, but can also threaten women's rights to life, health, bodily integrity, privacy, autonomy, and freedom from discrimination (196). Abolishing the term will not end the human rights violation, that includes the lack of access to EBP during labor and childbirth. On the other hand, it will create barriers for women to raise their voices against it, fragmenting the suffered violence as if they were not part of a health system that disrespects women's autonomy, choices, and desires.

Advocating for the incorporation of a reproductive justice approach in Brazil’s public health policy is particularly important now. In June 2019, the Brazilian government surprised the international community with a shift from defense of human rights and equality to one that denied human rights and equality through demanding the withdrawal of the term gender from any UN resolution (197).

Furthermore, several state-level bills proposing women can request a cesarean without clinical reasons were proposed by right-wing congressmen and women around the country. The first bill, signed into law (198) in 2019, was justified by the right-wing congresswomen who sponsored it as needed to protect women in the public sector, since women in private hospitals already have that option. While bills such as these appear to defend human rights, they highlight a lack of understanding about maternal health outcomes in Brazil on the part of legislators. Brazil has a cesarean rate of 56% overall and 83% in private hospitals (25), and current health policy already guarantees women’s choices and desires should be respected during childbirth (40,68). Women are not being denied a choice of cesarean; they are being induced to believe a high-risk surgery is the best or only option, even if there are not clinical recommendations for mother and/or
baby. A choice that does not include women's value, and patient safety does not promote autonomy, and without autonomy, there is no informed decision making (170,171). The cesarean only becomes a choice when the alternative is a vaginal birth without access to EBP and permeated by obstetric violence practices. The law, instead of promoting EBP during childbirth, ensuring the implementation of existing policies and the best quality of care for women, is giving them a riskier procedure as the only path to avoid suffering, pain, disrespect, and obstetric violence.

Within the current political scenario, the findings from the current studies could serve as an essential instrument for women and policymakers when it brings to light the knowledge of 1287 women and the childbirth experience of 555 women. Women are saying they want the possibility to choose the best practices available, but not to choose between the lesser evil care. Women reaffirm that a positive childbirth experience is vital to mother and baby, which contributes not only to better health outcomes but also to the respectful beginning of a life journey. Women know what they want and, if empowered with quality information, will advocate for a better health system that includes their needs, choices, and desires.

Health policies, including the public sector and tailored program of the private sector, have shown an improvement in health outcomes for maternal health care (42), nonetheless, that improvement was not as deep and as fast as needed considering the urgency of the problem. Furthermore, any advances conquered are now threatened by a conservative government. As Simone de Beauvoir reminded us in 1948: “Never forget that a political, economic or religious crisis would suffice to call women’s rights into question.”(199). Therefore, there is a current and urgent need to fully implement the health policies and scale-up successful program and health education experiences before stating that they did not work or rewriting strategies. However, that
implementation and scaling up will only be effective if the women are heard and included in the
initial phases of planning, implementation, and evaluation.
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Appendix 1 – Post-test survey

_Pregnant Women Survey – Post-test survey applied immediately after the intervention_

1. Date
2. Full name
3. What is your age?
4. **What is your address?** Neighborhood / City / State
5. **What is your telephone number:** Landline / Cell phone / I do not want to provide
6. **What is your e-mail?**
7. **Marital Status:** Single / Married or civil union / Widow / Separated or divorced
8. **Family Income (Counting income of all the people who live in your household)**
   
   (The income in Brazil is usually reported monthly, and the currency used was REAL – the government defines the minimum wage, and by the time of this questionnaire it was R$ 788.00)

   a) Up to 1 minimum wage (<788.00)
   b) From 1 to 2 minimum wages (2 788.00 to 1576.00)
   c) From 2 to 3 minimum wages (1576.00 to 2364.00)
   d) From 3 to 5 minimum wages (2364.00 to 3,940.00)
   e) From 5 to 10 minimum wages (3,940.00 to 7,880.00)
   f) From 10 to 20 minimum wages (7,880.00 to 15,760.00)
   g) More than 20 minimum wages (> 15,760.00)
   h) I do not know / I do not want to inform

_2 Questions presented here were translated to English by the author, the original questionnaire was developed by the research team and applied in Portuguese_
9. Your work situation - check one option only

a) Work with a formal contract
ea) Autonomous (includes MEI)
b) Works without a formal contract
f) Cooperative
c) Public servant (municipal, state, g) I have no work that earns money
   federal or military)   h) Other (specify)
d) Employee – owns the business

10. What is your occupation? Check all options that apply

a) Physician
f) High School Student
b) Nurse
g) Undergraduate Student
c) Other health professionals (please h) Graduate student
   specify)
i) Housewife
d) Teacher
j) Retired
e) Middle School Student     
k) Other (please specify)

11. What is your schooling?

a) Incomplete middle school
   e) Incomplete undergrad education
b) Complete middle school
   f) Complete undergraduate education
c) Incomplete high school
   and more
d) Complete high school
   g) I do not want to inform

12. The color of your skin is (read option)

a) White
   d) Asian/Eastern
b) Black
   e) Indigenous
c) Pardo/Mulato

13. Do you have private health insurance? Yes / No
14. How many times have you been pregnant before, excluding this pregnancy and counting termination (voluntary or natural)? You have had If answer = 0 move to question 17 - (Insert Number)

15. How many births were normal (including birth using forceps and vacuum)? (Insert Number)

16. Moreover, how many were cesarean? (Insert Number)

17. How many weeks/months of gestation are you?
   Insert number for Weeks / Insert number for Months

18. Is your pregnancy considered high risk?
   Yes / No
   If yes, please describe why __________________

19. Your prenatal appointments (current pregnancy) are covered by (check all that apply)
   a) Private Health Insurance
   b) SUS (National Universal Public Health System)
   c) Private (direct payment to professional – out of pocket payments)
   d) I never had prenatal care
   e) Other (please specify)

20. Do you prefer NORMAL BIRTH?
   No way / a little / Maybe / Probably / Absolutely

21. Do you prefer CESARIAN?
   No way / a little / Maybe / Probably / Absolutely

22. Your knowledge about NORMAL BIRTH BEFORE the exhibition was:
   None / Poor / Fair / Good / Very good

23. Your knowledge about a CESAREAN BEFORE the exhibition was:
   None / Poor / Fair / Good / Very good

24. Your knowledge about NORMAL BIRTH AFTER the exhibition was:
   None / Poor / Fair / Good / Very good

25. Your knowledge about a CESAREAN AFTER the exhibition was:
26. BEFORE the exhibition, would you say your knowledge about DOULAS was:
None / Poor / Fair / Good / Very good

27. BEFORE the exhibition, would you say your knowledge about MIDWIVES/OBSTETRIC NURSES was:
None / Poor / Fair / Good / Very good

28. BEFORE the exhibition, would you say your knowledge about the Pregnant Woman's Right to have companionship, from her choice, during the labor and childbirth was:
None / Poor / Fair / Good / Very good

29. BEFORE the exhibition, would you say your knowledge about non-pharmacological birth pain relief methods was:
None / Poor / Fair / Good / Very good

30. Before the exhibition, would you say your knowledge about humanized and evidence-based care during labor and childbirth was:
None / Poor / Fair / Good / Very good

31. Before the exhibition, would you say your knowledge about organizations (NGOs, social networks, professionals, others) that defend the humanized and evidence-based care during labor and childbirth was:
None / Poor / Fair / Good / Very good

32. Before the exhibition, would you say your knowledge about the cesarean rates in Brazil was:
None / Poor / Fair / Good / Very good

33. Before the exhibition, would you say your knowledge about the Ministry of Health / World Health Organization guidelines for labor and childbirth care were:
None / Poor / Fair / Good / Very good

34. Before the exhibition, would you say your knowledge about Obstetric violence was:
None / Poor / Fair / Good / Very good

35. Before the exhibition, would you say your knowledge about Birth Plan was:
None / Poor / Fair / Good / Very good

36. Have you ever had experience with normal birth?
a) Never had normal birth
b) Positive experience
c) Negative experience

Describe __________________________

37. After the exhibition, would you say your knowledge about DOULAS is:
None / Poor / Fair / Good / Very good

38. After the exhibition, would you say your knowledge about MIDWIVES/OBSTETRIC NURSES is:
None / Poor / Fair / Good / Very good

39. After the exhibition, would you say your knowledge of the Pregnant Woman's Right to have companionship, from her choice, during the labor and childbirth is:
None / Poor / Fair / Good / Very good

40. After the exhibition, would you say your knowledge about non-pharmacological birth pain relief methods is:
None / Poor / Fair / Good / Very good

41. After the exhibition, would you say your knowledge about humanized and evidence-based care during labor and childbirth is:
None / Poor / Fair / Good / Very good

42. After the exhibition, would you say your knowledge about organizations (NGOs, social networks, professionals, others) that defend the humanized and evidence-based care during labor and childbirth is:
None / Poor / Fair / Good / Very good

43. After the exhibition, would you say your knowledge about the cesarean rates in Brazil is:
None / Poor / Fair / Good / Very good

44. After the exhibition, would you say your knowledge about the Ministry of Health / World Health Organization guidelines for labor and childbirth care are:
None / Poor / Fair / Good / Very good

45. After the exhibition, would you say your knowledge about Obstetric violence is:
None / Poor / Fair / Good / Very good

46. After the exhibition, would you say your knowledge about Birth Plan is:
47. Your knowledge about the risks of NORMAL BIRTH BEFORE the exhibition was:  
None / Poor / Fair / Good / Very good  
48. Your knowledge about the risks of CESAREAN BEFORE the exhibition was:  
None / Poor / Fair / Good / Very good  
49. Your knowledge about the risks of NORMAL BIRTH AFTER the exhibition is:  
None / Poor / Fair / Good / Very good  
50. Your knowledge about the risks of CESAREAN AFTER the exhibition is:  
None / Poor / Fair / Good / Very good  
51. Did your preference for the type of birth (NORMAL BIRTH) change AFTER the exhibition?  
No way / a little / Maybe / Probably / Absolutely  
52. Did your preference for the type of birth (CESAREAN) change AFTER the exhibition?  
No way / a little / Maybe / Probably / Absolutely  
53. Do you think you can have a NORMAL childbirth?  
No way / a little / Maybe / Probably / Absolutely  
54. How will your labor and childbirth be paid? - Consider the various financing possibilities of the hospital and the professional who will attend the delivery (check all options that apply)  
   a) Private Health Insurance  
   b) SUS (National Universal Public Health System)  
   c) Private (direct payment to professional – out of pocket payments)  
   d) Private Health Insurance + out of pocket only for the obstetrician  
   e) Other (please specify)  
55. If you had a previous cesarean section, identify the reason(s) - spontaneous response, check all options that apply.  
   a) I did not have a previous cesarean  
   b) I wanted to connect the tubes  
   c) I wanted to have a cesarean  
   d) I had one cesarean before  
   e) I had two or more cesareans before.  
   f) I did not want to feel the pain of normal childbirth
g) I fear the lack of beds for hospitalization  
h) I fear the city violence  
i) My baby was wrapped in the cord  
j) My baby was crossed  
k) My baby was sitting  
l) My baby was too big / I had no  
  passage / I had no dilatation (failure to  
  progress)/ my baby did not settle into  
  my pelvis  
m) I passed my due date  
n) My baby was growing too slow or  
  stopped growing  
o) My placenta was old  
p) My baby was suffering  
q) I did not have enough amniotic liquid  
r) I had a low-lying placenta  
s) I had high blood pressure  
t) I had diabetes  
u) I had problems with HIV / AIDS  
v) I had a genital ulcer/condyloma or  
  problem in the preventive uterus  
  cervix exam  
w) I had a positive result exam for  
  Streptococcus in the vagina and/or  
  anus  
x) I had a premature placental abruption  
y) I had a bleeding  
z) My water broke  
aa) My labor never started  
bb) I was pregnant with twins  
cc) I had a fetal death  
dd) My pregnancy induce failed  
e) I had a previous gynecologic surgery

Other (describe) ____________________________________________________

56. Did you have information about the benefits of normal birth during your prenatal care  
  appointments?  
Yes / No / I did not have prenatal appointment  
Specify____________________________________

57. Do you participate in movement/e-mail lists/group discussions of pregnant women from  
  humanized care to childbirth?  
Yes. Specify which ___________________________  
No  
Other (specify)________________________________________

58. AFTER the exhibition, have you changed your perception about the NORMAL BIRTH?
59. After the exhibition, have you changed your perception of CESAREAN?
No way / a little / Maybe / Probably / Absolutely

60. BEFORE the exhibition you used to associate normal birth with JOY?
Never / Rarely / Occasionally / Frequently / Always

61. BEFORE the exhibition you used to associate normal birth with FEAR?
Never / Rarely / Occasionally / Frequently / Always

62. BEFORE the exhibition you used to associate normal birth with PAIN?
Never / Rarely / Occasionally / Frequently / Always

63. BEFORE the exhibition you used to associate normal birth with LOVE?
Never / Rarely / Occasionally / Frequently / Always

64. BEFORE the exhibition you used to associate normal birth with SUFFERING?
Never / Rarely / Occasionally / Frequently / Always

65. BEFORE the exhibition you used to associate normal birth with ANXIETY?
Never / Rarely / Occasionally / Frequently / Always

66. BEFORE the exhibition you used to associate normal birth with SAFETY?
Never / Rarely / Occasionally / Frequently / Always

67. BEFORE the exhibition you used to associate normal birth with CHALLENGE?
Never / Rarely / Occasionally / Frequently / Always

68. BEFORE the exhibition you used to associate normal birth with COURAGE?
Never / Rarely / Occasionally / Frequently / Always

69. BEFORE the exhibition you used to associate normal birth with RISK?
Never / Rarely / Occasionally / Frequently / Always

70. BEFORE the exhibition you used to associate normal birth with CONFIDENCE?
Never / Rarely / Occasionally / Frequently / Always

71. BEFORE the exhibition you used to associate normal birth with ACHIEVEMENT?
Never / Rarely / Occasionally / Frequently / Always

72. BEFORE the exhibition you used to associate normal birth with STRENGTH?
Never / Rarely / Occasionally / Frequently / Always

73. After the exhibition, you associate normal birth with JOY?
Never / Rarely / Occasionally / Frequently / Always
74. After the exhibition, you associate normal birth with FEAR?
Never / Rarely / Occasionally / Frequently / Always

75. After the exhibition, you associate normal birth with PAIN?
Never / Rarely / Occasionally / Frequently / Always

76. After the exhibition, you associate normal birth with LOVE?
Never / Rarely / Occasionally / Frequently / Always

77. After the exhibition, you associate normal birth with SUFFERING?
Never / Rarely / Occasionally / Frequently / Always

78. After the exhibition, you associate normal birth with ANXIETY?
Never / Rarely / Occasionally / Frequently / Always

79. After the exhibition, you associate normal birth with SAFETY?
Never / Rarely / Occasionally / Frequently / Always

80. After the exhibition, you associate normal birth with CHALLENGE?
Never / Rarely / Occasionally / Frequently / Always

81. After the exhibition, you associate normal birth with COURAGE?
Never / Rarely / Occasionally / Frequently / Always

82. After the exhibition, you associate normal birth with RISK?
Never / Rarely / Occasionally / Frequently / Always

83. After the exhibition, you associate normal birth with CONFIDENCE?
Never / Rarely / Occasionally / Frequently / Always

84. After the exhibition, you associate normal birth with ACHIEVEMENT?
Never / Rarely / Occasionally / Frequently / Always

85. After the exhibition, you associate normal birth with STRENGTH?
Never / Rarely / Occasionally / Frequently / Always

86. What do you think influences your preference for the type of birth? Spontaneous response
- Check all that apply

a) Birth stories of your family and / or your friends
b) Your husband's preference for the type of birth
c) Fear of normal birth pain
d) Fear of normal birth change your vagina
e) I wanted to bind the tubes
f) Fear of cesarean section

m) Previous negative experience with
cesarean section

g) Fear of anesthesia

n) Online information

h) To schedule the due date

o) Information in newspaper and
magazine

i) Have a known professional at
delivery

p) Information on television

j) Positive previous experience with
normal birth

q) Information on pregnant women
groups

k) Previous negative experience with
normal birth

r) Normal childbirth is better than
cesarean section

l) Positive previous experience with
cesarean section

s) Better recovery in normal birth

Other (please specify) ______________________________

87. How did you hear about the exhibit?

a) Social networks (Facebook / Instagram / Twitter)

c) Site

b) Newspaper / radio / television

d) Friend/family

e) Posters / Brochures

Other (please specify) ______________________________

88. What brought you to the exhibition?

a) I was hanging around / waiting for someone/passing by
e) My institution (school/work/health
center/others) has scheduled my visit

b) I came because it is free

c) I am interested in the subject

d) They recommended me

Other (please specify) ______________________________
89. Do you usually visit exhibitions and museums?
Never / Rarely / On occasion / Frequently / Always

90. In your opinion, the exhibition was:
Bad / Regular / Good / Very good / Great

91. What did you like best about the exhibition?
   a) Gestation (baby in the belly)
   b) Surgical Maternity convenience store (product shelf)
   c) Controversies (videos with dialogues / opinions)
   d) Birth (birth tunnel)
   e) Conversations (area of texts, photos, videos)
   f) None of the options

92. Do you intend to recommend this exhibition to others?
No way / I think not / Perhaps / Most likely / Certainly.
Appendix 2 – Follow-up survey

Pregnant Women Follow-Up Survey

All questions are mandatory – The questions with * are identified as open-ended questions.

SECTION I
1. Today's date: ________
2. Name /Last name ________
3. What was your date of birth? ________
4. How many weeks/months of gestation did you give birth? ________
5. Where did you birth take place?
   a) Private Hospital / Maternity
   b) Public Hospital / Maternity - (SUS)
   c) Birth House / Normal Birth Center
   d) Residence
   e) Other: ______________________________

5.1 Name of the hospital * ________
6. Which was your type of birth?
   a) Normal/Vaginal
   b) Cesarean section
   c) Vaginal with use of forceps/vacuum extractor

7. If cesarean, what was the reason? * ________
7.1 If cesarean, when it occurred?

Questions presented here were translated into English by the author, the original questionnaire was developed by the research team and applied in Portuguese
a) Before Labor  
c) I had a normal labor
b) During labor

8. Have you had any memory of the Senses of Birth Exhibition during labor/delivery? Yes / No
8.1 Please comment: *

9. Have the Senses of Birth Exhibition influenced your childbirth in any way? Rate how much: 1 (not at all) to 5 (much)
1 / 2 / 3 / 4 / 5
9.1 Please comment *
9.2 Was the influence positive? Yes / No / Did not influence
9.3 Please comment: *

10. Evaluate your satisfaction with your delivery: Rate how much: 1 (very bad) to 5 (great)
1 / 2 / 3 / 4 / 5

11. Do you consider that you have experienced violence/maltreatment during childbirth/cesarean section/birth of the baby?
Yes / No / Do not know
Please comment: *

12. Tell us a little about your birth experience: *

SECTION II

1. Gestational age at birth was defined by
   a) Date of last menstruation
   b) Ultrasound before 20 weeks
   c) Estimated by obstetrician
   d) Estimated by the pediatrician
   e) Do not know
   f) Other: __________

2. At the time of delivery, you were considered pregnant at risk?
Yes / No / Do not know

2.1. If yes, why? *

3. Did you make a Birth Plan during pregnancy? (Childbirth planning with your choices/desires)
Yes / No / Did not know/do not know what it is
3.1 If not, why?* ________

3.2. If you had a Birth Plan, was there any part of it that happened as expected?
   a) Yes
   b) No
   c) I did not have a normal vaginal delivery
   d) I did not give birth

3.3 If you had a Birth Plan, do you consider that the clinical care received correspond to your desires?
   a) Yes
   b) No
   c) Partially
   d) I did not give birth

3.4 Please comment * ________

4. During your birth/cesarean section, did you have a companion?
   a) Throughout the time/hospitalization
   b) In labor
   c) During anesthesia
   d) At the time of delivery/cesarean section
   e) In postpartum / cesarean section
   f) I did not have a companion

5. Have you used methods for pain relief in labor/delivery?
   a) Yes
   b) No
   c) I did not have labor

5.1. What methods of pain relief did you use during labor?
   a) Ball
   b) Massage
   c) Shower
   d) Bathtub
   e) Analgesia/epidural (anesthesia)
   f) Free movement throughout labor
      (stayed in the position you chose)
   g) Movement during labor (walking / dancing / crouching / rebozo)
   h) I have not used pain relief method
   i) I did not have labor
   j) Other: ________

5.2 Please comment * ________
6. At the time of childbirth you were:
   a) Squatting
   b) On the stool
   c) Lying (gynecological position)
   d) Recumbent (with footrest - semi-seated)
   e) On hands and knees
   f) Lying on your side
   g) I had C-section
   h) Other: ____________________

7. During labor / cesarean section did you have the assistance of which health professionals (check all that apply)
   a) Doula
   b) Physician obstetrician
   c) Obstetric nurse
   d) Midwife
   e) Pediatrician
   f) I did not have health professional’s assistance
   g) Other: ____________________

8. Who attended your delivery / cesarean delivery was the same prenatal professional?
   a) Yes
   b) No
   c) I did not have professional assistance during childbirth

9. At the time of delivery, did someone squeeze/climb onto your belly for the baby to be born (Kristeller maneuver)?
   a) Yes
   b) No
   c) Do not remember

10. Was a vaginal cut made at the time of the baby being born? (Episiotomy)
    a) 
    b) Yes
    c) No
    d) Do not know
    e) Did not have a vaginal delivery
11. Did you have an episiotomy?
   a) Yes
   b) No
   c) Do not know
   d) I had no episiotomy

12. Was your baby born well?
   a) Yes
   b) No, he was stillborn
   c) No, he had a problem.

12.1 If the baby had any problems at birth, what happened? * ________

13. If the baby was born dead, why? What happened? * ________

*If the baby was born dead, please go to the last question (23). If your baby was born alive, please continue to answer the following questions.*

14. Have you and your baby had skin-to-skin contact immediately after birth? (Baby without clothes or fabrics on your body?)
   Yes / No

14.1 If not, why? * ________

14.2 Did you and your baby stay in skin-to-skin contact for the first hour after birth? (Baby without clothes or fabrics on your body)
   Yes / No

14.3 If not, why? * ________

15. Was the baby put to breastfeed the first hour after birth?
   Yes / No

15.1 If not, why? * ________

16. After birth did the baby stay with you all the time (did not go to another place as a nursery or ICU)?
   Yes / No

16.1 If not, why? * ________

17. After the birth was your baby hospitalized?
   Yes / No

17.1 If yes, why? * ________
17.2 If yes, how many days?* ________

18. Is your baby well today?
Yes / No

18.1 If not, why?
- Is hospitalized
- Is sick
Other: _______________

18.2 Comment on what is happening/happened to the baby* ________

19. Has the baby been breastfed?
Yes / No

19.1 If you breastfed, how long was it exclusive breast milk (without adding other milk or foods)?* ________

19.2. Currently, the baby feeds on: (check all that apply)
   a) Breast milk
   b) Other liquids (tea, juice)
   c) Other milk (from cow, goat, soy, formula, other)
   d) Fruits
   e) Soup/solid food
   f) Other:___________________

19.3. If you are not breastfeeding, why?* ________

20. Your baby uses or has used a pacifier
1- Never used / 2- Has used / 3- Is using

21. Your baby uses or used a baby bottle
1- Never used / 2- Has used / 3- Is using

22. Your baby uses or used a cup
1- Never used / 2- Has used / 3- Is using

23. Recalling the period of pregnancy, have you taken any measures to prevent ZIKA virus infection?
No / Yes

23.1 If not, why?* ________

23.2 If yes, what measure(s)?* ________
24. Term of Consent.

Our questions are over, and once again, we want to thank you for your cooperation. We want to remind you that your participation is voluntary. The data is confidential; that is, you will not be identified in any publication.

If you have any questions or would like to, you can contact us by e-mail:

   a) I agree to participate.
   b) I agree to participate and would like to receive the results of the survey.
   c) I do not want to participate.

25. Would you like to add something else?* _________
## Appendix 3 – Codebook

<table>
<thead>
<tr>
<th>Category</th>
<th>Code</th>
<th>Frequency that appears relate to EBP</th>
<th>Used when a woman describes…</th>
<th>Exemplifying Quotation</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Acolhimento”</td>
<td>10</td>
<td></td>
<td>… a set of practices reflecting the &quot;acolhimento&quot; practice described by Brazil’s Humanization Policy, combined with a feeling/perception of being welcomed</td>
<td>“My desire for a childbirth as natural as possible was respected even with the length of the labor (as I was a first-time mother, I went to the hospital very early in the early days of pain). And the comfort provided by the hospital structure and its staff went far beyond our expectations.” (94:2)</td>
</tr>
<tr>
<td>Anxiety/Nervous</td>
<td>1</td>
<td></td>
<td>… feeling anxiety or nervous. It is related with the lack of use of an EBP</td>
<td>“I was then taken to the surgical unit, anesthetized and left unaccompanied for almost two hours until delivery. I did not like this period, being in a cold room, alone and anxious for my first childbirth.” (27:4)</td>
</tr>
<tr>
<td>Calming/Comforting</td>
<td>12</td>
<td></td>
<td>… a calming feeling or a perception related to a birth situation, connected with the use of any EBP</td>
<td>“Since I wanted natural childbirth, I was very open to receive massage, the shower too, I could feed in the intervals of the contractions, I could have this moment of going through the process of contraction on a very calming way.” (38:3)</td>
</tr>
</tbody>
</table>

**Outcome:**

Group of codes that describe the results for the use of one or more Intrapartum Evidence-based Practices
<table>
<thead>
<tr>
<th><strong>Demystify Normal Birth</strong></th>
<th>1</th>
<th>... the EBP correlate with demystifying common misconceptions related to a normal birth.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dissatisfaction</strong></td>
<td>1</td>
<td>... a negative feeling related to the childbirth and/or use of EBP, including a negative perception or dislike with the process and/or outcome.</td>
</tr>
<tr>
<td><strong>Enriching Experience</strong></td>
<td>1</td>
<td>... the EBP (companionship for example) was a reason to enrich her childbirth experience.</td>
</tr>
<tr>
<td><strong>Expectation attended</strong></td>
<td>5</td>
<td>... a direct mention or implicit perspective to a previous expectation related with childbirth and the use of an EBP that was attended.</td>
</tr>
<tr>
<td><strong>Expectation not attended</strong></td>
<td>12</td>
<td>... a direct mention or implicit perspective to a previous expectation related with childbirth and the use of an EBP which was not attended.</td>
</tr>
</tbody>
</table>
and I wanted a vertical position, but in the delivery I ended up staying in lithotomy." (39:1)

| Gain Strength/Courage | 5 | .... gaining strength or courage with the use of EBP. However, not used when the same perception is described as an internal decision and not an external factor. |
| Loneliness | 8 | ... a direct or indirect description of feeling lonely during the childbirth and as a result of not having access to an EBP |
| Overcome Fear | 2 | … using an EBP results into overcoming fear |
| Regret | 2 | … direct or indirect mention of regret for choosing not to use an EBP |

"I went to the hospital, {there I} had all the assistance of my husband, the doctor, {and} the doula, who were fundamental. The pain of childbirth brought out all my fragility and {the support was needed to find the} strength to experience this moment." (48:1)

"I consider having a doula next to me and my husband two important factors to get a positive experience with the pain of childbirth, to make them welcome and not something to fear and repulse." (76:6)

"When I learned (about the birth plan) I was already living a moment of so much change that I could not do, I regret not having done so, but I really
<table>
<thead>
<tr>
<th>Barriers</th>
<th>Group of codes that described barriers</th>
<th>woman face to use or have access to intrapartum EBP's</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td>... a feeling or perception of safety related to the use of EBP</td>
<td>did not know before the exhibition.” (238:2)</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>... a positive feeling or perception with the use of an EBP. Satisfaction actually groups a set of feelings described by women such as pleasure, happiness, loved, wonderful</td>
<td>&quot;I had a lot of freedom, I loved all the methods to relieve pain, especially the shower!” (212:6)</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>... any situation that indicates woman’s confidence in her capacity, empowerment. Related with EBP when its user promotes gain, increase or perception of the self-efficacy.</td>
<td>&quot;We were walking down the aisle to assist in the childbirth. It felt so good to see the people in the hallway and to endure the pain that came. I felt like a warrior.” (66:4)</td>
</tr>
<tr>
<td>Additional Financial cost</td>
<td>... having an out of pocket cost, in addition with any cost with the private health insurance, to have access to an EBP</td>
<td>&quot;I used the ball, I could not use everything because I had to pay, but it was good.” (9:4)</td>
</tr>
<tr>
<td>Avoid expectation</td>
<td>... avoiding creating a birth plan to don't stimulate expectations</td>
<td>&quot;More or less, I did not want to get stuck in the things I wanted because I was afraid things would go the other way and disappoint me. I heard many stories of friends of mine who followed the birth plan and in the end the doctor said that there was</td>
</tr>
<tr>
<td>Emotion</td>
<td>Code</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------</td>
<td>------</td>
<td>------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Disbelief it would be followed</td>
<td>7</td>
<td>... not using a birth plan for a belief that would not be followed.</td>
</tr>
<tr>
<td>Disrespected</td>
<td>15</td>
<td>... a situation where her desire or choice not being respected led to lack of access or not being able to use an EBP.</td>
</tr>
<tr>
<td>Embarrassed</td>
<td>1</td>
<td>... a feeling of being embarrassed stopping her from having access or using an EBP.</td>
</tr>
<tr>
<td>Fear</td>
<td>6</td>
<td>... a described feeling or perception of fear related to childbirth and the use or not of an EBP. When related to EBP appears as a barrier to not use it, however, when related to the type of childbirth appears as an outcome.</td>
</tr>
<tr>
<td>Frustration</td>
<td>4</td>
<td>... direct or indirect mention to a feeling of frustration as a result of the use of an EBP. Appears as a barrier for not using an EBP and a outcome when related to the type of birth.</td>
</tr>
<tr>
<td>Lack of Individualized care</td>
<td>6</td>
<td>… not receiving a tailored care or a continuous/uninterrupted support as a barrier to accessing or using an EBP.</td>
</tr>
<tr>
<td>-----------------------------</td>
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<td>-------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>

- **Hospital Conduct**: 16
  - “… the hospital conduct, routine, protocol or health professional behaviors as an impediment to access or use an EBP.
  - “The hospital did not allow free position at the time of delivery and did not let people eat. When it comes to giving birth, they also do not let you stay in the position you want, you have to be lying that way with the legs open.” (195:2)

- **Lack of bond with OB/GYN/Physician**: 2
  - “… lack of bond with the physician during prenatal care to have access or use an EBP - frequently related with the Birth Plan
  - “I did not even talk to my prenatal doctor, who was a family doctor. Each month was different doctor. There was no bond to anyone.” (188:2)

- **Lack of Choice**: 21
  - “… not being able to choose the care they would like to receive.
  - “Because I was not given the option, when you arrive and are admitted to a maternity ward using your private health insurance, where the attendant does your birth, the pregnant woman is not heard in relation to her expectations or wishes” (134:1)

- **Lack of Hospital Ambiance**: 7
  - “… the hospital structure and adequate support for a normal birth as an impediment to access or use an EBP.
  - “After I was admitted, I was informed that the delivery suite was closed down and would have to go through labor in a common room, with no recourse for pain relief.” (96:1)

- **Lack of Individualized care**: 6
  - “… not receiving a tailored care or a continuous/uninterrupted support as a barrier to accessing or using an EBP.
  - “I just missed a doula. There [at the private maternity hospital] has doulas, the problem was...
| Lack of orientation/incentive | 18 | EBP - frequently related to doula, midwife or companion of choice. | there was only one there that day. She was going back and forth between another woman who was giving birth at the same time. I think that [support] was lacking.” (143:1) |
| Lack of orientation/incentive | 18 | … not being advice on the use of EBP or its benefits before childbirth or not having the support to use it during childbirth | “The consultations were so quick. I always left the prenatal appointment wondering if it was just that. It was just blood pressure and weight” (218:2) |
| Lack of Self-efficacy | 2 | … any situation that indicates lack of empowerment - confidence in her capacity. It does not need to be a direct mention to be used. | “I could not do it and I do not think I gave it enough importance either. My gestation was a moment where I became a very indecisive person. Even to choose the baby's outfit I kept thinking for hours. And the plan required an empowerment that I did not have. The idea to have a birth plan was, by itself, something very new for me.” (10:4) |
| Lack of Time | 14 | … lack of time to use an EBP during childbirth or to discuss a birth plan before childbirth | “The doctor who was on call asked to give me a shower, but they did not give it to me. I believe that it was because of the short time between my contractions, they did not have time for this. But they
applied the anesthesia. I remember exactly the doctor speaking to apply the analgesia because I was already in a lot of pain." (109:2)

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
<th>Description</th>
<th>Quote</th>
</tr>
</thead>
<tbody>
<tr>
<td>Law disrespected</td>
<td>19</td>
<td>… the companionship law is described as not being followed. It will not be used to quantify how many women had their rights disrespected, but how do they describe their rights being disrespected when it happens in relation to this law</td>
<td>&quot;The cesarean section was good, but they did not let my sister-in-law get in&quot; (263:1)</td>
</tr>
<tr>
<td>Methods NOT offered/available</td>
<td>11</td>
<td>… not being offered or not having access to one or more EBP, before or during childbirth.</td>
<td>&quot;Alternative methods for pain were not offered on call.&quot; (27:3)</td>
</tr>
<tr>
<td>Need not perceived</td>
<td>13</td>
<td>… not using the Birth Plan because she did not perceive the need for.</td>
<td>&quot;I did not find it necessary. I figured that when the time / date informed by the doctor came, it was only to go to the hospital.&quot; (67:1)</td>
</tr>
<tr>
<td>No written document</td>
<td>18</td>
<td>… not creating an written document for the Birth Plan</td>
<td>&quot;I had a knowledge about the elements of the birth plan and had them in mind, though I did not do it in writing.&quot; (27:7)</td>
</tr>
<tr>
<td>Not applicable for the type of birth</td>
<td>6</td>
<td>… a perceived that a birth plan would only be applicable if a woman has a vaginal birth or even a natural birth without analgesia</td>
<td>&quot;My baby was big, so I knew it would be cesarean&quot; (219:1)</td>
</tr>
<tr>
<td>Not presented to the health professionals</td>
<td>9</td>
<td>… having done a Birth Plan but not presented it to the health professionals at the time of childbirth, that is, not using it.</td>
<td>&quot;I made a birth plan, but at the time we did not take it to the hospital. I thought I did not need it and today I see the importance of&quot;</td>
</tr>
<tr>
<td>Facilitators/Strategies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Group of codes that describe strategies used to have access to an EBP and/or factors that facilitated woman’s use of intrapartum EBP’s</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birth Team of choice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Choice/desire respected</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discussed with health professionals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family/husband Support</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Birth Team of choice**
  - 11
  - … having a specific birth team or set of chosen health professionals during childbirth as reason to use an EBP

- **Choice/desire respected**
  - 66
  - … her choices or desires being respected or considered during childbirth, leading to the use of an EBP

- **Discussed with health professionals**
  - 11
  - … previously discussing the use of an EBP with health professional

- **Family/husband Support**
  - 49
  - … a family member having an acting part during childbirth and supporting the use of one or more EBP. It is frequently related with the companionship during labor and childbirth, since it is required for the respect of the law. However, it refers to an active participation and not only the presence of a companionship of choice.

- **Facilitators/Strategies**
  - Having my wishes guaranteed even at the time of Cesarean section.” (242:1)

- **Birth Team of choice**
  - “So, because actually I was with a private team. I had a doula that was with me.” (163:1)

- **Choice/desire respected**
  - “(…) and then they asked where I wanted to delivery, I went to the bed and I was very keen to make poop, they asked if I wanted the stool and I asked for the ball, and I stayed kneeled on the bed leaning on the ball and after a while he was born.” (261:2)

- **Discussed with health professionals**
  - "The birth plan was discussed with the obstetrician and doula, which made it possible to be follow.” (82:2)

- **Family/husband Support**
  - "This moment is unforgettable and helped a lot to push him out. I could feel my little one be born. {My husband} was holding me in the bathtub, helping me to have strength and support” (66:7)
<table>
<thead>
<tr>
<th>Hospital Ambiance</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>… hospital's structure and/or protocol, health professional's posture supporting/incentivizing the use of EBP</td>
<td>&quot;The hospital has a natural delivery room, where I had access to all the equipment for pain relief. My doula and companions were always massaging and stimulating me.&quot; (167:1)</td>
</tr>
<tr>
<td>Individualized care</td>
<td>44</td>
</tr>
<tr>
<td>… a tailored care she received, often related to the roles of a doula, midwife or companion of choice. It is also used to describe a care that is uninterrupted, that is, a continuous support during childbirth</td>
<td>&quot;They even surprised me positively, it went beyond what I imagined. The midwives came to my house on Tuesday and only left Wednesday, I would never have imagined that the midwives would stay so long with me.&quot; (19:2)</td>
</tr>
<tr>
<td>Methods available/offered/used</td>
<td>66</td>
</tr>
<tr>
<td>… the method being available or offered as a reason that the EBP was used. Also used when the method being used was described without any other characterizing code, making it an implicit reference that to be used the method had to be available or offered.</td>
<td>&quot;My son's health was checked every 30 minutes, alternative postures were offered during childbirth, I received food, so did my husband.&quot; (99:2)</td>
</tr>
<tr>
<td>Trust</td>
<td>12</td>
</tr>
<tr>
<td>… a feeling or perception of trust related to the birth team or health professional as a facilitator to ensure the use or access to an EBP. Some times it appears related to the reason for not having a written birth plan.</td>
<td>&quot;At that time, although authorization was requested, I was already not following what was happening and said, &quot;do what you want&quot;. So, the importance of the birth plan and a trustworthy team. There comes a point that you may even</td>
</tr>
</tbody>
</table>
be aware of what I was happening, but you do not want to spend your neurons in this kind of situation, letting them do whatever they want (a good time for obstetric violence). My birth plan was read and followed by my team.” (117:3)

“I did not use analgesia, although, sometimes, I asked for it. Since I had the plan not to use it, I had a lot of support from the doctor, my husband, and the midwife {to not use the analgesia}. This support was fundamental. I also used bathtub a lot, but at some point, it was not enough. The bathtub in the hospital brought me a lot of relief.” (111:4)