Journal of Midwifery & Reproductive Health

JMRH.mums.ac.ir

The Effect of a Birth Plan on Birth Outcomes: A Systematic Review and Meta-Analysis

Parivash Ahmadpour (MSc)[1], Golnaz Molaei (MSc)[2], Mojgan Mirghafourvand (PhD)[3]*

[1] Students' Research Committee, Tabriz University of Medical sciences, Tabriz, Iran
[2] Graduated, Taleghani Hospital, Tabriz University of Medical Sciences, Islamic Republic of Iran
[3] Professor, Social Determinants of Health Research Center, Faculty of Nursing and Midwifery, Tabriz University of Medical Sciences, Tabriz, Iran

ARTICLE INFO

Article type:
Review article

Article History:
Received: 24-Sep-2022
Accepted: 13-Sep-2022

Key words:
Systematic Review
Maternal
Meta-Analysis
Natural Childbirth

ABSTRACT

Background & aim: Women often feel more vulnerable during delivery, whereby the birth plan becomes most applicable, as an approach for pregnant women to present their expectations for childbirth. This systematic review was conducted to determine the effect of birth plan on birth outcomes.

Methods: This systematic review was conducted by searching across databases of PubMed, Scopus, Web of Science, Cochrane Library, Medline, EMBASE, ProQuest, Magiran, IranDoc, and IranMedex using search terms of "plan birth", "birth experience", "pregnancy", and "labor with no time limitation until January 2024. Bias assessment of randomized controlled trials was done using the Cochran handbook, while that of quasi-randomized clinical trials was done via ROBINS-I.

Results: A total of 424 articles were retrieved from database searches, and an additional 10 articles were identified through manual searches. Ultimately, 9 studies with totally 1949 participants were included in the systematic review, and 6 studies were included in the meta-analysis. The results of meta-analysis showed that the mean score of childbirth experience was significantly higher in the birth plan compared to the control group (SMD=0.60; 95%CI: 0.07 to 1.13; P=0.03). Vaginal delivery frequency was significantly higher in the birth plan than in the control group (OR= 3.50; 95%CI: 1.78 to 6.89; P=0.0003). There was no significant difference between groups in terms of stages of labor (P>0.05). The results on neonatal outcomes were discrepant.

Conclusion: The birth plan improves the childbirth experience and delivery outcomes. Clinical trials with stronger designs are suggested while also observing all RCT principles.

▶ *Please cite this paper as*:
Ahmadpour P, Molaei G, Mirghafourvand M. The Effect of a Birth Plan on Birth Outcomes: A Systematic Review and Meta-Analysis. Journal of Midwifery and Reproductive Health. 2024; 12(1): 1-15. DOI: 10.22038/JMRH.2024.67780.1992

Introduction

Delivery is an important event which creates strong, positive, and negative emotions (1). Many women experience joy, peace, and happiness in response to delivery (2). However, many women also experience negative feelings about birth associated with posttraumatic stress disorder (PTSD) and depression (3). Indeed, positive childbirth experience can be facilitated through preparation for delivery and a birth plan. Anxiety, as a major variable in the course of childbirth, is affected by the delivery preparation. According to Triolo theory, the four principal goals of childbirth preparation are: a) training and preparing for labor, childbirth, and childcare; b) resolving anxiety; c) mitigating or eliminating pain or pain perception; and d) consciousness and awareness of the mother during the childbirth process in order to perceive the experience of childbirth. Triolo believed that through childbirth preparation, realistic descriptions and images of the course of delivery, precise expectations can form for women (4).

* *Corresponding author*: Mojgan Mirghafourvand, Associate Professor, Department of Midwifery, Faculty of Nursing and Midwifery, Tabriz University of Medical Sciences, Tabriz, Iran. Tel: 009814306121; Email: mirghafourvand@gmail.com

It is often during delivery that women feel more vulnerable and have the least decision-making ability, whereby the birth plan becomes most applicable (5). Birth plan was first propounded in the 1908s in Europe and America in response to increasing "delivery medicalization" approach to facilitate the relationship between women and the healthcare or midwifery staff (6). The birth plan would allow women to express their inclinations and needs about the childbirth process. This plan was an important movement in the resuscitation of both women's and mothers' rights (7).

The birth plan would allow parents to consider different events that may occur during delivery and help them express their needs (8). A birth plan may have been written simply in some lines, or it may include information checked in a checklist or form. This instrument can be shared with healthcare specialists, so that the mothers' preferences about the childbirth events would be identified (5). It could also provide greater contribution of the woman and her spouse to the decisions made related to delivery management. Birth plan is an effective tool for couples through which they could express their needs and wants. This facilitates their active participation during the stages of labor and delivery. This participation would enable the pregnant woman and her spouse to gain self-confidence and sense of control (9).

Evidence shows that support and care of women by a familiar person during pregnancy and delivery have improved maternal and neonatal outcomes, including the frequency of cesarean section, length of labor stages, neonatal Apgar score, and umbilical cord blood pH and admission in the neonatal intensive care unit (NICU) (10, 11). Furthermore, it caused the women gain a more positive experience of their childbirth (10). Use of birth plans in clinical settings is controversial and published papers have shown discrepant results. Some studies have indicated that birth plan can contribute to establishing reliable and respectful relationships with mother, facilitate contemplation and interpretation of the mother's expectations and needs. It would also it introduces birth options to women and share their expectations with specialists, thereby increasing their sense of control over the course of labor and delivery (11-12). Meanwhile, birth plan has been described as a tool that hinders communication, annoys the healthcare staff, and questions professional experience and expertise. It has also been reported that when this plan is not fulfilled, women satisfaction with childbirth decreases (6, 13).

Considering that it is important to improve the quality of services provided to women of reproductive age (8) and considering sparse evidence about the effect of birth plans on maternal and neonatal outcomes and existence of various views about the experience of using birth plans, and absence of a clear relationship between data and use of birth plan, there are inadequate grounds for policy support of encouraging pregnant women to write birth plan (14). A recent narrative review, which summarised internationally published research on birth plan, concluded that there is still no consensus on its use from birth plan (14). Conducting a systematic review for investigating the effect of birth plan and unveiling the current gap can provide more evidence about the birth plan and support further research. Also, by determining the results of using the birth plan, it can be used to improve women's experiences and satisfaction with childbirth, improve maternal and newborn outcomes, and increase women's active participation in the process of labor and delivery (13). Accordingly, this systematic review was performed to determine the effect of birth plan on maternal and neonatal outcomes.

The general objective of the present research was to determine the effect of birth plan on birth outcomes.

Materials and Methods

Criteria for considering studies for this review

Types of studies

Randomized clinical trials (RCTs) and quasi-randomized clinical trials were included in this systematic review with no time constraints. Meta-analyses, systematic reviews, letter to editor-in-chief, qualitative studies, observational studies, reports published in conferences, and abstracts of papers were excluded.

Types of participants

Primiparous and multiparous pregnant women with no age constraints with or without delivery complications who had used birth plan were included in the study. Written or verbal birth plan requested by the mother or parents in comparison to any type of control group including delivery without such plans or routine as well as standard delivery care of hospitals were considered in the present study.

Types of outcome measures

Primary outcomes included Childbirth experience, Maternal anxiety level, Delivery outcomes (duration of labor, frequency of vaginal labor, induction of labor, frequency of emergency C-section, frequency of episiotomy) and Neonatal outcomes (first- and fifth-minute Apgar score, admission in the NICU. The secondary outcome was postpartum depression.

Search strategy

Electronic searches

This systematic review was conducted through searching across various databanks including PubMed, Scopus, Web of Science, Cochrane Library, Medline, EMBASE, ProQuest, Magiran, IranDoc, and IranMedex. With no time limitation until January 2024, the search terms included “plan birth”, “birth experience”, “pregnancy”, and “Labor.” An example of a PubMed search strategy is given below.

("pregnancy"[MeSH Terms] OR "pregnancy"[Text Word]) AND ((("plan"[All Fields] AND "parturition"[MeSH Terms]) OR "birth plan"[Text Word]) AND ("birth experience"[All Fields] OR "birth experience"[Text Word]) AND ("work"[MeSH Terms] OR "labor, obstetric"[MeSH Terms] OR ("labor s"[All Fields] OR "labored"[All Fields] OR "laborer"[All Fields] OR "laborer s"[All Fields] OR "laborers"[All Fields] OR "laboring"[All Fields] OR "labors"[All Fields] OR "labour"[All Fields] OR "work"[MeSH Terms] OR "work"[All Fields] OR "labor"[All Fields] OR "labor, obstetric"[MeSH Terms] OR ("labor"[All Fields] AND "obstetric"[All Fields]) OR "obstetric labor"[All Fields] OR "laboured"[All Fields] OR "labourer"[All Fields] OR "labourers"[All Fields] OR "labouring"[All Fields] OR "labours"[All Fields])))

Searching other resources

In order to identify further studies, the references of systematic and relevant studies were examined.

Selection of studies and data collection

Two authors (MM and PA) screened independently the titles and abstracts identified through search across databases. The potentially relevant papers were thoroughly investigated in order to determine their eligibility for inclusion. If required, any disagreement between the two authors in terms of studies fulfilling the criteria were resolved through discussion; in case they did not reach agreement, a third person was consulted. The type of study design, number of participants in the studied groups, research setting, inclusion and exclusion criteria, measurement tool for outcomes, the sample size attrition in studies, as well as the results and data of studies were extracted by the authors independently.

Risk of bias assessment in included studies

Two authors (MM and PA) independently investigated the quality of evidence and risk of bias for the RCTs through the mentioned criteria in Cochrane handbook including random allocation sequence, allocation concealment, blinding the participants and personnel, blinding of outcome assessors, selective outcome reporting, incomplete outcome data and other bias. The risk of bias of each item for these included studies was classified as low risk, unclear and high-risk (15). For judgment on the quasi-RCTs, ROBINS-I (Risk of Bias in Non-randomised Studies of Interventions) was used. The ROBINS-I tool is concerned with evaluating risk of bias in estimates of the effectiveness or safety (benefit or harm) of an intervention from studies that did not use randomization to allocate interventions (16). Next, judgments were matched against each other, and in case of disagreement, a third person was consulted and the final result was obtained.

Data analysis

Meta-anlysis was conducted by Revman version 5.4.1 for childbirth experience and its results was reported by standardized mean difference and 95% confidence interval. Due to the high hetrogenity, random effect was reported instead of fixed effect.

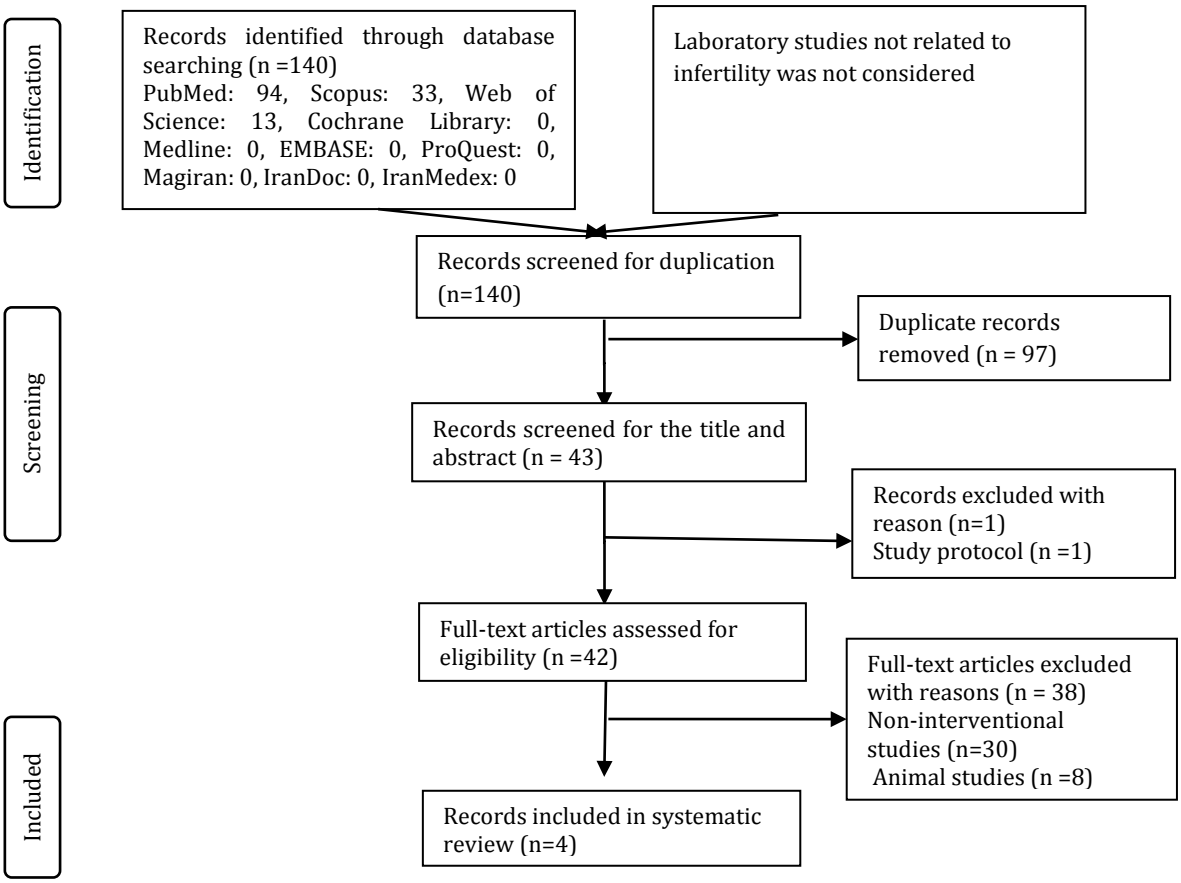

Figure 1. Study selection steps based on the PRISMA 2020 flow diagram

Results

Search results

A total of 434 papers were found, 424 of which through searching in the databases until January 2024 and 10 via search across the references of studies. Duplicate studies were removed after checking the titles. After investigating the titles, the studies were screened based on reading the abstract and full text of the paper by two authors. Eventually, nine studies were included in the systematic review and six studies were included in the meta-analysis (Figure 1).

Nine studies with a total 1949 participants were investigated; four as RCTs and five as quasi-RCTs. The participants in the included studies were primiparous and multiparous women; those in the intervention group had received their own-requested birth plan, while the control group only received the routine or standard hospital care with no birth plan. The sample size in the included studies ranged from 45 in the study by Springer (5) to 542 in the research by Lundgren et al. (11) (Table 1).

Methodological quality

Out of nine studies examined, five have been done as quasi-experimental (5, 11, 20-22) and four as RCT (18-19, 23-24).

Table 1. Characteristics of included studies

Author s	Study Design	Location/Date of Data Collection	Inclusion/Exclusion Criteria	Number of Participant	Interventio n	Comparato r	Results
Springer., 1996	Quasi-experimental study	USA 1996	Ages of 18 and 35 At least 30 weeks gestation Educated through the tenth grade.	45	Birth plan	Routine care	No improvement in the state anxiety
Lundgren et al., 2003	Quasi-experi mental study	Sweden 2000-2001	All women from each antenatal care unit, Women with poor information in writing and/or speaking Swedish, Exclusion criteria: women planning to have an elective cesarean section	542	Birth plan	Standard care	No improvement in the childbirth experience, Reduction in the mean score of fear of delivery and pain during labor.
Kuo et al., 2010	Randomized controlled trial RCT)	Taiwan 2007	At least 18 years old, at least 32 weeks of pregnancy, without complications of pregnancy, and the ability to communicate and to write in Chinese. Exclusion criteria: women who planned to elective cesarean section.	330	Birth plan	Standard care	Improvement in the childbirth experiences.
Irene et al., 2010	Randomized controlled trial RCT)	China 2010	Low-risk Chinese pregnant women attending the TsanYuk Hospital for antenatal care and delivery in Queen Mary Hospital, those who participated in prenatal health sessions held at the hospital in the 20th week of pregnancy or later.	86	Birth plan	Standard care	No improvement in level of anxiety and postpartum depression.

Author s	Study Design	Location/Date of Data Collection	Inclusion/Exclusion Criteria	Number of Participant	Intervention	Comparator	Results
Farahat et al., 2015	Quasi-experimental study	Egypt,2013	Primiparous low-risk women, age 18 years or more, gestational age from 36 to 42 weeks, ability to read & write.	260	Birth plan	Routine care	Improvement in the childbirth experiences as well as maternal and neonatal outcomes. Decrease in the duration of second stage of delivery, episiotomy, and rates of C-section.
Abd Elfattah et al. 2022	Quasi-experimental study	Egypt, 2022	Pregnant women who presented to the antenatal clinic and maternity ward of the Department of Obstetrics and Gynaecology at Kafr-El Sheikh General Hospital, aged from 18 to 35 years, gestation age 36 to ≥41 weeks, normally pregnant and primiparous, had no pregnancy complications or systemic diseases, and were willing to participate in the study.	120	Birth plan	Routine care	Improvement in maternal outcomes, women's satisfaction and experiences.
Abd El Aliem et al. 2020	Quasi-experimental study	Egypt, 2018	Primigravida women with normal pregnancy (singleton pregnancy & cephalic presentation), 18 years or more, gestational age from 36 to 40 weeks, had a normal delivery at Benha University Hospital, and could read and write. Exclusion criteria: Suspected placental abruption and/or any contraindications to vaginal delivery.	194	Birth plan	Routine care	Reduction in the mean score of the duration of the first stage and total duration of labor stages. Improvement in maternal and fetal outcomes, and women's total empowerment scores.
Mohaghegh et al., 2023	Experimental study	Iran, 2021	Primiparous or multiparous women who had a low-risk	300	Birth plan	Routine care	Improvement in the satisfaction of the childbirth. Increase in the

Author s	Study Design	Location/Date of Data Collection	Inclusion/Exclusion Criteria	Number of Participant	Intervention	Comparator	Results
			singleton pregnancy, were married and had ≥18 years of age, had a gestational age of 32–33 weeks, had basic literacy skills, were planning a normal vaginal delivery, and were attending the fifth session of antenatal classes. Exclusion criteria: Women with any contraindications to vaginal birth.				vaginal birth rate, and decrease in the duration of the first and second stages of labor.
Ahmadpour et al., 2015	Experimental study	Iran, 2021	Aged 18 years old or older, literate women at the gestational age of 32–36 weeks with a single fetus and a depression score < 13, who were living in Tabriz and were planning to have their first or second vaginal delivery at the Taleghani Hospital. Exclusion criteria: Indications for C-section, obstetric problems and high-risk pregnancies.	106	Birth plan	Routine care	Improvement in the birth experience, perceived support and control during labor. Increase in the frequency of vaginal delivery, and improvement in the newborn's Apgar scores in the first minute. No improvement in the duration of labor, neonatal Apgar scores at the fifth minute, and the frequency of admission of a newborn to the NICU.

The random allocation sequence bias in the all four RCTs was low risk, and random allocation concealment bias in two studies was unclear (18-19) and in two studies was low risk (23-24).

Further, due to the nature of study, it was not possible to blind the participants and personnel, and the blinding bias of the participant and researcher was high-risk, while the information about blinding the outcome assessor was unclear in the two studies (18-19) and it was low risk in two studies (23-24). Further, incomplete outcome data bias was high-risk in the study by Kuo et al. (18), and low risk in the three studies (19, 23-24). For four studies selective reporting bias was low risk (18-19, 23-24), Finally, other bias was low risk in two studies (23-24), in one study was high risk (19) and in one study unclear (18) (Figures 2 and 3).

ROBINS-I was used to evaluate the quality of non-randomized clinical trials. The risk of bias in five studies (5, 11, 20-22) was checked in seven areas. The bias of the confounding variable and sample selection for two of the studies was serious (5, 10), bias in measurement of outcomes and bias in classification of interventions was serious for three studies (5, 11, 20), while bias due to missing data and bias due to deviations from intended interventions was low for all five studies (5, 11, 20-22). Bias in selection of reported results was unclear because of unavailability of protocol of studies (Table 2).

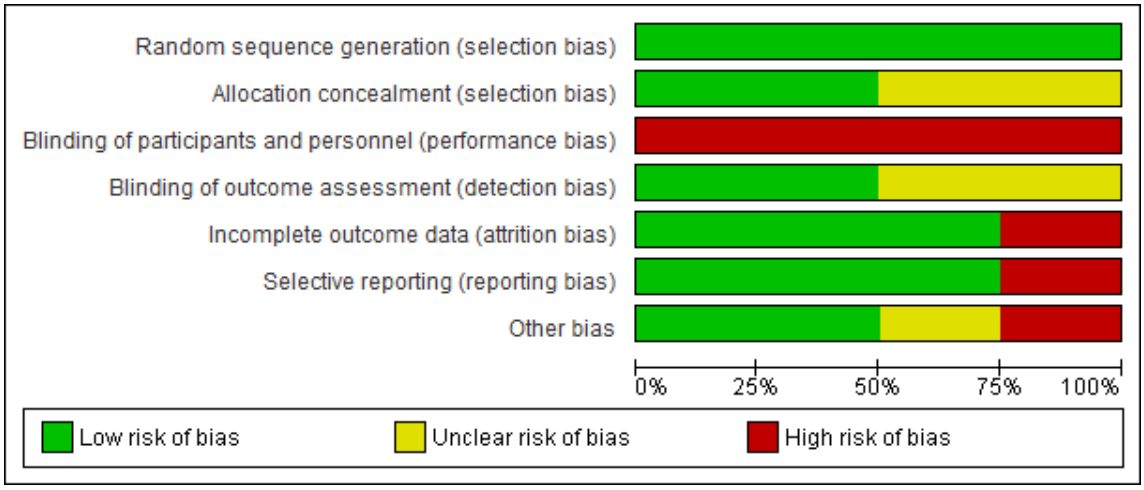

Figure 2. Risk of bias graph

Effects of intervention on outcomes

Childbirth experiences

The childbirth experiences have been measured in four of the studies (11, 18, 20, 23). Childbirth experience score in the study by Farahat et al. (20) was significantly more in the birth plan group (1.8 (SD: 0.3)) compared to the control (1.3 (SD: 0.4)) (P<0.001). In the study by Kuo et al. (18), childbirth experience score was significantly more in the birth plan group (93.85 (SD: 10.13)) compared to the control group (90.58 (SD: 12.52)) (P= 0.01). In the study by Ahmadpour et al. (23), childbirth experience score was significantly more in the birth plan group (3.2 (SD: 0.2)) compared to the control group (2.2 (SD: 0.2)) (P<0.001). Finally, in the study by Lundgren et al. (11), no significant difference was seen between the group receiving birth plan and control group (P> 0.05). The results of meta-analysis on 3 studies showed that the mean score of childbirth experience was significantly more in the birth plan group compared to the control (SMD= 0.60; 95% CI: 0.07 to 1.13; P= 0.03) (Figure 4).

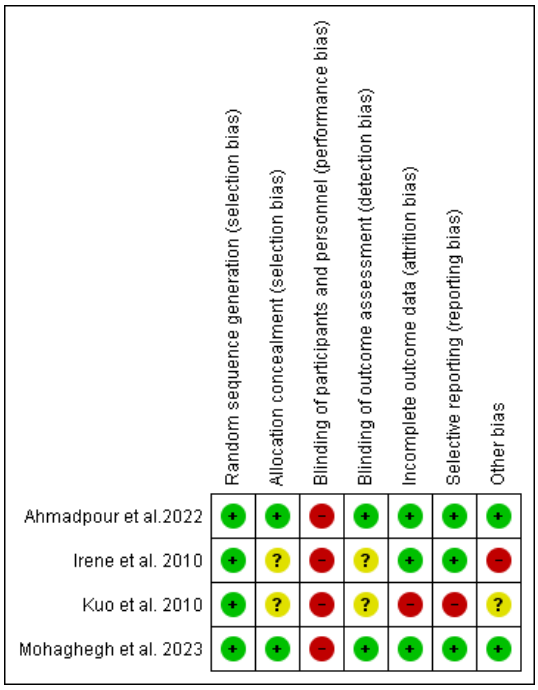

Figure 3. Review authors' judgements about each risk of bias item for each included RCT

Table 2. The results of ROBINS-I in the quasi-randomized clinical trials

Author	Springer. 1996	Lundgren et al. 2003	Abd El Aliem et al. 2020	Abd Elfattah et al. 2022	Farahat et al. 2015
Bias due to confounding	Serious	Serious	Serious	Serious	Low
Bias in selection of participants	Serious	Serious	Serious	Serious	Low
Bias in classification of interventions	Serious	Serious	Serious	Serious	Serious
Bias due to deviations from intended interventions	Low	Low	Low	Low	Low
Bias due to missing data	Low	Low	Low	Low	Low
Bias in measurement of outcomes	Serious	Serious	Low	Low	Serious
Bias in selection of reported result	No information	No information	No information	No information	No information
Overall	Serious	Serious	Serious	Serious	Serious

"Low: low risk of bias- the study is comparable to a well-performed randomized trial with regard to this domain; No information: no information on which to base a judgement about risk of bias for this domain; Serious: serious risk of bias- the study has some important problems."

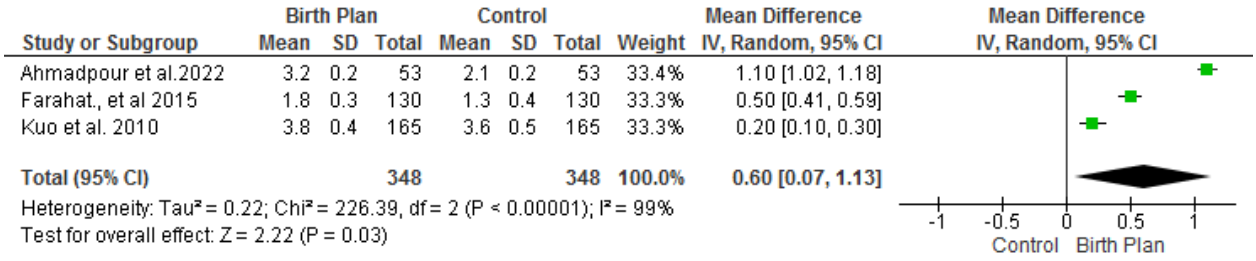

Figure 4. Birth plan versus control group, outcome: Childbirth experience

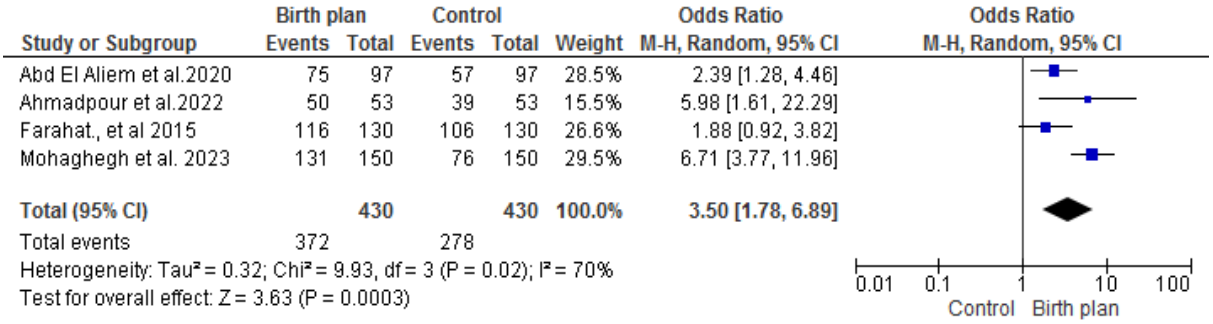

Figure 5. Birth plan versus control group, outcome: Vaginal birth

Maternal anxiety level

Investigation of the effect of birth plan intervention on anxiety had been done in two studies (5, 19) Springer (5) had used state-trait anxiety inventory (STAI), though the result was not reported numerically. Yet the results indicated diminished level of pregnancy anxiety in the birth plan group over the control, though it was not statistically significant (P=0.6). Also in the study by Irene et al. (19), women's anxiety across different periods of pregnancy, at time of admission, in the delivery or labor room, five days and six weeks post-delivery had been measured; the results did not show any significant difference between groups.

Delivery outcomes

In the study by Farahat et al. (20) the frequency of episiotomy and emergency C-section was less in birth plan group compared to the control, while the rate of vaginal delivery was higher in the birth plan group compared to the control (P=0.001). On the other hand, in Lundgren et al. (11) study, the frequency of emergency C-section and episiotomy was higher in the birth plan group compared to the control.

The results of the meta-analysis of four studies (20-21, 23-24) showed that the rate of vaginal delivery was statistically significantly higher in the birth plan group than in the control group (OR= 3.50; 95% CI: 1.78 to 6.89; P= 0.0003) (Figure 5).

The results of the meta-analysis of five studies (20-24) showed that there was no statistically significant difference between the two groups with regard to the first (MD= -36.98 (minute); 95% CI: -76.95 to 3.03; P= 0.07), second (MD= 0.31 (minute); 95% CI: -6.51 to 7.13; P= 0.093) and third (MD= 14.51 (minute); 95% CI: -19.71 to 48.73; P= 0.41) stages of labor (Figure 6).

Neonatal outcomes

The mean Apgar score at first minute in the study by Farahat et al. (20) in the neonates of mothers receiving the birth plan and control was 7.09 (SD: 0.55) and 5.5 (SD: 1.35), respectively, which was significantly different. Also, the mean Apgar score at fifth minute was 9.12 (SD: 0.5) and 7.33 (SD: 1.38) in the birth plan and control groups, respectively, suggesting that the neonatal Apgar score was higher in the birth plan group compared to the control (p<0.001). However, in the study by Mohagheg et al. (24) and in the study by Ahmadpour et al. (23), there was no statistically significant difference between the two groups with regard to the Apgar score of the first and

fifth minute. In the study by Lundgren et al. (11) the frequency of fifth minute Apgar score lower than 7.5 was 1.1% in the birth plan group and 1.5% in the routine care group.

Frequency of admission in NICU in the study by Lundgren et al. (11) was 6.3% and 7.4% in the birth plan and routine care groups, respectively. Also, frequency of admission in NICU in the study by Ahmadpour et al. (23) was 5.7% in both birth plan and routine care groups.

Postpartum depression was measured in the study by Irene et al. (19) at different periods of 3 days (p=0.054), 5 days (p=0.067) and 6 weeks after delivery (p=0.792), and the results of the analysis did not show a statistically significant difference between the two groups (19). In the study by Ahmadpour et al. (23), the postpartum depression score was statistically significantly lower in the birth plan group than in the control group (MD= 4.8; 95% CI: 3.9 to 5.7; P< 0.001).

Postpartum depression

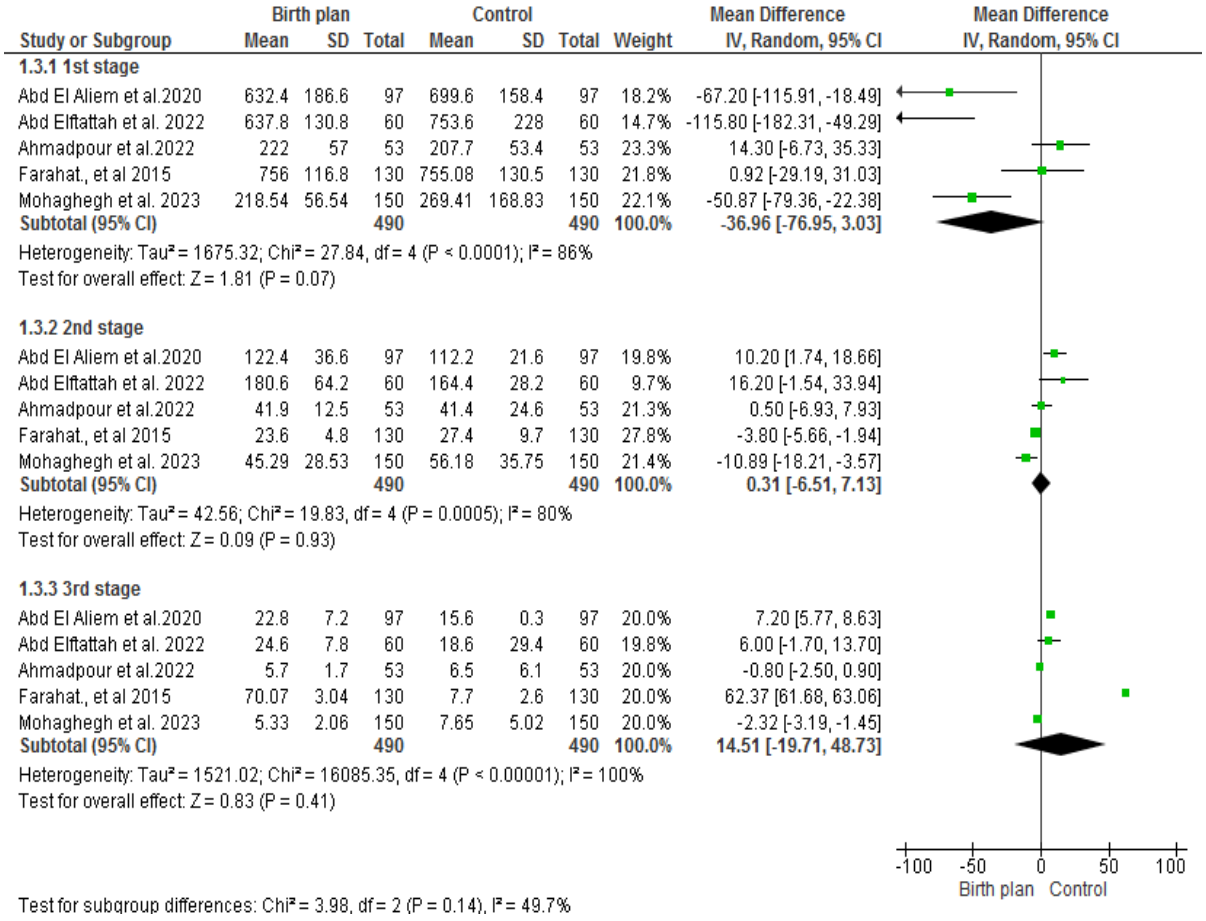

Figure 6. Birth plan versus control group, outcome: Stages of labor

Discussion

Based on the results of investigations examined here, birth plan can improve the childbirth experiences, while birth plan has no effect on the level of anxiety and postpartum depression. The results showed an increase in vaginal delivery and decrease in emergency caesarean section in the birth plan group. The results of a survey in Victoria hospitals in 1993 showed that birth plans could not make significant changes in the women's experience about cares provided during delivery (14). In another investigation, with the increase in the number of fulfilled needs for women, the level of satisfaction with the childbirth experience improved (25), though the reason is not clear.

This may that more wants signify having great expectations by women. Thus, in case these expectations are not fulfilled, the level of satisfaction with childbirth will be lower. The incompatibility between some women's desires and medical views may be another reason for this dissatisfaction (6). Illogical expectations and uninformed desires of women can lead to loss of the birth plan and negative attitude of care providers to the birth plan (9, 26). A study found that 65% of care providers believe that birth plan would lead to adverse delivery complications (27). In addition, 29% of mothers and 14% of care providers believe that birth plan would create a strong sense of control that does not allow pregnant women to be prepared for the unexpected conditions (28). Meanwhile, birth plans can improve the childbirth experience in different methods. The women in the birth plan group may have more realistic expectations and feel calmer at hospital. This helps women to contemplate on how they can control their labor and delivery (29).

In this study, results of meta-analysis showed that the score of childbirth experience was significantly higher in the birth plan group compared to the control. In the systematic review by Mirghafourvand et al (28), on investigating the effect of birth plan on women's childbirth experience, they found that there is insufficient evidence about the recommendation of birth plan to improve the childbirth experience of women. Positive feelings about birth lead to satisfaction from childbirth, and this positive feeling emanates from a sense of participation, fulfillment of desires, expectations, sense of ability, and competence (18, 30). Childbirth experiences are an important supersensible outcome, which has long and short-term consequences on women's lives (2, 31). Research has shown that factors such as support, control, internal locus of control, and birth outcomes determine the birth experience (32).

Anxiety had been examined in two of the studies. None of them showed a significant difference between the intervention and control groups. Nevertheless, the results of Springer (5) indicated diminished level of pregnancy anxiety in the birth plan group compared to control. Anxiety is associated with compilations of pregnancy and delivery (33). Definitely, birth plans may be involved in reducing these complications through lowering anxiety. Birth plan is a good means through which the mother and neonate healthcare providers can do their best to fulfill the women's preferences (34). Birth plans help women have realistic expectations and think about how they should control themselves during labor and delivery. If anxiety is reduced through written birth plans, fear, worries, and pain may also be mitigated (35). The more anxious women are, the more pain and fear they perceive, causing again further anxiety, whereby a vicious cycle is established. Giving power of choice to women about delivery and childbirth experience may help them control their anxiety (36). It seems that women who follow a birth plan have greater cooperation, which is one of the important elements in reducing the degree of stress and worries during delivery (37).

In this study, results of meta-analysis showed that frequency of vaginal delivery was significantly higher in the birth plan group compared to the control. Although studies on the relationship between birth plan and maternal or neonatal outcomes are very sparse, some studies have indicated reduced rate of C-section and improvement of neonatal outcomes in women who had birth plan compared to women without it (37-39). The blood pH of the umbilical cord in the birth plan group compared to the control may be attributed to the fact that the number of interventions decreases (39).

According to world health organization WHO), overuse of medical interventions such as episiotomy, premature amniotomy, oxytocin, lithotomy position for expulsion of the fetus, and constant monitoring of the fetal heart rate should not be among the routine measures during normal delivery. Nevertheless, in spite of the increasing evidence and WHO recommendations about nonuse of numerous interventions, application of these interventions is still progressively increasing in deliveries (40). Use of birth plan by the WHO is recommended which mostly emphasizes on normal processes without interventions. This is because the main aim of gynecology and obstetrics care is achieving a healthy mother and child with minimal interventions (41). The

level of awareness and willingness to involve delivery service providers in birth plans and providing healthcare services are very important which can facilitate women's participation in their self-care (42). The studies on birth plans suggest that the context and environment also play an important role in the level of participation of hospital staff in preparing and implementing birth plans as well as attitudes toward these plans. Possibly, the exact effect of birth plans and method of achieving the goal of promoting relationship between women and healthcare providers are dependent on the policies and previous cultures of the hospital (14).

This study is the first review on the effect of birth plan on neonatal and maternal outcomes. Studies regarding investigation of the birth plan effects are limited. Meanwhile, most studies have been quasi-RCTs. The studies were high-risk regarding some biases, and it was not possible to perform meta-analysis on data except for childbirth experience. Further, the precise impact of birth plans and method of achieving the goal of promoting the relationship between women and care providers cannot be independent of the hospital previous cultures and policies, level of support of evidence-based actions, the degree of persistence of care, commitment, and participation of women as well as their partners.

According to the results of the present study, there is evidence to recommend use of birth plans in clinical practice. With a profound view to the nature of the birth plan, which derivatives from the principle of respecting biology and principle of freedom, birth plan can improve women's control over the process of delivery thereby enhancing their satisfaction (43). Further, birth plan would reduce women's fear, and creating positive feedback for them, because it provides information and awareness as well as connection with women (44). Since birth plan forms can guide pregnant women and their partners in decision-making on childbirth and prepare pregnant women to receive labor or delivery interventions and care, and due to the greater intellectual preparation for managing and coping with childbirth and increasing the parent's participation, the psychological complications of delivery would possibly diminish. Thus, it is better that a written plan is codified for childbirth that can be suitably incorporated in delivery training classes (14). In order to provide more robust evidence concerning the effect of birth plan on delivery, maternal, and neonatal outcomes as well as on the potential advantages and disadvantages of these plans, conducting further randomized clinical trials across various contexts, policies, and cultures is recommended.

Conclusion

Based on the results of the present study, the birth plan improves the childbirth experience and delivery outcomes. In order to provide more strongly evidence about the possible advantages and disadvantages of the birth plans, and recommending the use of a birth plan in hospital, clinical trials with stronger designs are suggested while also observing all RCT principles.

Declarations

Acknowledgements

The authors whose articles were reviewed are sincerely appreciated for their help in providing informational support for this systematic review.

Conflicts of interest

Authors declared no conflicts of interest.

Ethical considerations and ethical approval

Not applicable

Funding

None.

Authors' contribution

MM, PA, and GM designed the study. PA and GM conducted literature research. MM and PA were involved in data analysis. MM, PA, and GM were involved in writing the manuscript. All authors were responsible for the manuscript and have read and approved the final version.

References

1. Simkin P. Just another day in a woman's life? Women's long-term perceptions of their first birth experience Part I. Birth. 1991; 18(4): 203-210.

2. Ayers S, Pickering AD. Do women get posttraumatic stress disorder as a result of childbirth? A prospective study of incidence. Birth. 2001; 28(2): 111-118.
3. Olde E, van der Hart O, Kleber R, van Son M. Posttraumatic stress following childbirth: a review. Clinical Psychology Review. 2006; 26(1): 1-16.
4. Triolo PK. Prepared childbirth. International Journal of Childbirth Education. 1987; 30(3): 487-494.
5. Springer D. Birth plans: The effect on anxiety in pregnant women. International Journal of Childbirth Education. 1996; 11(3): 20-25.
6. Lothian J. Birth plans: the good, the bad, and the future. Journal of Obstetric, Gynecologic & Neonatal Nursing. 2006; 35(2): 295-303.
7. Hildingsson I, Johansson M, Karlström A, Fenwick J. Factors associated with a positive birth experience: an exploration of swedish women's experiences. International Journal of Childbirth. 2013; 3(3): 153-164.
8. Ekeocha C, Jackson P. The 'birth plan'experience. An International Journal of Obstetrics & Gynaecology. 1985; 92(1): 97-101.
9. DeBaets AM. From birth plan to birth partnership: enhancing communication in childbirth. American Journal of Obstetrics and Gynecology. 2017; 216(1): e1-e4.
10. Hidalgo-Lopezosa P, Hidalgo-Maestre M, Rodríguez-Borrego MA. Birth plan compliance and its relation to maternal and neonatal outcomes. Revista latino-americana De Enfermagem. 2017; 25 :e2953.
11. Lundgren I, Berg M, Lindmark G. Is the childbirth experience improved by a birth plan. Journal of Midwifery & Women's Health. 2003; 48(5): 322-328.
12. Welsh JV, Symon AG. Unique and proforma birth plans: a qualitative exploration of midwives' experiences. Midwifery. 2014; 30(7): 885-891.
13. Jones M, Barik S, Mangune H, Jones P, Gregory S, Spring J. Do birth plans adversely affect the outcome of labour. British Journal of Midwifery. 1998; 6(1): 38-41.
14. Divall B, Spiby H, Roberts J, Walsh D. Birth plans: a narrative review of the literature. International Journal of Childbirth. 2016; 6(3): 157-172.
15. Higgins JP, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, et al. Cochrane handbook for systematic reviews of interventions: John Wiley & Sons; 2019.
16. Sterne JA, Hernán MA, Reeves BC, Savović J, Berkman ND, Viswanathan M, et al. ROBINS-I: a tool for assessing risk of bias in non-randomised studies of interventions. BMJ. 2016; 355: i4919.
17. Ahmadpour P, Mosavi S, Mohammad-Alizadeh-Charandabi S, Jahanfar S, Mirghafourvand M. Evaluation of the birth plan implementation: a parallel convergent mixed study. Reproductive Health. 2020; 17(1): 1-9.
18. Kuo S-C, Lin K-C, Hsu C-H, Yang C-C, Chang M-Y, Tsao C-M, et al. Evaluation of the effects of a birth plan on Taiwanese women's childbirth experiences, control and expectations fulfilment: a randomised controlled trial. International Journal of Nursing Studies. 2010; 47(7): 806-814.
19. Irene LY, Ho LF, Ma G, LEUNG W. The Effect of a Birth Plan on Anxiety Levels in Chinese Pregnant Women: a Randomised Controlled Trial. Hong Kong Journal of Gynaecology, Obstetrics and Midwifery. 2010; 10(1): 32-36.
20. Farahat AH, Mohamed HES, Elkader SA, El-Nemer A. Effect of implementing a birth plan on womens' childbirth experiences and maternal & neonatal outcomes. Journal of Education and Practice. 2015; 6(6): 24-31.
21. Abd El Aliem RS, Emam AM, Sarhan AE. Effect of implementing birth plan on women childbirth outcomes and empowerment. The American Journal of Nursing. 2020; 9(3): 155-165.
22. Abd Elfattah Ali H, Ramadan Hussein Ahmed S, Hussien Ahmed N. Effect of self-prepared birth plan on obstetrical outcome of primiparous women. Egyptian Journal of Health Care. 2022; 13(1): 1091-1105.
23. Ahmadpour P, Moosavi S, Mohammad-Alizadeh-Charandabi S, Jahanfar S, Mirghafourvand M. Effect of implementing a birth plan on maternal and neonatal outcomes: a randomized controlled trial. BMC Pregnancy and Childbirth. 2022; 22(1): 1-4.
24. Mohaghegh Z, Javadnoori M, Najafian M, Abedi P, Kazemnejad Leyli E, Montazeri S, Bakhtiari S. Effect of birth plans integrated into childbirth preparation classes on maternal and neonatal outcomes of Iranian women: A randomized controlled trial. Frontiers in Global Women's Health. 2023; 4: 1120335.
25. Aragon M, Chhoa E, Dayan R, Kluftinger A, Lohn Z, Buhler K. Perspectives of expectant women and health care providers on birth plans. Journal of Obstetrics and Gynaecology Canada. 2013; 35(11): 979-985.
26. Huber US, Sandall J. A qualitative exploration of the creation of calm in a continuity of carer model of maternity care in London. Midwifery. 2009; 25(6): 613-621.

27. Grant R, Sueda A, Kaneshiro B. Expert opinion vs. patient perception of obstetrical outcomes in laboring women with birth plans. The Journal of Reproductive Medicine. 2010; 55(1-2): 31-35.
28. Mirghafourvand M, Mohammad Alizadeh Charandabi S, Ghanbari-Homayi S, Jahangiry L, Nahaee J, Hadian T. Effect of birth plans on childbirth experience: A systematic review. International Journal of Nursing Practice. 2019; 25(4): e12722.
longitudinal study. Journal of Mental Health. 2007; 16(6): 719-730.
31. Wijma K, Söderquist J, Wijma B. Posttraumatic stress disorder after childbirth: a cross sectional study. Journal of Anxiety Disorders. 1997; 11(6): 587-597.
32. Waldenström U, Borg IM, Olsson B, Sköld M, Wall S. The childbirth experience: a study of 295 new mothers. Birth. 1996; 23(3): 144-153.
33. Grigoriadis S, Graves L, Peer M, Mamisashvili L, Tomlinson G, Vigod SN, et al. Maternal anxiety during pregnancy and the association with adverse perinatal outcomes: systematic review and meta-analysis. The Journal of Clinical Psychiatry. 2018; 79(5): 17r12011.
34. Westergren A, Edin K, Walsh D, Christianson M. Autonomous and dependent–The dichotomy of birth: A feminist analysis of birth plans in Sweden. Midwifery. 2019; 68: 56-64.
35. Dick-Read G. Childbirth without fear: the principles and practice of natural childbirth: Pinter & Martin Publishers; 2004.
36. Bailey JM, Crane P, Nugent CE. Childbirth education and birth plans. Obstetrics and Gynecology Clinics of North America. 2008; 35(3): 497-509.
37. Hidalgo-Lopezosa P, Rodríguez-Borrego MA, Muñoz-Villanueva MC. Are birth plans associated with improved maternal or neonatal outcomes. The American Journal of Maternal/Child Nursing. 2013; 38(3): 150-156.
38. Suárez-Cortés M, Armero-Barranco D, Canteras-Jordana M, Martínez-Roche ME. Use and influence of Delivery and Birth Plans in the humanizing delivery process. Revista latino-americana de enfermagem. 2015; 23(3): 520-526.
39. Afshar Y, Wang ET, Mei J, Esakoff TF, Pisarska MD, Gregory KD. Childbirth education class and birth plans are associated with a vaginal delivery. Birth. 2017; 44(1): 29-34.
40. World Health Organization. Appropriate technology for birth. The Lancet. 1985; 2(8452): 436-437.
29. Hodnett ED, Hannah ME, Hewson S, Whyte H, Amankwah K, Cheng M, et al. Mothers' views of their childbirth experiences 2 years mter planned caesarean versus planned vaginal birth for breech presentation at term, in the international randomized term breech trial. Journal of Obstetrics and Gynaecology Canada. 2005; 27(3): 224-231.
30. Benoit C, Westfall R, Treloar AE, Phillips R, Mikael Jansson S. Social factors linked to postpartum depression: A mixed-methods
41. Technical Working Group WHO. Care in normal birth: a practical guide. Birth. 1997; 24(2): 121-123.
42. Tillett J. Decision making by women during the process of labor. The Journal of Perinatal & Neonatal Nursing. 2009; 23(3): 204-206.
43. Whitford HM, Hillan EM. Women's perceptions of birth plans. Midwifery. 1998; 14(4): 248-253.
44. Kaufman T. Evolution of the birth plan. The Journal of perinatal Education. 2007; 16(3): 47-52.