Journal of Midwifery & Reproductive Health

JMRH.mums.ac.ir

The Efficacy of Maternal Lateral Decubitus Position During Labor in Correcting Fetal Occiput Posterior Position and Childbirth Outcomes: A Systematic Review

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ARTICLE INFO

Article type:
Review article

Article History:
Received: 27-Jan-2022
Accepted: 06-Dec-2022

Key words:
Maternal Lateral Position
Fetal Occiput Posterior Position
Childbirth Outcome
Systematic Review
Meta-Analysis

ABSTRACT

Background & aim: Fetal occiput posterior (OP) position during labor may be associated with negative maternal and neonatal outcomes. It is therefore necessary for the mothers to have active participation in changing their position during the labor in order to facilitate OP rotation. The present study aimed to investigate whether maternal lateral decubitus position during labor can correct fetal OP position and childbirth outcomes.

Methods: In this systematic review, searches were made in the databases of Medline, Web of Science, Embase, Scopus, and Cochrane Central Controlled Trials Register as well as Persian databases including SID, Magiran and IranMedex from inception to September 2021. Eligible randomized controlled trials evaluating the effect of maternal position on fetal OP position during labor were selected. Cochrane risk of bias tool for randomized trials was used to assess the quality of included articles.

Results: Four randomized controlled trials (RCTs) met the eligibility criteria. They included 871 participants, who were divided into two groups. overall, no difference was reported between the intervention and control groups in terms of the rate of occiput anterior position at birth. The mother's position in the same or opposite direction of the fetal occiput had no role in the spontaneous vaginal delivery rate and other outcomes and neonatal Apgar score.

Conclusion: The lateral decubitus position of mother during labor played no role in fetal head rotation toward the OP position or delivery outcomes.

▶ *Please cite this paper as*:
Iravani M, Faal Siahkal Sh, Bahmaei H, Beheshti Nasab M,Ghanbari S, Askari S, Zahedian M. The Efficacy of Maternal Lateral Decubitus Position During Labor in Correcting Fetal Occiput Posterior Position and Childbirth Outcomes: A Systematic Review. Journal of Midwifery and Reproductive Health. 2023; 11(3): 3759-3766. DOI: 10.22038/JMRH.2022.63293.1821

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Introduction

One of the most common problems that midwives encounter during labor is the fetal occiput posterior (OP) position (1). The prevalence of OP positions is around 40% during labor and 1.8%-6% at birth (2). The persistent occiput posterior (POP) position could be due to malrotation of the fetal head to the occiput anterior (OA) position or failure in OP to OA rotation (3).

Nulliparity, gestational age≥41 weeks, age>35 years, African American ethnicity, fetal birth weight ≥4000gr, epidural anesthesia, pelvic capacity limitation, previous OP delivery, anterior placenta position, and short stature of the mother are the most important risk factors for this abnormality (3-4). The POP position has been linked to a high rate of maternal and neonatal morbidity. These include prolonged first and second stages of labor, instrumental delivery, cesarean section, third- and fourth-degree perineal tears (obstetric anal sphincter injuries), back pain, maternal fatigue, chorioamnionitis, postpartum hemorrhage, epidural analgesia, neonatal trauma, low Apgar score, NICU admission, and newborn encephalopathy (2, 4-6).

Various interventions have been devised to correct the position of the OP. Some interventions include cesarean section, using oxytocin, manual rotation, operative delivery, and maternal posturing before or during labor (7). If the fetal heart is normal and labor is progressive in the first and second stages of labor, a routine policy is adopted, and no intervention is necessary. However, if OP occurs in the second stage, there will be an increase in the cesarean section rate (7-9). It is reported that in a majority of OP positions (87%), there is rotation to the OA position when the pelvic floor receives effective contractions, the head flexes adequately, and fetal size is average (1). The mother must have active participation in changing her position during the first and second stages of labor in order to facilitate OP rotation (10).

Lying, standing, sitting on all-fours, and assuming squatting positions by the mother during labor can shorten the first and second stages of labor, decrease cesarean-section and instrumental delivery rates, and correct the OP position (11).

The side-lying position can be helpful in OP rotation provided that the mother is under epidural anesthesia or cannot get out of bed (10). It has been reported that the modified Sims maternal position is not an effective postural intervention for POP rotation (12). Ridley's review study, on the other hand, found that lateral recumbent positions enhance OP to OA rotation (13).

In two other studies, including 300 Iranian mothers, the first and second stages of labor were found to be significantly prolonged due to the side-lying position (14-15). Maternal hands-knees position had no contribution to fetal head rotation (16-17). According to a review study by Lee and colleagues (2021), maternal hands-and-knees position and/or lateral decubitus position led to an insignificant increase in the rate of successful correction of fetal position from OP to OA (18). Levy et al. (2021) reported no increase in the OA positioning rate at birth owing to the maternal hands-and-knees position (19).

Given the contradictory results of previous studies and the lack of a systematic review on the effect of maternal lateral decubitus position during labor on the correction of the fetal OP position, the present study was carried out to investigate the impact of maternal lateral decubitus positions during labor on the correction of the fetal position from OP to OA and the improvement of delivery outcomes.

Materials and Methods

The present study was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (20) of randomized controlled trials (RCTs).

Search strategies

Databases including Medline, Web of Science, Embase, Scopus, and Cochrane Central Register of Controlled Trials were searched from inception to April 2020. The search was later updated upto September 2021. Additional records identified through other sources including SID, Magiran and IranMedex. The search was performed using the following English keywords: "Maternal position" OR "Kneeling" OR "Semi-prone position" OR "Lateral position" OR "Side-lying position" OR

"Decubitus position" OR "Lateral" AND "Fetal occiput posterior" OR "Fetal head position" OR "Fetal head rotation" AND "labor" OR "labour" OR "childbirth" OR "delivery". Table 1 shows the search strategy in this study.

Inclusion and exclusion criteria

All published RCTs evaluating the effect of maternal posture on fetal occiput posterior during labor were included. This study included all clinical trials and quasi-randomized trials that compared the use of lateral decubitus positions during labor with other positions to correct the fetal occiput posterior position and the outcomes of childbirth. This study did not include case reports, review articles, qualitative articles, letters to the editor, and articles without full text.

Type of participants

Women in labor with a term singleton pregnancy with the cephalic presentation were eligible to participate in the study. The fetal OP position was confirmed by ultrasound in all studies.

Table1. Search strategy

Search keywords with synonyms	
Labour (s1)	labor OR labour OR childbirth OR delivery
Maternal position (s2)	Maternal position OR Kneeling OR Semi prone position OR Lateral position OR Side-lying position OR Decubitus position OR Lateral decubitus position OR Supine position OR Sims position
Fetal head position (s3)	Fetal occiput posterior OR Fetal head position OR Fetal head rotation"
Search combination	S1 AND S2 AND S3

The review compared the use of the lateral decubitus position on the same side or the opposite side of the fetal spine with the upper knee hyper-flexed at 90° with the free position for the dorsal recumbent position.

Type of outcomes

The primary outcomes of this study included the rate of spontaneous rotation to the occiput anterior and the mode of delivery. The secondary outcomes included the use of oxytocin, duration of labor, episiotomy, third- and fourth-degree perineal tears (obstetric anal sphincter injuries), and Apgar score.

Study selection

After searching the databases and importing the articles that were extracted into the Covidence software, two members of the research team first screened the titles and abstracts of the initially selected studies. The same individuals also carried out the full-text screening. Covidence was used for screening the full texts, extracting data, and assessing quality of the included studies. A third member of the research team was asked to help in case of any disagreement.

Data extraction

Two authors extracted information about the study's specifics. The same two authors independently extracted study details, which included authors, year, study design, interventions, baseline characteristics, inclusion and exclusion criteria, and outcomes. This was done using Covidence software.

Quallity assessment

Two authors reviewed the records independently using Covidence software, and the risk of bias was assessed using the Cochrane risk of bias tool for RCTs. Based on six domains (i.e., selection bias, performance bias, detection bias, attrition bias, reporting bias, and other bias), we assessed bias for individual elements in the form of a judgment (high, low, or unclear).

Random sequence generation: Articles that used any nonrandomized process, those that used any randomized process, and those that reported insufficient information were considered high risk, low risk, and unclear risk, respectively.

Allocation concealment: Articles that had alternate allocations were reported; those that used a central assignment were reported; and those reporting insufficient information were considered high-risk, low-risk, and unclear-risk, respectively.

Blinding of participants and personnel: Articles in which both participants and personnel were blinded were reported; those with no blinding

and articles with insufficient information were considered low-risk, high-risk, and unclear-risk, respectively.

Blinding of outcome assessment: The evaluation method of each outcome was assessed separately. Complete blinding of the outcome assessor was reported as low risk; otherwise, it was reported as high risk, and with not enough information, the risk of bias was reported as unclear.

Incomplete outcome data: When the amount of missing data is high or the loss in the two groups is unbalanced, it is reported as a high risk. When there is no or little missing data or the reasons for the sample loss are the same in the two groups, it is reported as low risk. With insufficient information, the risk of bias was reported as an unclear risk.

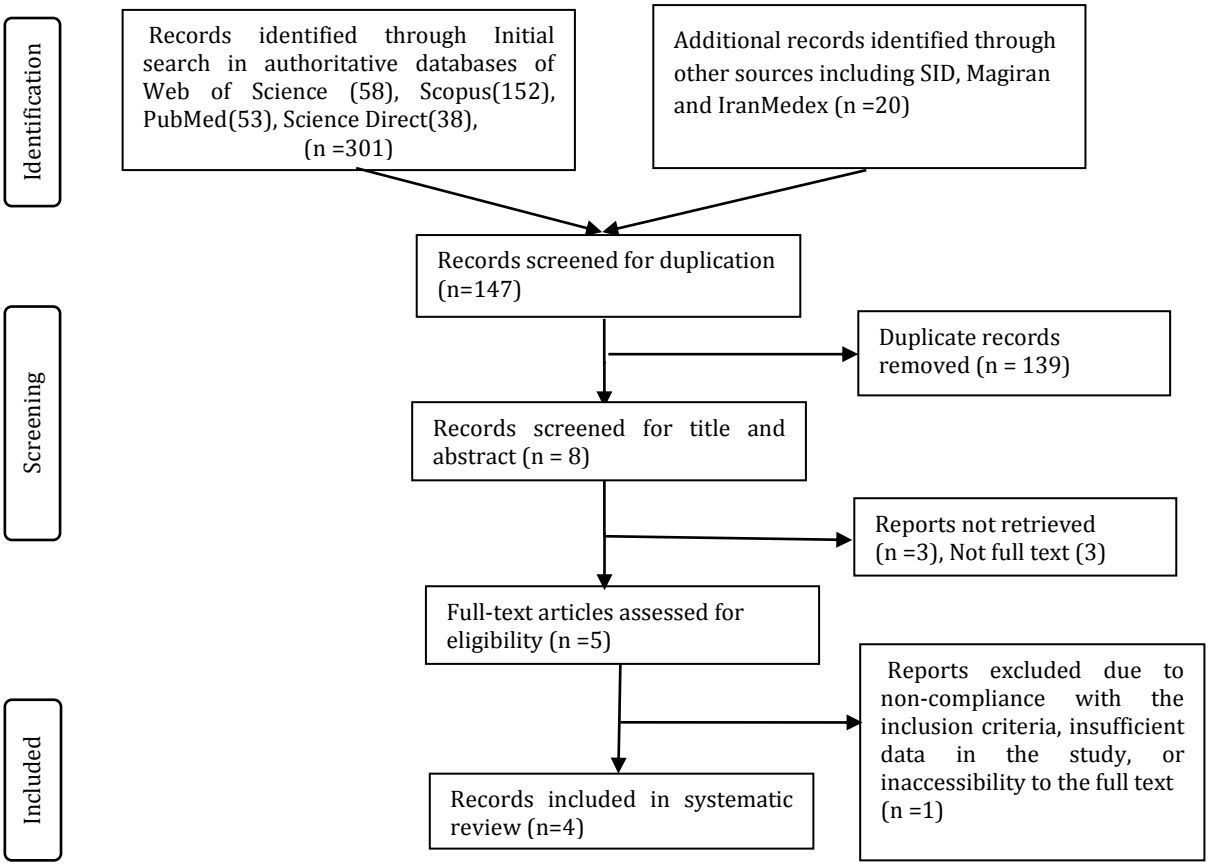
Selective reporting: If all of the preset results are not reported or are incomplete and useless, the risk of bias is high. If all predicted results of the study are reviewed and reported, the risk of bias is low. In the case of reporting insufficient information, the risk of bias was reported as unclear.

The results were imported into the RevMan software to be charted.

Results

A total of 321 articles were identified through database searching. After removing the duplicates by the Covidence software (n = 167), the titles and abstracts of the remaining papers (N=147) were screened for potentially relevant studies. Three articles were relevant to the objective, but there was no access to their full text (21-23). Finally, out of the five full-text articles that were considered eligible, four were subjected to systematic review. The fifth paper was excluded because of wrong study design (Figure 1).

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



The studies included in this systematic review involved 871 women in labor. Details of these studies are shown in Table 2. Two studies were conducted in France (12, 17), one in China (24), and one in Spain (25). Generally, the RCTs were considered to have average quality according to the Cochrane tool used to assess the risk of bias in RCTs. No blinding of personnel, participants, or outcome assessors was done in the selected studies. The risks of bias in each study are based on the authors' judgments (Figure 2).

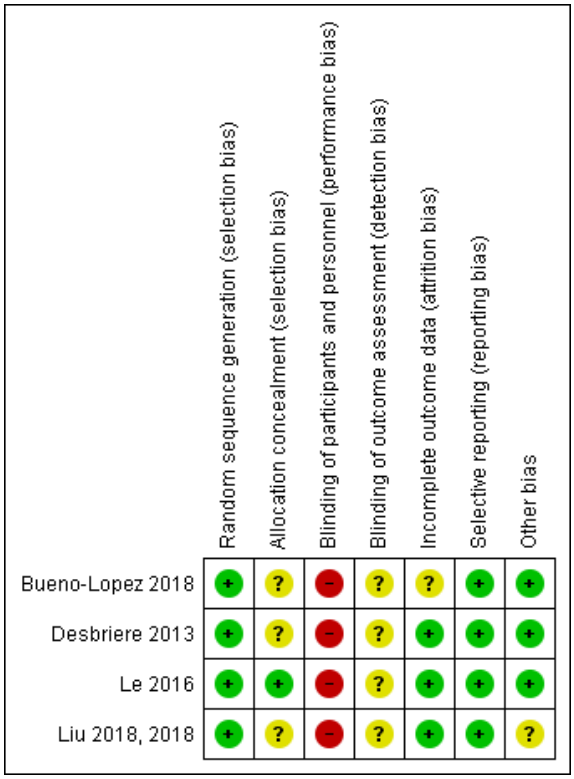


Figure 2. Risk of bias summary: review authors' judgments about each risk of bias for each included study

OA position at birth

In Bueno-Lopez et al. (2018), 120 women in labor with fetal OP position were randomized into the control group (n=60) with a free posture and intervention group mothers (n=60) with the modified Sims on the side of the fetal spine. The result of this study showed more cases of rotation to occiput anterior in the intervention group compared to the control group (50.8% vs. 21.7%; P=0.01) (25).

Liu et al. (2018) evaluted 226 women with fetal OP position between January 2015 and June 2017. Pregnant women were divided into intervention group (n=114) who were in maternal extreme flexure and hip abduction combined with contralateral side-lying position, and control group (n=112) who were in contralateral side-lying position alone. Result showed that maternal extreme flexure and hip abduction combined with contralateral side lying made a higher rate of head rotation to OA position than contralateral side-lyingn alone (P=0.004)(24).

In Desbriere et al. (2013), 220 women with fetal occiput posterior position in the active phase participated. At the fetal head station> 0, mothers in the intervention group (n= 110) were placed in the modified sims posture.

Table 2. Characteristics of studies included in the systematic review

Author	Country	Study Design	Participants	Parity	Type of intervention	Main outcome	Intervention	Control	p-value
Liu et al (2018) (24)	China	Interventional with 2 parallel groups	Intervention group=105 Control group=105	Did not divide the primi- and multi parous women	**Intervention**: Maternal extreme flexure and hip abduction combined with contralateral side lying, **Control:** Contralateral side-lying alone	OA position at birth Spontaneous deliveries Instrumental vaginal delivery Cesarean:	92.105 98.105 4.105 3.105	69.105 70.105 25.105 10.105	P=0.004 P=0.001 P=0.002 P=0.060
Bueno-Lopez et al. (2018) (25)	Spain	RCT 2 parallel groups	Intervention group=59 Control group= 60	**Intervention:** Primiparous:43 Multiparous:16 **Control**: Primiparous:43 Multiparous:17	**Intervention**: Lateral decubitus position on the same side as the fetal spine with the upper knee hyper-flexed at 90° (modified sims position) **control:** free position	Spontaneous rotation to occiput anterior Vaginal delivery: Cesarean:	30.59 50.59 9.59	13.60 41.60 19.60	P=0.01 P=0.04 P=0.04
Le ray et al (2016) (12)	France	RCT 2 parallel groups	Intervention group=160 Control group=162	**Intervention:** Primiparous:122 **Control:** Primiparous:124	**Intervention =** Lateral asymmetric decubitus posture on the side opposite that of the fetal spine **Control =** Dorsal recumbent posture	OA position at birth Cesarean:	133.160 29.160	140.162 23.162	P=0.436 P=0.608
Desbriere et al (2013) (17)	France	RCT 2 parallel groups	Intervention group=110 Control group=110	**Intervention:** Primiparous:69 Multiparous:31 **Control**: Primiparous:62 Multiparous:38	**Intervention =** Fetal head station>0: lateral recumbent position on the same side of the fetal spine, with the inferior leg lying in the axis of the body and the other leg folded at an approximately 90-degree angle with the use of a leg support. **Control:** Dorsal recumbent posture	OA position at birth Spontaneous deliveries Cesarean:	86.110 60.110 21.110	84.110 70.110 19.110	P=0.748 P=0.889 P=0.727

This position is the lateral recumbent position on the same side of the fetal spine, with the inferior leg lying in the axis of the body and the other leg folded at an approximately 90-degree angle with the use of a leg support.

For the control group (n=110), the dorsal recumbent posture was used. The results showed that there was no statistically significant difference between the two groups in terms of the posterior occiput rate of the fetal head (P=0.748) (17).

In the study by Le ray et al. (2016), 322 women with fetal OP position participated from May 2013 through December 2014. Mothers in the intervention group used a lateral asymmetric decubitus posture on the side opposite that of the fetal spine during the first hour and encouraged to maintain this position for as long as possible during the first stage of labor. Mothers who were assigned to control group adopted a dorsal recumbent position. Result showed that OA position at birth in the intervention group was lower than the control group(P=0.436) (12).

Mode of delivery rate

In Bueno-Lopez et al. (2018), the rate of vaginal delivery was significantly higher in the intervention group than that in the control group (P= 0.04). Also, the cesarean rate was significantly lower compared with the control group (P= 0.04)(25). Liu et al (2018) showed a statistically significant difference between the intervention and control groups in terms of spontaneous deliveries (P=0.001), instrumental vaginal delivery (P=0.002) and cesarean delivery (P=0.062) (24). In Desbriere et al. (2013), the prevalence of vaginal delivery and cesaren delivery was not significantly different between the intervention and control groups (P=0.727)(17).

Le ray et al. (2016) showed no significant difference between the intervention and control groups in term of the prevalence of spontaneous, instrumental, and cesarean deliveries (P=0.608) (12).

Secondary outcomes

Bueno-Lopez et al. (2018) showed that length of second stage of labor in the intervention group was significantly lower than that in the control group (P=0.028). However, the rates of episiotomy, perineal tears, and Apgar score were not significantly different between the two groups (P>0.05) (25).

Liu et al. (2018) showed that duration of labor in the intervention group was significantly shorter than that in the control group (P<0.05) (24).

In Desbriere et al. (2013), the duration of the first and second stages of labor, and the rate of oxytocin use, episiotomy, lacerations and Apgar score were not significantly different between the intervention and control groups (P>0.05) (17). Le ray et al. (2016) showed that there were no significant differences between the two groups in terms of the duration of the active phase of labor, episiotomy, and Apgar score (P>0.05) (12).

Discussion

The present study aimed to examine the efficacy of maternal lateral positions to correct the fetal occiput posterior position and improve delivery outcomes.

According to the findings of this study, maternal lateral decubitus position on fetal head rotation rate was effective in two studies and had no effect in the other two studies, as it seems that this position improves neither fetal head rotation from OP to OA nor other maternal and neonatal outcomes.

The modified Sims maternal position is an efficient intervention to achieve fetal POP rotation. Moreover, the Sims position has been reported to be associated with a higher vaginal delivery rate and greater safety for newborns (25). Maternal Sims' position during labor is hypothesized to aid in OP to OA rotation (13). Maternal extreme flexure and hip abduction can not only decrease pelvic inclination but also allow the straightening of the sacral procurve, the backward movement of the sacrum, the widening of the sacrococcygeal joint, and the straightening of the birth canal. This can help in increasing pelvic volume and correcting the OP position (24).

Consistent with our results, Mirzakhani et al. (2020) who reviewed 17 RCTs carried out on 4,848 participants found that the most common maternal positions during labor were the upright and lying positions. Their results also revealed that the upright and lying positions of the mother during the first and second stages of labor affected neither the fetal head's OP to OA rotation nor the maternal and neonatal outcomes (28). Our results are also consistent

with Levy et al.'s (2021) systematic review and meta-analysis(19). Moreover, Lee et al. found no significant increase in OP rotation to OA in the maternal hands and knees position compared with the lateral decubitus position (18).

In two studies conducted in Iran in 2014 and 2017 on 300 women, there was a significant increase in the duration of the first and second stages of labor owing to the side-lying position (14-15). In their meta-analysis, Gupta et al. (2017) reported that the upright positions (sitting, birthing stools, chairs, squatting, and kneeling) decreased the incidence of instrumental labor and episiotomy compared to lying down (lateral Sims) position, semi-recumbent, lithotomy position, and Trendelenburg's position. Also, there was an increased risk of second-degree tears in upright positions (27).

If the mother lies for 15 to 30 minutes in the same position as the fetal occiput position, it can help with head rotation. Also, the mother's semi-prone position opposite the fetal occiput for 15 to 30 minutes can help with head rotation. In this position, the pelvis rotates, and under the influence of gravity, the fetal head first rotates from OP to OT (occiput transverse) and then from OT to OA (27). The lateral asymmetric decubitus posture on the same side of the fetal occiput by confronting the fetal occiput with the maternal sacroiliac joint and delaying the tangency of the forehead with the pubis, can help the fetal head to flex and rotate to the OA position (17). maternal Sims' position during labor on the same side of the fetal spine significantly increased OP to OA rotation of the fetal head and enhanced the rate of vaginal delivery (22-23). However, due to the paucity of relevant studies, more studies are recommended to address this topic.

The strength of the present study is to examine the state of the mother by focusing on matching the state of the mother with the left or right direction of the occiput of the fetal head. There are some limitations to this study. First, there were few studies assessing how maternal position during labor affects delivery outcomes. Second, the available papers did not have a high-quality design. Fourth, the control groups in the included studies used different positions during labor. Finally, the included papers did not analyze the outcomes based on the mother's parity, and overall results were reported. Given the small number of studies included, however, high-quality research on this very topic is still required. Future studies addressing maternal posture are recommended to focus on OP rotation, labor promotion, and delivery outcomes.

Conclusion

According to the results of this study, maternal lateral position during labor did not change the posterior position of the fetal head or improve maternal delivery outcomes. The results of the present study can be used more consciously with the aim of positioning the mother during labor in cases of posterior occiput of the fetal head.

Acknowledgements

The authors would like to express their gratitude to the authors of the original studies for their cooperation, data supply, and clarifications.

Conflicts of interest

The authors declared no conflicts of interest.

References

1. Cunningham F, JW W. Williams obstetrics. 22nd edn McGraw-Hill Professional. New York. 2005.
2. Molina Reyes C, Muñoz Martínez A. La malposición fetal occipito-posterior. Revisión bibliográfica. Metas de Enfermería. 2009; 12(7): 22-26.
3. Mikael Gardberg M ,Sälevaara M. Intrapartum sonography and persistent occiput posterior position: a study of 408 deliveries. Obstetrics & Gynecology. 1998; 91(5): 746-749.
4. Ponkey SE, Cohen AP, Heffner LJ, Lieberman E. Persistent fetal occiput posterior position: obstetric outcomes. Obstetrics & Gynecology. 2003; 101(5): 915-920.
5. Cheng YW, Shaffer BL, Caughey AB. The association between persistent occiput posterior position and neonatal outcomes. Obstetrics & Gynecology. 2006; 107(4): 837-844.
6. Cheng YW, Hubbard A, Caughey AB, Tager IB. The association between persistent fetal occiput posterior position and perinatal outcomes: an example of propensity score and covariate distance matching. American Journal of Epidemiology. 2010; 171(6): 656-663.

7. Hofmeyr G, Kulier R. Hands and Knees Posture in Late Pregnancy or Labour for Fetal Malposition (Lateral or Posterior). Birth. 2005; 32(3): 235-236.
8. Lieberman E, Davidson K, Lee-Parritz A, Shearer E. Changes in fetal position during labor and their association with epidural analgesia. Obstetrics & Gynecology. 2005; 105(5 Part 1): 974-982.
9. Fitzpatrick M, McQuillan K, O'Herlihy C. Influence of persistent occiput posterior position on delivery outcome. Obstetrics & Gynecology. 2001; 98(6): 1027-1031.
10. Hart J, Walker A. Clinical rounds: management of occiput posterior position. Journal of midwifery & women's health. 2007; 52(5): 508-513.
11. Gizzo S, Di Gangi S, Noventa M, Bacile V, Zambon A, Nardelli G. Women's choice of positions during labour: return to the past or a modern way to give birth? A cohort study in Italy. Biomed Research International. 2014; 2014: 638093.
12. Le Ray C, Lepleux F, De La Calle A, Guerin J, Sellam N, Dreyfus M, et al. Lateral asymmetric decubitus position for the rotation of occipito-posterior positions: multicenter randomized controlled trial EVADELA. American journal of obstetrics and gynecology. 2016; 215(4): 511. e1-511. e7.
13. Ridley RT. Diagnosis and intervention for occiput posterior malposition. Journal of Obstetric, Gynecologic & Neonatal Nursing. 2007; 36(2): 43-45.
14. Golmakany A, Kordi M, Mehran F, Mazloom S. Effects of left lateral position compared with lithotomy position in the second stage of labour on nulliparous women perineal trauma. Journal of Mazandaran University of Medical Sciences. 2005; 15(49): 57-64.
15. Reyhani m, Mosharaf s, HasanZahrai r. Effect of mother's position in active phase of labour on length of labour. Journal of Shahrekord Uuniversity of Medical Sciences. 2008; 10(2): 72-80.
16. Guittier M, Othenin-Girard V, De Gasquet B, Irion O, Boulvain M. Maternal positioning to correct occiput posterior fetal position during the first stage of labour: a randomised controlled trial. BJOG: An International Journal of Obstetrics & Gynaecology. 2016; 123(13): 2199-2207.
17. Desbriere R, Blanc J, Le Dû R ,Renner J-P, Carcopino X, Loundou A, et al. Is maternal posturing during labor efficient in preventing persistent occiput posterior position? A randomized controlled trial. American journal of obstetrics and gynecology. 2013; 208(1): 60. e1-60. e8.
18. Lee N ,Munro V, Oliver K, Flynn J. Maternal positioning with flexed thighs to correct foetal occipito-posterior position in labour: A systematic review and meta-analysis. Midwifery. 2021; 99: 103008.
19. Levy AT, Weingarten S, Ali A, Quist-Nelson J, Berghella V. Hands-and-knees posturing and fetal occiput anterior position: a systematic review and meta-analysis. American Journal of Obstetrics & Gynecology. 2021; 3(4): 100346.
20. Moher D, Liberati A, Tetzlaff J, Altman DG, Page MJ, Moher D, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, Shamseer L, Tetzlaff JM, Akl EA, Brennan SE, Chou R. PRISMA 2020 explanation and elaboration: updated guidance and exemplars for reporting systematic reviews. BMJ. 2021; 372.
21. Niemczyk N. Maternal positioning to rotate fetuses in occiput posterior position in labor. Journal of midwifery & women's health. 2014; 59(3): 362-363.
22. Wu X, Fan L, Wang Q. Correction of occipito-posterior by maternal postures during the process of labor. Zhonghua fu chan ke za zhi. 2001; 36(8): 468-469.
23. Ou X, Chen X, Su J. Correction of occipito-posterior position by maternal posture during the process of labor. Zhonghua fu chan ke za zhi. 1997; 32(6): 329-332.
24. Liu LP, Chen JH, Yang ZJ, Zhu J. Corrective effects of maternal extreme flexure and hip abduction combined with contralateral side-lying on persistent foetal occipito-posterior position. International Journal of Nursing Practice. 2018; 24(5): e12663.
25. Bueno-Lopez V, Fuentelsaz-Gallego C, Casellas-Caro M, Falgueras-Serrano AM, Crespo-Berros S, Silvano-Cocinero AM, et al. Efficiency of the modified Sims maternal position in the rotation of persistent occiput posterior position during labor: a randomized clinical trial. Birth. 2018; 45(4): 385-392.
26. Mirzakhani K, Karimi FZ, Mohamadzadeh Vatanchi A, Feroz Zaidi F, Mirzaei Najmabadi K. The effect of maternal position on maternal, fetal and neonatal outcomes: A systematic review. Journal of Midwifery and Reproductive Health. 2020; 8(1): 1988-2004.
27. Gupta JK, Sood A, Hofmeyr GJ, Vogel JP. Position in the second stage of labour for women without epidural anaesthesia. Cochrane Database of Systematic Reviews. 2017; 2017(5): CD002006.