Review Article

Perineal Massage for Prevention of Perineal Trauma and Episiotomy During Labor: A Systematic Review and Meta-Analysis

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Abstract

Objective: Vaginal births are associated with a certain degree of trauma to the genital tract, with significant short-term and long-term morbidity. Awareness of morbidity following perineal trauma has led to application of different interventions during the late first stage and second stage of labour to prevent severe perineal trauma. This includes techniques such as perineal massage, warm and cold compresses, and perineal management techniques. Objective of this meta-analysis is to evaluate the effect of perineal massage during the late first stage and second stage of labour on the rate of episiotomy and risk of perineal trauma.

Materials and methods: Electronic databases (PubMed, Scopus, Cochrane Library and Science Direct) were searched from inception until August 2021. We included randomized controlled trials (RCTs) which compares perineal massage during labor (i.e., intervention group) with a control group in women with singleton gestation and cephalic presentation at ≥36 weeks. The primary outcome was severe perineal trauma and the rate of episiotomy. Meta-analysis was performed using the random-effects model of DerSimonian and Laird to produce summary treatment effects in terms of relative risk (RR) with 95% confidence interval (CI).

Results: Ten trials including 4,088 women were analyzed. Women with perineal massage during labor had a significantly lower incidence of severe perineal trauma (RR: 0.52, 95% CI 0.29- 0.94) compared to the control group. The incidence of episiotomy was lower in the perineal massage group (RR: 0.71, 95% CI 0.52-0.98 p < 0.01) but was statistically insignificant (P>0.05).

Conclusion: The finding of meta-analysis showed that perineal massage during labor could be effective in reducing the risk of severe perineal trauma, such as third- and fourth-degree spontaneous lacerations during labor.

Keywords: Perineal Massage; Episiotomy; Labor; Meta-Analysis

Introduction

Perineal trauma is a very common event during childbirth which occurs in 30 – 80% women, and is associated with short term and long-term morbidity (1). The degrees of perineal trauma could be graded as first degree (involving the fourchette, perineal skin and vaginal mucus membrane), second degree (involving the fascia and muscles of the perineal body), third degree (involving the anal sphincter) and fourth degree (involving the rectal mucosa) (2). The trauma could be a laceration or an episiotomy, depending on whether the trauma is spontaneous or induced by intention (3). A high incidence of 60 - 70% of the perineal trauma requires suturing (4). Perineal pain or discomfort is quite common and might also impair normal sexual functioning. Dyspareunia (painful sex) following a vaginal delivery is reported to persist for a period of 3 months in around 60% individuals and for 6 months in 30% individuals, (5), while 15% of women experience dyspareunia even up to 3 years (6). Perineal trauma occurs mostly in nulliparous women, malposition of fetus and while delivering babies with increased head diameter and weight (7, 8). Different techniques such as perineal massage, hands-on, warm compress and Ritgen maneure are being widely used alone, or in combinations, to reduce the risk of perineal trauma and rate of episiotomy (9, 10). Massage to the posterior perineum by the clinician's finger with or without lubricant is known as perineal massage. Perineal massage in late labor was associated with significant reduction in third- and fourth-degree tears (9). Our aim is to investigate the role of perineal massage during late first and second stage of labour and its effects on the incidence of perineal trauma and rate of episiotomy.

Materials and methods

The current systematic review and meta-analysis is reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines (11).

Search Strategy: Electronic databases like PubMed, Scopus, Cochrane Library and Science Direct since inception till August 2021 were searched using a combination of search terms such as perineal trauma, perineal massage, episiotomy, perineal tear and second stage labor. Two authors independently performed title and abstract screening to find the eligible articles as per the inclusion and exclusion criteria and then accessed the full-text of eligible articles. Reference section of the recent systematic reviews was also searched for possible inclusions. Any discrepancies regarding the selection of studies and possible duplications were resolved by mutual discussions which involved the corresponding author as well.

Eligibility criteria

Inclusion criteria

All studies which had met the following (PICO) criteria were included

-Participants (P): Women with singleton gestation and cephalic presentation at 36 weeks.

-Intervention (I): Perineal massage with or without lubrication at the second stage of labor.

-Control (C): A control group with usual care or no intervention

-Outcomes (O): Studies measuring perineal trauma and rate of episiotomy in both intervention and control group.

Exclusion criteria

-Studies which used perineal massage as an intervention before commencement of labor

-Studies conducted in participants with other types of presentation

Data extraction and reliability: Two authors performed data extraction using MS Excel and independently evaluated the published literature using the selection criteria. Data was extracted primarily based on Study information (E.g., First author, year of publication, study period), Study design (E.g., RCT, cross-sectional), Participant characteristics (E.g., age, country), Perineal massage intervention characteristics (E.g., component of perineal massage

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such as directions, lubricant, etc., duration, frequency), Control intervention characteristics (E.g., Control, active control, duration, frequency), Outcome measures (perineal trauma & rate of episiotomy) from each study. The outcome measure of the meta-analysis is perineal trauma and episodes of rates of episiotomy.

Statistical analysis: Meta-analyses were conducted in R software version 4.0.2, using the Metafor packages (12). Relative risk (RR) with 95% CI was used to measure the effect of perineal massage on perineal trauma and episodes of rates of episiotomy. To take account for both within- and between-study variability, DerSimonian and Laird random effect model was used to produce summary treatment effects in terms (RR) and 95 % CI. Cochrane's Q test was used to assess the heterogeneity (I^2 < 25 %: weak heterogeneity; I^2 = 25-50 %: moderate heterogeneity; I^2 > 50 %: large or extreme heterogeneity) across included studies with the level of significance set at 0.1 (10 %) (13). Begg's test and Egger's test was used to assess the potential publication bias.

Results

Literature selection: The literature selection process was done by two independent authors and presented in figure 1. We have identified 155 potential and eligible records from the literature search. After reading the title and abstract, 61 studies were excluded by the two independent authors. 20 studies were retrieved after carefully read the full text and finally 10 studies include for the qualitative analysis.

Literature characteristics: From the ten included studies, data of 4,088 women were extracted, in which 1,705 women were in the experimental group and 2,383, in the control group. Their characteristics are shown in Table 1. Of the ten studies, four were from Iran (14-17) three from Turkey (18-20) and remaining three from USA (21), Australia (22) and India (23). The largest sample size was 1,340 and smallest was 77. Among ten studies, six studies included only nulliparous women (14-18, 23) and remaining four studies included both nulliparous and multiparous women (19-22). The inclusion criteria for maternal age were 18 to 35 years in three studies (16, 18), and 18 to 30 years in one study (14). Likewise, inclusion criteria for maternal age was ≥ 18 years in one study (21), while three studies did not report the maternal age (17, 19, 22). All included studies have gestational age ranging between 36 weeks to 42 weeks.

Methodological quality of included trials: It was noted that the methodological quality of the included trials is inadequate.

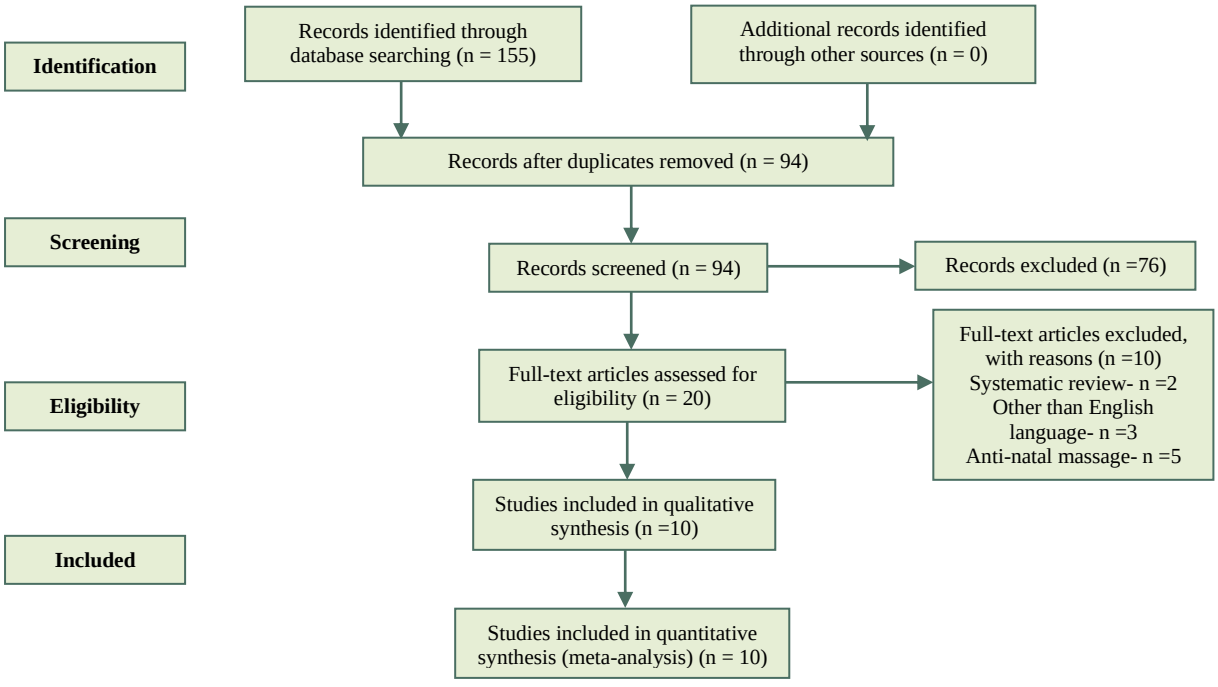

Figure 1: A PRISMA diagram illustrating the search strategy for the review

Table 1: Details of the studies included in the meta analysis

Author (Year)	Study location	When started	No. of participants	Technique (Duration)	Parity included	Maternal age (years) / Gestational age at the time of enrolment (weeks)	Conclusion
Stamp (2001) (22)	Australia	1st and 2nd stage	T=1,340 E=708 C=632	2 fingers inside the vagina with a sweeping motion, gently stretched the perineum.	Nulliparous and multiparous	Not reported / ≥36	No change in rate of episiotomy and perineal trauma.
Albers (2005) (21)	USA	2nd stage	T=807 E=403 C=404	2 fingers from side to side inside patient's vagina, with a downward pressure toward the rectum for 1 s in each direction until crowning	Nulliparous and multiparous	≥18 / ≥37	Rate of episiotomy↓ Perineal trauma ↓
Geranmayeh (2011) (14)	Iran	2nd stage	T=90 E=45 C= 45	Sweeping and rotating perineal massage	Nulliparous only	18 to 30 / 38 to 42	Rate of episiotomy↓ Perineal trauma ↓
Karacam (2012) (18)	Turkey	1st stage & 2nd Stage	T=396 E=198 C=198	The index and the middle finger in the vagina, with lateral movements in aspect of half circle pressing perineum downward toward the rectum for about 1 second, maximum of 10–15 minutes.	Nulliparous only	18 to 35 / 37 to 42	Rate of episiotomy↓ Perineal trauma ↓
Zare 2014 (15)	Iran	2nd stage	T =145 I=45 C=100	5 to 10 minutes	Nulliparous only	32 / 37 to 42	No change in rate of episiotomy and perineal trauma.
Demirel (2015) (19)	Turkey	1st & 2nd stage	T=284 E=142 C=142	Thumbs 2–3 cm into the vagina for the massage. 1st stage: 2 minutes for each vaginal side. 2nd stage: 10 minutes, with a rest of 30 minutes before repeating the massage	Nulliparous and multiparous	Not reported /37 to 42	Rate of episiotomy↓
Raja A (2019) (23)	India	2nd stage	T=150 E=75 C=75	Perineal massage was given with 2% lignocaine gel, gently, using two fingers of the gloved hand (index and middle) inside the vagina and thumb over the perineum in a sweeping motion. Mild downward pressure (toward the rectum) was applied with steady, lateral strokes which lasted one second in each direction.	Nulliparous only	18 to 35 / 38.6±1	Rate of episiotomy↓
Akhlaghi (2019) (16)	Iran	2nd stage	T=99 E=50 C= 49	Inserted fingers into the vagina 2-3 cm and pressed both sides of the vaginal wall for 10-minute massage	Nulliparous only	18 to 35 / 37 to 42	Rate of episiotomy↓ Perineal trauma no change.
Romina (2020) (17)	Iran	2nd stage	T=77 E=39 C= 38	Massage in U shape with gentle pressure toward the rectum in up and down direction for 5–10 min every 30 min.	Nulliparous only	Not reported / 37 to 42	Rate of episiotomy↓ Perineal trauma no change.
Bayraktar (2021) (20)	Turkey	2nd stage	T=700 E=350 C=350	Perineal massage with olive oil during second stage of labor	Nulliparous and multiparous	17 to 40 / 38 to 40	Rate of episiotomy↓ Perineal trauma ↓

Note: T= Total; E=Experimental group; C=Control group

Of the ten trials, three trials (16, 21, 23) stated the methods of sequence generation of computerized randomization, one trail stated random number table (19), and two trial used simple lottery method (18, 20), and one trail used block randomization technique (17) for the selection of participants. Among the ten trials, three trails (16, 21, 22) reported allocation concealment and one trail (16) reported double-blind for the intervention and outcome assessment. Only one trial (17) mentioned single-blind of outcome assessment. Drop out of the participants were mentioned in three studies (16, 17, 21).

Meta-analysis

Perineal trauma: Three studies reported the incidence of perineal trauma (14, 21, 22). Meta-analysis indicated that perineal massage significantly lowers the incidence of perineal trauma (RR: 0.52, 95% CI 0.29- 0.94) compared to control group (Figure 2). Because of the statistical heterogeneity among the included studies were less than 50% (I^2=0%, p =0.37), fixed effects model was used for pooled analysis.

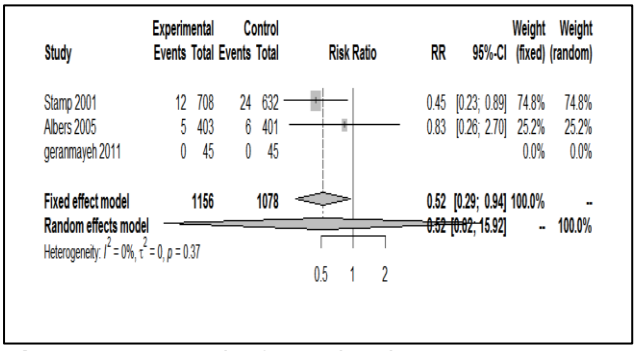

Figure 2: Forest plot for Perineal Trauma

First degree perineal tear: Risk of first-degree perineal tear was reported in eight studies (14-18, 21-23). Meta-analysis findings indicated (Figure 3) lower the risk of first-degree perineal tear (RR: 1.20, 95% CI 0.90-1.59 p=0.13) compared to control group with considerable heterogeneity [I^2 =37%].

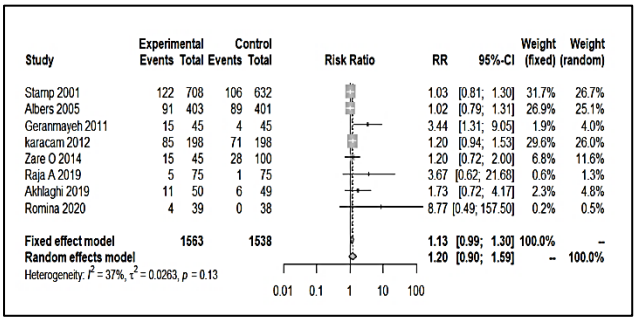

Figure 3: Forest plot for risk of First-degree Perineal tear

Second degree perineal tear: Eight studies reported second-degree perineal tear outcomes (14-18, 22, 23). Result presented as forest plot shown in figure 4, it was significantly lower the risk of second-degree perineal tear (RR: 1.05, 95% CI 0.9-1.22, p= 0.66) compared to control group without heterogeneity (I^2=0%).

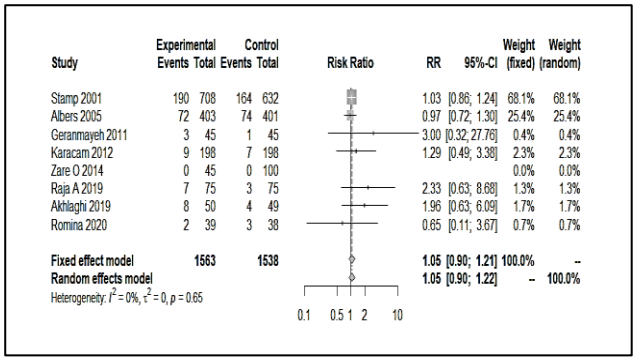

Figure 4: Forest plot for risk of second-degree Perineal tear

Third degree perineal tear: Five studies reported third-degree perineal tear outcomes (14, 15, 21-23). Result presented as forest plot shown in figure 5, it was significantly lower the risk of third-degree perineal tear (RR: 0.61, 95% CI 0.06-6.59, p= 0.66) compared to control group without heterogeneity (I^2=38%).

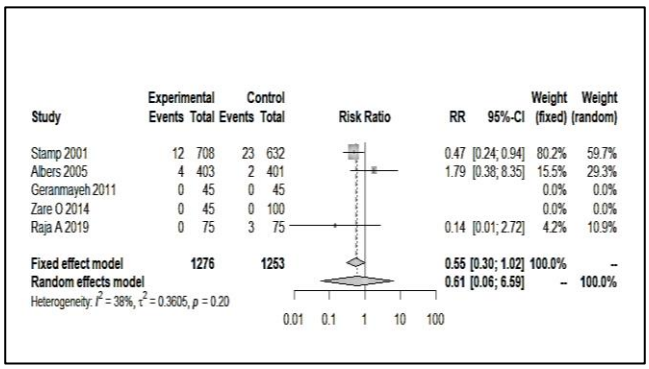

Figure 5: Forest plot for risk of third-degree Perineal tear

Fourth degree perineal tear: Risk of fourth degree perineal tear recorded in five studies (14, 15, 21-23) were combined and analyzed to assess the effect of perineal massage during labor to prevent the risk of fourth degree perineal tear. Result presented as forest plot shown in figure 6, it was significantly reducing the risk of fourth degree perineal tear (RR: 0.32, 95% CI 0.18-0.59 p= 0.95) compared to control group without considerable heterogeneity (I^2=0%).

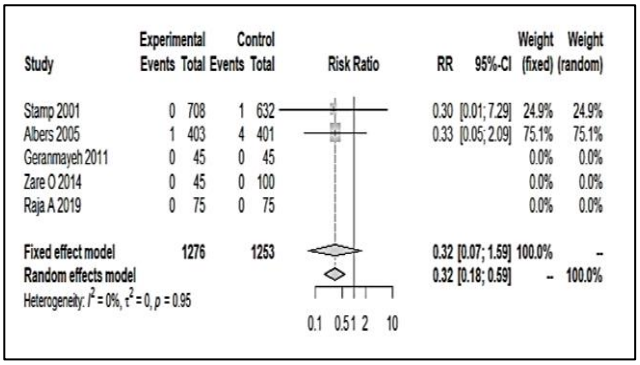

Figure 6: Forest plot for risk of Fourth degree Perineal Tear

Intact perineum: Seven studies mentioned the incidence of intact perineum (14, 15, 18, 19, 21, 22, 23). Result presented as forest plot shown in figure 7, it maintains the intact perineum significantly (RR: 1.02, 95% CI 0.84-1.24, p= 0.15) compared to control group, with considerable heterogeneity [I^2 =36%].

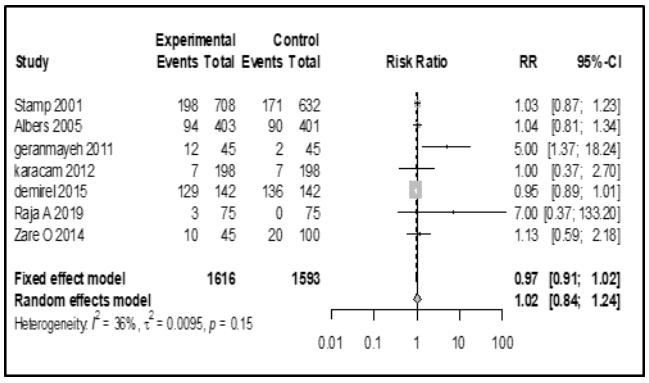

Figure 7: Forest plot for Intact Perineum

Episiotomy: Risk of episiotomy reported in the ten studies (14-23) were combined and analyzed to assess the effect of perineal massage during labor. Findings of the meta-analysis presented as forest plot shown in figure 8, perineal massage reduces the risk of episiotomy (RR: 0.71, 95% CI 0.52-0.98 p < 0.01) compared to control group, with considerable heterogeneity [I^2 =82%, p<0.01] and it was statistically insignificant.

Publication bias and sensitivity analysis: Results of the funnel plot (Figures 9-11) suggest certain degree of publication bias as the symmetry of funnel plots are unsatisfactory. Sensitivity analysis results suggested that there was no essential change in the combined results or estimated heterogeneity after these exclusions, suggesting that the meta-analysis results were reliable.

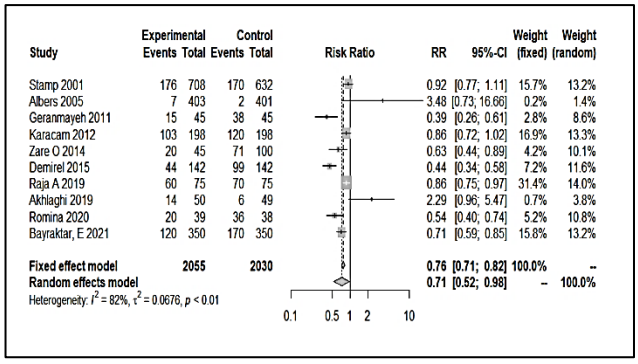

Figure 8: Forest plot for risk of Episiotomy

Discussion

This meta- analysis includes ten randomized controlled trials involving 4088 women with singleton gestation and cephalic presentation at term, showed that perineal massage during late first stage and second stage was associated with less incidence of severe perineal trauma (i.e., 3rd and 4th degree laceration), and maintains the integrity of intact perineum, and lowers the risk of episiotomy.

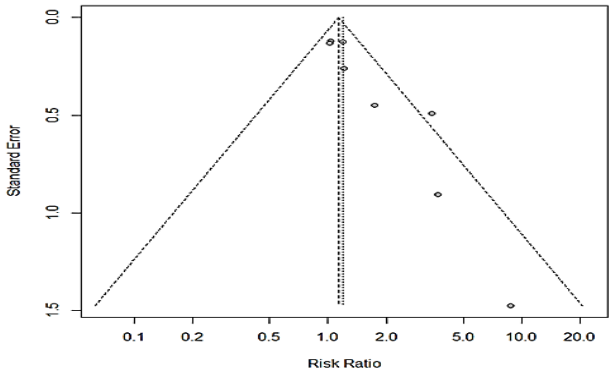

Figure 9: Funnel plot for first degree perineal trauma

Out of the ten included studies, three RCTs started the perineal massage at the first stage of labour (18, 19, 22).

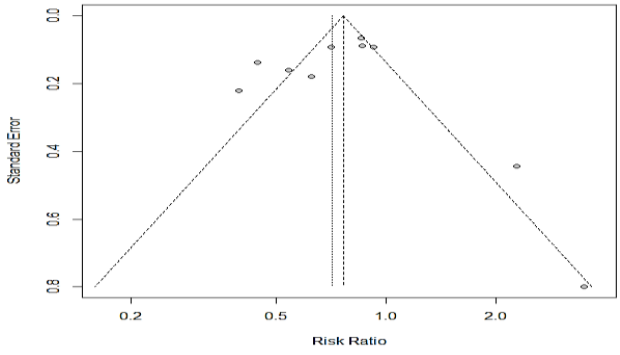

Figure 10: Funnel plot for Episiotomy

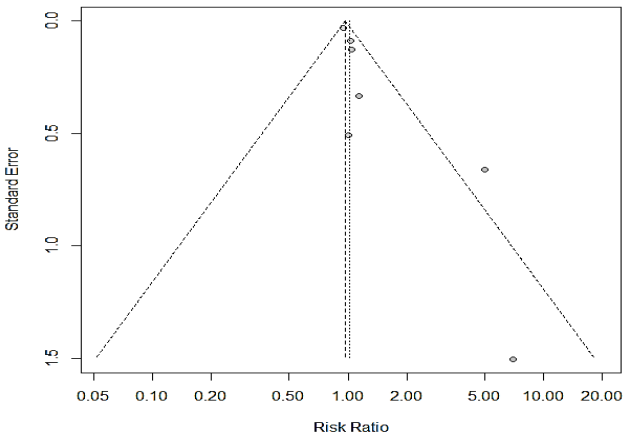

Figure 11: Funnel plot for intact perineum

In most of the studies perineal massage was done using the middle and index fingers of midwifes and mild stretching of the perineum from the inside, with or without the use of water-soluble lubricant.

All the included studies used a wide variety of techniques for execution of perineal massage and few of them were not explained in detail. A previous Cochrane review (24), analyzed many perineal techniques such as flexion technique, Ritgen's maneuver, warm compresses, hands-on or hands-poised including perineal massage. The included RCTs of Cochrane review performed massage only in the second stage of labour that showed a reduction in the incidence of third- and fourth-degree perineal tear. However, the Cochrane review had not reported duration, procedure, usage of lubricants, and frequency of massage. A meta-analysis (9) which assessed perineal massage during labour reported a significant reduction in severe perineal trauma and rate of episiotomy. This meta-analysis that includes the latest randomized controlled trials systematically assessed the efficacy of perineal massage during labour.

In this meta-analysis, RCTs in which perineal massage was performed as the only intervention are included. Our study gives a better understanding about the ideal stage to perform perineal massage, its duration and outcome [table 1]. The limitation of our study is we haven't performed subgroup analysis and heterogenicity being a major drawback.

Conclusion

Findings of the current meta-analysis showed perineal massage during labor to be effective in reducing the risk of severe perineal trauma and rate of episiotomy during labor. And thus, would be beneficial to improve quality of life in women following delivery.

Acknowledgments

Authors have no conflict of interests.

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