Original Article

Integrating Maternity Gymnastics and Effleurage Massage into Midwifery Care: A Complementary Strategy for Maternal Comfort and Efficient Labor

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Abstract

Background: Maternal morbidity and mortality remain significant public health challenges in Indonesia. Complications such as labor pain, sleep disturbances, and fetal malposition continue to affect maternal outcomes. Complementary therapies, including maternity gymnastics and effleurage massage, have emerged as potential strategies to enhance maternal comfort and promote efficient labor.

Objective: This study aimed to evaluate the effects of integrating maternity gymnastics and effleurage massage into midwifery care on improving maternal sleep quality, fetal descent, and labor outcomes.

Methods: A quasi-experimental, one-group pretest-posttest design was employed. Forty-two pregnant women between 32 and 36 weeks gestation were recruited consecutively from a public health center in West Java, Indonesia. Participants engaged in weekly maternity gymnastics sessions and received effleurage massage during the first stage of labor. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI), and labor outcomes were recorded using a validated checklist. Data were analyzed using paired t-tests and descriptive statistics.

Results: There was a significant improvement in sleep quality following the intervention, with the mean PSQI score decreasing from 8.6 ± 2.1 to 5.2 ± 1.8 ($p < 0.001$). The mean duration of the first stage of labor was 4.3 ± 1.1 hours. A high proportion of participants achieved spontaneous vaginal delivery (90.5%), and early fetal head engagement at admission was observed in 83.3% of cases. Labor pain intensity was moderate, with a mean Visual Analog Scale (VAS) score of 5.7 ± 1.4.

Conclusion: Integrating maternity gymnastics and effleurage massage into midwifery care effectively improved maternal sleep quality, facilitated fetal engagement, and promoted shorter labor duration. These findings support the incorporation of complementary therapies into routine antenatal and intrapartum care to enhance maternal comfort and optimize labor outcomes.

Keywords: Complementary therapy, maternity gymnastics, effleurage massage, maternal comfort, labor outcomes

INTRODUCTION

Global public health programs continue to place a significant emphasis on maternal health, especially in low- and middle-income nations where maternal death rates continue to be a cause for concern. In Indonesia, the maternal mortality rate (MMR) was estimated to be 305 per 100,000 live births as recently as 2019, showing that there are ongoing issues in ensuring that pregnant women and women who are giving birth have safe experiences (1). This is despite the fact that there have been significant advances. These common maternal problems, which include labour pain, sleep difficulties, and foetal malposition, have a substantial impact on the well-being of the mother as well as the outcomes of the pregnancy (2,3). As a consequence of this, the use of complementary treatments in conjunction with standard obstetric care has been gaining more and more support in order to improve the level of comfort experienced by the mother, lessen the likelihood of problems, and facilitate more effective labour (4,5).

An effective intervention to reduce physical discomforts such as lower back pain, pelvic girdle pain, and sleep disturbances during pregnancy, maternity gymnastics has attracted attention as an effective intervention to alleviate these physical discomforts (6,7). Maternity gymnastics is a structured exercise program that is developed for pregnant women. Recent research has shown that participating in maternity gymnastics on a daily basis may also help support appropriate foetal posture, which is essential for a more seamless labour process (8,9). Through the promotion of flexibility, the development of core muscles, and the improvement of circulation, maternity gymnastics makes a good contribution to the psychological and physical health of the mother during the third trimester (10).

In a similar vein, effleurage massage, which is characterised by soft strokes that are rhythmic and performed on the back or belly, has been extensively recognised for its analgesic and soothing benefits during labour (11,12). According to research, effleurage massage has the potential to lessen the sensation of labour pain, lower levels of anxiety, and minimise the amount of time that the initial stage of labour lasts (13,14). The non-invasive nature of effleurage massage and its adaptation to varied birthing environments make it a viable practice for midwives wishing to offer holistic care that promotes mother autonomy and comfort (15).

The incorporation of effleurage massage and maternity gymnastics into normal midwifery care is a strategy that is supported by research and is designed to meet the physical and mental requirements of women who are pregnant or in labour. These complementary treatments not only provide physiological advantages, but they also empower women by actively incorporating them in the process of their care, which ultimately results in an improvement in the overall experience of delivery (16,17). The incorporation of such therapies is in accordance with the principles of respectful maternity care, which emphasise the significance of individualised, woman-centered care models that go beyond pharmaceutical and procedural interventions (18).

In light of the growing amount of research that substantiates the advantages of complementary treatments in the field of obstetric care, there is an urgent need to formally include these therapies into clinical practice standards. The purpose of this research is to emphasise the significance of including effleurage massage and maternity gymnastics into midwifery care protocols in order to maximise the level of comfort experienced by the mother, facilitate the natural progression of labour, and make a contribution to favourable outcomes for both the mother and the newborn (19,20). Future study should continue to investigate the long-term advantages associated with the use of these medicines across a wide range of populations and healthcare settings. These benefits include protection for both mothers and infants.

METHODS

Study Design

This study employed a quasi-experimental, one-group pretest-posttest design to evaluate the effects of maternity gymnastics and effleurage massage as complementary therapies integrated into midwifery care. The design was selected to allow observation of changes in maternal outcomes following the interventions without the need for a control group, aligning with previous studies examining non-pharmacological interventions during pregnancy and labor (21).

Sample

Participants

Participants were pregnant women attending antenatal care at a public health center in West Java, Indonesia. Recruitment was conducted between June and October 2024.

Inclusion and Exclusion Criteria

Inclusion criteria were as follows: (a) singleton pregnancy, (b) gestational age between 32 and 36 weeks at enrollment, (c) low-risk pregnancy as assessed by an obstetrician or midwife, and (d) willingness to participate with informed consent. Exclusion criteria included (a) history of obstetric complications (e.g., placenta previa, preeclampsia, gestational diabetes), (b) contraindications for physical exercise during pregnancy, and (c) existing musculoskeletal disorders or neurological impairments that could affect physical activity (22).

Sample Size Calculation and Justification

The sample size was determined using G*Power software version 3.1 (23), with an effect size (d) of 0.5 based on prior studies evaluating exercise interventions in pregnant women (24), a significance level of $\alpha = 0.05$, and a power $(1-\beta)$ of 0.80. The required minimum sample size was calculated to be 34 participants. To account for potential dropout (estimated at 20%), a final sample of 42 participants was targeted.

Sampling Technique

A consecutive sampling method was used, whereby eligible participants who met the inclusion criteria were invited to participate until the required sample size was reached (25).

Instrument

Maternal outcomes were assessed using two primary instruments:

Pittsburgh Sleep Quality Index (PSQI) developed by Buysse et al., the PSQI consists of 19 items assessing sleep quality over the past month (26). Each item is scored from 0 to 3, generating a global score ranging from 0 to 21, with higher scores indicating poorer sleep quality. A global score >5 suggests significant sleep disturbance. The PSQI demonstrated good internal consistency in the original study (Cronbach's $\alpha = 0.83$) (26).

Labor Outcome Checklist: A researcher-developed checklist, validated by three midwifery experts through content validity index (CVI), was used to record labor onset, fetal head descent (measured by station assessment), duration of labor stages, and maternal pain perception (based on a 10-point visual analog scale, VAS).

Procedure

Eligible participants were invited during antenatal visits and provided informed consent. Participants attended weekly maternity gymnastics sessions starting from 32–36 weeks gestation, based on the standardized "Senam Hamil Indonesia" module adapted for low-risk pregnancies (27). Sessions lasted 60 minutes and were conducted by a certified prenatal exercise instructor. Effleurage massage was administered during the first stage of labor by trained midwives following the World Health Organization guidelines for non-pharmacological pain management (28). Pre-intervention data (PSQI score) were collected at enrollment, and post-intervention sleep quality was assessed after 4 weeks. Labor outcomes were documented immediately following delivery.

Data Analysis

Data were analyzed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics (mean, standard deviation, frequencies) were used to characterize the sample. Paired t-tests were conducted to evaluate differences in sleep quality before and after the intervention. Labor outcomes (e.g., labor duration, fetal descent) were described using mean values and compared with reference values from prior observational studies (29). Statistical significance was set at $p < 0.05$.

Ethical Consideration

The study was approved by the Institutional Review Board (IRB) of STIKep PPNI West Java (Approval No. 014/KEPK/STIKEPPPNI/IV/2024). All participants provided written informed consent before participation. Participants were informed about the study's aims, procedures, potential risks, and their right to withdraw at any time without any consequence to their standard care. All data were anonymized to maintain confidentiality in accordance with the Declaration of Helsinki (30).

RESULTS

A total of 42 pregnant women participated in this study, and no participants dropped out during the intervention period. The mean maternal age was 28.4 ± 4.6 years, with the

majority (76.2%) being multiparous. All participants completed the maternity gymnastics sessions and received effleurage massage during labor.

Analysis of the Pittsburgh Sleep Quality Index (PSQI) scores showed a significant improvement following the maternity gymnastics intervention. The mean pre-intervention PSQI global score was 8.6 ± 2.1, indicating poor sleep quality. After four weeks of participation in maternity gymnastics, the mean PSQI score decreased to 5.2 ± 1.8 ($p < 0.001$), suggesting a transition toward better sleep quality.

Table 1. Maternal Sleep Quality and Labor Outcomes (n = 42)

Outcome Variable	Pre-Intervention (Mean ± SD)	Post-Intervention (Mean ± SD)	*p*-value
PSQI Global Score	8.6 ± 2.1	5.2 ± 1.8	<0.00

Effleurage massage administered during the first stage of labor was associated with favorable labor characteristics. The average duration of the first stage of labor was 4.3 ± 1.1 hours. Furthermore, 90.5% of participants achieved spontaneous vaginal delivery without instrumental assistance. Fetal descent was assessed by midwives and showed earlier engagement, with the fetal head at station 0 or lower at admission for 83.3% of participants. Participants also reported lower pain intensity scores during labor, with a mean Visual Analog Scale (VAS) score of 5.7 ± 1.4.

Table 2. Descriptive statistics of studies variabel

Labor Outcome	Mean ± SD or %
Duration of first stage of labor (hours)	4.3 ± 1.1
Spontaneous vaginal delivery (%)	90.5%
Fetal head engagement at admission (%)	83.3%
Labor pain (VAS score)	5.7 ± 1.4

Note: PSQI = Pittsburgh Sleep Quality Index; VAS = Visual Analog Scale.

DISCUSSION

This study demonstrated that integrating maternity gymnastics and effleurage massage into midwifery care has a positive effect on maternal sleep quality, fetal engagement, and labor outcomes. These findings are aligned with existing evidence suggesting that physical activity during pregnancy improves maternal health and promotes optimal fetal positioning (32,33).

The significant improvement in sleep quality among participants after maternity gymnastics intervention is noteworthy. Sleep disturbances are common during the third trimester and are associated with adverse pregnancy outcomes, including prolonged labor and increased cesarean section rates (34). Maternity gymnastics, by promoting relaxation, muscular flexibility, and circulatory health, likely contributed to the reduction of sleep disturbances observed in this study (35).

Effleurage massage applied during the first stage of labor was associated with shorter labor durations and moderate pain intensity scores. This supports findings from previous randomized controlled trials indicating that massage therapy can enhance uterine contractility, reduce anxiety, and lower pain perception (36,37). The relaxation response elicited by effleurage massage may facilitate better oxytocin release and thus promote more effective labor progression (38). Moreover, the majority of participants experienced spontaneous vaginal deliveries with minimal obstetric intervention, further underscoring the potential of these complementary strategies to contribute to safer childbirth experiences. Importantly, these results reflect the growing acknowledgment of non-pharmacological

interventions as integral components of respectful maternity care practices (39-41).

Implication

The integration of maternity gymnastics and effleurage massage into midwifery care demonstrates practical implications for improving maternal health outcomes. These complementary therapies are cost-effective, non-invasive, and easily implementable in primary healthcare settings. Midwives can adopt maternity gymnastics during antenatal classes and apply effleurage massage during labor to enhance maternal comfort, promote efficient labor, and support positive childbirth experiences. Widespread application of these practices may contribute to reducing maternal morbidity and improving maternal satisfaction with maternity services, particularly in resource-limited settings.

Limitation

This study has several limitations. The use of a quasi-experimental design without a control group limits the ability to draw definitive causal inferences regarding the effectiveness of the interventions. The sample was relatively small and recruited from a single healthcare facility, potentially limiting generalizability to broader populations. Self-reported measures, such as sleep quality and pain perception, may be subject to response bias. Future research should employ randomized controlled trials with larger, multicenter samples to validate and expand upon these findings.

CONCLUSION

Integrating maternity gymnastics and effleurage massage into midwifery care was associated with significant improvements in maternal sleep quality, fetal descent, and shortened labor duration. These complementary strategies represent effective, low-risk interventions to enhance maternal comfort and optimize labor outcomes. Midwifery care models should consider incorporating maternity exercise and massage techniques as routine supportive practices during pregnancy and childbirth to foster a positive maternal health trajectory.

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Author Contribution

SM : Conceptualization and Study Design, Writing – Original Draft, Writing – Review & Editing
SS : Methodology, Formal Analysis, Writing – Review & Editing
BK : Data Curation, Writing – Review & Editing

Conflict of Interest

The authors declare that they have no conflicts of interest in relation to this study.

Data Availability

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

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