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Effect of Heat and Cold Therapy on Labor Pain Intensity and Birth Outcomes among Primiparous Women: A Protocol for a Systematic Review and Meta-Analysis

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Abstract

The experience of labor, characterized by its unpredictable nature, is considered one of the most agonizing ordeals for women. It is estimated that approximately forty percent of women regard the pain of labor as the most excruciating aspect of the childbirth process. Applying heat and cold on the lumbosacral region can provide certain pain relief benefits. ***Aim:*** *The main goal of the review is to evaluate how effective heat and cold therapy is in reducing labor pain and influencing the outcomes of childbirth* ***Materials and Method****: A systematic review will be conducted on randomized control trials and non-randomized control trials. In this review, Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) will be followed (Prospero Registration No-CRD42023440608) and a literature search will be conducted in PubMed-Medline, CINHAL Science Direct, databases. The literature search for this systematic review will be done on studies published between 2011 and 2023. The quality of the study will be assessed by the JBI clinical appraisal checklist for RCTs and Non-RCTs. Studies will be included based on predetermined inclusive criteria like studies published in the English language, with keywords like Primiparous woman OR Primiparous women AND Heat therapy AND Cold therapy AND Pain intensity AND Birth Outcomes* ***Results:*** *A descriptive synthesis of the findings of the selected studies will be carried out which will be presented in a narrative summary with statistical findings incorporated.* ***Conclusion:*** *This review will provide up-to-date evidence to support or oppose the hypothesis that how effective heat and cold therapy is in reducing labor pain and influencing the outcomes of childbirth*

Keywords: *Heat Cold Therapy Labor Pain.*

INTRODUCTION

Childbirth is an intricate biological occurrence that encompasses numerous mechanisms comparable to those activated during stress reactions. It is a profound experience characterized by intense physical strain and holds great emotional, social, and cultural importance. (1) During the process of childbirth, there are two types of pain: visceral pain and somatic pain. Visceral pain is felt during the early stages of labor, including the first and second stages. On the other hand, somatic pain is experienced during the later stages of the first and second stages. (2) A research study indicated

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that labor pain varied in intensity from gentle to intense and was experienced across the entire body, especially in the lower abdomen, vagina, and waist region. The women expressed their distress during childbirth by shedding tears, screaming, and raising their voices to communicate their discomfort. (3) Effective management of pain during childbirth is a vital aspect of the labor process in high-income countries (HICs). In these countries, there exist multiple methods, both pharmacological and non-pharmacological, to alleviate pain. These methods encompass oral tablets, inhalation analgesia, intravenous and intramuscular opioids such as pethidine or diamorphine, different types of local anesthesia (such as a Para cervical or pudendal block), regional anesthesia (like epidural or spinal anesthetic), as well as breathing exercises. (4). The application of cold to the sacral area of pregnant women during the initial phase of labor has been shown to reduce labor pain and decrease the duration of labor. This was evidenced by the experimental group, whose pain scores were significantly lower at the 40th ($p=0.041$), 100th ($p<0.001$), and 160th ($p=0.014$) minutes of labor.(5)

A randomized controlled experimental trial was conducted in Turkey among pregnant women, during labor process to assess labor pain, using visual analog scale. The results revealed hot-pack applications had a beneficial effect on the duration of the active and transition stages of labor. Additionally, these interventions led to a reduction in pain during the active and transition phases. The control group exhibited higher mean scores compared to hot-pack application groups (p 0.001). (6) The level of pain was evaluated in comparison to the control group receiving cold therapy. The cold therapy group exhibited lower pain intensity throughout the active phase and the second stage of labor. (7)

Rationale

Various research studies indicate that heat and cold therapy on lumbosacral region can provide certain pain relief benefits during labor. However, the specific effects of heat and cold therapy on primiparous mothers are still uncertain. Consequently, the purpose of this review is to assess the efficacy of heat and cold therapy compared to a control group. This analysis aims to determine the effectiveness of this therapy and assist in its implementation to support women in labor.

Objective:

The main goal of the review is to evaluate how effective heat and cold therapy is in reducing labor pain and influencing the outcomes of childbirth.

METHODS

This review will follow to PRISMA Guidelines (8) and the Prospero Registration No-CRD42023440608

Eligibility Criteria:

This literature search for the systematic review will only include studies in the English language that were published between 2011 and 2023. The initial search will be conducted in PubMed-Medline, Science direct database with keywords like Primiparous woman OR Primiparous women AND Heat therapy AND Cold therapy AND Pain intensity AND Birth outcomes

P =Population =primiparous women

I =Intervention= Heat and Cold Therapy

C =Comparison= control group

O =Outcomes = pain intensity and birth outcomes

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The studies for this review will be chosen based on the following inclusion criteria.

a) Full-text Articles published in peer-reviewed journals only

b) Studies available in electronic databases.

c) Study design: Randomized control trials, and non-RCT studies will be included in this review.

d) Intervention: Studies consisting of lumbosacral heat and cold application as the main variable will be included in the study.

e) Population: Primiparous aged 18 and above with low-risk pregnancy

f) Settings: conducted in Hospitals or clinical settings

g) Outcomes: Studies will be included if they describe either labor pain intensity or birth outcomes such as fetal heart rate Apgar score at 1 and 5 minutes

h) Language: English-only articles

i) Studies using terms like the application of heat therapy, warm compression, cold therapy, or ice pack application can be included.

Exclusion Criteria

Conference abstract, databases contain only abstract books and grey literature will be excluded.

Information Sources:

Preliminary search will be done in Science Direct and PubMed databases with keywords based on PICO and abstracts and titles will be checked for additional keywords. A detailed search will be undertaken in databases such as PubMed-Medline, databases, Science Direct, and the Cochrane library, using an effective search technique. In addition to this Citation pearl searching will, be done for relevant studies.

Search strategy:

PubMed

Like Primiparous woman OR Primiparous women AND Heat therapy AND Cold therapy AND Pain intensity AND Birth outcomes (Filters: Research articles, 2011-2023)

Science Direct database:

Primiparous woman OR Primiparous women AND Heat therapy AND Cold therapy AND Pain intensity AND Birth outcomes (Filters: Research articles, 2011-2023).

Study records

Data Management Search articles planned to uploaded in Mendeley software (Reference Manager) and duplications. Articles details maintained in the Reference Manager throughout this review.

Selection Process

As regards the relevance of the review topic, two authors independently will take a look at the initial abstract and titles of the articles in the screening process. In accordance with the eligibility criteria, screening shall be carried out after such full text assessment. Two authors will screen separately, and any disputes planned to handle through conversation with the third author.

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Data collection Process:

Each selected article will be assessed for quality based on a clinical appraisal checklist created by JBI (Joanna Briggs Institute Manual). (9) Two independent reviewers will conduct the quality appraisal, and the third reviewer will seek out any disagreements. Two authors will screen separately, and any disputes planned to handle through conversation with the third author.

Data items This evaluation cover studies with variables like educational interventions or packages which includes information about types of substance use disorder (Opioids, cannabis, alcohol, cocaine, sedative hypnotics, and other stimulants like tobacco, hallucinogens, and volatile solvents)) its management and prevention on knowledge & practices as the main variables and college students/under graduate students as population.

Outcomes and Prioritization:

In this study we are going to assess the effectiveness of educational interventions on Knowledge and Practices regarding substance use disorder its management and prevention among undergraduate students, so knowledge and practices are main outcomes in this review, to get support for the utilization of these interventions to the future studies.

Risk of bias in individual studies

Each of the studies included in this review will be evaluated using the Cochrane Risk Bias Assessment Tool for RCTs. (10)

Data synthesis

Study findings will be collected based on the objectives. A descriptive synthesis will be performed and given in the form of a narrative summary in tabular form. The summaries will include both narratives and statistical results from research. The meta-analysis will be done for knowledge variable using SMD (Standardized mean difference) and heterogeneity will be assessed by I^2 statistics.

Meta-bias: Publication bias will be assessed for the included research.

Confidence in cumulative evidence: The GRADEpro Approach is going to be used to evaluate the evidence's reliability. (11)

CONCLUSION

This review will help the healthcare team to understand the importance of implementing lumbosacral heat and cold therapy during first stage of labor to minimize their sufferings associated intense labor pain and to identify the gaps in the existing literature and suggests the areas for carrying further researches.

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