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Research

The Effect of Warm Compress on the Intensity of Back Pain in Pregnant Women in the Third Trimester: Scoping Review

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A B S T R A C T

Background: Pregnancy is a natural process. During pregnancy, a mother experiences discomfort, one of which is back pain, there are several treatments to treat back pain, namely pharmacological and non-pharmacological therapies. One of the nonpharmacological therapies that can be done is with warm compresses because it is safer, cheaper, effective, cheap and without adverse effects.
Purpose: This article aims to identify literature related to the effect of warm compresses on the intensity of back pain in pregnant women in the third trimester.
Methods: The method used is scoping review which consists of 5 phases, namely identifying scoping review questions using the PICO framework; identifying relevant articles; searching for articles using relevant databases, namely PubMed, Wiley, and Google Scholar; creating PRISMA flowcharts; conducting critical appraisals to assess the quality of articles; charting data; compiling, summarizing and reporting results.
Results: The results of the review of 15 selected articles obtained 8 articles with grade A, 7 articles grade B, 11 articles using quasi experiment, and 4 articles pre experiment. Two themes that emerged based on the results of the Scoping Review are the concept of back pain, and the concept of warm compresses.
Conclusion: Warm compresses are effective in reducing back pain in pregnant women in the third trimester, so they can be recommended as complementary therapy to reduce the intensity of back pain.

INTRODUCTION

Pregnancy is a natural and normal process. During pregnancy a mother experiences changes that occur both physically and psychologically [1]. Such changes cause the expectant mother to experience discomfort. The discomfort felt by pregnant women usually varies in each trimester of pregnancy. Most women also experience minor discomfort during pregnancy to some degree during normal pregnancy, such as nausea, heartburn, joint pain, back pain, dyspnea, nasal congestion, varicose veins, leg cramps [2].

A person's body undergoes physical changes and body systems during pregnancy. Such changes can occur one of them in the third trimester of pregnancy. Changes in the musculoskeletal system are also experienced in the third trimester of pregnancy, namely the shortening of the abdominal muscles as the uterus grows. In line with this, the center of gravity of the body is also increasingly shifted leaning forward so that there is an imbalance of muscles around the pelvis and lower back. Ligament tension and lordosis conditions in this lumbar cause pain in the mother's lower back [3].

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Back pain is pain that occurs in the lumbosacral area (spine). Back pain will usually increase in intensity with increasing gestational age because this pain is the result of a shift in the center of gravity and changes in posture. These changes are caused by an enlarged uterus and increased body weight, causing the muscles to work harder, excessive bending, walking without rest, and lifting weights. Symptoms of back pain are also caused by the hormones estrogen and progesterone, which relax the joints, ligaments and muscles of the hips. In addition to substances that can stimulate pain sensitivity. The body also has substances that can inhibit (inhibitor) pain, namely endorphins and enkephalins that can relieve pain [4].

Back pain that is not immediately resolved, can lead to long-term back pain, increasing the tendency of post-partum back pain and chronic back pain that will be more difficult to treat or cure, namely when the pain spreads to the pelvic area causing difficulty walking so that it requires crutches or other walkers. Low back pain can have a negative impact on the quality of life of pregnant women due to disruption of daily physical activities, for example, it will be difficult to carry out activities such as standing after sitting, moving from bed, sitting too long, standing too long, undressing and removing clothes, and lifting and moving objects around [5].

Most pregnant women consider back pain as part of the pregnancy process, causing them not to take special actions to overcome it. Though this condition can cause disability and decreased quality of life, and the risk of causing various adverse effects for the mother after pregnancy, and can be repeated in subsequent pregnancies. So the management of this back pain should be considered. Because it can bring improvement, and reduction of complications caused by pregnancy and increase comfort during pregnancy [6].

Management of back pain during pregnancy varies as pharmacological and non-pharmacological management. Pharmacological pain control is more effective than non-pharmacological methods, but pharmacological methods are more expensive and have the potential to cause side effects. Pharmacological methods also affect pregnancy for the mother, fetus, and the process of childbirth. Non-pharmacological therapy that can reduce or relieve pain, reduce or prevent muscle spasms, and provide comfort with massage, acupressure, warm or cold compresses [7]. Non-pharmacological methods are cheaper, simple, effective and without adverse effects. Pain management can be done in various ways such as yoga [8], effleurage and lavender massage, warm compresses and pelvic rocking [9].

One of the non-pharmacological ways that can reduce or eliminate pain, reduce or prevent muscle spasms, provide a sense of comfort is with warm compresses [10]. Warm compresses on pregnant women with back pain can use warm temperatures locally which can provide physiological effects, including softening fibrous tissue, relaxing body muscles, relieving pain, and improving blood flow in pregnant women and stimulating blood vessels, reducing muscle spasm and increasing pain threshold, and providing peace and comfort [11].

A warm compress is to give a feeling of warmth to a certain area by using a bag filled with warm water, using a towel dipped in warm water and then squeezed or with a bottle filled with warm water to cause a feeling of warmth on the part of the body that needs to be heat treated. Warm compress therapy will channel signals to the hypothalamus through the spinal cord which causes peripheral blood vessels to dilate. The presence of vasodilation can get rid of inflammatory products, such as bradykinin, histamine, and prostaglandins [12].

The prevalence of low back pain or low back pain has not been recorded with certainty, but various studies both internationally and nationally state that low back pain often occurs in the third trimester of pregnancy. The incidence of low back pain in pregnant women worldwide is estimated at 50-60% of pregnant women experience new back pain during pregnancy and in non-pregnant women aged 35, the rate is only 15% [13]. The prevalence of pregnant women in Indonesia has been found in several studies, such as Fatmawati et al., (2017) which states that the prevalence of low back pain in Indonesia is 18%. The prevalence of low back pain increases with age and is most common in the middle and early four decades [14]. The purpose of this scoping review is to identify literature related to the effect of warm compresses on the intensity of back pain in pregnant women in the third trimester.

METHOD

The method to be used is scoping review, where scoping review is a systematic review that can be used in interpreting the results with existing evidence-based to map the underlying concepts of the area in research, sources of evidence, and types of evidence available. The purpose of scoping review is to map the literature, explore information related to research activities on the topic under study and also investigate the existence of a problem or gap that exists in the research area to be studied. The steps taken in this scoping review are as follows:

Step 1. Identify Scoping Review Questions

To identify scoping review questions using a special framework used is the framework Population, Intervention, comparison, Outcomes (PICO).

Table 1. *Framework* PICO

Population	*Intervention*	*Comparison*	*Outcomes*
Pregnant Women	Warm Compress	-	Back Pain

Based on the PICO framework above, the scoping review question chosen is how does a warm compress affect the intensity of back pain in pregnant women in the third trimester?

Step 2. Identifying Relevant Articles

To identify the relevant articles in this scoping review, the first step is to determine the inclusion and exclusion criteria from the framework that has been created, while the inclusion and exclusion criteria in this scoping review are as follows:

Table 2. Inclusion and Exclusion Criteria

No.	Inclusion Criteria	Exclusion Criteria
1	Articles published in 2014-2024	Review article (systematic review. literature review, etc)
2	Original article	Opinion papers article
3	Articles published in Indonesian and English	Abstract with English but full text with other languages like Spanish, Chinese and more
4	Full text article	Letters and book reviews
5	Article that discusses the effectiveness of giving warm compresses to reduce the intensity of back pain in pregnant women	Publication script
6	Health or obstetrics articles	

Step 3. Literature Searching

Article search is done using 3 databases, namely PubMed, Wiley Online Library, and Google Scholar by using keywords that have been identified by researchers related to scoping topics in the search process.

Table 3. Keywords

Element	Keyword
Pregnat Women	Pregnant OR pregnant women OR pregnancy
Warm Compress	Warm compress
Back Pain	Back pain

The keywords used to search for papers in pubmed are ((((Pregnant) OR (pregnant women)) OR (pregnancy)) AND (compress)) AND (back pain), for wiley the keywords used are ((((Pregnant) or (pregnant women)) OR (pregnancy)) AND (warm compress)) AND (back pain), while in google scholar the keywords used are "ibu hamil trimester III", "nyeri punggung", "kompres hangat".

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Step 4. Article Selection

Selection of articles through 3 databases obtained 662 articles from all searches, consisting of PubMed 12 articles, Wiley Online Library 28 articles, and Google Scholar 622 articles. Of these 622 articles were subsequently imported into mendeley's bibliography machine. The findings of the number of articles and the screening process will be discussed in the PRISMA flowchart as follows:

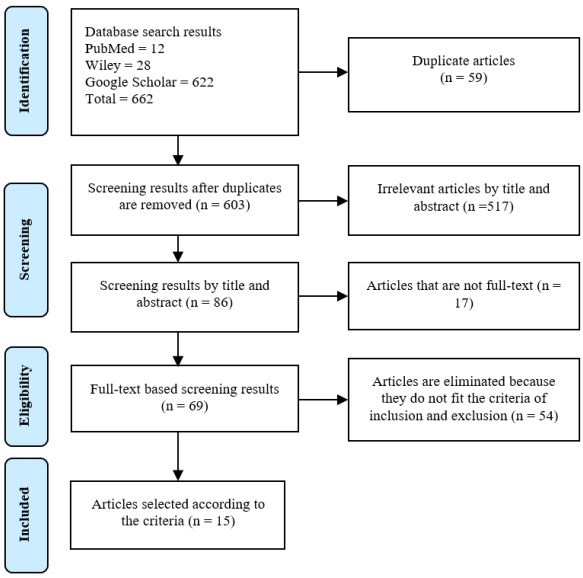

Figure 1. PRISMA Flowchart

The tool used to assess the quality of articles is the Joana Brigs checklist from the Joana Brigs Institute (JBI) Critical Appraisal Tools. In assessing the quality of the article, the author uses grade A, B, C to distinguish the category of good articles (a), enough (B), less (C). Data from 15 articles were data charting to include key criteria such as research location, research population, research objectives, methodology, and significant findings or recommendations. The author independently records the information and then compares the data of the articles found.

Table 4. Data Charting

No.	Title / Author / Year	Country	Purpose	Methods	Participants / Samples	Results
A1	Pengaruh Kompres Hangat Terhadap Intensitas Nyeri Punggung pada Ibu Hamil Trimester III di PMB di Kota Jakarta Selatan Tahun 2022/ Putri *et al*/ 2023	Indonesia	To know the effect of warm compresses on reducing the intensity of back pain in pregnant women in trimester III at PMB in South Jakarta City in 2022.	Quasi experiment with a nonequivalent one group only approach	Third trimester pregnant women totaled 30 respondents.	There was a decrease in back pain before and after giving a warm compress with a difference of 2.97 and obtained significant results of 0.000 smaller than the significant level of 5% (p-value = 0.000 < 0.05), then the conclusion there is the effect of warm compresses on back pain in pregnant women trimester III.
A2	*The Effect of Warm Compress on Back Pain In The Third Trimester Pregnant Women In Our Clinic With Sand Spiritual Pangaraan*/ Ernamari *et al*/ 2022	Indonesia	To find out the effectiveness of warm compresses on pregnant women in the third trimester who experience low back pain at our clinic with Pasir Pangaraian Rohul in 2021.	Quasy Experimental with a one group pretest posttest design	There were 20 respondents in the third trimester of pregnancy	The statistical test results obtained a p value of 0.000 so it can be concluded that there is a significant difference between the intensity of pain before and after being given a warm compress.
A3	*The Effect of Warm Compress on Low Back Pain during Pregnancy*/ Novelia *et al*/ 2021	Indonesia	To observe the intensity of low back pain before and after giving warm compresses to pregnant women in the third trimester in the working area of the Kilasah Health	Quasy experiment with control group design.	Pregnant women in the third trimester amounted to 32 respondents (16	The results of this study showed that there were differences in the level of low back pain between the intervention group and the control group (p value = 0.000).

			Center in Serang City in 2019.		intervention groups and 16 control groups).	
A4	Perbedaan Efektivitas Endorphin Massage dengan Kompres Hangat Terhadap Penurunan Nyeri Punggung Ibu Hamil Trimester III di Puskesmas Wilayah Kerja Sekota Mataram/ Saudia & Sari/ 2018	Indonesia	To determine the effect of endorphin massage with warm compresses to reduce back pain in pregnant women in the third trimester.	Quasi experiment with a two group pre test post test design approach model	There were 30 pregnant women in the third trimester who were diagnosed with back pain.	The results showed that the average value before and after the Endorphin Massage is 1.933 while the average value before and after a warm compress is 0.733.
A5	Perbandingan Antara Kompres Hangat dan Akupressure untuk Menurunkan Nyeri Punggung Bawah Ibu Hamil Trimester III/ Pratama *et al*/ 2020	Indonesia	To analyze the effect of warm compresses and acupressure on low back pain in pregnant women of the third trimester.	Pre-experimental research method with pre-test post-test group design.	Pregnant women in the third trimester amounted to 30 respondents (15 respondents on warm compress intervention and 15 respondents on acupressure intervention).	There was a significant difference for low back pain between warm compress and acupressure intervention (p=0.001). With a warm compress is more significant in reducing lower back pain because it has a mean value of 2.2 which is greater than the mean value of akupressure which is 1.6.
A6	Pengaruh Kompres Hangat terhadap Nyeri Punggung Ibu Hamil Trimester III di Puskesmas Sekernan Ilir Tahun 2020/ Suryanti *et al*/ 2021	Indonesia	To find out the effect of warm compresses on back pain in pregnant women in the third trimester at the Sekernan Ilir Health Center in 2020.	Quantitative research with a quasi-experimental design with a one group pretest-posttest approach	Pregnant women totaled 30 respondents	There is an effect of warm compresses on the level of back pain in pregnant women in the third trimester and obtained p-value = 0.000 (p< 0.05).
A7	Efektifitas Kompres Hangat dan Pelvic Rocking Terhadap Intensitas Nyeri Punggung Bawah Ibu Hamil/ Jamaan *et al*/ 2024	Indonesia	To determine the effectiveness of warm compresses and pelvic rocking on the intensity scale of low back pain in pregnant women third trimester.	The quasy experimental method with a quasy experimental design	Pregnant women in the third trimester amounted to 36 respondents	There is an effect of giving warm compresses and pelvic rocking on the intensity of lower back pain scale in pregnant women in the third trimester. However, statistically the decrease in pain intensity was greater in the group given warm compresses than in the pelvic rocking group.
A8	Kompres Hangat dan Aromaterapi Lavender Dapat Mengurangi Nyeri Punggung pada Ibu Hamil Trimester III/ Wulandari *et al*/ 2021	Indonesia	To determine the effect of giving warm compress therapy and lavender aromatherapy on reducing back pain in pregnant women in the third trimester of Bangetayu Semarang Health Center.	Pre-experiment with research design using one group pre-post test design using a double pretest.	Pregnant women in the third trimester with a gestational age of 28-40 weeks, there were 18 respondents.	There is an effect of giving warm compresses and lavender aromatherapy on back pain in pregnant women in the third trimester in the Bangetayu Semarang Health Center (p-value=0.001).
A9	Pengaruh Endorphin Massage dan Kompres Hangat Terhadap Penurunan Intensitas Nyeri Punggung pada Ibu Hamil Trimester III/ Suwandi *et al*/ 2023	Indonesia	To determine the effect of endorphin massage and warm compresses to decrease the intensity of back pain in pregnant women trimester III and know the difference in the decrease in intensity of back pain in pregnant women trimester III before and after endorphin massage and warm compresses.	Quasi Eksperiment (Pretest-Postest Control Group Design)	Pregnant women in the third trimester amounted to 30 respondents.	There is an effect of endorphin massage and warm compresses on reducing the intensity of back pain in pregnant women in the third trimester with a p value of 0.001<0.05.
A10	Providing Warm Compresses for Back Pain In 3rd Trimester Pregnant Women/ Nurfaizah *et al*/ 2023	Indonesia	To find out the effect of warm compresses on low back pain in pregnant women in the third trimester at the Healthy Mother Clinic Cijantung Jakarta.	Quasi-experimental with a pre and post-test design approach with a control group	Pregnant women in the third trimester amounted to 40 respondents (20 case groups and 20 control groups).	There is an effect of warm compresses on low back pain in pregnant women in the third trimester with a p value of 0.000. So that warm compresses have an effect on reducing lower back pain in pregnant women in the third trimester at the Healthy Mother Clinic Cijantung Jakarta.
A11	Efektivitas Kompres Hangat terhadap Intensitas Nyeri	Indonesia	To find out the effectiveness of warm	Quasi-Experiment with a Non-	Pregnant women in the	The results of statistical analysis showed that p value =

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	Punggung pada Ibu Hamil Trimester III/ Amalia *et al*/ 2020		compresses against back pain in pregnant women in the third trimester at the Pekanbaru Health Center.	Equivalent Control Group research design	third trimester amounted to 30 respondents.	0.001 < ③ (0.05), so it is known that warm compresses effectively reduce the intensity of back pain in pregnant women in the third trimester.
A12	Efektifitas Massage Effleurage dan Kompres Hangat Terhadap Penurunan Nyeri Punggung pada Ibu Hamil Trimester III di UPT Puskesmas Buay Pemaca/ Suparmi & Yuliasati/ 2023	Indonesia	To find out the effectiveness of effleurage massage and warm compresses against back pain in pregnant women in the third trimester at UPT Puskesmas Buay Pemaca.	Quasy experimental design with a one group pre test-post test design	Pregnant women in the third trimester amounted to 32 respondents.	Wilcoxon test results that there is an effect with p value (0.000 <0.05). It is concluded that the effect of effleurage massage and warm compresses on back pain in pregnant women third trimester.
A13	Pengaruh Terapi Kompres Hangat Terhadap Penurunan Nyeri Punggung Bawah pada Ibu Hamil/ Setiyarini & Rahmawati/ 2023	Indonesia	To determine the effect of warm compress therapy on reducing low back pain in pregnant women in midwives Sri Wahyuni Blitar.	Pre experimental. Using a one group pre test-post test design research design.	Pregnant women were 10 respondents.	There is an effect of warm compress therapy to reduce low back pain in pregnant women with a value of ρ value = 0.004.
A14	Pengaruh Kompres Air Hangat Terhadap Nyeri Tulang Belakang pada Ibu Hamil Trimester III/ Natalia *et al*/ 2023	Indoneisa	To determine the effect of warm water compresses on spinal pain in pregnant women in the third trimester.	Quasy experiment with one group pretest-posttest design.	15 pregnant women	The average spinal pain in pregnant women trimester before warm water compresses III is 4.93 and after warm water compresses is 3.59. There is an effect of giving warm water compresses on spinal pain in pregnant women in the third trimester.
A15	Pengaruh Kompres Hangat Terhadap Tingkat Nyeri Punggung Bawah pada Ibu Hamil Trimester III/ Karyawati *et al*/ 2022	Indonesia	To determine the effect of warm compresses on the level of low back pain in pregnant women trimester III.	Pre experiment with research design using one group pre test-post test	Third trimester pregnant women totaling 40 people	There is an effect of warm compresses on the level of low back pain in pregnant women in the third trimester with the results of analysis using the wilcoxon test obtained p value = 0.000 < 0.05.

RESULT DAN DISCUSSION

Based on the data extraction that has been done on the selected article by categorizing the title, author, year, country, research objectives, methods, number of samples, and research results, the following mapping is obtained:

Year of Issue

Based on the results of the critical appraisal carried out using the Joana Brigs Institute (JBI) Critical Appraisal Tools, the characteristics of articles based on the year of publication show that 1 article was published in 2018, 2 articles in 2020, 3 articles in 2021, 2 articles in 2022, 6 articles in 2023, 1 article in 2024. Further grouped by year of publication of the article, the results are as follows:

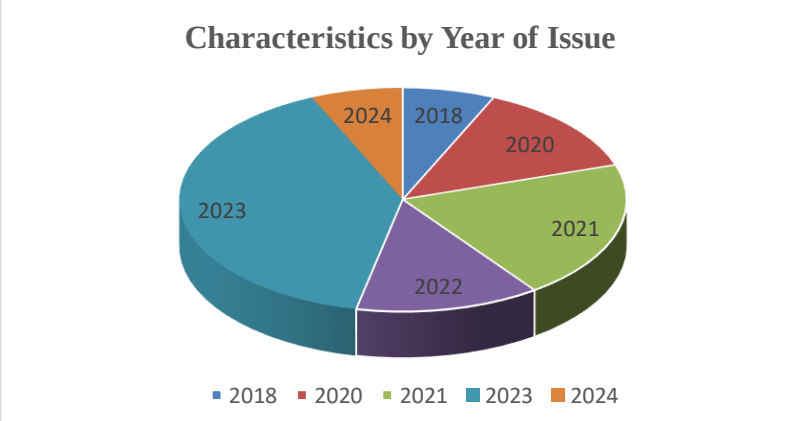

Figure 2. Diagram of the Characteristics of the Article by Year of Publication

Grade

Based on the results of critical appraisal conducted using Joana Brigs Institute (JBI) Critical Appraisal Tools obtained characteristics of articles based on grade critical appraisal shows that of the 15 articles that have been assessed, there are 8 articles

with good quality (grade A), and 7 articles with enough (grade B). Further grouped by grade selected articles, the results are as follows:

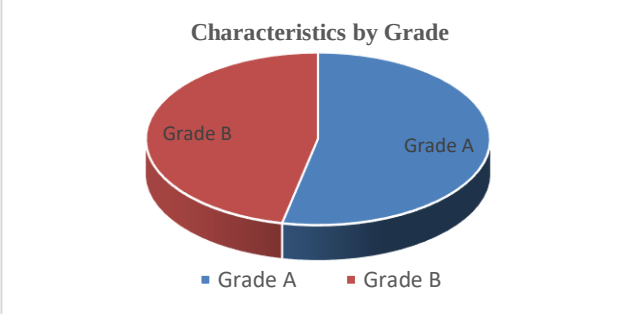

Figure 3. Diagram of the Characteristics of the Article by Grade

Country

Based on the results of the critical appraisal conducted using the Joana Brigs Institute (JBI) Critical Appraisal Tools obtained the characteristics of the article by country all articles come from developing countries. Based on these findings, the use of warm compresses as complementary therapy to reduce back pain in pregnant women is very popular in developing countries, and the incidence of back pain in pregnant women is a case that occurs a lot and is still one of the problems in developing countries. Further grouped by selected countries, the results are as follows:

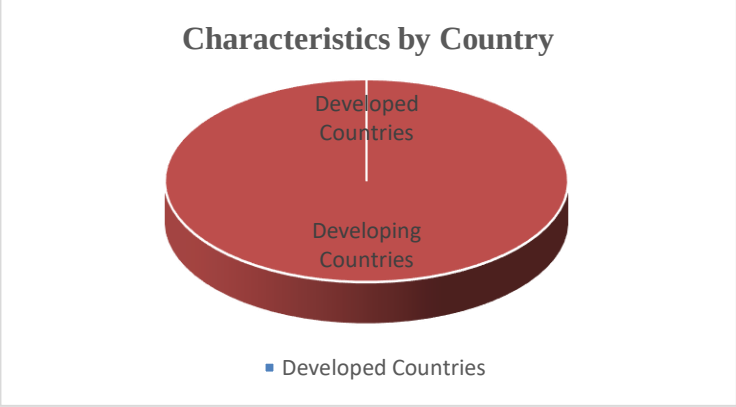

Figure 4. Diagram of the Characteristics of Articles by Country

The results of the analysis of related articles that have gone through the stages of Article analysis, data extraction and assessment of the quality of research articles, then grouping interesting study findings from 15 articles into several themes and sub themes that are relevant to the focus of the review. From the results of the review found several themes that match the focus of the review seen in Table 5. In this mapping step, the authors classify the interesting study findings from the article review as follows:

Table 5. Mapping Themes

Themes	Sub Theme / Reference
Back Pain	1. Prevalence (A3, A6, A10, A12, A15) 2. Causes (A1, A2, A3, A4, A6, A8, A10) 3. Risk Factors (A6, A7, A9, A12, A13) 4. Prevention (A4, A13, A15) 5. Impact (A1, A4, A6, A7, A10, A13)
Warm Compress	1. Effectiveness (A2, A3, A6, A12, A15) 2. Mechanism (A1, A2, A5, A10, A13, A15) 3. Benefits (A1, A6, A7, A8, A10) 4. Advantages (A3, A4, A5, A6)

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Based on the results of a review of 15 articles found several themes in accordance with the focus of the review, namely back pain with sub themes (prevalence, causes, risk factors, prevention, and impact of back pain), and warm compresses with sub themes (effectiveness, mechanisms, benefits, and advantages of warm compresses). Discussion of the findings of the study are interesting from the review article:

1. Back Pain

a. Prevalence

The prevalence of low back pain has not been recorded with certainty, but various studies both internationally and nationally state that low back pain often occurs in the third trimester of pregnancy. The incidence of low back pain in pregnant women worldwide is estimated at 50-60% of pregnant women experience new back pain during pregnancy and in non-pregnant women aged 35 years the figure is only 15% [15].

The prevalence of low back pain in pregnant women occurs more than 50% in various countries, including the United States, Canada, Iceland, Turkey, Israel, and Korea. While in non-Scandinavian countries such as North America, Africa, the Middle East, Norway, Hong Kong, and Nigeria, the prevalence ranges from 21% to 89.9% [16]. The prevalence of pregnant women in Indonesia was found in several studies such as Fauziah et al., (2020) which states that the prevalence of low back pain in Indonesia is 18% [8]. The prevalence of low back pain increases with age and is most common in the middle and early four decades. Further in the study Mafikasari & Kartikasari (2015), states that the prevalence of pregnant women who experience low back pain in various regions of Indonesia reaches 60-80% of people who experience low back pain during pregnancy [15].

According to Natalia et al., (2023), pregnant women (83%) suffer from back pain [17], while according to the Ummah (2015), primiparous and multiple pregnancy mothers (80%) suffer from back pain [18]. Up to 50% of pregnant women complain of very uncomfortable back pain during pregnancy. In pregnant women, about 50% of women are found to have low back pain and about 10% of women have chronic back pain since pregnancy [19].

Incidence of low back pain in pregnant women based on intrinsic research 2015 there are 47% of pregnant women who experience spinal pain from 180 pregnant women studied. While based on research Ulfah (2017) found 58.1% of pregnant women complain of back pain with details of moderate pain (29.0%), mild pain (22.6%), and severe pain (6.5%) [20]. In line with this study, the next study was conducted by Suparmi & Yuliasati (2023) in pregnant women who experienced low back pain, 73.33% experienced moderate pain, while those who experienced mild pain (10%) and severe (16.67%) [21].

Back pain in Indonesia is more often encountered in pregnant women and the age group of 40 years. Overall, back pain is the most common complaint with a prevalence rate of 49%, but about 80-90% of pregnant women who experience back pain do not make any effort to overcome the onset of these symptoms, in other words only about 10-20% of those who seek medical care to health workers [22].

b. Causes

According to the International Association for the Study of Pain (IASP) low back pain is discomfort felt in the lower back of pregnant women in the third trimester from the last thoracic vertebra (T12) to the first sacral vertebra (S1). Low back pain in pregnancy is an unpleasant condition due to the growing uterus and increased body weight causes the muscles to work harder so that it can cause stress on the muscles and joints. Low back pain can also be caused due to hormonal changes that cause changes in the soft tissue buffer and connective resulting in decreased elasticity and flexibility of the muscles [23].

Back pain is pain that occurs in the lumbosacral region. Back pain will usually increase in intensity with increasing gestational age because this pain is the result of a shift in the center of gravity and changes in posture. Such changes are caused by the heavier the uterus, the greater the weight of the uterus, excessive bending, walking without rest, and lifting

weights. Symptoms of back pain are also caused by the hormones estrogen and progesterone that relax the hip joints, ligaments and muscles. In addition to substances that can stimulate pain sensitivity. The body also has substances that can inhibit (inhibitors) pain, namely endorphins and enkephalins that can relieve pain [2].

Predisposing factors for pelvic pain include uterine growth leading to changes in posture, weight gain, effects of the hormone relaxin on ligaments, previous history of pelvic pain, parity and activity [24]. The growth of the uterus along with the development of pregnancy results in stretching the supporting ligaments that the mother usually feels as a very painful puncture spasm also called ligament pain, this is what causes lower back/pelvic pain. In parallel with the gradual increase in body weight during pregnancy there is a change in posture so that the center of gravity of the body shifts forward. There is a tendency for the back muscles to shorten when the abdominal muscles are stretched, which can lead to muscle imbalance around the pelvis and additional tension can be felt in the ligaments [25].

Back pain is pain that occurs in the lumbosacral area. Back pain will usually increase in intensity with increasing gestational age because this pain is the result of a shift in the center of gravity and changes in the mother's posture. These changes are caused by the weight of the enlarged uterus, the weight of the enlarged uterus, excessive bending, walking without rest, and lifting weights. This symptom of back pain is also caused by the hormones estrogen and progesterone that relax the joints, bone bonds and muscles in the hip. In addition to substances capable of stimulating pain sensitivity. The body also has substances that are able to inhibit (inhibitors) pain, namely endorphins and enkephalins that are able to relieve pain [26].

The increasing gestational age leads to gradual changes in the body (posture) and the way of walking changes. Increased abdominal distension that makes the pelvis tilt forward, decreased abdominal muscle tone and increased body weight in late pregnancy require adjustment of the spinal curvature bones. The normal lumbosacral curve should be increasingly curved and the cervicodorsal area should be formed curvature (excessive anterior flexion of the head) to maintain balance. These changes often cause discomfort in the back of pregnant women [22].

Back pain during pregnancy is caused by changes in anatomical structure, hormonal and stress. Low back pain is discomfort that occurs below the costa and above the inferior gluteal portion. This back pain will usually increase in intensity with increasing gestational age because this pain is the result of a shift in the woman's center of gravity and her posture. These changes are caused by the weight of the enlarged uterus, excessive bending, walking without rest, and lifting weights. Increased hormones released during pregnancy will make the joints of the pelvic bones stretch this can increase the risk of back pain [27].

Low back pain in pregnancy occurs due to the growth of the uterus, which causes changes in the posture of pregnant women, resulting in increased pressure on the curvature of the spine, there is a tendency for the lower back muscles to shorten. This state provokes the release of chemical mediators such as prostaglandins from damaged cells, bradykinin from plasma, histamine from mast cells, serotonin from platelets. This increase in mediators makes the sympathetic nerve stimulated. Fast pain is triggered by mechanical or thermal type receptors (i.e. a-Delta nerve fibers), while slow pain (slow pain) is usually triggered by C nerve fibers). A-Delta nerve fibers have the property of transmitting pain quickly and myelinated, whereas C nerve fibers are not myelinated [15].

c. Risk Factors

Pain is an unpleasant sensory and emotional experience, usually associated with tissue damage or potentially causing damage to body tissues. Pain is a condition that makes a person feel uncomfortable and can even continue to cause a sense of security disorder or life threatening. Pain is very individual, many factors influence it, causing different perceptions between individuals from one another [21].

Based on research Carvalho (2016), which states that gestational age is a risk factor that causes back pain, namely the higher the gestational age the greater the risk of low back pain [28]. Other studies have shown that the prevalence of

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low back pain during pregnancy increases with increasing gestational age [22].

Back pain is a common complaint of pregnant women during pregnancy. Back pain can be influenced by various factors, including a history of back pain or low back pain in previous pregnancies, young mother's age, childbirth repeatedly, stress, physical pressure at work [29].

Factors that affect the occurrence of back pain in pregnant women include a high body mass index, hormonal changes, changes in posture during pregnancy, and other factors, such as depression, stress, and emotional [21].

Risk factors for back pain in pregnant women are caused by a history before pregnancy and previous pregnancies experienced back pain, the age of the mother at the time of pregnancy >35 years and have too many children. If the state of back pain during pregnancy is not resolved immediately, it will lead to chronic back pain [16].

Age is an important variable in influencing pain in individuals. Back pain in pregnant women is felt by all ages, especially < 20 years of age because the mother is not ready to face pregnancy. But with many pregnant at the age of 20-35 years of age, it is certain that many experience back pain, especially in the third trimester. At the age of > 35 years, tissue degeneration occurs which causes stability in bones and muscles to be reduced. The older a person gets, the higher the risk of experiencing back pain due to decreased elasticity in the bones, which triggers the onset of symptoms of low back pain [21].

In addition to age, the mother's work is a factor in the occurrence of back pain during pregnancy. Most of the respondents have a job outside the home by helping their husbands in the garden. The activity of the mother can cause fatigue and stress. According to Morini et al., (2017) fatigue can indirectly worsen pain perception [30]. In addition, fatigue causes the sensation of pain to intensify and decrease coping mechanisms, while stress can increase the response to pain [21].

Meanwhile, according to research conducted by Kartikasari & Mafikasari (2015), that most pregnant women in the third trimester are housewives (83.3 %) whose daily activities are sweeping, cooking, parenting and washing [31]. The work of Housewives was so heavy that it caused back pain in pregnant women in the third trimester [32].

d. Prevention

Spinal pain or spinal pain is pain that occurs in one part of the spine. This pain can occur in the cervical spine (cervical spine), upper and middle back (thoracic spine), lower back or waist (lumbar spine), and/or coccyx (sacral spine) [19].

The various ways to reduce lower back pain include drinking more water, avoiding bent body positions and avoiding carrying too heavy a load, adequate rest, using a seat belt, avoid wearing high heels, getting up slowly when getting out of bed, sitting in a chair that can support the back and place a small pillow behind the lower back, diligent exercise, and using warm water therapy. Warm water is useful for blood circulation to bring oxygen to the area of pain. This makes the ligaments and tendon muscles experience relaxation. Warm compress therapy, one of which can use jars that are washed with warm water [16].

Meanwhile, according to Saudia & Sari (2018), pregnant women can prevent discomfort in the form of back pain through good posture and body mechanics and avoid fatigue. Wearing the right shoes during the activity and a supporting corset can help. Daily exercise, such as walking, swimming, and stretching are effective ways of preventing back pain. When back pain occurs, it can be reduced by giving a relaxing warm compress or giving a bottle filled with hot water and placed on the lower back, rubbing your back, or taking a warm bath [26].

e. Impact

Low back pain is an discomfort that occurs below the ribs and above the inferior gluteal region [33]. Back pain will hinder the activity of pregnant women. Pregnant women who experience back pain will have difficulty walking if the pain radiates to the pelvis. If not treated properly can lead to chronic back pain that will be more difficult to treat or cure

[15].

Back pain that is not immediately overcome, can lead to long-term back pain, increase the tendency to post-partum back pain and chronic back pain that will be more difficult to treat or cure, namely when the pain spreads to the pelvic area which causes difficulty walking so that it requires crutches or other walking aids [16]. Low back pain can have a negative impact on the quality of life of pregnant women due to disruption of daily physical activities such as difficulty performing activities such as standing after sitting, moving from bed, sitting too long, standing too long, undressing and removing clothes, and lifting and moving objects around [22].

Low back pain can have a negative impact on the quality of life of pregnant women due to disruption of daily physical activity [23]. If not immediately overcome the pain can affect daily life activities such as insomnia, appetite, concentration, interaction with others physical movement, work, relaxing activities [26].

Most pregnant women consider back pain as part of the pregnancy process, causing them not to take special measures to overcome it. Though this condition can cause a decrease in quality of life, and the risk of causing various adverse effects for the mother after pregnancy, and can be repeated in subsequent pregnancies [29].

2. Warm Compress

a. Effectiveness

Based on the results of the study after being given a warm compress showed a decrease in pain intensity in pregnant women in the third trimester of the average experiencing moderate pain. The results of this study are supported by research conducted by Ernamari et al (2022), which says that warm compresses have an effect on reducing low back pain in pregnant women in the third trimester [2]. Another study conducted by Putri et al., (2023) which says that warm compresses can reduce back pain in pregnant women in the third trimester so that warm compresses can be applied to pregnant women who experience back pain with a decrease after applying compresses of 0.733 [23]. The results of this study are in line with intrinsic research 2015 which states that warm water therapy is very effective in pregnant women who experience spinal pain with a decrease in pain after warm water therapy by 2.71 [2].

The results of this study are also in line with the research of Alloya & Wahyuni (2016) which found that warm compresses were effective in reducing low back pain in pregnant women in the third trimester by an average of 7.2 to 3.6 after applying warm compresses [34]. Another study conducted by Richard (2015) said that warm compresses are effective in reducing low back pain in pregnant women with the results of the study pain scale before administration an average of 5.90 and after being given a compress to 4.23 in other words a decrease after giving a warm compress [35]. Maryani's (2019) research, on the effect of pain intensity before and after giving warm compresses to pregnant women in the third trimester at Pelita Hati Banguntapan Clinic Bantul Yogyakarta concluded that there was an effect of pain intensity before and after giving warm compresses with a value of 0.000 [36].

The effectiveness of warm compresses with hot water not only provides comfort but also improves circulation in pregnant women so as to prevent the potential occurrence of heat in the stomach. Good circulatory circulation will minimize the occurrence of abdominal contractions and leg cramps. The intended abdominal contractions are Braxton-Hicks or false contractions [22]. Based on research conducted by Maryani (2019) at the Pelita Hati Banguntapan Bantul Clinic, it was found that there was a significant difference between the intensity of pain before and after a warm compress was given [36]. The decrease in the pain scale after being given a warm compress is 3.30, that is, before being given the average pain intensity is 7.35 (severe pain) and after being given a warm compress is 4.05 (moderate pain). So that warm compresses performed on pregnant women in the third trimester have an effect on reducing the intensity of back pain felt by the mother [22].

While the research of Amalia et al (2020), the results of bivariate analysis showed that there was an effect of warm

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compresses on the level of back nyeiri of pregnant women in the third trimester and obtained p-value = 0.000 (p< 0.05) [37]. This is supported by the research of Fitriani (2018), the results of statistical analysis showed that p value = 0.001< α (0.05) so that it was found that warm compresses effectively reduce the intensity of back pain in pregnant women in the third trimester [38]. Warm compresses can be recommended as a complementary therapy for back pain [21].

The results of a study conducted by Yuspina et al., (2018), in Tasikmalaya showed that there are differences in the level of pain before and after warm and cold water compresses [39]. While research (Maryani, 2019), at Pelita Hati Clinic shows that there is an effect of giving warm compresses on the intensity of back pain in pregnant women in the third trimester [36]. Based on the results of the study showed that there is an effect of warm water compresses on spinal pain in pregnant women in the third trimester. The influence of this is because warm water compresses provide warmth to the area of pain that the mother feels so that the mother becomes comfortable and the pain decreases. The decrease was 1.40, the average pain before compress was 4.93 and after warm compress was 3.53 [19].

b. Mechanism

Warm compress is a compress action with warm water temperature 37-40ºC to the surface of the body. Warm compresses can be done using a towel dipped in warm water and then squeezed or with a bottle filled with warm water. It aims to reduce pain and prevent muscle spasm so as to provide a sense of comfort in the third trimester of pregnancy [10]. Warm compresses can relieve pain by relaxing muscles, providing a sedative effect and by removing inflammatory products that cause pain [39]. Warm compress therapy will also channel signals to the hypothalamus through the spinal cord. With the stimulation of hot receptors in the hypothalamus, the effector emits a signal that causes peripheral blood vessels to dilate. Dilation of blood vessels, it will facilitate blood circulation and oxygenation to the body given a warm compress and relieve local pain [40].

Warm compresses on painful areas are said to help relieve pain. The feeling of heat reduces ischemic muscle spasm, stimulates nerve cells to prevent further transmission of pain stimuli, causes vasodilation and increases blood flow to the stressed area [22]. A hot compress is to give a feeling of warmth to a certain area by using a bag filled with warm water to cause a feeling of warmth on the part of the body that needs to be heat treated. Hot compresses can be done at temperatures ranging from 40-46°C by attaching a rubber bag filled with warm water to the area of the body to be compressed. Hot compress time can be 15 to 30 minutes. While research Karyawati et al (2022), that giving warm compresses for 15 minutes each time effectively reduces back pain [19].

According to Putri et al (2023), how to do a warm compress is to put a bottle of warm water on the lower back [23]. The given temperature is 38-40°C and compressed 20 minutes. Meanwhile, according to research by Amalia et al (2020), compressing can be done with jars that have a significant effect [41]. This provides comfort and a sense of security because using the appropriate temperature (38-40°C) with a temperature that has been set in such a way that it is not too hot and irritating to the skin [23]. The duration of using a warm compress is 15-20 minutes. Warm water compresses on painful areas are considered able to relieve pain. Compresses are done 1-2 times a day for 15-20 minutes that can be done while lying on your side, sitting or half-sitting. Warmth relieves muscle spasms caused by ischemia stimulating neurons that block further transmission [15].

According to Potter & Perry (2010) the pain relief process is influenced by skin stimulation which can result in a greater and faster transition of a-beta sensory nerve fibers [42]. This process slows the transition of pain through small-diameter C and a-delta fibers that close the synaptic gate thereby blocking the pain message. In the study Ernamari et al (2022), stated that it was in accordance with the gate control theory that stimulation of the skin with warm compresses produces messages through A-delta fibers, which are fibers that transmit pain quickly resulting in closed pain gates so that the cerebral cortex does not receive pain signals and pain intensity changes or decreases [2].

According to Pratama et al (2020), a warm compress can be done for 20 minutes on the mother's lower back. To

maintain temperature stability when performing this intervention, the towel should be dipped in warm water repeatedly every 4 minutes [40]. Warm compresses will provide a vasodilating effect on blood vessels so that it will facilitate blood circulation and oxygenation to the part of the body that is given a warm compress. Increased blood circulation will relieve the cause of local pain by getting rid of inflammatory products, such as bradycin, histamine, and prostaglandins [12]. The compression Area is in the lumbosacral area, which is located above the sacrum bone. The lumbosacral region has the main role of supporting body weight [15].

Nurfaizah et al (2023), in his research said that back pain is often felt by pregnant women at night, efforts to reduce the pain can be done with warm compresses done 2 times a day in the morning and afternoon/ evening, the morning before activity, while at night the mother again feels pain at bedtime [15]. Warm compress therapy is given for 2 days in a row for 15 minutes using a jar with a water temperature of 37 ° -40°, previously given a measurement of water temperature using a thermometer [16].

c. Benefits

One of the non-pharmacological methods that can reduce or relieve pain, reduce or prevent muscle spasm, provide a sense of comfort that is with a warm compress. The use of warm water compresses can make blood circulation smooth, smooth vascularity and vasodilation occur which makes relaxation of the muscles because the muscles get excess nutrients carried by the blood so that muscle contraction decreases [23]. Warm water (46.5-51.5ºc) has a physiological impact on the body, namely softening fibrous tissue, affecting tissue oxygenation so as to prevent muscle stiffness, improve blood flow, so as to reduce or eliminate pain. This is evidenced in the study of Richard (2015), which mentions a warm compress with a temperature (46.5-51.5ºC) caused 10 respondents to experience a decrease in pain by an average of 2-3 points [22].

Warm compress during pregnancy is very useful for pregnant women because it is one of the techniques to reduce pain nonpharmacology that can provide benefits for pregnant women, such as providing peace to pregnant women in the third trimester amid uncomfortable conditions and pain, so pregnant women need treatment to reduce the discomfort felt by mothers in pregnancy [22].

Warm compresses have a physiological effect that can soften fibrous tissue, make the body's muscles more relaxed, reduce or eliminate pain, and improve blood flow. The feeling of heat generated from warm compresses can cause dilation and physiological changes to occur so that blood circulation can improve and relieve pain. This heat response is used for pain reduction therapy. The therapeutic effect of applying warm compresses will be able to reduce muscle spasms and reduce joint stiffness [29].

Warm compresses on pregnant women with back pain can use warm temperatures locally that can provide physiological effects, among others, soften fibrous tissue, relax the muscles of the body, eliminate pain, affect tissue oxygenation so as to prevent muscle stiffness, vasodilation and facilitate blood flow in pregnant women, so as to reduce and eliminate pain [15]. Giving a warm compress for 20 minutes can serve to dilate blood vessels, reduce stiffness, and also serves to eliminate the sensation of pain during back pain [27].

d. Advantages

Pregnant women who get warm compress therapy will feel calm, comfortable, relaxed, and will be closer to health workers who serve, because both can be done simultaneously so that indirectly this can reduce the level of pain felt. This intervention needs to be distributed to pregnant women to reduce back pain during pregnancy [25].

Pain can be relieved by pharmacological and nonpharmacological therapy. Pharmacological pain control is more effective than nonpharmacological methods, but pharmacology is more expensive and potentially has side effects. In pregnancy pharmacological methods also have an influence on the mother, fetus, and for the progress of Labor. Meanwhile, according to Saudia & Sari (2018), non-pharmacological methods that can be done through activities without drugs include massage and mobilization exercises, acupuncture, relaxation, hot or cold compress therapy [26].

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Nonpharmacological methods and without effects are also easier to do and cheap, simple, effective and without adverse effects. The use of non-pharmacological interventions can be used as an alternative therapy to reduce back pain because it has no side effects [40].

Warm compresses are one of the non-pharmacological strategies for treating back pain. The use of warm compresses is highly recommended for back pain problems because it is easy to do and does not cost much to carry it out [22].

CONCLUSION

One of the non-pharmacological methods that can reduce or relieve pain, reduce or prevent muscle spasm, provide a sense of comfort that is with a warm compress. Warm compresses during pregnancy have proven effective and very beneficial for pregnant women because it is one of the preferred nonpharmacological pain reduction techniques because it is safer, effective, inexpensive, does not harm the mother or fetus, can help reduce pain and has no allergic effects or drug effects. Warm compresses can provide benefits for pregnant women, such as providing peace to pregnant women in the third trimester, relaxing the muscles of the body, relieving pain, affecting tissue oxygenation so as to prevent muscle stiffness, vasodilation and improving blood flow in pregnant women, so as to reduce and eliminate pain. Article taken in scoping review most of the studies were conducted in developing countries which showed that the use of warm compresses as a complementary therapy to reduce back pain in pregnant women is very popular in developing countries, so more research needs to be done on warm compresses to reduce back pain in developed countries. Considering the level of incidence of back pain in pregnant women is a case that occurs a lot and is still one of the problems in developed countries.

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