Non-Pharmacological Interventions To Reduce Back Pain in Pregnant Women: A Literature Review

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Abstract

Back pain is pain that occurs in the lumbosacral area. The phenomenon of back pain experienced by pregnant women is one of the most frequently reported complaints. The purpose of this study was to find out what are the non-pharmacological interventions to reduce back pain in pregnant women. This study is a literature review to study non-pharmacological interventions to reduce back pain in pregnant women. Sources for conducting this literature review included ScienceDirect search studies, Google scholar, Sage journal and PubMed. There are several interventions that can be done to reduce back pain in pregnant women non-pharmacologically, namely unsupervised water exercises, Ear Acupuncture, Topical Use of Rosa Damascena (Rose) Oil, Yoga, Endorphine Massage, Effleurage Techniques and Warm Compresses and Effleurage Massage and Breath Relaxation In. Non-pharmacological interventions have significant value in reducing back pain in pregnant women and are safe to use.

***Keywords**: Intervention, Non-Pharmacological, Back Pain, Pregnant Women.*

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A. INTRODUCTION

Pregnancy is a natural process that occurs from conception to the formation of a fetus that grows in the mother's womb. Pregnancy is divided into 3 periods known as trimesters of pregnancy. Each trimester of pregnancy lasts for 3 months or about 12 to 14 weeks which start counting from the first day of the last menstrual period (HPHT) experienced by pregnant women. During pregnancy a mother will experience changes that occur to her, both physical changes and psychological changes.

Physical changes that occur in pregnant women will affect several systems in the body, one of which is the musculoskeletal system. The body shape of pregnant women will change gradually as the pregnancy period increases and the weight gain experienced. The increasing period of pregnancy along with the growth of the fetus and the enlargement of the uterus will cause the center of gravity of the pregnant woman's body to be more inclined forward, so the mother needs to adjust her position to maintain balance. As a result, the body will adjust by pulling the back towards the back so that the lower back is more curved and experiences lordosis and the spinal muscles shorten (Mafikasari & Kartikasari, 2015). According to Reeder et al., in Fitriana & Vidayanti (2019) stated that this causes tension in the muscles and back ligaments, causing back pain which is often felt in the late period of pregnancy.

Back pain is pain that occurs in the lumbosacral area. The phenomenon of back pain experienced by pregnant women is one of the most frequently reported

complaints. In a study conducted by Purnamasari & Widyawati (2019), the prevalence of back pain that most often appeared was moderate pain as much as 73.33%, while those who experienced mild pain were 10% and those who experienced severe pain were 16.67%. It was reported that as many as a third of the population of pregnant women who suffer from lower back pain report that the pain they feel is often associated with limitations to work effectively which results in a poor quality of life (Mayonzo et al., 2019).

Poor quality of life during pregnancy can have an impact on a higher risk of pregnancy (Duhita et al., 2021). One way that can be done to maintain a good quality of life for pregnant women who experience back pain is to reduce pain. Pain can be managed with pharmacological and non-pharmacological therapy. Non-pharmacological pain management is a pain relief strategy without using drugs. Non-pharmacological therapy is preferred because it is safer and also effective for pregnant women, because the use of several types of drugs during pregnancy can have an adverse effect on the fetus (Yinchu Hu et al., 2021). This study aims to determine non-pharmacological therapy that can be used to reduce back pain in pregnant women.

B. METHOD

The method used in this study is a narrative review approach, because it will identify non-pharmacological interventions to reduce back pain in pregnant women. The article selection process followed the Preferred Reporting items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines which began with selecting a topic, then determining research questions based on PICO. PICO is a clinical information search method which is an acronym for 4 components, namely Population (pregnant women, pregnancy, pregnant), Intervention (Non pharmacological intervention), Comparison (-), and Outcome (Low Back pain, low back pain management, low back pain reliefs). Then formulate keywords using Boolean (((((Pregnancy) OR (pregnant women)) OR (pregnant)) AND (Non pharmacological intervention)) AND (Low Back pain)) OR (low back pain management). Article publication is limited to 2017-2022. The databases used by the authors are ScienceDirect, Sage Journal, Google Scholar, and PubMed. Inclusion criteria in the study were full text articles in English and Indonesian, publication year 2017-2022, articles with experimental research designs and articles that reviewed non-pharmacological interventions as a relief for pregnant women's back pain. The exclusion criteria in the study were review articles, thesis manuscripts and books.

C. RESULT AND DISCUSSION

The following presents search results using the Pubmed database and Google Scholar regarding non-pharmacological interventions to reduce back pain in pregnant women in table 1:

Table 1. Search Results for Articles On Non-Pharmacological Interventions To Reduce Back Pain in Pregnant Women

Author, Year	Title	Country	Desain	Sample	Intervension	Measurement	Timeframe	Result
Backhause et al. (2017)	The Effects of an Unsupervised Water Exercise Program on Low Back Pain and Sick Leave Among Healthy Pregnant Women - A Randomized Controlled Trial	Denmark	Randomized Controlled Trial (RCT)	516 healthy pregnant women	Unsupervised water drills	Self-assessed Ronald Morris Disability and general health questionnaire (EQ-5D and EQ-VAS)	12 weeks with twice a week breakdown	Unsupervised water exercises resulted in clinically significant low back pain intensity.
Vas et al. (2019)	Effect of Ear Acupuncture On Pregnancy-related Pain in The Lower Back and Posterior Pelvic Girdle : A Multicenter Randomized Clinical Trial	Spanyol	Multicenter Randomized Clinical Trial	220 pregnant women	Acupuncture	Visual analog scale (0-100 mm) from start to end of treatment (T2)	2 weeks of treatment	Ear acupuncture significantly reduces low back and hip pain in pregnant women, improves quality of life and reduces functional disability
Shirazi (2017)	The Effect of Topical Rosa damascena (Rose) Oil on	Iran	Randomized Controlled Trial (RCT)	120 women with pregnancy-related low back pain	Administration of rose oil, almond oil or no intervention.	-Visual Analogue Scale	10 months	Rose oil can significantly reduce the intensity of back pain in pregnant women compared to almond

	Pregnancy-Related Low Back Pain: A Randomized Controlled Clinical Trial							oil or without intervention
Resmi (2017)	Pengaruh Yoga Terhadap Nyeri Punggung Bawah Pada Ibu Hamil Trimester Iii Di Puskesmas Kalikajar I Kabupaten Wonosobo	Indonesia	Quasi Experiments	14 pregnant women	Yoga intervention	-Roland Morris	During 2	There is a significant influence of yoga
Mother's (2018)	Perbedaan Efektivitas Endorphin Massage dengan Kompres Hangat Terhadap Penurunan Nyeri Punggung Ibu Hamil Trimester III Di Puskesmas Wilayah Kerja Se Kota Mataram	Indonesia	with a pre test post research design	who have low back pain	Endorphin massage and warm compresses	Disabilities	times a week for 3	on reducing the intensity of low back pain in pregnant women.

Richard (2017)	Tehnik Effleurage dan Kompres Hangat Efektif Menurunkan Nyeri Punggung Ibu Hamil	Indonesia	non-equivalent control group tests.		Effleurage technique and warm compresses	Questionnaires	Sunday.	
Fitriana & Vidayanti (2019)	Pengaruh Massage Effleurage dan Relaksasi Nafas Dalam Terhadap Nyeri Punggung Ibu Hamil Trimester III	Indonesia	Quasi Experiment with	30 third trimester pregnant women	Massage effleurage and deep breathing relaxation	(RMDQ)		Endorphin massage is more effective than treatment
Holden et al. (2019)	Prenatal Yoga for Back Pain, Balance, and Maternal Wellness: A Randomized, Controlled Pilot	Israel	two group approach model pre test post test design	30 third trimester pregnant women	Prenatal yoga	version	4 months	warm compresses in reducing back pain in third trimester pregnant women
Aswitami & Mastiningsih (2018).	Pengaruh Terapi Akupresur terhadap Nyeri Punggung Bawah pada Ibu Hamil TM III di Wilayah Kerja Puskesmas	Indonesia		32 third trimester pregnant women	Acupressure Therapy	Iran	1 time, with a duration of 10 minutes (effleurage technique) and 15 minutes (warm compresses)	technique

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Mohyadin (2021)	The effect of practicing yoga during pregnancy on labor stages length, anxiety and pain: a randomized controlled trial	Iran	Quasi experiment type non –	20 participants	Pregnancy Yoga Program	Pre and post	not mentioned	effleurage and warm compresses are effective in reducing back pain in pregnant women

Pregnancy is a natural and normal process. During pregnancy a mother experiences changes that occur both physically and psychologically. These changes cause pregnant women 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 throughout a normal pregnancy, including nausea, heartburn, joint pain, back pain, dyspnea, nasal congestion, varicose veins, leg cramps.

Musculoskeletal pain is often overlooked during pregnancy because it is considered physiological. However, back and hip pain doesn't always go away after pregnancy and can become chronic. Pain that occurs during pregnancy increases the chances of it appearing again in future pregnancies. Women with low back pain are more likely to take sick leave during pregnancy because their ability to carry out activities is limited. 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 body posture. These changes are caused by the growing weight of the uterus, the weight of the growing uterus, 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 in 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 which can relieve pain.

As the gestational age increases, a woman's posture changes to compensate for the growing weight of the uterus. The shoulders are pulled back as a result of the protruding enlarged abdomen, and to maintain body balance, the inward curvature of the spine becomes excessive. Relaxation of the sacroiliac joint, which accompanies the change in posture, causes varying degrees of back pain after excessive strain, fatigue, stooping, or lifting. If not treated immediately, pain can affect activities of daily living, such as sleep, appetite, concentration, interaction with other people, physical movement, work, leisure activities. Even if the discomfort is not serious, it decreases a woman's feelings of comfort and well-being.

Pain can be managed with pharmacological and non-pharmacological therapy. Pharmacological pain control is indeed more effective than non-pharmacological methods, however, pharmacology is more expensive and has the potential to have side effects. Meanwhile, non-pharmacological methods can be carried out through activities without drugs, including distraction techniques, reducing pain perception, and massage stimulation, warm baths, hot or cold compresses. Methods and without non-pharmacological effects are also cheaper, simple, effective and without adverse effects.

Unsupervised Water Training

Based on research conducted by Backhausen et al. (2017), training is carried out with an introductory session in a public indoor swimming pool first, then followed by 12 weeks of unsupervised training 2 times a week. Previously, pregnant women were

given theoretical counseling regarding exercise recommendations that are commonly carried out by watching videos of six AquaMama water exercises including: MamaSurf, Mama Pendul, Mama jogging, MamaLift, Mama boxing and Mama Biceps. Then pregnant women are given practical instructions by specially trained trainers when doing exercises in the water. The practice session consisted of 4 laps of swimming (100 m) as a warm-up, followed by the six AquaMama exercises that you have watched in the video and ended with 4 more rounds. The exercise enan is done in 2 series and requires 2 foam dumbbells, a swim belt and a kick board.

Ear Acupuncture

Non-pharmacological intervention methods according to (Vas, Cintado, Aranda-Regules, Aguilar, & Rivas Ruiz, 2019) namely ear acupuncture. Treatment is carried out within 2 weeks with this type of treatment:

1. Standard midwifery care: Explains the causes of low back or hip pain and provides information about recommended self-care both to prevent pain and reduce its intensity together in specific stretching exercises for the back and hamstring muscles.
2. Verum ear acupuncture: Using auricular pressure needles applied to two standard points (shenmen and kidney) and to reflex points in the ear area which classically represent the lumbar or sacral region
3. Non-specific ear acupuncture: The type of needle used is the same as ear acupuncture, but the needle is applied to specific ear points to reduce low back pain/posterior girdle pain related to pregnancy and which corresponds to the anatomical location of the ankle, wrist and shoulder.
4. Placebo acupuncture: In this acupuncture does not use needles and is applied to the same non-specific points as in non-specific ear acupuncture. all of the previous implants (VEAc, NSEAc, and PEAc) were placed unilaterally (on the side of the head where the pain was) or bilaterally when pain was more intense and held in place for a week.

Rosa Damascena (Rose) Oil Topical

The research conducted by Shirazi (2017) was topical administration of rosa damascena oil by means of pregnant women in the first 2 groups being prescribed 7 drops of oil topically for 100 cm of painful skin without massage, 2 times a day for 4 weeks. Topical administration of rose oil (in almond oil carrier) to pregnant women with LBP resulted in a significant reduction in pain intensity compared to carrier oil or without intervention. Rose oil also improves the patient's functional ability, while its effect on function is not significant compared to carrier oil.

Rose oil is one of the most popular topical preparations recommended in traditional Persian medicine for the management of pregnancy-related LBP. In this preparation the lipophilic constituents, especially the essential oil of Rosa Kamascena. The use of rose oil has reduced pain and increased functional ability of LBP in pregnant women without serious side effects and considering its applicability and low

cost, it can be considered as a safe and efficacious drug for the management of this disorder.

Yoga

Yoga is a form of exercise that pregnant women can do because yoga can make the body more flexible, comfortable, besides supporting blood circulation, overcoming back pain, waist pain, aches and swelling (Vermany, 2009). Official Research (2017) and Ellahe Mohyadin (2021) say that yoga that is adapted to back pain in pregnant women is yoga asana, because this yoga asana prioritizes repair and improvement of the quality of body structure. Practicing yoga on a regular basis may indeed give a slightly painful sensation to some parts of the body, but actually makes a person more aware and able to control his body. To get a pregnancy that remains healthy, it is highly recommended to practice yoga regularly. Practice 1-2 times a week (Sindhu, 2009). The frequency of doing yoga will also affect the decrease in lower back pain for pregnant women, in this study yoga was done 2 times a week for 3 weeks.

This is in line with research conducted by Ellahe Mohyadin (2021) which stated that women who did modified yoga during pregnancy reported lower pain scores at dilation (4-5 cm) and 2 hours after the first measurement compared to the control group. The breathing technique in yoga, by regulating inhalation and exhalation, provides sufficient oxygen to the brain neurons and prolongs exhalation reduces exposure to carbon dioxide and other harmful gases, activates the parasympathetic system and exacerbates anxiety and relaxation thereby reducing the perception of pain.

In another study conducted by Holden et al., (2019) regarding yoga interventions to reduce back pain in pregnant women, it was said that there was no difference in back pain disability with the control group. Yet these interventions are feasible, safe, and acceptable. The main findings in Holden et al.'s study, (2019) are a lower burden of pregnancy symptoms felt by intervention participants and an increase in biomechanics that may be protective in pregnancy as seen from walking speed, double support time, and counting time.

The yoga intervention carried out in Holden et al.'s research, (2019), was developed through a modified Delphi process, including individual consultations and group discussions. For variety and to include some of the recommended poses two classes are held which have a similar overall structure, but different specific asanas are taught in alternating weeks over the course of 12 weeks.

Endorphins Massage

Endorphin massage has been shown to be effective in reducing back pain in third trimester pregnant women. This is in line with research conducted by Mother's (2018) which states that the majority of respondents to endorphin massage gave very positive non-verbal responses and reported a significant decrease in pain scale after being given massage. So that endorphin massage can be used as a non-pharmacological therapy which is effective in reducing back pain in Trimester III

Pregnant Women. This is in accordance with research conducted by Yenny Safitri (2017) which states that skin stimulation with massage techniques produces impulses that are sent through large nerve fibers that are on the surface of the skin, these large nerve fibers will close the gate so that the brain does not receive pain messages because it has been blocked by skin stimulation with this technique, as a result the perception of pain will change. In addition to relieving pain, this technique can also reduce muscle tension and increase blood circulation in areas that feel pain. So, endorphin massage is proven has a major influence in reducing back pain in third trimester pregnant women. This is supported by research conducted by Ratih (2016), who said that Endorphin massage is a non-pharmacological alternative to treat pain.

Effleurage Techniques and Warm Compresses

Research Richard (2017) states that the effleurage technique and warm compresses significantly reduce back pain in treating back pain for pregnant women. Although these two interventions use different techniques, the significance in reducing the pain scale is relatively the same and neither is more effective. The effleurage technique and warm compresses have different physiological responses in the course of reducing pain.The effleurage technique and warm compresses can reduce the back pain scale according to the fact that pregnant women choose interventions that are considered good through their perceptual response and the capacity of pregnant women to do so.Giving massage (massage)) can help pregnant women relax by rubbing the back. Gentle massage will help the mother feel more refreshed, relaxed and comfortable during pregnancy. Massaging can stimulate the body to release endorphins which are natural pain relievers. Meanwhile, the therapeutic effect of giving warm compresses can reduce pain, increase blood flow, reduce muscle spasms and reduce joint stiffness.

Effleurage Massage and Deep Breathing Relaxation

Research conducted by Fitriana & Vidayanti (2019) states that massage effleurage interventions and breathing relaxation reduce back pain in third trimester pregnant women. The effleurage massage technique is in the form of long, continuous gentle strokes which causes the process of inhibiting pain impulses, causing a relaxing effect. The pain fibers that carry the painful stimulus to the brain are slower than the broad touch fibers and the sensations travel more quickly. When touch and pain are stimulated together, the touch sensation that travels faster to the brain will close the gate so that the cerebral cortex does not receive pain signals and the pain intensity decreases. The relaxing effect is not only caused by massage effleurage, but also caused by deep breathing relaxation. When a person achieves relaxation, the perception of pain will decrease and anxiety about pain will be minimal. Although massage effleurage and deep breathing relaxation can reduce back pain, research has concluded that massage effleurage is more effective than deep breathing relaxation.

D. CONCLUSION

Based on the results of the article review, there are several non-pharmacological interventions that can be used to reduce back pain in pregnant women including: Unsupervised water exercises, Ear Acupuncture, Topical Rosa damascena (Rose) Oil, Yoga, Endorphine Massage, Effleurage Techniques and Warm Compresses, and Effleurage Massage and Deep Breathing Relaxation. The interventions mentioned have significant value in reducing back pain in pregnant women and are safe to use.

For readers of health students and nurses who are in charge of providing nursing care/treatment, it is hoped that in the discussion related to the literature review this time it can be used properly by health workers in dealing with back pain experienced by pregnant women and more research will be done. participate in creating good management, safe to use and accessible to all groups.

REFERENCES

1. Backhausen, M. G., Tabor, A., Albert, H., Rosthøj, S., Damm, P., & Hegaard, H. K. (2017). The effects of an unsupervised water exercise program on low back pain and sick leave among healthy pregnant women – A randomised controlled trial. *PLoS ONE*, *12*(9), 1–16. https://doi.org/10.1371/journal.pone.0182114
2. Duhita, F., Sujarwanta, T. P., & Puspitasari, I. W. (2021). Perbedaan Antara Kualitas Hidup Ibu pada Periode Kehamilan Akhir dan Nifas Awal di Kota Yogyakarta. *Jurnal Kesehatan Repsoduksi*, *12*(1), 65-76.
3. Fitriana, L. B., & Vidayanti, V. (2019, September 30). Pengaruh Massage Effleurage dan Relaksasi Nafas Dalam Terhadap Nyeri Punggung Ibu Hamil Trimester III. *Bunda Edu-Midwefery Journal (BEMJ)*, *2*(2), 1-6.
4. Holden, S. C., Manor, B., Zhou, J., Zera, C., Davis, R. B., & Yeh, G. Y. (2019). Prenatal Yoga for Back Pain, Balance, and Maternal Wellness: A Randomized, Controlled Pilot Study. *SAGE*, *8*, 1-11.
5. Mafikasari, A., & Kartikasari, R. I. (2015, Agustus). Posisi Tidur dengan Kejadian Back Pain (Nyeri Punggung) pada Ibu Hamil Trimester III. *7*(2), 26-34.
6. Mayonzo, S. D., Nesto, T., Bonongwe, P., & Muula, A. S. (2019, Maret). Low Back Pain during Pregnancy: Prevalence, Risk Factors and Association with Daily Activities among Pregnant Women in Urban Blantyre, Malawi. *Malawi Medical Journal*, *31*(1), 71-76. https://doi.org/10.4314%2Fmmj.v31i1.12
7. Purnamasari, K. D., & Widyawati, M. N. (2019, Desember). Gambaran Nyeri Punggung Bawah Pada Ibu Hamil Trimester III. *Jurnal Keperawatan Silampari*, *3*(1), 352-361. https://doi.org/10.31539/jks.v3i1.512
8. Ratih dan Aprilliya. 2016. Pengaruh Endorphin Massage Terhadap Penurunan Intensitas Nyeri Punggung Ibu Hamil. RAKERNAS AIPKEMA 2016.
9. Vas, J., Cintado, M. C., Aranda-Regules, J. M., Aguilar, I., & Rivas Ruiz, F. (2019). Effect of ear acupuncture on pregnancy-related pain in the lower back and posterior pelvic girdle: A multicenter randomized clinical trial. *Acta Obstetricia et Gynecologica Scandinavica*, *98*(10), 1307–1317. https://doi.org/10.1111/aogs.13635

10. Yinchu Hu, Lu, H., Huang, J., & Zang, Y. (2021). Efficacy and Safety on Non-pharmacological Interventions for Labour Pain Management: A Systematic Review and BAyesian Network Meta-Analysis. *J Clin Nurs*, *30*, 23-34. https://doi.org/10.1111/jocn.15865