



Effectiveness of Progressive Muscle Relaxation Compared to BL 23 and GV 3 Point Acupressure Therapy in Reducing Back Pain Intensity in Third Trimester Pregnant Women

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Abstract

Background/Aim: Back pain is one of the most common discomforts experienced by pregnant women in the third trimester of pregnancy. Interventions that can be done to overcome this are progressive muscle relaxation or acupressure at the BL 23 and GV 3 points. The aim was to determine the effectiveness of progressive muscle relaxation with BL 23 and GV 3 acupressure to reduce low back pain in third trimester pregnant women.

Methods: Quasi-experimental research design method with a two-group pretest and post-test design approach was conducted. The total sample was 88 with inclusion criteria - third trimester pregnant women who experienced back pain. Pain was measured with numerical rating scale (NRS) and analysed using Wilcoxon test.

Results: The average reduction in back pain for pregnant women after progressive muscle relaxation was 2.12, while the average reduction in back pain for pregnant women after BL 23 and GV 3 acupressure was 1.50. There is a mean difference between the two (0.62), so it can be concluded that there was a difference in the effectiveness of reducing back pain for pregnant women in the third trimester between the progressive muscle relaxation intervention and the respondents' pain scale after the acupressure therapy intervention at points BL 23 and GV 3.

Conclusion: Back pain for pregnant women in the third trimester can be treated with progressive muscle relaxation therapy or acupressure at points BL 23 and GV 3 to reduce back pain. Progressive muscle relaxation therapy was more effective. Progressive muscle relaxation can be done by pregnant women themselves when back pain occurs.

Key words: Back pain; Pregnant women; Progressive muscle relaxation; BL 23; GV 3; Acupressure.

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Citation:

Pawestri P, Yunitasari E, Khayati N, Pranata S. Effectiveness of progressive muscle relaxation compared to BL 23 and GV 3 point acupressure therapy in reducing back pain intensity in third trimester pregnant women. *Scr Med.* 2024 Mar-Apr;55(2):173-9.

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Received: 22 October 2023
Revision received: 27 March 2024
Accepted: 27 March 2024

Introduction

During pregnancy, a woman experiences many changes, both physiological and psychological.^{1,2} Physiological changes that occur not only in the reproductive organs but also in the cardiovascular,

respiratory, renal, integumentary, musculoskeletal, neurological, digestive and endocrine systems can cause discomfort, especially in the second and third trimesters.³ Physical changes

can include dyspnoea, insomnia, gingivitis and expulsion, frequent urination, pressure and discomfort in the perineum, back pain, constipation, varicose veins, fatigue, Braxton Hicks contractions, leg cramps, ankle oedema.^{4,5} One of the problems faced by pregnant women in the third trimester is back pain. Back pain can appear at the beginning of the trimester and then peak in the third and second trimesters.⁶

Back pain is one of the most common discomforts experienced by pregnant women in the third trimester of pregnancy.⁶ Based on research conducted on pregnant women, it shows that the prevalence of back pain in pregnant women is 70-86%.⁷ The study mentions that the prevalence of back pain in third trimester pregnant women was 33.7%.⁸ According to the study, 73.33% of pregnant women experienced moderate pain, while 16.67% experienced severe pain and 10% experienced mild pain.⁹ Based on the Indonesian health data profile, 5,298,285 pregnant women were experiencing back pain in Indonesia, in the Central Java province the number was 314,492, in the Semarang City area 53,734 pregnant women experienced back pain.¹⁰ Back pain that occurs during pregnancy occurs due to anatomical changes in the body. Back pain is the most commonly reported complaint of pregnant women.⁷⁻⁹

The impact of back pain complaints on pregnant women in the third trimester is that mothers feel uncomfortable with their activities or have disturbed activities, are anxious, experience changes in the shape of their body structure and experience long-term back pain, thereby increasing the tendency for back pain.¹¹ Pain causes pregnant women to experience fear and anxiety, thereby increasing stress and experiencing physiological changes during pregnancy.¹² Pain and anxiety are synergistic and exacerbate each other, a sign of discomfort in pregnant women experiencing pain in the back.⁷ Back pain causes a person to experience fear and anxiety, resulting in stress during pregnancy, which has an impact on the pregnancy process. Back pain in pregnant women has the impact that a pregnant woman will feel fear and anxiety, thereby increasing stress and experiencing physiological changes.¹³ Around 75-90% of back pain in pregnancy affects the level of quality of life, limits activity and productivity and

even creates physical disabilities in pregnant women.^{7,14}

Therapies that can be used to reduce back pain for pregnant women in the third trimester include progressive muscle relaxation, BL 23 and GV 3 acupressure.¹⁵⁻¹⁷ Progressive muscle relaxation therapy is carried out by tightening and relaxing the muscles at one time to provide a feeling of physical relaxation.^{18, 19} Progressive muscle relaxation therapy can also be done by stretching and relaxing each group of muscles at the same time which will produce progressive relaxation of the entire body, as well as calming the mind by stretching for three to five seconds and focusing attention.^{7,19} Progressive muscle relaxation is one of the complementary therapies that nurses can use as a non-pharmacological therapy. Progressive muscle relaxation can be given to pregnant women who experience sleep disturbances, back pain, anxiety and stress the benefits of progressive muscle relaxation therapy can provide a feeling of relaxation and calm, improve blood flow and reduce muscle tension.¹⁸⁻²⁰ One non-pharmacological treatment method for dealing with back pain in third trimester pregnant women is the progressive muscle relaxation technique which is carried out to reduce the intensity of back pain.²¹

With acupressure therapy at points, BL 23 and GV 3, based on the study, point GV 3 shows that acupressure influences reducing the level of back pain in pregnant women.^{15, 22} Acupressure measures to treat back pain at the Shenshu point, bladder point (BL 23) can facilitate blood flow located in the lumbar area on the same inferior line as the second lumbar spine spinous process, point (GV 3) can facilitate blood flow which is located between the third and fourth lumbar.^{17, 22, 23} There is a decrease in the intensity of back pain in pregnant women in the third trimester after performing acupressure at BL 23, which means that there is an influence of acupressure at BL 23 on the intensity of lower back pain in pregnant women in the third trimester.^{15, 22, 24} Thus, this study aimed to determine the difference in back pain intensity of pregnant women in the third trimester who underwent progressive muscle relaxation therapy and acupressure therapy at points BL 23 and GV 3.

Methods

The research design was carried out as a quasi-experiment with a two-group pretest and post-test design approach. The research was conducted at the Semarang City Maternity Clinic, Indonesia.

The number of respondents was 88 divided into two groups, 44 respondents underwent progressive muscle relaxation intervention and other 44 respondents underwent acupressure therapy intervention at points BL 23 and GV 3. Including criteria was: pregnant women in the third trimester who experienced back pain, older than 20 and younger than 35 years of age, gestational age more than 28 weeks and willingness to participate.

Interventions

The researcher delivered a questionnaire before the intervention (pretest) and examined the completeness of filling out the questionnaire. The in-

tervention stage was carried out by progressive muscle relaxation therapy and acupressure therapy at points BL 23 and GV 3 on each respondent with a prospective random sampling design. The final stage was to review the intensity of back pain by using a pain scale instrument called the numeric rating scale (NRS).²⁵

Statistical and data analysis

Univariate analysis was carried out on the variable intensity of back pain in third trimester pregnant women. Bivariate analysis was carried out to analyse differences in the effectiveness of reducing the intensity of back pain in third trimester pregnant women who underwent progressive muscle relaxation intervention and acupressure therapy at points BL 23 and GV 3. Bivariate analysis used the Wilcoxon test because the data was non-parametric with non-normal data distribution.

Results

The number of respondents was 88, 44 of third trimester pregnant women underwent progressive muscle relaxation intervention and 44 underwent acupressure therapy intervention at points BL 23 and GV 3. Characteristics of respondents is shown in Table 1.

Table 1: Characteristics of third trimester pregnant women with back pain

Parameter	N	%
Age (year)		
20-35	85	96.59
> 35	3	3.41
Gestational age (weeks)		
28-30	21	23.90
31-35	32	36.40
36-40	34	38.60
41-45	1	1.10
Occupation		
Private employee	36	40.90
Housewife	40	45.50
Teacher	5	5.70
Trader	5	5.70
Government employee	2	2.30
Total	88	100.00

Intensity of back pain of third trimester pregnant women before and after progressive muscle relaxation therapy intervention is shown in Table 2. The back pain scale before the progressive muscle relaxation intervention was a minimum of 5, a maximum of 8 and the average pain scale was 6.05 ± 0.834 . After progressive muscle relaxation intervention pain scale was a minimum of 2 and a maximum of 6 and the average pain scale was 3.93 ± 1.065 .

Intensity of back pain of third trimester pregnant women before and after acupressure intervention points BL 23 and GV 3 is shown in Table 3. The back pain scale before the acupressure therapy intervention at points BL 23 and GV 3 was a minimum of 4, a maximum of 7 and the average pain scale was 6.25 ± 0.811 . Pain scale after acupressure therapy was a minimum of 3 and a maximum of 6 and the average pain scale was 4.75 ± 0.918 .

The average reduction in pain intensity in the progressive muscle relaxation intervention was 2.12, while the average reduction in pain inten-

Table 2: Back pain in third trimester pregnant women before and after progressive muscle relaxation (PMR) therapy intervention according to the numerical rating scale (NRS)

NRS	n	Min	Max	Mean	SD	Z	p-value
Back pain before PMR	44	5	8	6.05	0.834	-5.834	< 0.001
Back pain after PMR	44	2	6	3.93	1.065		

n: number of participants; Min: minimum; Max: maximum, SD: standard deviation; Z: Wilcoxon test value;

Table 3: Back pain in third trimester pregnant women before and after acupressure intervention points BL 23 and GV 3 according to the numerical rating scale (NRS)

NRS	n	Min	Max	Mean	SD	Z	p-value
Back pain before acupressure intervention BL 23 and GV 3	44	4	7	6.25	0.811	-5.753	< 0.001
Back pain after acupressure intervention BL 23 and GV 3	44	3	6	4.75	0.918		

n: number of participants; Min: minimum; Max: maximum, SD: standard deviation; Z: Wilcoxon test value;

Table 4: Difference in means of back pain decrease in pregnant women in the 3rd trimester after progressive muscle relaxation intervention compared to acupressure at points BL 23 and GV 3

Research variable	Intervention	Mean	Z	p-value
Intensity scale of back pain for pregnant women in the 3rd trimester	Progressive muscle relaxation	2.12	-5.834	< 0.001
	Acupressure at points BL 23 and GV 3	1.50	-5.753	

sity in the BL 23 and GV 3 acupressure interventions was 1.50. There was an average difference in decrease of 0.62. Reduction of back pain in third trimester pregnant women with progressive motor relaxation intervention was more effective than acupressure therapy at points BL 23 and GV 3 (Wilcoxon test, $p < 0.001$) (Table 4).

Discussion

The research results showed that the age of the respondents was between 20-35 years old (96 %). In this study, data was obtained that the respondents were in the productive age range during pregnancy. The age range of 20-35 years is the ideal age during pregnancy where the reproductive organs develop optimally and psychological development is very good in preparing for pregnancy. The safest age for a woman to get pregnant is 20-35 years old, if the age is above or below this age there is a risk of complications during pregnancy and childbirth.^{3, 26} Pregnant women under the age of 20 are at risk of miscarriage, premature birth, anaemia in pregnancy, congenital abnormalities, easy

infection, poisoning and death.^{27, 28} Ages over 35 years are at risk of complications during pregnancy. The risk of pregnancy complications over the age of 35, where at that age there are changes in the tissues of the uterus and the birth canal is no longer flexible, which can result in high blood pressure, excess weight, diabetes and labour that is more difficult and prolonged are problems that can occur.²⁹ Other dangers that can occur are pre-eclampsia, premature rupture of membranes, obstructed labour and post-natal bleeding.³⁰

The back pain of pregnant women who underwent progressive muscle relaxation experienced a very significant reduction. In line with the study, back pain in third trimester pregnant women can be treated with progressive muscle relaxation therapy.^{18, 19} This occurs because back pain occurs due to muscle tension in the back and pelvic muscles, so by carrying out progressive muscle relaxation interventions, the tense muscles begin to relax and loosen. The progressive muscle relaxation technique is a method that can be used to overcome the intensity of back pain in pregnant women.¹⁸ The progressive muscle relaxation technique is a nursing intervention to

reduce back pain in pregnant women that has no side effects, is very easy for pregnant women to do themselves and costs nothing.

Progressive muscle relaxation is a complementary therapy for dealing with back pain in pregnant women that can be given or taught by nurses to clients. The principle of progressive muscle relaxation is to relax the muscles and mind by stretching and relaxing each group of muscles for five seconds and concentrating the mind followed by deep breathing and then releasing tension until the muscles become limp.²¹ The effect of progressive muscle relaxation provides a feeling of comfort that stimulates endorphin hormones. An increase in endorphin hormones in the blood can inhibit pain nerve endings and prevent pain stimuli from entering the spinal cord so that the quality of pain is reduced in the cerebral cortex.^{31, 32} Movements in progressive muscle relaxation help relax the muscles so that they become relaxed and then back pain can be controlled. Back pain is transmitted by visceral pain impulses originating from the back muscles and pelvic muscles through sensory nerve fibres that run in the sympathetic nerves.¹⁸

The results of this study showed that the back pain scale of pregnant women in the third trimester of respondents before the acupressure therapy intervention at points BL 23 and GV 3 was a minimum of 4, a maximum of 7, the average pain scale was 6.25. The respondents' pain scale after acupressure therapy intervention at points BL 23 and GV 3 was a minimum of 3 and a maximum of 6, the average pain scale was 4.75. Acupressure is a technique that applies physical pressure to the surface of the body which is a place for energy circulation and balance in cases of pain. For back pain, acupressure intervention at points BL 23 and GV 3 can also reduce back pain in pregnant women.²²⁻²⁴ When acupressure points are stimulated, there is a release of tension in the muscles or increased blood circulation, relaxing the pelvic muscles. Massaging at BL 23 can reduce back pain in pregnant women in the third trimester.²² The acupressure technique at points BL 23, GV 3 and GV 4 can effectively reduce back pain in third trimester pregnant women. Acupressure energy at acupuncture points will flow through the meridians to the target organs. Stimulation or sedation of target organs will affect changes in biochemistry, physiology and perception/taste.¹⁶

The acupressure mechanism contributes to

the stimulation of the pituitary-hypothalamus complex, releasing β -endorphins systemically into the bloodstream from the pituitary gland, resulting in the release of β -endorphins accompanied by the release of adrenocorticotrophic hormone.²³ Biochemical changes can occur in the form of increased serotonin and endorphin levels, physiological changes can occur in the form of oxygen activity and blood flow and changes in perception/taste can occur in the form of decreased pain levels.¹⁷

Progressive muscle relaxation is more effective in reducing back pain in the third trimester of pregnant women by the principle of the progressive muscle relaxation movement is a combination of deep breathing relaxation with contraction-relaxation of the muscles, thus causing a pleasant feeling of comfort and relaxation.²¹ The effect of progressive muscle relaxation training is that the parasympathetic nerve fibres will be active and activate endorphin hormones which function to get a happy effect and return the body to a normal condition so that the muscles relax and reduce pain, anxiety and stress.^{19,31} A relaxation technique that can reduce tension, is comfortable because it is equipped with deep breathing exercises and a series of movements from the face to the feet so that it can stimulate the release of endorphins hormones and reduce feelings of pain.³¹

In this study, the results showed that progressive muscle relaxation was more effective for dealing with third trimester pregnant women's back pain compared to acupressure at points BL 23 and GV 3. This was because there was an active process from the respondents to carry out muscle relaxing movements coupled with deep breathing relaxation, then also perform muscle movements both on the face, body and legs to increase muscle relaxation; widen blood vessels reduce pain due to spasm or stiffness in the muscles.^{19, 31} Progressive muscle relaxation is identifying tense muscles and then reducing tension by carrying out progressive muscle relaxation techniques to get a relaxed feeling so that it can reduce pain.^{18, 21} Acupressure at points BL 23 and GV 3 in this study can also reduce back pain for pregnant women in the third trimester, however when compared with progressive muscle relaxation it is less effective.^{15, 17, 22} This is because the implementation of acupressure is only carried out once, so the intervention needs to be repeated so that the results will be maximal. The frequency of acupressure therapy performed 2 times is more effective than 1 intervention.²⁴

Conclusion

Back pain for pregnant women in the third trimester can be treated with progressive muscle relaxation therapy or acupressure at points BL 23 and GV 3 to reduce back pain. Both therapies can be used to reduce back pain for pregnant women in the third trimester with the right methods and techniques. Progressive muscle relaxation therapy was more effective. Progressive muscle relaxation can be done by pregnant women themselves when back pain occurs.

Ethics

This study was approved by the Health Research Ethics Committee Universitas Muhammadiyah Semarang, Indonesia (decision No 230/KE/09/2023, dated 11 December 2023).

Acknowledgement

We would like to express our gratitude to any parties for support in this study.

Conflicts of interest

The authors declare that there is no conflict of interest.

Funding

We would like to express our thanks to Universitas Muhammadiyah Semarang for funding support.

Data access

The data that support the findings of this study are available from the corresponding author upon reasonable individual request.

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