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The Impact Of Lumbar Stabilization Exercise On The Quality Of Life Of Pregnancy-Related Back Pain

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ABSTRACT

Introduction: The developmental process of the fetus disrupts the daily activities of pregnant women, leading to musculoskeletal system disorders, mainly back pain. Fetal development causes postural changes and a shift in the body's centre of gravity to the anterior of the pregnant woman, resulting in paraspinal muscle tension and abdominal muscle weakness. Ignoring back discomfort during pregnancy can negatively affect a woman's overall health and happiness. Lumbar Stabilization Exercises are physical activities that aim to enhance neuromuscular function, strengthen the lower back, and improve flexibility, all of which contribute to maintaining spinal stability. This study aims to determine the effect of lumbar stabilisation exercise on the quality of life of pregnant women experiencing discomfort from back pain**. Methods:** The subjects of this study are pregnant women located at the Puskesmas Kartasura worksite who experience complaints of back pain. We assigned 11 respondents to the treatment group who underwent the exercise therapy known as LSE. We assigned another 11 respondents to the control group, who attended prenatal classes either in the village or at the clinic. We used the WHOQOOL Bref-Ina as the quality-of-life questionnaire. The data analysis involved using univariate analysis, normality tests, homogeneity tests, influence tests, and difference tests. **Results:** This study found that Lumbar Stabilization Exercise (LSE) affects the quality of life of pregnant women who report back pain (p = 0.000); however, there is no statistically significant difference (p = 0.902) between the treatment group and the control group. **Conclusion:** Lumbar Stabilization Exercises (LSE) effectively improve the quality of life for pregnant women experiencing back pain, as evidenced by significant improvements in physical, psychological, social, and environmental domains.

Keywords: *Lumbar Stabilization, Exercise On The Quality Of Life Of Pregnancy-Related Back Pain*

INTRODUCTION

The process of fetal development disrupts the regular activities of pregnant women, resulting in discomfort, particularly back pain. Back discomfort presents a multifaceted challenge for pregnant women, affecting the musculoskeletal system (Arummega, Rahmawati, & Meiranny, 2022; Nurlitawati, Aulya, & Widowati, 2022). During pregnancy, three types of back pain manifest low back pain (LBP) in the lumbar region, pelvic girdle pain (PGP) in the sacroiliac joint region, and lumbo pelvic pain (LPP) affecting both the lumbar and sacroiliac joint areas. Franke et al. (2017) and Weis et al. (2018) indicate that pregnancy-related back pain often peaks between weeks 24 and 28. Puspitasari and Ernawati (2020).

Approximately 30–78% of pregnant women outside Asia, including those in England, Scandinavia, the United States, Europe, and Africa, report suffering back pain throughout pregnancy. In Asia, particularly in Indonesia and Kartasura, 17–64.5% of pregnant women report back pain. (Fatmarizka, Khasanah, and Arwida, 2021; Nurlitawati, Aulya, and Widowati, 2022; Rusniawati, 2022). Previous research on the prevalence of back pain among pregnant women in Kartasura District indicated that 18.6% of respondents experienced low back pain, 64.3% reported pelvic girdle discomfort, and 17.1% reported lumbopelvic pain. The statistics are

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derived from a total of 140 responders among 225 pregnant women in Kartasura District. (Fatmarizka, Khasanah, & Arwida, 2021).

Back discomfort arises from postural alterations and the anterior displacement of body gravity in pregnant women, such as a larger abdomen inducing strain in the paraspinal muscles. Alongside muscle stress, there is a deficiency in the abdominal muscles attributable to the loss of tone and strength. The iliac ligaments in the pelvis become slack, resulting in increased lumbar hyperlordosis, which enhances pelvic flexibility and exerts pressure on the significant blood arteries in the pelvis and back. Back pain during the third trimester of pregnancy is primarily attributed to diminished blood circulation to the spine. Reversed, leading to heightened pressure Casagrande et al. (2015) Casagrande et al. (2015), Elia et al. (2017), and Lima et al. (2017) Pregnant women may have interruptions in their regular activities owing to back pain. Insufficient management of back pain in pregnant women can considerably affect their quality of life and impede their capacity to engage in daily activities. Lima et al. (2017) and Arummega, Rahmawati, and Meiranny (2022) assert that insufficient management of back pain in pregnant women can profoundly affect their quality of life and impede their capacity to engage in daily activities.

The WHO defines quality of life as an individual's subjective evaluation of their well-being, considering their cultural background, values, environment, goals, expectations, standards, and worries. (Baherta et al., 2022). Lumbar stability exercises are frequently included in therapeutic regimens to alleviate back pain. The Lumbar Stabilization Exercise aims to build muscle strength, endurance, and neuromuscular control, which are crucial for maintaining stability in the spine and trunk. Lumbar stabilization exercises significantly influence the postural control of pregnant women. The research conducted by Fontana Carvalho et al. (2020) and Hikhmah, Noviana, and Pahlawi (2022) corroborates this assertion.

The research (Fontana Carvalho et al., 2020) showed that lumbar stabilization exercise (LSE) and stretching exercise (SE) alleviated pain in pregnant women experiencing low back pain by evaluating their impact on pain reduction, disability, postural control, and muscle activation. Low back pain mostly arises from diminished lumbar stability and weakness in the core musculature of the back. The 2022 study by Hikhmah, Noviana, and Pahlawi corroborates this finding. The M. transversus abdominis and M. lumbar multifidus serve as the primary stabilizers in the lumbar area; hence, Lumbar Stabilization Exercise can engage these muscles. This exercise can equilibrate the function of the lumbar muscles and alleviate discomfort. Fitriani (2019) asserts that providing workouts to pregnant women can alleviate back discomfort and enhance psychological well-being by diminishing tension, despair, and anxiety.

An enhancement in psychological well-being will elevate the quality of life for a pregnant woman.

The author's decision to explore "The Effect of Lumbar Stabilization Exercise on the Quality of Life of Pregnant Women with Back Pain Complaints" is grounded in the preceding explanation. Furthermore, there is a deficiency of research in Indonesia about the therapy of back pain and its effects on the quality of life of pregnant women.

METHODS

This research uses the quasi-experimental method, which is a quantitative study. The researcher conducts a quasi-experiment directly, without the ability to control external factors that could influence the experimental process. (Fenti, 2020). The research employed a pre-test and post-test design with a control group. This study involves two groups: the treatment group, which receives Lumbar Stabilization Exercise, and the control group, which does not receive it but continues to participate in activities in the village's pregnant women's class or at the midwife clinic. The activities in the village's pregnant women's class are usually filled with educational

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sessions from other medical personnel. In this study, we used the WHOQOL-BREF post-test and pre-test to assess the quality of life in pregnant women. The Kartasura Subdistrict Health Center, Sukoharjo, undertook the research in 12 villages, conducting the assessment period from October 2023 to January 2024.

This study examines a population of 166 pregnant women in the Kartasura area. We used purposive sampling as the sampling method. Purposive sampling is a method of selecting individuals or elements of a study based on specific criteria or characteristics. (Sugiyono, 2010). We obtained the sample until we met the quota, which included the following inclusion criteria: (1) pregnant women aged >18; (2) pregnant women in the second and third trimesters; (3) complaints of back pain that began during pregnancy; and (4) NRS back pain score >4; (5) At least one specific test for back pain is positive; (6) Respondents have good cognitive ability and are capable of communicating well. However, the exclusion criteria include: (1) a high-risk pregnancy; (2) a history of miscarriage. The respondent has exercise contraindications that, according to ACOG, pose a risk to pregnancy. (4) Undergoing back pain treatment in the last 3 months; (5) History of spinal surgery. There were 22 respondents who filled out the questionnaire. In the treatment group, there are 11 respondents; in the control group, there are 11 respondents.

The study conducted LSE training three times a week for six weeks. Each session takes about 30 minutes. Cohort studies, which assess umbilical artery blood flow, fetal heart rate, and biophysical profile before and after exercise, demonstrate that pregnant women can tolerate 30 minutes of exercise well. (Gynecologist, 2015). Individuals perform LSE exercises under the guidance of a facilitator. The moderate intensity of LSE exercises stems from the 20–30-minute duration of the movements, which adhere to ACOG guidelines. LSE exercises use equipment such as a gym ball and yoga mat. The LSE exercises consist of five movements: the Warm up, Tonic Perineum, Tonis Synergysm, Trunk Mobility, Balance, and Cooling Down. For the warm-up movement, it involves walking in place for 3 minutes. Meanwhile, the cooling-down movement involves the pregnant woman sitting on a gym ball and then rotating it for 3 minutes. The duration of the LSE exercise is determined by the respondents' requests.

As part of the data collection process, several questionnaires are used, including we use the respondent characteristics questionnaire to gather general information and characteristics of the respondents. The study will include and sample the respondents if they meet the criteria corresponding to the items in this questionnaire.

We use the Body Chart Questionnaire to pinpoint the respondents' pain location and classify the resulting information into patterns of back pain complaints in pregnant women. (3) The Indonesian version of the World Health Organization's (2004) quality of life questionnaire, known as "WHOQOL-BREF", demonstrates validity results of r=0.89-0.95 and reliability results of r=0.66-0.87 (Permatasari, 2019). Thus, these validity and reliability values indicate that WHOQOL-BREF is valid and reliable in measuring the quality of life of pregnant women. Specific tests to diagnose pelvic Girdle pain (PGP) has high sensitivity (81–93%) and specificity (80–90%) for diagnosing PGP (Walters, West, and A Nippita, 2018). There are specific tests available to diagnose low back pain (LBP). The sensitivity for the Patrick Test is high at 89%, and the specificity is 100%. (Walters, West, and A Nippita, 2018)

We used the IBM SPSS statistical program to analyze the study's data and determine the frequency and percentage of respondents. Each group underwent the Shapiro-Wilk normality test, and the variable homogeneity test used the Levene statistic. There are two types of the effect tests. The first is the paired sample test, using the Paired Sample T-test for normally distributed data and the Wilcoxon test for non-normally distributed data. The second is the two independent sample tests, which employs the independent T-test for both normally distributed and homogeneously distributed data. We use the

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Mann-Whitney test if neither of the data is normally distributed or homogeneous.

RESULTS

Univariate Test

Table 1. Frequency distribution and percentage of respondent characteristics

Karakteristik	F	%
Age		
23-28	10	45,5
29-33	9	40,9
34-39	3	13,6
Gestational		
Trimester 2 (14-27 week)	18	81,8
Trimester 3 (28-41 week)	4	18,2
Parity Of Pregnancy		
Pregnancy 1	9	40,9
Pregnancy 2	19	45,5
Pregnancy 3	1	9,1
Pregnancy 4	1	4,5
Back Pain Pattern		
Low Back Pain	8	36,4
Pelvic Girdle Pain	8	36,4
Lumbo Pelvic Pain	6	27,3
Numeric Rating Scale		
Moderate Pain	20	90,9
Severe Pain	2	9,1
Profession		
Housewife	15	68,2
Employe	7	31,8
Total	22	100

Table 1 indicates that among 22 responses, the predominant age group of pregnant women is 29-33 years, comprising 10 individuals (45.5%). The bulk of participants are in the second trimester, comprising 18 individuals (81.8%). In Kartasura District, the predominant parity among pregnant women is 2, comprising 10 individuals (45.5%). Simultaneously, the predominant pain categories are Low Back Pain and Pelvic Girdle Pain, both affecting 8 individuals (36.4%). The predominant pain level recorded using the NRS was moderate, reported by 20 individuals (90.0%). In Kartasura District, the predominant occupation of pregnant women is housewife, comprising 15 individuals (68.2%).

Table 2. Univariate Quality Of Life

Keterangan	Mean ± STDEV		Modus		Min		Max		Range		Median	
	Experiment	Control	Experiment	Kontrol	Experiment	Control	Experiment	Control	Experiment	Control	Experiment	Control
WHOQOL Bref Ina Pre	**88,90 ± 10,57**	**86,09 ± 7,84**	**87**	**89**	**75**	**72**	**111**	**101**	**36**	**29**	**87**	**85**
Domain 1	64,36 ± 12,28	59,09 ± 14,14	56	50	44	31	88	81	44	50	63	56
Domain 2	68,36± 9,91	65,81 ± 10,96	63	56	56	56	88	81	32	25	69	63
Domain 3	68,18 ±14,14	71,63 ± 13,76	56	75	44	50	94	100	50	50	69	75
Domain 4	69,36± 10,74	70,09 ± 7,01	56	69	56	63	88	81	32	18	69	69
WHOQOL Bref Ina Post	**101,81 ± 7,16**	**72,45 ± 13,20**	**105**	**67**	**90**	**51**	**113**	**99**	**23**	**48**	**104**	**67**
Domain 1	84,36 ± 11,81	55,81± 15,39	88	38	56	31	94	81	38	50	88	56
Domain 2	80 ,18± 8,81	46,27 ± 16,34	75	38	69	19	94	69	25	50	81	38
Domain 3	82,45 ± 14,01	55,72 ± 15,65	94	50	56	31	100	81	44	50	81	50
Domain 4	79,45 ± 6,28	49,63 ± 18,79	81	44	69	19	94	94	25	75	81	44

According to Table 2, prior to the exercise, the treatment group exhibited a total WHOQOL Bref-Ina score with an average of 88.90, a median of 87, and a mode of 87. In the treatment group prior to the exercise, domain 1 (physical health) exhibited the lowest score, whereas domain 4 (environment) demonstrated the greatest score. Conversely, the control group had an average of 86.09, a median of 85, and a mean of 89. In the control group, domain 1 (physical health) had the lowest score, whereas domain 3 (social interactions) demonstrated the highest score. The post-exercise results indicated that the therapy group had a WHOQOL Bref-Ina score with an average of 101.81, a median of 104, and a mode of 105. In the treatment group post-exercise,

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domain 4 (environment) exhibited the lowest score, whereas domain 1 (physical activity) demonstrated the highest score. Simultaneously, the control group exhibited an average of 72.45, a median of 67, and a mode of 67. In the control group, domain 2 (psychological) exhibited the lowest score, whereas domain 1 (physical activity) recorded the highest score.

Bivariate Test

Table 3. Normality Test

Group	Experiment	Control
Average Quality Of Life (Pre-Test)	88,90	86,09
P - Value	0,093	0,886
Average Quality Of Life (Post-Test)	101,81	72,45
P-Value	0,405	0,723
Difference	14,00	13,63
P-Value	0,925	0,813

The normality test of the data in Table 3 indicates the average quality of life in the treatment group during the pre-test and post-test phases. The test follows a normal distribution, as the p-value exceeds 0.05. The control group's mean quality of life at both the pre-test and post-test exhibits a normal distribution, with a p-value surpassing 0.05. A p-value exceeding 0.05 typically distributes the disparity between the pre-test and post-test.

Homogenity Test

Table 4. Homogenity Test

Group	P-Value
Experiment	0,612
Control	0,612

The normality test of the data in Table 3 indicates the average quality of life in the treatment group during the pre-test and post-test phases.

The test follows a normal distribution, as the p-value exceeds 0.05. The control group's mean quality of life at both the pre-test and post-test exhibits a normal distribution, with a p-value surpassing 0.05. A p-value exceeding 0.05 typically distributes the disparity between the pre-test and post-test (table 4).

Influence Test

Table 5. Paired Sample T-test

Group	Average Quality Of Life Pre-Test	Average Quality Of Life Post-Test	P-Value
Experiment	88,90	101,81	0,000
Control	86,09	72,45	0,000

Table 5 illustrates the impact assessment for the data. The LSE treatment group exhibited an average quality of life score of 88.90 in the pre-test and 101.81 in the post-test. The treatment group exhibited a p-value of 0.000 (<0.005), indicating that LSE significantly influences the quality of life of pregnant women with back pain. Simultaneously, the data shows that the control group achieved an average quality of life score of 86.09 in the pre-test, while the control group achieved a score of 86.09 in the post-test. achieved an average score of 72.45, accompanied by a p-value of 0.000 (<0.005). The LSE significantly affects the quality of life of pregnant women with back discomfort. A difference test is essential due to the substantial impact on the quality of life in both groups.

Conduct a difference test by comparing the pre-evaluation and post-test outcomes of each group. The mean difference in pre-post findings for the treatment group is 14.00, whereas the mean difference for the control group is 13.63. The table below presents the outcomes of the difference test:

Difference Effect Test

Table 6. Test of Differences in Effects of Experiment Groups and Control Groups

Group	Average difference between Pre-Test and Post-Test	P-Value
Experiment	14,00	0,000
Control	13,63	0,000

The Independent Sample T-test analysis reveals a statistically significant disparity in quality of life between the treatment and control groups for pregnant women experiencing back pain. The data indicate a p-value of 0.000 (< 0.005).

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DISCUSSION

Characteristics of Respondents

The majority of respondents (45.5%) in this study were between the ages of 29 and 33. This is in line with Tri, Gita, and Emy (2018) who revealed that the onset of back pain often occurs at the age of 20 and reaches maximum intensity at the age of 40. Back pain is more severe in pregnant women.

Age-related discomfort is a result of changes in body posture and the movement of the center of gravity. Most respondents experiencing back pain were in the second trimester of pregnancy, totaling 18 people (81.8%). Lin (2017) states that the age of pregnancy and weight gain primarily cause back pain in pregnant women, typically manifesting between the 24th and 28th weeks of pregnancy. Therefore, experts advise pregnant women to begin exercising in the second trimester, specifically after 22 weeks.

The respondent data for the parietal category revealed that the most common condition, second pregnancy parietas, affected 10 people (45.5%). This aligns with the findings of Fithriyah, Dyah, and Sari (2020), who suggest that women who are multiparous (having more than one pregnancy) are more susceptible to back pain than those who are pregnant for the first time. This is due to the weaker muscles of multiparous women, which may lead to their muscles failing to support the expanding uterus. The most common back pain patterns among the respondents were low back pain and pelvic girdle pain, with 8 individuals (36.4%) reporting both sThis aligns with the findings of Fatmarizka, Khasanah, and Arwida (2021), which suggest that most pregnant women experience low back pain and pelvic girdle pain patterns. This is due to the laxity of the iliac ligaments in the pelvis, which leads to an increase in lumbar hyperlordosis. This increased flexibility of the pelvis puts pressure on the major blood vessels in the pelvis and back (Casagrande et al., 2015; Emilia et al., 2017; Lima et al., 2017).

The characteristics of the respondents regarding their pain levels, as measured by the NRS, revealed that the majority, 20 individuals (90.9%), experienced moderate pain. This is consistent with the study by Devi and Nurul (2019), which found that out of 30 respondents, 22 experienced moderate pain due to back pain. The intensity of back discomfort will increase.

As pregnancy progresses, the larger uterus, excessive bending, continuous walking without rest, and increased levels of physical strain play a significant role (Lin, 2017). As many as 15 respondents (68.2%) have characteristics of housewives. This aligns with the findings of Arummega, Rahmawati, and Meiranny (2022), who found that household tasks like sweeping, mopping, caring for children, cooking, and washing clothes can exert pressure on the lower back area, leading to changes in body load mechanics during pregnancy.

Quality of Life

Table 2 shows an increase in domain 1, specifically the physical activity dimension, from 64.36 to 84.36 in the treatment group. The control group showed a decrease from 59.09 to 55.81. Pregnant women often experience symptoms such as dizziness, pain in the back and pelvis, and difficulty sleeping due to back pain, which can lead to discomfort and weakness. This aligns with the findings of Fontana Carvalho et al. (2020), who suggest that LSE can enhance postural control by restoring neuromuscular control, promoting coordination and spinal stability, and ultimately reducing back pain during pregnancy. Relieving back pain can improve the comfort of daily activities for pregnant women. Physical factors include aspects such as the ability to perform daily activities, mobility, the intensity of assistance from others, sleep disturbances, and discomfort. (Puspitasari and Sulistyorini, 2021)

In this study, domain 2, specifically the psychological aspect in the treatment group, showed an increase from 68.36 to 80.18. In contrast, the control group experienced a decrease from 65.81 to 46.27. During pregnancy, women often experience psychological discomfort due to anxiety about the delivery process. Furthermore, the psychological discomfort of pregnant women often correlates with physical discomfort. (Wulandari and Wantini, 2021). Psychological

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factors consist of aspects of self-perception, positive feelings, and negative feelings about pregnancy. (Puspitasari and Sulistyorini, 2021). According to Winarni et al. (2020), the breathing technique in LSE movements can help reduce stress levels in pregnant women and help the body calm down and focus on thoughts to reduce anxiety.

In this study, domain 3, which is the dimension of social relationships, showed an increase from 68.18 to 82.45 in the treatment group. The control group experienced a decrease from 71.63 to 55.72. Pregnant women with back pain may find it difficult to engage in physical activities with friends, neighbors, and family (Bahadoran and Mohamadirizi, 2015). Social support from family and friends can be effective in improving the physical activity levels of pregnant women who experience a decrease in activity due to back pain, whether through direct contact or or phone.

The results of the treatment group in domain 4, specifically the environmental dimension, showed an increase from 69.36 to 79.45. The control group experienced a decrease from 70.90 to 49.63. Most pregnant women feel worried about the cost of childbirth, and they receive information about pregnancy from midwives or community health centers. (Puspitasari and Sulistyorini, 2021). Environmental factors include financial issues, social health insurance, information access, the physical environment, recreation, and hobbies, as well as transportation. (Puspitasari and Sulistyorini, 2021). According to Astuti and Afsah, 2019) Exercise can improve the well-being of pregnant women, enabling them to regularly attend prenatal classes or clinics to obtain information about pregnancy, as well as engage in recreational activities or hobbies they frequently engage in.

The Influence of LSE on the Quality of Life of Pregnant Women with Back Pain Complaints

Based on the difference in average quality values before and after the exercise, the research and paired sample t-test on Table 5 revealed an increase in the average quality of life among pregnant women who received LSE for six weeks. With a p-value of 0.000, the effect test results in the treatment group showed that LSE had an impact on improving the quality of life of pregnant women who reported back pain. Meanwhile, the control group, after participating in activities in the pregnant women's class, either in the village or at the clinic, showed a decrease in the average quality of life for pregnant women. The effect test in the control group yielded a p-value of 0.000, indicating a decrease in quality of life among pregnant women with back pain who did not receive LSE. This study revealed that back pain among respondents could interfere with physical activities, psychological well-being, social relationship support, and the availability of information from the surrounding environment. According to Setiawan and Wungouw (2013), maintaining a good lifestyle and exercising regularly can improve the quality of life. According to Fontana Carvalho et al. (2020), LSE can reduce back pain status and improve postural balance and spinal stability. This type of exercise is commonly referred to as lumbar stabilization. Exercise for the back improves neuromuscular control, strength, and muscle endurance. Ensuring spinal and back stability Dynamic is crucial in minimizing back discomfort (Megy Taufik dkk, 2023).

The results from the control group showed a decrease in quality of life, in line with the research (Anggasari, 2021). There is a correlation between irregular pregnancy activities and the discomfort experienced by pregnant women. Only the control group attended prenatal classes in the village, typically held once a month, and prenatal yoga classes at the clinic, typically held every two weeks. Consequently, the control group's back pain exercises were less intense than those of the treatment group, who received LSE three times a week. Therefore, the intensity of the exercises was lower in the control group, leading to a decline in their quality of life. Several factors, including physical, mental health, social, and environmental factors, influence the quality of life of pregnant women. (Puspitasari and Sulistyorini, 2021).

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Differences in the Effect of LSE on the Quality of Life of Pregnant Women with Back Pain Complaints in the Treatment and Control Groups

The results of the independent sample t-test in Table 6 show that there is a statistically significant difference between the treatment group and the control group in terms of the impact on the quality of life of pregnant women reporting back pain. The treatment group positively improved the quality of life of pregnant women due to the regular and appropriately intense implementation of LSE exercises, which effectively reduced back discomfort. According to Arummega, Rahmawati, and Meiranny (2022), lower back discomfort adversely affects pregnant women's capacity to perform daily activities and leads to reduced participation.

CONCLUSION

The study demonstrates that Lumbar Stabilization Exercises (LSE) effectively improve the quality of life for pregnant women experiencing back pain, as evidenced by significant improvements in physical, psychological, social, and environmental domains. The intervention group's consistent participation in LSE resulted in better postural control, reduced discomfort, and enhanced overall well-being compared to the control group, which exhibited a decline in quality of life. These findings highlight the potential of LSE as a beneficial non-invasive therapeutic option for managing pregnancy-related back pain, thereby promoting a healthier and more comfortable pregnancy experience.

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