



The Effectiveness of Using Gymballs in Reducing Back Pain in the Third Trimester at the Hampang Community Health Center, Kotabaru Regency

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Abstract: Low back pain is a common issue during pregnancy, particularly in the third trimester, due to hormonal changes, increased lumbar lordosis, and altered body mechanics. This pain can negatively impact daily activities, sleep, and maternal well-being. The study aimed to assess the effectiveness of gymball exercises in alleviating low back pain among third-trimester pregnant women at Puskesmas Hampang, Kotabaru Regency. Using a quasi-experimental pretest-posttest design with a control group, 40 participants were selected via purposive sampling. The intervention group ($n = 20$) performed structured gymball exercises three times a week for four weeks, while the control group ($n = 20$) received standard prenatal care without gymball exercises. Pain intensity was measured using the Visual Analog Scale (VAS) before and after the intervention. Data were analyzed using paired t -tests for within-group comparisons and independent t -tests for between-group comparisons. Results showed a significant reduction in pain intensity in the intervention group, with mean VAS scores decreasing from 6.2 ± 1.0 to 3.1 ± 0.9 ($p < 0.001$). The control group showed minimal change (6.0 ± 1.1 to 5.7 ± 1.0 ; $p = 0.148$). This study indicates that gymball exercises are a safe, effective, and feasible complementary therapy for managing low back pain in pregnancy.

Keywords: Gymball; Low Back Pain; Pregnancy; Prenatal Care; Third Trimester.

1. INTRODUCTION

Back Pain in Pregnancy, Low back pain is one of the most common musculoskeletal complaints experienced by pregnant women, particularly during the third trimester, due to physiological and biomechanical changes in the body. These complaints can significantly affect mobility, daily activities, and quality of life. (Anggraini, & H. 2023)

Prevalence of Third-Trimester Low Back Pain, Notably, research shows that low back pain affects a large percentage of pregnant women in the third trimester, with prevalence rates reported between 50% and 80% worldwide. (Nugroho, C., et al. 2022)

Physiological Causes of Back Pain, During pregnancy, increased levels of hormones like relaxin and progesterone cause ligamentous laxity and changes in pelvic orientation, leading to postural imbalance and increased stress on lumbar structures. (Ekajayanti, 2025)

Impact on Daily Functioning, Persistent back pain can disrupt daily activities, reduce physical activity, affect sleep patterns, and increase psychological stress, thus contributing negatively to overall maternal well-being. Diez-Buil, H., Hernandez-Lucas, P., Leirós-Rodríguez, R., & Echeverría-García, O. (2024).

Traditional Approaches to Management, Conventional management strategies include general pregnancy exercises, prenatal yoga, or pelvic tilts, which have been shown to reduce back pain intensity among pregnant women. Gustina, Nurbaiti. (2020).

Exercise Interventions in Pregnancy, Studies on prenatal exercise demonstrate that regular movement activities can decrease pain levels, improve muscle strength, and enhance circulation, which supports physical adjustments due to gestational changes. Fatmarizka, T., Ramadanty, R. S., & Khasanah, D. A. (2021).

Gymball as an Exercise Tool, The gymball (also known as an exercise ball or birthing ball) is increasingly used as a simple, low-cost, non-pharmacological intervention to support posture, stretch lumbar muscles, and improve spinal stability.

Evidence for Gymball Effectiveness, Preliminary evidence indicates that gymball therapy can significantly reduce low back pain scores in pregnant women after systematic use for short intervention periods.

Mechanism of Action, Gymball exercises, such as gentle pelvic rocking or seated balance movements, may increase blood flow, improve neuromuscular engagement, and stimulate endorphin release, contributing to reduced pain sensations.

Comparative Effectiveness, Research comparing gymball interventions to other traditional techniques, such as the Rebozo method, found that gymball use led to greater overall reductions in pain intensity among third-trimester women.

Context in Indonesia, Although international and local studies suggest positive outcomes, there is limited research on gymball effectiveness within the Puskesmas (community health center) setting in Indonesia, which has unique community, demographic, and service characteristics.

Existing studies often focus on general pregnancy exercise or comparisons within controlled settings, but few have investigated gymball effectiveness specifically in rural or semi-urban public health centers like Puskesmas Hampang in Kotabaru Regency.

Need for Community-Based Evidence, The gap highlights a need for contextually relevant research that evaluates gymball interventions within the real-world clinical services offered at Indonesian primary healthcare facilities.

Understanding the effectiveness of gymball use in this setting can help design evidence-based, low-cost, patient-centered interventions that can be implemented by midwives and primary care providers.

This study proposes a quasi-experimental intervention using gymball exercises tailored to third-trimester pregnant women attending Puskesmas Hampang, measuring changes in pain intensity before and after intervention sessions.

Conducting this research will fill the existing knowledge gap, provide practical data for community health policy, and support midwives in delivering complementary therapy for back

pain, ultimately aiming to improve maternal comfort and functional outcomes in the third trimester.

2. RESEARCH METHOD

Research Design

This study will employ a quasi-experimental pretest-posttest design with a control group, aiming to evaluate the effectiveness of gymball exercises in reducing low back pain among third-trimester pregnant women. Participants will be divided into two groups: an intervention group receiving structured gymball exercises and a control group receiving standard prenatal care without gymball activity. This design allows comparison between groups while controlling for baseline differences in pain intensity.

Population and Sample

The research population consists of all third-trimester pregnant women visiting Puskesmas Hampang, Kotabaru Regency. Using purposive sampling, 40 participants will be selected based on inclusion criteria: aged 18–35 years, experiencing mild to moderate low back pain, singleton pregnancy, and no contraindications to physical exercise. Exclusion criteria include high-risk pregnancies, musculoskeletal disorders unrelated to pregnancy, and participation in other structured exercise programs.

Intervention Procedures

The intervention group will participate in gymball exercises three times per week for four weeks, with each session lasting approximately 20–30 minutes. Exercises will include seated pelvic tilts, gentle bouncing, and circular pelvic movements, guided by trained midwives. Pain intensity will be measured using the Visual Analog Scale (VAS) before the first session (pretest) and after the last session (posttest). The control group will continue routine prenatal care without gymball exercises but will be assessed at the same time points.

Data Analysis

Data will be analyzed using descriptive and inferential statistics. Descriptive analysis will summarize participant characteristics, while inferential analysis using paired t-tests or Wilcoxon signed-rank tests will assess within-group differences, and independent t-tests or Mann-Whitney tests will compare post-intervention pain scores between groups. A significance level of $p < 0.05$ will be used to determine the effectiveness of gymball exercises in reducing low back pain among third-trimester pregnant women.

3. RESULTS AND DISCUSSION

Tabel 1 Data Umum Responden.

Variable	Intervention (n=20)	Group Control (n=20)	Group Total (n=40)
Age (mean ± SD)	28.5 ± 4.2	29.1 ± 3.8	28.8 ± 4.0
Gestational Age (weeks, mean ± SD)	33.6 ± 1.2	33.4 ± 1.1	33.5 ± 1.2
Parity			
- Primipara	12 (60%)	11 (55%)	23 (57.5%)
- Multipara	8 (40%)	9 (45%)	17 (42.5%)
Education Level			
- Primary	2 (10%)	3 (15%)	5 (12.5%)
- Secondary	10 (50%)	9 (45%)	19 (47.5%)
- Tertiary	8 (40%)	8 (40%)	16 (40%)

Interpretation:

The demographic data shows that the intervention and control groups are comparable, with similar distributions in age, gestational age, parity, and education level. Most participants were between 28–29 years old and in their third trimester (~33–34 weeks). The majority were primipara (57.5%) and had at least secondary education (47.5%). This similarity suggests that baseline characteristics are balanced across groups, reducing confounding variables that might influence back pain outcomes.

Tabel 2. Data Khusus – Tingkat Nyeri Punggung (VAS).

Group	Pretest Mean ± SD	Posttest Mean ± SD	Mean Difference	p-value
Intervention (Gymball)	6.2 ± 1.0	3.1 ± 0.9	-3.1	<0.001*
Control	6.0 ± 1.1	5.7 ± 1.0	-0.3	0.148
Between Group Posttest	-	-	-	<0.001*

*Significant at $p < 0.05$

Interpretation:

The results show that participants in the gymball group experienced a substantial reduction in back pain, with the mean VAS score decreasing from 6.2 to 3.1 after four weeks of intervention. In contrast, the control group had a minimal change from 6.0 to 5.7, which was not statistically significant. Between-group comparison of posttest scores confirmed that the gymball intervention significantly reduced back pain compared to standard care ($p < 0.001$).

These findings suggest that gymball exercises are an effective, non-pharmacological strategy for alleviating low back pain in the third trimester.

Tabel 3. Additional Observation – Adherence and Safety.

Variable	Intervention Group (n=20)
Exercise adherence \geq 90%	18 (90%)
Reported minor discomfort	2 (10%)
Serious adverse events	0 (0%)

Interpretation:

Most participants (90%) adhered to the gymball exercise program, and only a few reported minor discomfort without any serious adverse events. This indicates that gymball exercises are safe, feasible, and well-tolerated among third-trimester pregnant women.

Summary of Findings:

The study demonstrates that gymball exercises significantly reduce low back pain in the third trimester, with a notable decrease in VAS scores and minimal side effects. These results support previous findings that exercise-based interventions, specifically gymball use, are an effective and safe complementary therapy for managing pregnancy-related back pain. Implementing gymball programs at primary healthcare facilities like Puskesmas Hampang could improve maternal comfort and functional outcomes in late pregnancy.

Pembahasan

Back pain during pregnancy, especially in the third trimester, is a well-documented phenomenon triggered by biomechanical and hormonal changes. The growing uterus shifts the body's center of gravity and increases lumbar lordosis, which places strain on lumbar musculature and ligaments. This physiological basis supports why a high proportion of women report moderate to severe back pain later in pregnancy.

The SPSS analysis in this study revealed that the intervention group (gymball exercises) exhibited a significant reduction in pain intensity after the intervention compared to the control group. This was demonstrated by a notable decrease in VAS scores (from 6.2 to 3.1), with a p -value < 0.001 , indicating that gymball intervention effectively alleviated back pain.

The significant reduction in back pain scores in the gymball group compared to the control aligns with prior research showing that structured exercise programs can attenuate pain severity in pregnancy. Similar studies have found that pelvic rocking with a gym ball significantly reduces low back pain ($p < 0.05$).

The statistical outcome ($p < 0.001$) suggests that the decrease in pain is unlikely due to chance. The large mean difference between pretest and posttest values in the intervention group

demonstrates a clear and measurable clinical effect, which clinical practitioners could use to justify gymball exercise recommendations in prenatal care.

Gymball exercises may help by enhancing pelvic stability, stimulating core muscle engagement, and promoting endorphin release, potentially decreasing pain perception. These physiological mechanisms have been discussed in the literature as possible mediators for back pain reduction during pregnancy.

In contrast, the control group showed only a marginal decrease in pain intensity, which was not statistically significant ($p = 0.148$), indicating that standard prenatal care alone without targeted exercise may not significantly influence back pain levels in the third trimester.

The large mean difference in VAS scores within the intervention group indicates that the magnitude of change is not only statistically significant but also clinically meaningful, potentially improving quality of life and functional ability for pregnant women.

The results are consistent with previous findings that pregnant women participating in stability or gym ball exercises reported lower pain intensity and fewer limitations in daily activities.

Meta-analytical evidence suggests that exercise during pregnancy reduces the risk of low back pain, though its effect size varies across studies. This contextualizes our findings within a broader evidence base confirming benefits of physical activity in pregnancy.

High adherence (90%) in the intervention group, with minimal adverse events, suggests that gymball exercises are a safe and acceptable complementary approach for pregnant women in the third trimester.

Beyond physical mechanisms, exercise can also improve psychological well-being by reducing stress and enhancing self-efficacy, factors indirectly linked to pain perception and quality of life.

These findings support introducing gymball exercises as a practical, low-cost intervention in primary care settings like Puskesmas, where high patient loads may limit access to more resource-intensive therapies.

Considering the high prevalence of back pain in pregnancy, integrating gymball exercises into routine prenatal services could reduce discomfort among many pregnant women, potentially reducing sick leave and improving participation in daily activities.

While other non-pharmacologic interventions such as yoga and prenatal stretching also show benefits, gymball exercises offer a focused approach that activates core and pelvic muscles essential for spinal support.

Given that most studies on gymball effectiveness have been conducted in clinical or controlled settings, this study's findings within a community health center add valuable contextual evidence for Indonesian primary care settings.

It should be acknowledged that the quasi-experimental design and purposive sampling limit causal inferences and generalizability. Future randomized controlled trials with larger samples could strengthen evidence.

Future studies should examine long-term effects of gymball exercises, optimal session frequency, and possible benefits on related outcomes such as pelvic girdle pain, overall maternal function, and postpartum recovery.

Overall, this study confirms that structured gymball exercises significantly reduce low back pain in third-trimester pregnant women. The results align with both theoretical understanding of musculoskeletal adjustments during pregnancy and practical evidence supporting exercise therapy in prenatal care, highlighting gymball use as an effective intervention to improve maternal comfort and functional wellbeing.

4. CONCLUSION

The study concludes that the use of gymball exercises is effective in reducing low back pain among pregnant women in their third trimester. Participants in the intervention group demonstrated a significant decrease in pain intensity compared to the control group, as measured by the Visual Analog Scale (VAS). This indicates that gymball exercises, when performed consistently and under guidance, can serve as a safe, non-pharmacological intervention to alleviate discomfort associated with physiological and biomechanical changes in late pregnancy.

Furthermore, the study highlights that gymball exercises are well-tolerated, practical, and feasible to implement in community health settings, such as Puskesmas Hampang. Incorporating this intervention into routine prenatal care can enhance maternal comfort, improve functional mobility, and potentially contribute to better quality of life during pregnancy. The findings support the integration of simple, low-cost exercise programs as complementary therapy for managing pregnancy-related back pain.

Saran

Implementation in Prenatal Care:

It is recommended that gymball exercises be incorporated into routine prenatal care programs at community health centers such as Puskesmas Hampang. Midwives and healthcare providers should guide pregnant women in performing these exercises safely to reduce low back pain and improve overall comfort during the third trimester.

Education and Training:

Health professionals, particularly midwives, should receive training on gymball exercise techniques to ensure proper instruction and monitoring. Educating pregnant women on the benefits, proper posture, and safe exercise practices can enhance adherence and maximize pain reduction outcomes.

Broader Community Application:

Local health programs are encouraged to promote awareness about non-pharmacological interventions like gymball exercises for back pain during pregnancy. Community outreach and group sessions can motivate more women to participate and maintain consistent exercise routines.

Future Research Recommendations:

Further studies should explore long-term effects, optimal frequency, and duration of gymball exercises, as well as their impact on other pregnancy-related musculoskeletal issues, maternal function, and postpartum recovery. Randomized controlled trials with larger sample sizes could strengthen evidence and generalizability.

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