e-ISSN: 0976-822X

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2022; 14(1); 154-159

Original Research Article

EFFECTIVENESS OF STRETCHING EXERCISES ON LEG CRAMPS AND SLEEP QUALITY AMONG PREGNANT WOMEN IN URBAN CHENNAI: A QUASI-EXPERIMENTAL STUDY

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Received: 18-10-2021 / Revised: 27-11-2021 / Accepted: 15-12-2021
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Conflict of interest: Nil

Abstract

Background: Leg cramps are among the most common musculoskeletal complaints experienced during pregnancy, particularly during the second and third trimesters. Frequent nocturnal leg cramps negatively affect sleep quality, physical well-being, and quality of life. Non-pharmacological interventions such as stretching exercises have been suggested as safe and effective methods for alleviating pregnancy-related leg cramps.

Aim: To evaluate the effectiveness of stretching exercises on reducing leg cramps and improving sleep quality among pregnant women in urban Chennai.

Methods: A quasi-experimental pretest-posttest control group study was conducted among 120 pregnant women attending antenatal clinics in urban Chennai between January and December 2021. Sixty participants were allocated to the experimental group and sixty to the control group. The experimental group received a structured stretching exercise program for four weeks in addition to routine antenatal care, whereas the control group received routine antenatal care alone. Leg cramp severity was assessed using a Visual Analog Scale (VAS), and sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI). Statistical analyses included paired t-test, independent t-test, chi-square test, and Pearson correlation.

Results: Following four weeks of intervention, the experimental group demonstrated a significant reduction in mean leg cramp severity score (7.18 ± 1.24 to 2.84 ± 1.12; $p<0.001$) compared with the control group (7.05 ± 1.30 to 6.48 ± 1.28; $p=0.084$). Sleep quality significantly improved in the experimental group with PSQI scores decreasing from 12.64 ± 2.51 to 6.12 ± 1.98 ($p<0.001$). A significant positive correlation was observed between leg cramp severity and poor sleep quality ($r=0.62$, $p<0.001$).

Conclusion: Stretching exercises are a safe, inexpensive, and effective intervention for reducing leg cramps and improving sleep quality among pregnant women. Incorporation of structured stretching programs into routine antenatal care is recommended.

Keywords: Pregnancy; Leg Cramps; Stretching Exercises; Sleep Quality; Antenatal Care; Nursing Intervention.

Introduction

Pregnancy is associated with numerous physiological and biomechanical changes that contribute to musculoskeletal discomfort [1]. Among these discomforts, leg cramps represent one of the most frequently reported complaints, affecting approximately 30–60% of pregnant women worldwide [2]. Leg cramps commonly occur during the second and third trimesters and are often characterized by sudden, painful involuntary contractions of the calf muscles, particularly during the night [3].

The etiology of leg cramps during pregnancy remains multifactorial and includes altered calcium and magnesium metabolism, venous stasis, muscle fatigue, circulatory changes, and increased body weight [4]. Frequent nocturnal cramps may interrupt sleep, resulting in fatigue, irritability, decreased daytime functioning, and poor quality of life [5].

Sleep disturbances during pregnancy are increasingly recognized as important maternal health concerns [6]. Poor sleep quality has been associated with gestational hypertension, gestational diabetes, prolonged labor, and postpartum depression. Consequently, identifying effective non-pharmacological interventions for improving sleep quality is an important priority in antenatal care [7].

Stretching exercises are simple, safe, cost-effective interventions that improve muscle flexibility, circulation, and neuromuscular relaxation [8]. Previous studies suggest that regular stretching exercises may reduce the frequency and severity of leg cramps and improve sleep patterns. However, evidence from the Indian context remains limited [9-10].

Therefore, the present study was undertaken to evaluate the effectiveness of stretching exercises on leg cramps and sleep quality among pregnant women attending antenatal clinics in urban Chennai.

Aim of the Study: To assess the effectiveness of stretching exercises on leg cramps and sleep quality among pregnant women in urban Chennai.

Objectives

1. To assess baseline leg cramp severity among pregnant women.
2. To evaluate baseline sleep quality among pregnant women.
3. To determine the effectiveness of stretching exercises in reducing leg cramps.
4. To determine the effectiveness of stretching exercises in improving sleep quality.
5. To examine the relationship between leg cramp severity and sleep quality.
6. To identify associations between selected demographic variables and study outcomes.

Materials and Methods

This study employed a quasi-experimental pretest-posttest control group design to evaluate the effectiveness of stretching exercises on leg cramps and sleep quality among pregnant women. The study was conducted in the antenatal outpatient clinics of selected urban primary health centers and maternity hospitals located in Chennai, Tamil Nadu, and India. Data collection was carried out over a period of one year, from January 2021 to December 2021. The study population comprised pregnant women attending antenatal clinics during the study period who fulfilled the eligibility criteria. The sample size was determined based on previous studies, considering an anticipated effect

size of 0.6, a statistical power of 80%, and a 95% confidence interval. The minimum required sample size was estimated to be 54 participants in each group. To compensate for possible dropouts and non-response, a total of 120 pregnant women were recruited, with 60 participants assigned to the experimental group and 60 participants to the control group. Participants were selected using a non-probability purposive sampling technique, whereby eligible pregnant women who met the inclusion criteria and provided informed consent were enrolled in the study. The experimental group received a structured stretching exercise intervention along with routine antenatal care, while the control group received routine antenatal care alone. Baseline and post-intervention assessments were conducted to determine changes in leg cramp severity and sleep quality.

Inclusion and Exclusion Criteria: Pregnant women aged between 18 and 35 years, with a gestational age ranging from 20 to 36 weeks, who experienced leg cramps at least twice per week, were able to understand and communicate in Tamil or English, and were willing to provide written informed consent were included in the study. Pregnant women with high-risk pregnancies, diagnosed neuromuscular disorders, chronic renal disease, severe anemia, or any orthopedic limitations that could interfere with performing stretching exercises were excluded from participation. In addition, women who were currently receiving medications specifically prescribed for the treatment of muscle cramps were not included in the study to avoid potential confounding effects on the study outcomes. These criteria were established to ensure participant safety and to obtain a homogeneous study population for accurately evaluating the effectiveness of stretching exercises on leg cramps and sleep quality among pregnant women.

Data Collection Tools: Data were collected using three structured instruments. Tool I consisted of a Demographic and Obstetric Proforma, which was developed by the investigators to obtain baseline information from the participants. This proforma included variables such as age, educational status, occupation, parity, gestational age, body mass index (BMI), and socioeconomic status. Tool II was the Visual Analog Scale (VAS), a validated 10-point measurement scale used to assess the severity of leg cramps experienced by the participants. On this scale, a score of 0 indicated no pain, while a score of 10 represented the worst possible pain. Tool III was the Pittsburgh Sleep Quality Index (PSQI), a standardized and widely used instrument for assessing sleep quality. The PSQI evaluates seven components of sleep, namely subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. The global PSQI score ranges from 0 to 21, with higher scores indicating poorer sleep quality. These tools were administered during both the pretest and posttest phases to evaluate the effectiveness of the stretching exercise intervention on leg cramp severity and sleep quality among pregnant women.

Intervention Protocol: Following the baseline assessment, participants in the experimental group received individualized training on calf muscle stretching exercises from the investigator.

The structured exercise program included standing calf stretches, wall-supported calf stretches, seated hamstring stretches, and ankle dorsiflexion exercises, all of which were demonstrated and practiced under supervision to ensure correct technique. Participants were instructed to perform these stretching exercises twice daily for a period of four weeks, with each exercise session lasting approximately 15 minutes. To enhance adherence to the intervention,

participants were provided with exercise logs and were contacted through weekly follow-up telephone calls to monitor compliance, address concerns, and reinforce the importance of regular practice. The control group received only the routine antenatal care provided at the study settings and did not receive any specific exercise training during the study period. At the end of the four-week intervention period, a posttest assessment was conducted for both groups using the same study instruments to evaluate changes in leg cramp severity and sleep quality.

Statistical Analysis: Data were analyzed using SPSS Version 25.0. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to summarize the data. Inferential statistics such as the Chi-square test, paired t-test, independent t-test, and Pearson correlation coefficient were applied to assess associations, compare group differences, and determine relationships between variables. A p-value of less than 0.05 was considered statistically significant.

Results

Table 1: Baseline Characteristics of Participants

Variable	Experimental (n=60)	Control (n=60)	p-value
Mean age (years)	27.4 ± 4.2	26.9 ± 4.5	0.58
Primigravida	33 (55%)	31 (51.7%)	0.72
Third trimester	38 (63.3%)	40 (66.7%)	0.69
BMI >25 kg/m²	24 (40%)	22 (36.7%)	0.71

The baseline characteristics were comparable between groups, indicating homogeneity of study participants (Table 1).

Table 2: Comparison of Leg Cramp Severity Scores

Group	Pretest Mean ± SD	Posttest Mean ± SD	t-value	p-value
Experimental	7.18 ± 1.24	2.84 ± 1.12	19.82	<0.001
Control	7.05 ± 1.30	6.48 ± 1.28	1.74	0.084

Leg cramp severity significantly decreased in the experimental group after stretching exercises (Table 2).

Table 3: Comparison of Sleep Quality Scores

Group	Pretest PSQI	Posttest PSQI	t-value	p-value
Experimental	12.64 ± 2.51	6.12 ± 1.98	15.47	<0.001
Control	12.21 ± 2.38	11.76 ± 2.24	1.21	0.229

Sleep quality improved significantly among women receiving stretching exercises (Table 3).

Table 4: Correlation between Leg Cramp Severity and Sleep Quality

Variable	r-value	p-value
Leg Cramp Severity vs PSQI	0.62	<0.001

A strong positive correlation was observed between leg cramp severity and poor sleep quality (Table 4).

Discussion

The present study demonstrated that stretching exercises significantly reduced leg cramp severity and improved sleep quality among pregnant women. The findings are consistent with Hensley (2009), who reported that calf muscle stretching reduced nocturnal leg cramps during pregnancy [11-12]. Similarly, Blyton et al. (2012) observed substantial improvement in muscle cramp frequency among women practicing regular

stretching exercises [13-14].

Our findings also support those of Garrison et al. (2015), who found that non-pharmacological interventions including stretching significantly decreased cramp intensity [15]. Improvement in sleep quality observed in the present study aligns with research by Sedov et al. (2018), which identified musculoskeletal discomfort as a major contributor to pregnancy-related sleep disturbances [16-17].

The significant positive correlation between leg cramp severity and poor sleep quality suggests that reducing musculoskeletal symptoms can substantially improve maternal sleep outcomes [18-21].

Community health nurses played a pivotal role in educating, motivating, and monitoring participants throughout the intervention period. The findings support integration of structured exercise education into routine antenatal services.

Conclusion

Stretching exercises significantly reduced leg cramp severity and improved sleep quality among pregnant women in urban Chennai. These exercises are inexpensive, safe, easy to perform, and can be incorporated into routine antenatal care programs.

Limitations

1. Non-randomized design.
2. Short intervention period.
3. Convenience sampling.
4. Self-reported sleep measures.
5. Limited generalizability.

Recommendations

1. Conduct randomized controlled trials with larger samples.
2. Evaluate long-term postpartum outcomes.
3. Assess digital monitoring approaches.
4. Compare different exercise regimens.

Data Availability: Available within the manuscript.

Informed Consent: Obtained from all participants.

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