

# EFFECTIVENESS OF BACK STRETCH EXERCISE ON LOW BACK ACHE, BLOOD PRESSURE AND PAIN AMONG PREGNANT WOMEN DURING THIRD TRIMESTER OF PREGNANCY IN SMCH, THANDALAM

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## Abstract

**Background:** Antenatal mother experiences many problems during pregnancy. The most important one is lower back pain. It is a musculoskeletal condition that occurs between 30 to 78% of the time during pregnancy. **Objective:** The purpose of the current study is to determine the effectiveness of backstretch exercise on low backache, blood pressure, stress among pregnant women during the third trimester. **Materials and Methods:** A quantitative approach true experimental with pre- and post-test design. The study was conducted with 100 antenatal mothers who were recruited using purposive sampling technique divided into 2 groups. In both groups, a pre-test was done. Low back pain was assessed using the Eric.L. Linlow scale, blood pressure was monitored and level of stress was assessed by a modified perceived stress scale (PSS), followed by that back stretching exercise was initiated for the duration of 20 minutes daily in the morning and in the evening for about 25 days. For the control group, routine care was given and after the 26th day it was re-analysed. **Result:** The study result concluded that back stretching exercise reduces the level of pain, stress and blood pressure. A calculated independent 't' test value of  $r = 13.529$  was found to be statistically significant at  $p < 0.001$  with post-test level of pain. **Conclusion:** Backstretch exercise for low back pain administered among antenatal mothers in the experimental group was found to be effective in reduction of pain, stress and blood pressure.

**Keywords:** Antenatal Mother, Low Back Pain, Pregnancy, Stress, Blood Pressure, Back Stretching Exercise.

## INTRODUCTION

The physiological state of a woman experiencing multiple changes in the body during pregnancy [1]. The physiological changes begin after conception and affect every organ system in the body and also help women to adapt to the pregnant state and to aid fetal growth [2]. Universally, a notable portion of pregnancies are affected by various factors in this current scenario [3]. The main factors that affect pregnancy are maternal pre-gestational body weight, height, ethnicity, age, parity, smoking, socioeconomic status, and poor intake [4].

In the third trimester, the uterus weakens as it expands, and the abdominal muscles shift the center of gravity. This affects posture and causes back strain, which presses a nerve and causes the back to pain [5]. It is estimated that about 50% of pregnant women complain of some sort of back pain at some point in pregnancy or during the postpartum period. The compression of great vessels by the gravid uterus decreases spinal blood flow and may cause low back pain, particularly in the last half of pregnancy [6]. Incidents have been reported as 20% of women claimed that pain started as early as 16 weeks with some claiming pain within the first month [7].

Several studies have also found that pubic symphysis changes and postural change shifts increase the body's gravity to the center, resulting in lordosis [8]. Approximately 70% of women will develop low backache at some point in their lives [9]. When a woman is pregnant, joint laxity is caused by a tenfold rise in the hormone relaxin [10]. Pregnancy-related physiologic and biomechanical changes also lead to back pain. The musculoskeletal system experiences mechanical challenges during pregnancy due to changes in the mother's anatomy [11]

Antenatal women may undergo many hormonal changes which result in stress and anxiety [12]. It has been reported that a higher level of stress was experienced among 1 in 10 pregnant women and 40% of pregnant women experienced moderate stressful life [13]. Research studies have identified and reported that antenatal stress causes diminished blood flow to the maternal uterine arteries which causes the release of cortisol across the placenta, which ends up with complications for both mothers and causes behavioral problems in the newborn [14]. It has been proven that initiation of back stretching exercise is beneficial for both physical and mental wellbeing by showing remarkable stress control among all humans by reducing the activity of the sympathetic nervous system [15].

Hypertensive disorders of pregnancy are one of the major causes of maternal morbidity and mortality, leading to 10–15% of maternal deaths, especially in the developing world [16]. The High Blood Pressure Education Program (2000) has classified gestational hypertension, preeclampsia, eclampsia syndrome, and superimposed preeclampsia on chronic hypertension [17].

Hypertension is typically diagnosed after 20 weeks of pregnancy. If the placenta doesn't get enough blood, the fetus might receive less oxygen and fewer nutrients. This can lead to slow growth (intrauterine growth restriction), low birth weight or premature birth [18].

There are several different treatment options, including rest, medicine, and conservative measures like education, exercises, mobilizations, and supportive equipment [18]. Exercises have been shown to help with pelvic girdle alignment and to repair and prevent muscular imbalance [19]. According to follow-up studies, 75% of women experience persistent pelvic pain 3–6 months after giving birth [20].

Although specific joint exercises is advised in the postpartum period, there is insufficient evidence to support scientific evaluation of treatment programs for pelvic pain and lumbar pain during pregnancy [21]. Some people experience problems including low back pain (LBP) and pelvic girdle discomfort (PGP) [23,24]. PGP usually appears as pain between gluteal fold and posterior iliac [25,26].

## METHODS AND MATERIALS

**Study Design:** The quantitative approach with true experimental pre-test and post-test research design was adopted for the current study of the effectiveness of backstretch exercise on low backache among pregnant women during the third trimester of pregnancy.

**Study Setting:** This study was conducted for the duration of 3-months from March 15th 2023 till June 15th 2023, from the lower backache during the third trimester of pregnant women admitted to the host institution.

**Ethical Approval:** After obtaining an ethical clearance from the institutional ethical committee (IEC) of Saveetha Institute of Medical and Technical Sciences and formal permission from the hospital, the study was conducted.

**Study participants:** A total of 100 antenatal mothers who fulfill and meet the inclusion criteria were recruited as study participants.

**Inclusion criteria:** Primi gravida mothers who are attending the antenatal clinic regularly at 29–40 weeks of gestational age with a single fetus, with low back pain, who had increased blood pressure, who had mild, moderate and severe stress, who were willing to participate in the study and be able to read, write, speak and understand Tamil or English were included in the present study.

**Exclusion criteria:** Women with medical/ obstetrical complications, women below 28 weeks of gestation, women with comorbid diseases, bleeding disorders, multiple pregnancy and deformities were excluded from the study.

**Randomization:** Following recruitment of pregnant women using purposive sampling, all 100 pregnant women were randomly assigned to either the intervention (back stretching exercise) or the control population by the lottery method. 50 were assigned to the intervention group and 50 were assigned to the control group.

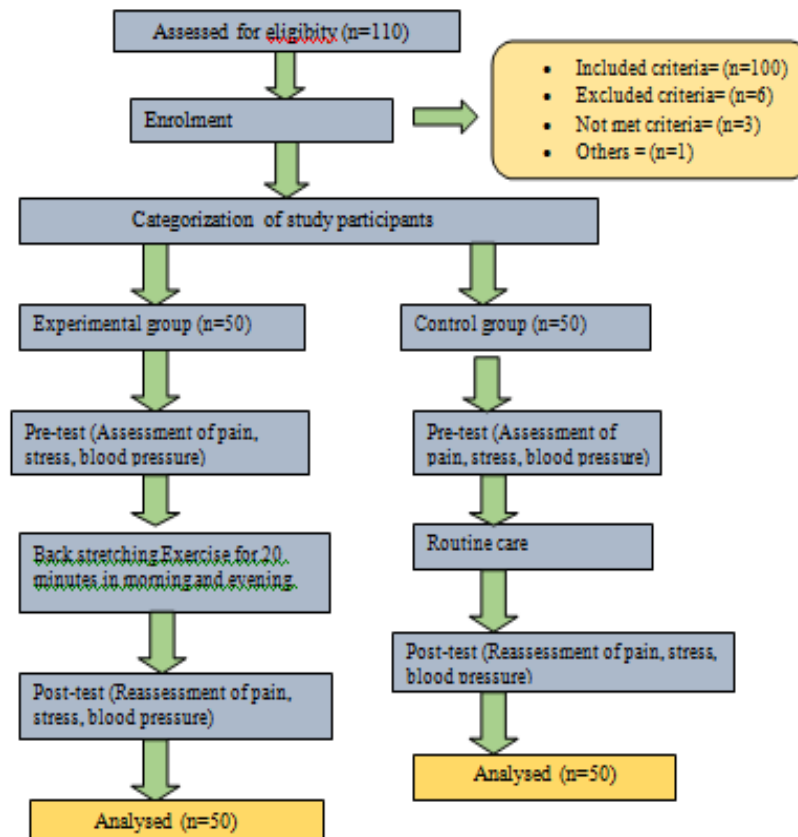
**Informed Consent:** The purpose of study was explained clearly in-depth to each of the study participants and a written informed consent was obtained from them.

**Pre-Assessment:** The demographic and clinical information was gathered using a self-structured questionnaire. Following that, the stress level was assessed using a perceived stress scale, the blood pressure was monitored using a sphygmomanometer and the pain was assessed by an Eric.L. Linlow pain scale.

**Intervention Details:** For Interventional group-on Day-1, antenatal mothers were asked to empty their bladder and be in a convenient position for back stretching exercise was initiated for the duration of 20 minutes daily in the morning and evening only for interventional group for about 25 days.

**Procedure:** Samples in the experimental group were asked to perform the following steps in stretching exercises at least 2 times a day for 20 minutes and to stop the exercise in case of excessive fatigue, shortness of breath, feeling faint, difficulty in walking, decrease in movement of the baby, and dizziness.

Figure 1. Consort Flow Chart Depicting the Steps Involved In Sample Recruitment Process



## RESULTS AND DISCUSSION

### Section A: Description Of The Demographic Variables Of The Antenatal Mothers

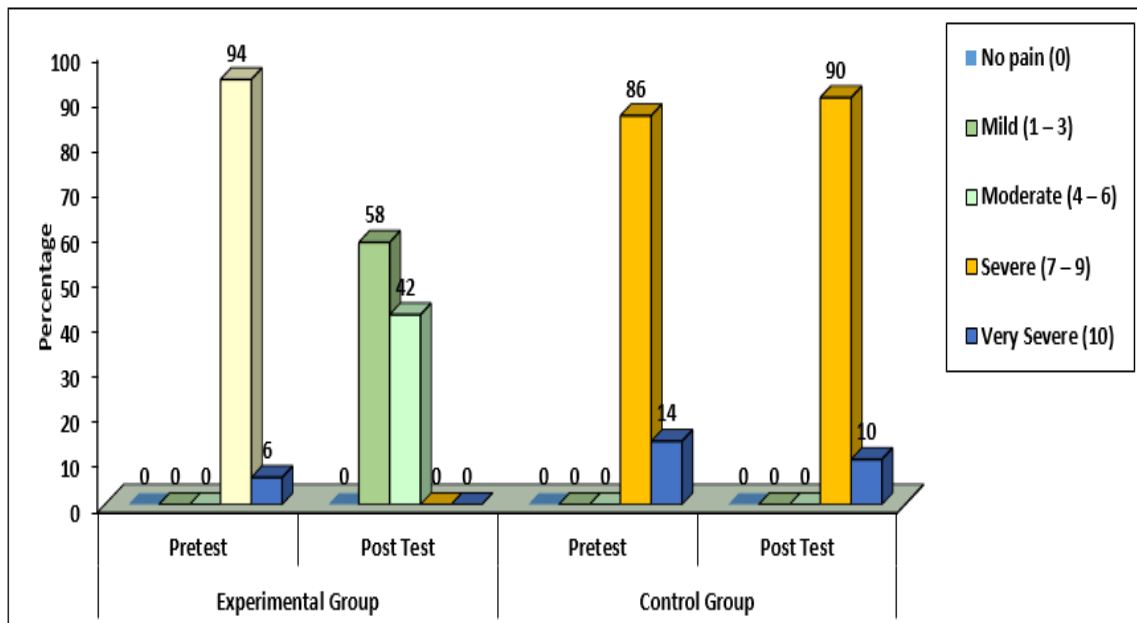
In the experimental group, in regard to the demographic and clinical characteristics, the majority of the antenatal mothers were 13 (65%) aged between 24 – 29 years, with 12 (60%) gestational age between 28 – 32 weeks. 12 (60%) were multi para, 14 (70%) had secondary education, 14 (70%) belonged to nuclear family, 16 (80%) had normal BMI. In control group, with regard to the demographic and clinical characteristics, the majority of the 10 (50%) in the aged between 24 – 29 years, with gestational age of between 33 – 38 weeks, 14 (70%) was multi para, 11 (55%) had secondary education, 15 (75%) belonged to nuclear family, 14 (70%) in had normal BMI.

### Section B: Assessment Of Level Of Low Back Pain Among Antenatal Mothers

In the pre-test of the experimental group, 47(94%) had severe pain and 3(6%) had very severe pain and in the post-test, 29(58%) had mild pain and 21(42%) had moderate pain. Whereas in the pre-test control group, 43(86%) had severe pain and 7(14%) had very severe pain and in the post-test, 45(90%) had severe pain and 5(10%) had very severe pain. (fig.2)

The present study findings are supported by a Quasi-experimental study conducted by Mahima Thakur et al. (2021) at selected villages in Haryana among 60 antenatal mothers aiming at analyzing low back pain using a numerical rating pain scale and. A

modified Oswestry low back pain questionnaire on each elective day, stretching exercises were offered for two weeks. Stretching exercise helps in toning the perineal area, it stretches the ligaments and strengthens the inner thighs and abdominal muscles [14]. By doing this, the body alignment is maintained so, BP is reduced [15]. The findings revealed that the post-test pain in the experimental group was 4.67 + 1.626 and in control group 8.60 + 2.415. The mean difference was -3.93. The independent “t” test value was -7.399. At the 'P' value of 0.05, this was statistically significant and revealed that the stretching exercise was effective in reducing back pain.

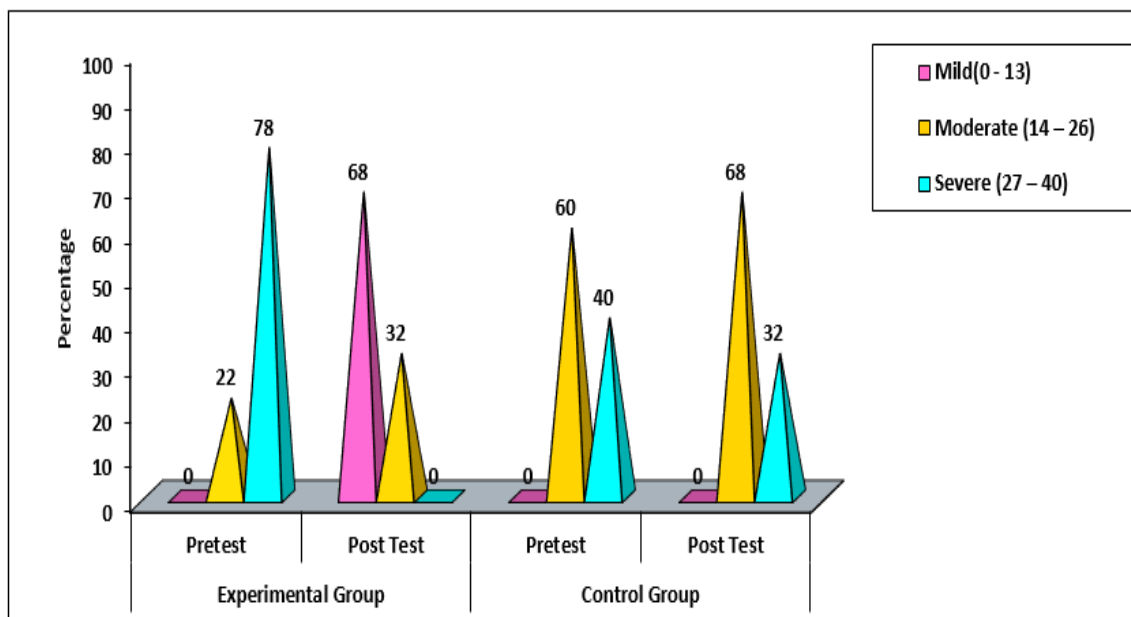


**Fig 2: Percentage distribution of low back pain among antenatal mothers in the experimental and control group**

The present study findings are supported by **Bijithra Chandra sekharan et.al (2020)** selected hospital in Karnataka, in a quasi-experimental pretest-post-test control group design among 60 antenatal mothers at 28–32 weeks of gestation. The study aimed to determine the effect of back-stretch (BS) exercise on the perception of back pain during pregnancy. The intensity of pain was estimated using the visual analogue scale. The results found that significant reduction in back pain among pregnant women after back stretching exercise in the study group. The control group's antenatal women experienced no statistically significant reduction in backache [15]. The end result of the study after the intervention identified that there was a significant reduction of back pain among antenatal mothers during their antenatal period.

**Section C: Assessment Stress Among Antenatal Mothers In Experimental And Control Group**

The above table 4 shows that in the Pre-test of the experimental group, 39(78%) had mild level of stress and 11(22%) had moderate stress and in the post-test, 34(68%) had mild stress and 16(32%) had moderate stress. Whereas in the pre-test control group, 30(60%) had moderate stress and 20(40%) had severe stress and in the post-test, 34(68%) had moderate stress and 16(32%) had severe stress.



**Fig 3: Percentage distribution of stress among antenatal mothers in the experimental and control group**

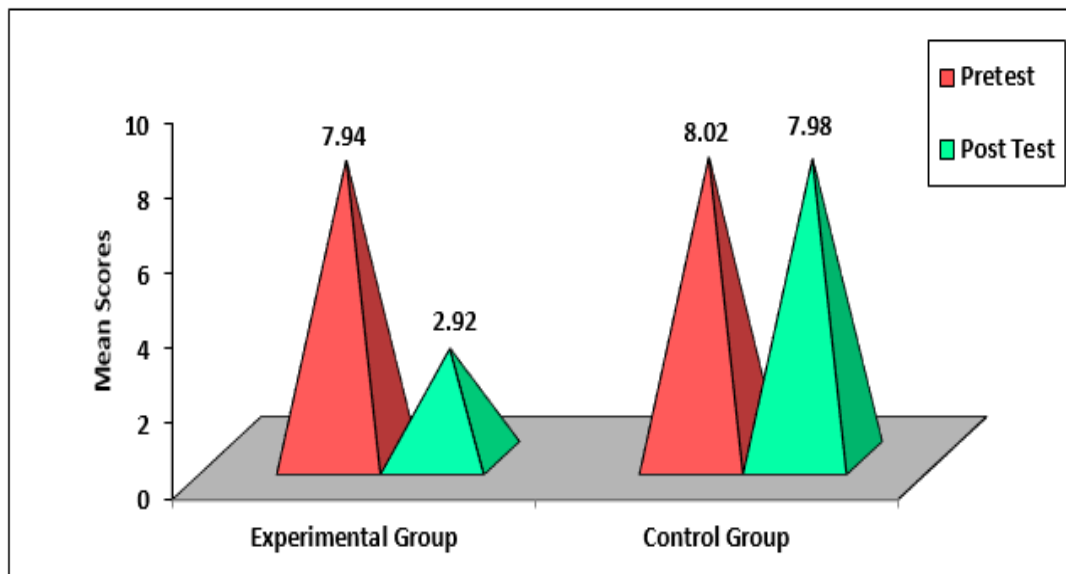
**Section D: Effectiveness Of Back Stretch Exercise On Low Back Pain, Blood Pressure And Stress Among Antenatal Mothers**

**Table 1: Effectiveness of back stretch exercise on low back pain among antenatal mothers in the experimental group and comparison of pre-test and post-test level of back pain among antenatal mothers in the control group**

**N=100(50+50)**

Variables	Pretest		Post Test		Mean Difference score	Paired 't' test & p-value
	Mean	S.D	Mean	S.D		
Experimental Group	7.94	0.81	2.92	1.38	<b>5.02</b>	<b>t = 37.901 p=0.0001, S***</b>
Control Group	8.02	0.95	7.98	0.89	0.04	t = 1.429 p=0.159, N.S
<b>Mean Difference Score</b>	0.08		5.06		<b>***p&lt;0.001 S – Significant N.S – Not Significant</b>	
<b>Student Independent 't' test value</b>	t = 0.449 p=0.954, N.S		t = 21.745 p=0.0001, S***			

The table 1 depicts that the pre-test mean score of low back pain score in the experimental group was  $7.94 \pm 0.81$  and the post-test mean score was  $2.92 \pm 1.38$ . The mean difference was 5.02. The calculated paired "t" test value of  $t = 37.901$  was statistically significant at  $p < 0.001$ . This clearly shows that after the administration of backstretch exercise on low back pain among antenatal mothers, the level of pain was significantly reduced among the antenatal mothers.



**Fig 4: Comparison of pre-test and post-test level of back pain among antenatal mothers in the experimental and control group**

The present study findings are consistent with the findings of **Poongodi et al. (2020)**, a tertiary care hospital in Pondicherry conducted a true experimental research study to assess the effectiveness of backstretch exercise on low backache among 60 antenatal mothers. Backstretch exercise was given to the experimental group and the level of low backache was assessed by Eric. L. Linlow backache scale [16]. The pre- and post-test mean values for group I were 3.93 and 5.1 when in motion, 4.77 and 5.67 while standing, and 5.57 and 6.5 while sitting. The obtained Wilcoxon value for group I was 4.944, 4.916 and 4.969 during motion, standing and sitting respectively. The obtained Wilcoxon value for group II was 5.152, 4.838 and 4.613 during motion, sitting and standing. It was statistically significant because the P value was < 0.001 [15].

**Mythili et al. (2018)** conducted a study to find out the effect of an exercise program on reduction of low back pain among 30 mothers who were divided into two groups. Group A (15 participants) took part in an exercise program, while Group B (15 subjects) got just regular antenatal exercise. The outcome was measured using Oswestry low back pain disability questionnaires. The trunk side bending test was done.

The study concluded that group A, which received abdominal strengthening exercise, hamstring strengthening exercise, hip flexor stretching exercise, was more effective than group B, which received only standard antenatal exercise [17]. As back stretching exercise arouses the spinal cord, it passes signals to the neuro transmitters of the medulla oblongata to reach the hypothalamus and helps to release relaxin hormones, thereby it reduces pain [18]. Stretching exercises act to tone the perineal area by stretching the ligaments and strengthening the inner thighs and abdominal muscles. Body alignment is also maintained, which reduces back pain in our experimental group and our hypothesis test results indicated that, after doing back stretching exercise, there was a significant reduction in low back pain among our study participants [19,20].

## LIMITATIONS

The study was conducted for only one month. A larger sample size will improve generalization.

## CONCLUSION

Based on the findings of the current study, it was evident that there was a significant reduction of low back pain after doing back stretching exercise in the experimental group than the control group. Therefore, back stretching exercise can be used as an alternative adjuvant therapy for antenatal mothers who are experiencing low back pain during their third trimester. Doing back stretching exercise, it also reduces blood pressure and stress.

**Acknowledgment:** Authors would like to appreciate all the study participants for their co-operation to complete the study successfully.

**Conflict of Interest:** Author declares no conflict of interest.

### Authors Contribution

Hemavathi developed the study concept and design, Priyanga collected the clinical data, sathiyabama and manonmani performed the statistical analysis and interpretation of data, Muthulakshmi study supervision, Hemavathi critical revision of the manuscript for the intellectual content and drafting of the manuscript. All authors read and approved the final manuscript.

### Conflict of Interest and Finding Support

The authors for the current project have no financial investment and are not the investor in any of the health sectors related to the project and not received any consultation payments. They did not have any patents linked to the project. The authors have no personal or professional contact with any of the health care organisations.

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