

## Effect of Sitting Pelvic Tilt Exercise on Low Back Pain among Primigravidae Women

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### Abstract

**Background:** Low back pain is frequent and disabling condition in pregnancy and causes problem in daily activities such as walking, lifting, sleeping and sitting. **Aim of this study:** Was to evaluate the effect of sitting pelvic tilt exercise on low back pain among primigravidae women. **Design:** Quasi-experimental (one group pre/ post/ test) design was utilized. **Setting:** The study was conducted at obstetrics and gynecological out-patient clinic at Benha University Hospitals. **Sampling:** A purposive sample of 152 primigravidae was selected according to inclusion criteria and was equally divided into two groups (study group = 76 women who was practice setting pelvic tilt exercise and control group= 76 women who received routine hospital antenatal care. **Tools of data collection:** Three main tools were used for data collection. **I:** A structured interviewing questionnaire. **II:** Visual analogue scale. **III:** Modified Oswestry Disability Pain Index. **Results:** The mean pain score and modified oswestry disability pain score were significantly decreased in the study group compared to in the control group after 4 weeks of application of sitting pelvic tilt exercise ( $P \leq 0.001$ ). **Conclusion:** The findings of the present study were concluded that sitting pelvic tilt exercise was effective in reducing low back pain in primigravidae women. **Recommendations:** Pelvic tilt exercise should be performed regularly as a part of the routine antenatal care and distribution of a designed brochure about sitting pelvic tilt exercise for all pregnant women who attended the antenatal clinic as a part of the routine antenatal care.

**Keywords:** Low back pain, Primigravidae, Sitting pelvic tilt exercise.

### Introduction

During pregnancy, many discomforts are experienced by women. The effects of discomforts on daily living activity of women are usually minor and self-limiting. Musculoskeletal complaints such as low back pain are described as minor discomforts or unpleasant symptoms; however, women may suffer considerable levels of pain and disability with social and economic consequences (Devkate et al., 2022).

Pregnancy increasing the counter of the uterus leads to weakening and stretching of the abdominal muscles. Also, changes in the posture with pelvic anteversion and

increased lumbar lordosis with the effect of the gravity, leading to increase the load on the sacroiliac ligaments and lumbar spine, and low back pain begin (Barczyk et al., 2020).

Guidelines commend non-pharmacological and noninvasive management includes the providing of instruction to stay active and the use of women education and exercise therapy. Pelvic tilts exercise are particularly effective in relieving lumbar pain because pelvic floor muscle has an important role in lumbar spine stability and lumbar instability as it works together with transverses

abdomens to stabilize the pelvis (Kurniyati et al., 2021).

Nurses play an essential role in improving the quality of antenatal care, which provides pregnant women with education and support regarding the conservative treatment of back pain during pregnancy as performing sitting pelvic tilt exercise to alleviate pain and stiffness strengthen core and prevents long-term issues by encouraging neutral alignment in the pelvic. Nurses educate women about technique of sitting pelvic tilt exercise; proper body mechanics attempts encourage and support correct posture, which is vital to avoid excessive stress in supporting structures (Klankhahon and Sthien, 2022).

### **Significance of the study**

Low back pain during pregnancy is rarely treated. The most effective strategies to reduce the low back pain is the pelvic tilt exercise which increases the flexibility of the muscles needed to compensate the large abdominal mass and maintains normal posture during pregnancy (Santonja et al., 2020).

Low back pain affects pregnant women's lives dramatically. Low back pain is the most common cause of sick leave after delivery. The majority of pregnant women receive little or even no care for low back pain, given alarms about medication prescription during pregnancy, European guidelines suggested several non-pharmacological options for management of pregnancy related low back pain. Teaching pregnant women about ergonomic concerns and proper body mechanics is one of the recommended therapies for pregnancy related low back pain. Besides various types of physical exercise as sitting pelvic tilt is prescribed for management (Fritz et al., 2020).

Besides, there is no previous study was done at Benha faculty of nursing addressed effect of sitting pelvic tilt exercise on low back pain during pregnancy. So the present study will be carried out to assess effect of sitting pelvic tilt exercise on low back pain during pregnancy.

### **Aim of the study**

The current study aimed to evaluate the effect of sitting pelvic tilt exercise on low back pain among primigravidae women.

### **Research hypotheses:**

**Hypothesis I:** Primigravidae women with low back pain who practice sitting pelvic tilt exercise will show reducing back pain than those who do not practice.

**Hypothesis II:** Primigravidae women with low back pain who practice sitting pelvic tilt exercise will record lower disability score in performing daily activities compared to those who do not practice.

### **Subject and Methods**

#### **Study design:**

Quasi - experimental design was utilized to achieve the aim of the current study.

#### **Setting of the study:**

The study was conducted in out-patient clinic at Obstetrics and Gynecological department in Benha University Hospitals

**Sample type:** A purposive sample.

**Sample size:** A 152 primigravidae was selected according to inclusion criteria and was equally divided into two groups (study group = 76 women who practiced sitting pelvic tilt exercise and control group= 76 women who received routine hospital care. Sample size was calculated utilizing following formula (Yamane, 1967).

$$n = \frac{N}{1+N(e)^2}$$

Where n= sample size N= total population number (600) according to Benha University Hospital Census, 2020.e= margin error (0.05).

**Inclusion criteria:**

- Had a singleton pregnancy.
- Age between 20 to 35 years.
- Had a complaint from low back pain during pregnancy (i.e., pain arising from the lumbar spine area and/or posterior pelvic pain at one or two-sided sacroiliac joints).
- Gestational age between (26-30) weeks.
- Free from a medical or obstetric condition that causes low back pain or restricts the use of a pelvic belt or limit exercise performance. Such as, a woman with orthopedic or neurologic disorders and that is with a previous history of back or pelvic girdle injury and operations. As well as, not using pelvic belts or on an exercise regimen at recruitment time.

**Tools of data collection:**

Three main tools were used for data collection:

**Tool (I): A Structured interviewing questionnaire:** This questionnaire was designed by the researcher after reviewing related literature (Ather et al., 2020; Rahmawati et al., 2020; Weis et al., 2020). It was written in an Arabic language in the form of closed and open ended questions and included

**Part 1:** Characteristics of the studied women included (age, educational level, occupation, residence and body measurements which included weight and height, body mass index).

**Tool (II): Visual analogue scale.**

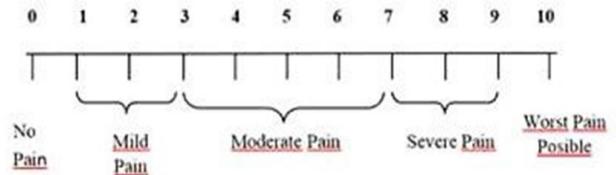
This tool was adopted from Dauphin et al., (1999), to assess low back pain intensity before and after applying sitting pelvic tilt exercise. The women was marked the pain was feeling. It is a standard tool having rating from (0 to 10).

**Scoring system:**

- 0 means no pain.
- 1-3 means mild pain.
- 4-6 means moderate pain.

7-9 means sever pain.

10 means the worst pain



**Tool (III): Modified Oswestry Disability pain Index (MODI):**

It was adopted from Fritz et al., (2001), and was translated into Arabic language by the researcher to evaluate how is low back pain limits a pregnant ability to achieve daily living activities. It comprised of ten items (intensity of pain, personal care such as washing or dressing, lifting, walking, siting, standing, sleeping, social life, travelling and employment, home making).

**Scoring System;**

Each item was evaluated by selecting one out of six options ranged from 0 which mean woman's ability to perform daily activities did not affected by the LBP to 5 which representing the greatest disability. The total possible scores (50) and multiply by 100 disabilities identified according to the following score:

- 0-20% means Minimal disability
- 21-40% means Moderate disability
- 41-60% means severe disability
- 61-80% means Crippled disability
- 81-100% means Bed-pound disability

**Tools validity and reliability:**

Tools of data collection were reviewed by three panel expertise of Obstetrics and Gynecological Health Nursing Faculty of Nursing Benha University to test content validity. Modifications were done in the light of valuable comments such as modifying some words to give the most appropriate meaning for the phrase which were not clear. Questionnaires were modified related to clarity of sentences, consistency and

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appropriateness of content, the sequence of items, and accuracy, and relevance, comprehensiveness of tools. The reliability of tools was done Cronbach's alpha for test internal consistency for visual analogue scale 0.90 (Dauphin et al., 1999) and for modified Oswestry disability pain index 0.87 (Fritz et al., 2001).

### **Ethical considerations:**

Ethical aspects were considered before starting the study as the following:

The research approval was obtained from scientific Researcher Ethical Committee, Faculty of Nursing at Benha University before starting the study. Oral consent was obtained from each studied woman who participates in the study. No harm or any physical, social or psychological risk for participants. Each woman was informed about the purpose and benefits of the study. Maintain confidentiality, self-esteem and dignity of studied women. Freedom to withdraw from participation without any consequence.

### **Pilot study:**

The pilot study was carried out on ten percent of total sample (15 women) to test the clarity, feasibility and applicability of the study tools. As well as, to detect any obstacles that faces the researcher during the study and estimate the time need to fill tools. No required modifications were done. Women involved in the pilot were included in the main study sample.

### **Field work:**

The present study was carried out from the beginning of May 2021 and completed at the end of November 2021 covering seven months. The researcher visited the previously mentioned setting three days/weeks (Saturday, Monday and Tuesday) from 9.00 Am to 12.00pm. The researcher took the study sample from registration hospital book. For both groups at

the beginning of the interview the researcher greeted with the pregnant women and introduced herself then the purpose of the study was explained by the researcher. The researcher provided the pregnant women with all information about the study (purpose, duration, and benefits) and took oral consent of participants in the study. Initial assessment (pretest) was done which was taken around 30 minutes included of the structured interview questionnaire sheet was taken 15 minutes, Visual analogue scale was taken 5 minutes and Modified Oswestry Disability Pain Index was taken 10 minutes. Tools were completed by the pregnant women in both groups and some time by the researcher. The data obtained constituted the baseline for further comparison to evaluate the effect of sitting pelvic tilt exercise on low back pain.

### **For the study group.**

The researcher divided the pregnant women in the study group into 15 subgroups; each group included 3-5 women per day of data collection. Each group attended 4 sessions, the duration of each session 30-45 minutes. The researcher divided these sessions into 2 theoretical sessions and 2 practical sessions. Women's telephone numbers were taken to ensure contact and follow up.

First theoretical session the researcher discussed all items of physiological changes during pregnancy on musculoskeletal system and its effect on pregnant women, general knowledge about low back pain, causes of low back pain, signs and symptoms and adverse effect of low back pain on pregnant women during pregnancy.

Second theoretical session the researcher illustrated to the pregnant women about benefits of sitting pelvic tilt exercise, the position of sitting pelvic tilt exercise and precautions for exercising during pregnancy.

Also, contraindications and danger signs to stop exercise.

Third practical session the pregnant women were instructed and trained about how to apply sitting pelvic tilt exercise. The women advised to sit on a firm surface edge of the bed, on a stool/chair (sitting clear of the back), sit upright with shoulders relaxed, head level and eyes looking straight a head. Drop the trunk down from a point on the breast bone whilst letting the pelvis tip down and back, Then sit up straight, tilting the pelvis slightly forward and bringing the breast bone up and forward, making stretch back upright, head should remain level with eyes focused should feel that weight comes forward over the hips, Repeat 3-5 times/day.

The fourth practical session the pregnant women received re demonstration about sitting pelvic tilt exercise technique. After the end of the session, each pregnant woman was asked to re-demonstrate the sitting pelvic tilt exercise the researcher used distributed Arabic brochure containing colored picture that clarified the steps of exercise, followed by watching an educational video on laptop. Then, the pregnant women were instructed to do it at home 2-3 times per day and to perform exercise for four consecutive weeks. Women were followed and encouraged for compliance with sitting pelvic tilt exercise through telephone calls and during antenatal follow up visits at the Obstetrics and Gynecology outpatient Clinic.

#### **For the control group.**

The pregnant women were received the routine prenatal care. The researcher started with control group and interviewed 2-3 women per day. There was no structured plan for the education. Otherwise, the researcher answered on any women's questions about the educational topic as needed.

Follow up was done for both groups after four weeks. The researcher was met the pregnant women to evaluate the effect of practicing sitting pelvic tilt exercise on low back pain among primigravidae women by using tool II and tool III.

#### **Statistical analysis:**

Data was verified prior to computerized entry. The statistical package for social sciences (SPSS version 20) was used followed by data analysis and tabulation. Descriptive statistics were applied (e.g., mean, standard deviation, frequency and percentages). Tests of significance (Chi-square test, fisher exact test and independent t test) were applied to test the study hypothesis. Pearson correlation coefficients were used to investigate the relationship between study variables. A significant level value was considered when  $p \leq 0.05$ . And a highly significant level value was considered when  $p < 0.001$ .

#### **Results:**

**Table 1:** Shows that, 55.3% and 63.2% of the study and control groups were in age group 20<25 years old with mean± SD 25.25 ± 2.91 years and 24.64 ± 3.48 years respectively. Regarding educational level, 60.5% and 54% of the study and control groups had secondary education respectively. As regards occupation 68.4% of study group and 59.2% of control group were working. Regarding residence 65.8% of study group and 76.3% of control group were living in rural area. Study group and more than three quarters 76.3% of control group were living in rural area.

**Table 2:** Reversed that there was no statistically significance difference between both groups regarding pain score before application of sitting pelvic tilt exercise ( $P > 0.05$ ), on the other hand, the mean pain score was significantly decreased in the study

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group  $4.93 \pm 1.69$  compared to  $7.46 \pm 1.53$  in the control group after 4 weeks of application of sitting pelvic tilt exercise ( $P \leq 0.001$ ).

**Figure 1:** Illustrates that, 72.4% of study group had sever pain score before sitting pelvic tilt exercise application compared by 17.1% after 4 weeks of sitting pelvic tilt exercise application. While 69.7% of control group had sever pain score before setting pelvic tilt exercise application compared by more 68.4% after 4 weeks of sitting pelvic tilt exercise application

**Table 3:** Clarifies that there were no statistically significant difference between study and control groups regarding all items of Modified Oswestry Disability pain score before sitting pelvic tilt exercise application ( $P > 0.05$ ).

While, after 4 weeks of sitting pelvic tilt exercise application all items of Modified Oswestry Disability pain score named (pain intensity, personal care, lifting, walking, sitting, standing, sleeping, social life, travelling and employment/ home making). Were significantly decreased in the study compared to the control group ( $P \leq 0.001$ ).

**Figure 2:** Shows that mean of total of the Modified Oswestry Disability pain score was

27.11 in the study group compared to 25.93 in the control group ( $p > 0.05$ ). On the other hand, that mean of total of the Modified Oswestry Disability pain score were significantly decrease in the study group 17.8 compared to 26.69 in the control group after 4 weeks of sitting pelvic tilt exercise application

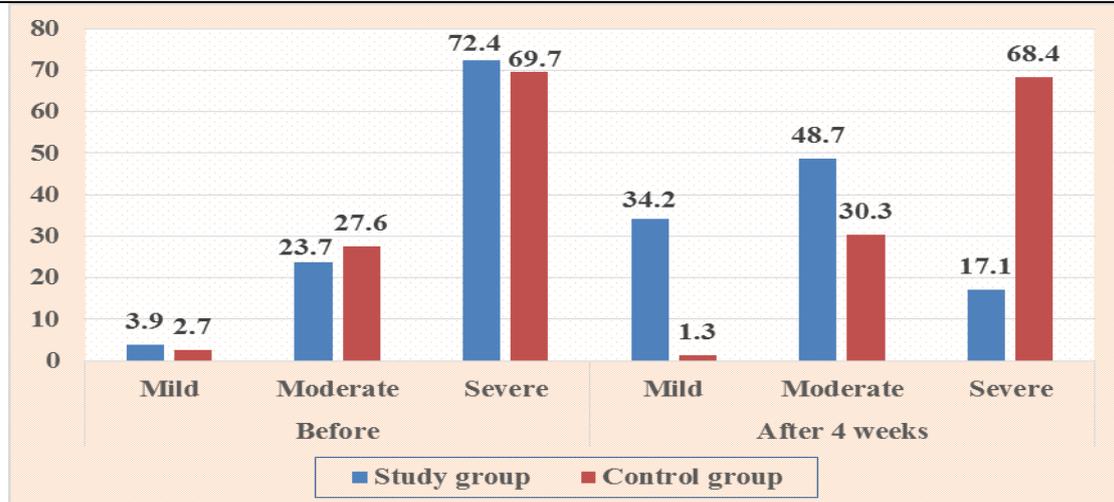
**Table 4:** Indicates that there were highly significant positive correlation regarding total pain and the Modified Oswestry Disability score between study and control groups before and after 4 weeks of sitting pelvic tilt exercise application ( $P \leq 0.001$ ).

**Table (1): Distribution of women in the study and control groups according to demographic characteristics (n= 152)**

Group Demographic Characteristics	Study group n= 76		Control group n= 76		X <sup>2</sup> /FET	P-value
	No.	%	No.	%		
<b>Age (years)</b>						
< 20	2	2.6	5	6.6	6.949 <sup>£</sup>	0.074
20 < 25	42	55.3	48	63.2		
25 < 30	28	36.8	15	19.7		
30 ≤ 35	4	5.3	8	10.5		
<b>Mean ± SD</b>	25.25 ± 2.91		24.64 ± 3.48		t= 1.162	0.247
<b>Educational level</b>						
Read and write	1	1.3	3	3.9	2.131 <sup>£</sup>	0.546
Basic education	7	9.2	5	6.6		
Secondary education	46	60.5	41	54		
University education	22	30	27	35.5		
<b>Occupation</b>						
Working	52	68.4	45	59.2	1.396	0.237
Housewife	24	31.6	31	40.8		
<b>Residence</b>						
Rural	50	65.8	58	76.3	2.147	0.152
Urban	26	34.2	18	23.7		

**Table (2): Comparison of mean pain score of women in the study and control groups before and after 4 weeks of sitting pelvic tilt exercise application (n=152)**

Groups Pain score	Study group n= 76	Control group n= 76	independent test	t	P-value
	Mean ± SD	Mean ± SD			
<b>Before application</b>	7.53 ± 1.48	7.38 ± 1.45	1.152		0.251
<b>After 4 weeks</b>	4.93 ± 1.69	7.46 ± 1.53	9.542		0.000**

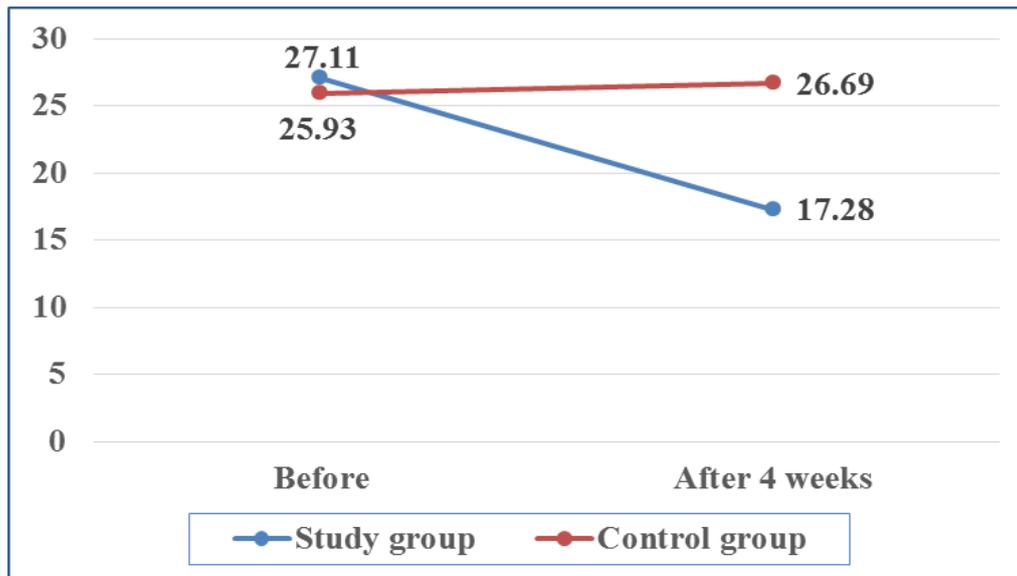


**Figure (1): Distribution of women in the study and control groups according to pain score before and after 4 weeks of sitting pelvic tilt exercise application (n=152)**

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**Table (3): Comparison of Mean Modified Oswestry Disability pain score of women in the study and control groups before and after 4 weeks of sitting pelvic tilt exercise application (n=152)**

Items \ Groups	Before		After 4 weeks	
	Study group n= 76	Control group n= 76	Study group n= 76	Control group n= 76
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
<b>Pain intensity</b>	3.61±1.37	3.36 ±1.598	2.37±1.86	3.55±1.56
<b>t test (P-value)</b>	1.137 (0.302)		4.250 (0.000**)	
<b>Personal care</b>	1.12 ± 0.52	0.96± 0.72	0.61± 0.49	1.05 ± 0.54
<b>t test (P-value)</b>	1.554 (0.122)		5.344 (0.000**)	
<b>Lifting</b>	3.16± 1.05	3.05± 1.02	1.81± 0.59	3.08± 0.876
<b>t test (P-value)</b>	.628 (0.531 )		10.541 (0.000**)	
<b>Walking</b>	2.53 ± 0.86	2.26 ± 0.79	1.71 ± 0.65	2.33 ± 0.81
<b>t test (P-value)</b>	1.970 (0.057 )		5.207 (0.000**)	
<b>Sitting</b>	2.59± 0.85	2.67± 0.82	1.70± 0.80	2.70± 0.849
<b>t test (P-value)</b>	0.581 (0.562)		7.473 (0.000**)	
<b>Standing</b>	2.54± 0.86	2.64± 0.92	1.74± 0.50	2.71± 0.86
<b>t test (P-value)</b>	0.731 (0.466)		8.524 (0.000**)	
<b>Sleeping</b>	2.86 ± 1.21	2.54 ± 1.32	1.92 ± 1.28	2.76 ± 1.21
<b>t test (P-value)</b>	1.538 (0.126)		4.163 (0.000**)	
<b>Social life</b>	1.88± 0.61	1.79 ± 0.97	1.05± 0.65	1.86 ± 0.89
<b>t test (P-value)</b>	0.700 (0.485)		6.345 (0.000**)	
<b>Travelling</b>	3.34 ±1.17	3.22 ±1.29	2.28 ±1.38	3.30 ± 1.12
<b>t test (P-value)</b>	1.531 (0.128)		5.131 (0.000**)	
<b>Employment / home making</b>	3.25 ± 1.18	3.17±1.39	2.11±1.48	3.25 ± 1.20
<b>t test (P-value)</b>	0.724 ( 0.470 )		5.227 (0.000**)	



**Figure (2): Mean score of total of the Modified Oswestry Disability Pain women in the study and control groups before and after 4 weeks of sitting pelvic tilt exercise application (n=152).**

**Table (4) Correlation coefficient between total pain and the Modified Oswestry Disability score of women before and after 4 weeks of sitting pelvic tilt exercise application (n=152)**

Variable			Total pain score			
			Before		After 4 weeks	
			r	P	r	P
Total Modified Oswestry Disability score		Study group (n= 76)	0.413	0.000**	0.529	0.000**
		Control group (n= 76)	0.264	0.021*	0.436	0.000**

**Discussion**

The result of current study showed that, more than half of study group and more than two thirds of the control groups were in age group 20-<25 years old with mean± SD 25.25 ± 2.91 years and 24.64 ± 3.48 years. Regarding educational level, more than half of the study and control groups had secondary education. As regard occupation, more than two thirds of study groups and more than half of control group were working. While regarding residence nearly two thirds of study group and more than three quarters of control group were living in rural area.

These findings were in the same line with a study of **Michel et al., (2019)** which entitled

"the effect of sitting pelvic tilt exercise on low back pain and sleep disorder in primigravidae in the third trimester" and was conducted in Irain and reported that, more than half of the study and control groups were in age group 20-<25 years old with mean± SD 22.25 ± 2.81 years and 23.64 ± 3.28 years and added, more than half of the study and control groups had secondary education, more than two thirds of study groups and more than half of control group were working and nearly two thirds of study group and more than three quarters of control group were living in rural areas. From the researcher point of view these similarities of results due to all participants

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were primigravidae and working due to the difficulty of material life.

While, these findings were in contrast with study of **Runjati, (2020)** entitled "Utilization of Back Movement Technique to Intensity of Low Back Pain in Third Trimester Pregnant Women" and was conducted in Indonesia and found that the mean age of women in study group was  $25.9 \pm 7.9$  years and in control group was  $32.9 \pm 7.9$  years. Also reported that more than half of study and control groups had university education. In term of occupation, more than three quarters of study group and more than half of control groups were housewives. According residence in study group and in control group was living in urban areas. This difference with present results may be due to differences in culture and setting of studied women of study.

The results of this study may be due to the homogeneity of the women in the term of age were due to all participants were primigravida and this is the age of marriage in Egypt. As regard occupation, due to the difficulty of economic life requirements. While regard residence, due to the sample was collected from Benha University Hospital, which serves most of the villages of Benha. Regarding education, due to most education in Egypt is secondary education.

Regarding low back pain intensity of studied women before and after application of sitting pelvic tilt exercise this current study reversed that there was no statistically significance difference between both groups regarding pain score before application of sitting pelvic tilt exercise ( $P > 0.05$ ), on the other hand, the mean pain score was significantly decreased in the study group compared to the control group after 4 weeks of application of sitting pelvic tilt exercise ( $P \leq 0.001$ ). That which supported Hypothesis I which named Primigravidae women with

low back pain who practice sitting pelvic tilt exercise will show reducing back pain than those who do not practice.

These findings were in the same line with **Awad et al., (2019)** and reported that mean of pain in study group before application of sitting pelvic tilt exercise was  $7.05 \pm 1.487$  and post exercise application was  $4.20 \pm 1.356$ . Mean of pain in control group before exercise application is  $7 \pm 1.538$  but post application were  $6.05 \pm 1.735$  and there were highly statistically significant deference between study and control groups regarding mean pain score pre and post intervention in study group more than control one ( $p < 0.001$ ).

Also these findings were agree with study of **Kurniyati and Bakara, (2021)** entitled "Pelvic Tilt Exercise against Lower Back Pain for Third Trimester Pregnant Women" and a study of **Wijayani, (2022)** entitled "The effect of Lumbopelvic Exercise on Low Back Pain in Pregnant Mother" which reported that mean of pain in study group before application of sitting pelvic tilt exercise was  $6.80 \pm 1.38$  and post exercise application was  $3.92 \pm 1.63$ . Mean of pain in control group before exercise application is  $7.38 \pm 1.03$  but post application were  $6.55 \pm 1.82$  there were highly statistically significant deference between study and control groups regarding mean pain score pre and post intervention of study group than the control group ( $p < 0.001$ ).

Additionally, **Ariendha et al., (2022)** study entitled "The Effect of Pregnancy Exercises on Low Back Pain in Pregnant Women" and showed that that mean of pain in study group before application of sitting pelvic tilt exercise was  $6.90 \pm 1.74$  and post exercise application was  $4.58 \pm 1.03$ . Mean of pain in control group before exercise application is  $7.15 \pm 1.73$  but post application were  $6.05 \pm 1.38$  there were highly

statistically significant deference between study and control groups regarding mean pain score pre and post intervention ( $p<0.001$ ) in study group than control group.

These study finding may be due to the effective of sitting pelvic tilt exercise on low back pain that helps to mobilize the lumbar joints and restore normal vertebral motion create cyclical interstitial pressure changes within the muscles and passive tissues of the spine and in sequence decrease low back pain.

Regarding Distribution of the studied women in the study and control groups according to pain score before and after 4 week of exercise application this current study illustrated that, less than three quarters of study group had sever pain score before exercise application compared by 17.1% after 4 weeks of exercise application. While more than two thirds of control group had severe pain score before exercise application compared by more than two thirds after 4 weeks of exercise application. These findings were in the same line with **Join, (2019)**. Study in titled Assess the Effectiveness of Sitting Pelvic Tilt Exercise on Level of Back Pain during Third Trimester among Antenatal Mothers in Selected Hospital at Tirupur which conducted in Austria and reported, less than three quarters of study group had severe pain score before exercise application compared by 20 % after application. While more than two thirds of control group had severe pain score before exercise application compared by more than two thirds after exercise application.

These findings were in the same line with **Nengsih et al., (2021)** study in titled The Effectiveness of Pregnancy Exercise In Relieving Back Pain During Third Trimester of Pregnancy and reported that, less than three quarters of study group had sever pain

score before exercise application compared by 19.1% after exercise application. While more than two thirds of control group had severe pain score before exercise application compared by more than two thirds after exercise application.

From the researcher point of view this may be due to sitting pelvic tilt exercise increase flexibility to prevent lumbar extension and strengthen abdominal and gluteal muscles to overcome low back pain. On other hand in control group low back pain increase due to increase pressure of gravid uterus in the end of pregnancy on low back.

Regarding modified oswestry disability pain score before and after applying sitting pelvic tilt exercise. This current study clarified that there were no statistically significant difference between study and control groups regarding all items of Modified Oswestry Disability pain score before sitting pelvic tilt exercise application. While, after 4 weeks of sitting pelvic tilt exercise application all items of Modified Oswestry Disability pain score named (pain intensity, personal care, lifting, walking, sitting, standing, sleeping, social life, travelling and employment/ home making). Were significantly decreased in the study compared to the control group. That which supported Hypothesis II which named Primigravidae women with low back pain who practice sitting pelvic tilt exercise will record lower disability score in performing daily activities compared to those who do not practice.

These findings were supported by **Marzouk and Fadel, (2020)** Study which entitled "effect of lumbopelvic belt exercise versus pelvic strengthening exercise on the level of pregnancy-related low back pain" in Egypt and formed that were no statistically significant difference between study and

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control groups regarding all items of Modified Oswestry Disability pain score before sitting pelvic tilt exercise application. While there were highly statistically significance difference regarding all items of Modified Oswestry Disability pain score between study and control groups after 4 weeks of exercise application ( $P \leq 0.001$ ).

Also **Sureshbabu and Shobana, (2022)**, who study "Pelvic tilt exercises in different positions for alleviating lumbar pain during pregnancy" in India and with **Haslia. (2022)**, study which entitled "The Effects of Lumbopelvic Exercise on Functional Activities in Pregnant Women with Conditions Low Back Pain at Sudiang Raya Health Center in Makassar City" and reported that there were no statistically significant difference between study and control groups regarding subscale of Modified Oswestry Disability pain score before sitting pelvic tilt exercise application ( $P \leq 0.001$ ). From researcher point of view the improvements of Modified Oswestry Disability pain score due to effect of sitting pelvic tilt exercise on low back pain which lead to improve the woman's ability to perform daily activities.

Regarding Correlation coefficient between total pain and the Modified Oswestry Disability score of the studied women before and after 4 weeks of sitting pelvic tilt exercise application this current study indicated that there were highly significant positive correlations regarding total pain and the Modified Oswestry Disability score between study and control groups before and after 4 weeks of sitting pelvic tilt exercise application.

These findings were in the same line with **Abadi et al., (2019)** study intitled "the effect of back exercise program on low-back pain disability in pregnant women" and reported that there were highly significant positive

correlations regarding total pain and the Modified Oswestry Disability score between study and control groups before and after sitting pelvic tilt exercise application ( $P \leq 0.001$ ). **Lestarl, (2020)**, study intitled "The Effectiveness of Pelvic Rocking Exercises on low back pain in III Trimester Pregnant Women "and formed that there were highly significant positive correlations regarding total pain and the Modified Oswestry Disability score between study and control groups before and after sitting pelvic tilt exercise application ( $P \leq 0.001$ ). This may be due to primigravida in the study group practice setting pelvic tilt exercise have reduce pain score that consequent decrease the modified oswestry Disability score. Vice versa to the control group.

### **Conclusion:**

The findings of the present study were concluded that sitting pelvic tilt exercise was effective in reducing low back pain in primigravidae women. There was no statistically significance difference between both groups regarding pain score before application of sitting pelvic tilt exercise ( $p < 0.05$ ), on the other hand, the mean pain score was significantly decreased in the study group compared to in the control group after 4 weeks of application of sitting pelvic tilt exercise ( $P \leq 0.001$ ). There was no statistically significant difference between study and control groups regarding all items of Modified Oswestry Disability pain score before sitting pelvic tilt exercise application ( $p < 0.05$ ). While, after 4 weeks of sitting pelvic tilt exercise application all items of Modified Oswestry Disability pain score named (pain intensity, personal care, lifting, walking, sitting, standing, sleeping, social life, travelling and employment/ home making). Were significantly decreased in the study compared to the control group ( $P \leq 0.001$ ). Therefore, the study aim was

achieved and the study hypotheses were supported.

**Recommendations:**

- The pelvic tilt exercise should be performed regularly as a part of the routine antenatal care.
- Distribution of a designed brochure about the sitting pelvic tilt exercise for all pregnant women who attended the antenatal clinics as a part of the routine antenatal care

**Further studies**

- Applying research study to compare the pelvic tilt exercise in different position for relieving low back pain.
- Replicate the same study in large sample size and different study setting.

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## تأثير تمرين إمالة الحوض الجلوسى على آلام أسفل الظهر لدى السيدات الحوامل البكرات

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إن آلام أسفل الظهر حالة متكررة ومعيقة أثناء الحمل وتسبب مشكلة في الأنشطة اليومية مثل المشي والرفع والنوم والجلوس. لذا هدفت الدراسة الى تقييم تأثير تمرين إمالة الحوض الجلوسى على آلام أسفل الظهر لدى السيدات الحوامل البكرات. تم استخدام تصميم شبه تجريبي فى هذه الدراسة. وقد أجريت الدراسة في العيادة الخارجية لأمراض النساء والتوليد بمستشفيات جامعة بنها تم اختيار عينة هادفة من 152 سيدة حامل بكرية وفقاً لمعايير التضمين وتم تقسيمها بالتساوي إلى مجموعتين (مجموعة الدراسة = 76 سيدة كانت تمارس تمرين إمالة الحوض ومجموعة التحكم = 76 سيدة تلقين رعاية روتينية قبل الولادة في المستشفى. حيث كشفت النتائج عن انخفاض متوسط درجة الألم وألم إعاقة بشكل ملحوظ في مجموعة الدراسة مقارنة بمجموعة التحكم بعد 4 أسابيع من تطبيق تمرين إمالة الحوض. استنتجت نتائج الدراسة الحالية أن تمرين إمالة الحوض الجلوسى كان فعال في الحد من آلام أسفل الظهر عند النساء البكرات. كما اوصت الدراسة بأن تكون تمارين إمالة الحوض فعالة بانتظام كجزء من الرعاية الروتينية السابقة للولادة وتصميم وتوزيع كتيب عن تمارين إمالة الحوض الجلوسى لجميع النساء الحوامل كجزء من الرعاية الروتينية السابقة للولادة.