



Original Article

Effectiveness of Pelvic Tilt Exercises in Patients With Pregnancy-Related Low Back Pain; Quasi-Experimental Study

Muhammad Muteen^{1*}, Rozina Saleh², Umema Tariq³, Muhammad Qasim Idrees⁴, Hafiza Aroofa⁵, Ali Raza⁶

^{1*}PhysioMed Clinic, Chishtian, Pakistan. ²FMH Institute of Allied Health Sciences, Lahore, Pakistan. ³Sindh Government Hospital, Liaquatbad, Karachi, Pakistan. ⁴Central Park Medical College, Lahore, Pakistan. ⁵Independent Medical College, Faisalabad, Pakistan. ⁶Riphah International University, Lahore, Pakistan.

ABSTRACT

Background: Low back pain has been recognized as the leading and the most common complaint during the entire gestational tenure. The pelvic joints are mostly considered to be very stable joints, however, in response to the growing baby and preparing the mother's body for delivery the ligaments stabilizing these joints get loose. During pregnancy, various physiotherapy exercises play an important role in maintaining normal posture, and muscle and preventing the onset of low back pain. **Objective:** The objective of this study is to determine the short-term and long-term effectiveness of pelvic tilt exercises in patients with pregnancy-related low back pain. **Methods:** The data for this quasi-experimental study was collected from the Gynecology OPD and gynecology ward of the district hospital, Bahawalpur. The sample size of this study was calculated to be n=25. A total of 25 patients with pregnancy-related low back pain in 3rd trimester were recruited in this study. Pregnant females who were obese, who had a weight gain of more than 25 kilograms and less than 10 kilograms were not recruited in our study. Our current study started after the approval from the Advanced Study and Research Committee of the University of Health Sciences, Lahore. Non-probability convenient sampling was used for sampling. The patients were randomly allocated to group 1 or group 2. The results of this study were analyzed using a statistical package for social sciences version 23. Paired sample t-test was applied for statistical analysis to find out pre and post-test differences. The p-value was 0.000 which shows that the results are statistically significant. **Results:** The result of this study shows that there was a decrease in the scores of the visual analog scale and Oswestry low back pain disability index in the pre and post-test of both the groups, undergoing short-term and long-term exercises. **Conclusion:** The results of this study conclude that pelvic tilt exercises show positive short-term and long-term effectiveness in patients with pregnancy-related low back pain. The severity of the low back pain tends to decrease with pelvic tilt exercises in pregnant females with low back pain.

Access
the article
online



SCAN ME

***Correspondence:** Muhammad Muteen, PhysioMed Clinic, Chishtian Pakistan.

Email:
drmuteen3428@gmail.com

Keywords: low back pain; pelvic tilt exercises; pregnancy

DOI: 10.55735/hjprs.v4i1.231

Citations: Muteen M, Saleh R, Tariq U, Idrees MQ, Aroofa H, Raza A. Short-term and long-term effectiveness of pelvic tilt exercises in patients with pregnancy-related low back pain; Quasi-experimental study. The Healer Journal of Physiotherapy and Rehabilitation Sciences. 2024;4(1):901-909.



Copyright©2024. The Healer Journal of Physiotherapy and Rehabilitation Sciences.

This work is licensed under [Creative Commons Attributions 4.0 International license](https://creativecommons.org/licenses/by/4.0/)

INTRODUCTION

Pregnancy is a marvelous period of a female's life as it marks the symptoms of the arrival of a new family member. The physical changes observed in the body of the female need special care and attention to save her from various diseases. One of the major issues observed during the pregnancy is low back pain. 90% of pregnant females suffer from it.^{1,2} During pregnancy the occurrence of low back disorders might have some adverse consequences which might involve, psychological, physical and social influences among females and their unborn babies.^{2,3} Low back pain has also been recognized as a common complaint amongst females throughout their physiological state. The adverse effects of low back pain are known to reduce the quality of life during pregnancy. Researchers described low back pain during pregnancy as an issue in numerous countries. In the year 1962, Walde was the 1st person to find out the difference between lumbar pain and pelvic girdle pain. After Walde, Ostgaard and his co-workers set the criteria for the differences between these two terms.⁴ Biomechanical and hormonal changes might alter the daily life routine of a pregnant female with low back pain.

Mild, moderate to severe lower back pain has been observed to occur recurrently and more frequently in literature also because it disrupts pregnant females from completing their daily activities.⁵ A previously conducted study showed that there is almost a fifty percent prevalence of low back pain in pregnancy. These females have also been observed to suffer from complications of low back pain during the postpartum period.⁶ Majority of the females suffer from low back pain throughout their pregnancy. Various reasons can be, that their weight might increase on one side of the body and the specific physiology of the spine might also alter. Moreover, during pregnancy the female's weight increases by 15 to 25%,

which puts a huge burden on the tendons, ligaments and joints. The release of hormones, estrogen and relaxin makes the ligaments loosen hence producing a further tendency for injury.⁷ The swollen and enlarged uterus and the enhanced volume of the breasts tend to shift the center of gravity of the body to the front. At the same time, the pelvis is tilted and the lordotic curve tends to increase.⁸ Risk of pain also increases in those females who had a previous history of pregnancies. The amount of risk any female has cannot be estimated in a pregnant female. However, those women, who suffer from low back pain before their pregnancy are at a higher risk of developing moderate to severe pain whose duration cannot be estimated after the birth of the child.⁹ This pain can be reduced by maximizing physical activities which involve their pelvis, and pelvic exercises. These exercises and activities might include, standing on one leg, walking long distances, climbing stairs, standing for long periods, maximizing vocational ergonomics, taking a lot of short breaks, trying to lie down and educating and creating awareness among pregnant females regarding structural fitness.

This might include ergonomics of the body and avoiding stress on the lower back. Also, tell pregnant to avoid lifting anything weighing over several pounds and strengthen the muscles of the back.¹⁰ If the low back pain is started to get treated at an earlier stage then their treatment might lead to the best possible outcome. Conservative management has been considered as a gold standard management which includes, physiotherapy, stabilization belts, nerve stimulation, pharmacological treatment, massage, relaxation techniques, yoga and acupuncture.¹¹ The severity of the low back pain might be diminished by taking certain precautionary and preventive measures. These are some of the techniques which aid in decreasing low back pain during pregnancy. Getting plenty of rest, using

exercises which have been approved by the health care providers. Those exercises support and aid in strengthening the abdomen and back, avoiding high heels and sleeping on the back.¹² One of the best treatments that has been recognized to minimize the low back pain during pregnancy is physiotherapy. This comprises passive therapies, such as active treatment, manual therapy and certain therapeutic exercises.¹³ Some other treatment modalities might also include, aquatic therapy, ergonomic advice, acupuncture and pelvic belts. Exercises are also known to reduce the intensity of pain, reduce disability and improve functioning.^{3, 7}

Developing countries like Pakistan, lack authentic evidence regarding the effectiveness of physiotherapy exercises on issues occurring during pregnancy and after delivering the child. This domain needs special attention and requires a lot of research work to be done. Finding out the short and long-term effects of pelvic tilt exercises on pregnancy-related lower back pain can help lots of females in Pakistan who cannot afford any other expensive treatment for this issue. Our study aims to evaluate and determine the short and long-term effects of pelvic tilt exercises on pregnancy-related lower back pain among pregnant women in Pakistan. Our study might add a lot to the literature in this field considering the Pakistani population as the target population.

METHODS

The data for this quasi-experimental study was collected from the gynecology OPD and gynecology ward of the district hospital Bahawalpur, Punjab, Pakistan. Non-probability convenience sampling was used as a sampling technique. The sample size of 25 participants was calculated by keeping the margin of error, $d_2=5\%$ and the level of significance, $Z_{1-\alpha/2}=5\%$. The pregnant females in their third trimester with low back

pain were recruited in this study. They were randomly allotted to group 1 or group 2. Our current study had 13 participants in group 1 and 12 participants in group 2. Our current study recruited pregnant females in their third trimester suffering from low back pain. The range of age of pregnant females was 20 to 35 years old. Healthy pregnant females were recruited in this study with no other underlying serious impairment or disease that could affect the exercise plan, pregnancy and labor for example, diabetes mellitus, infective hypertension, thyrotoxicosis and cardiac diseases. Pregnant females who were obese, who had a weight gain of more than 25 kilograms and less than 10 kilograms were not recruited in our study. Pregnant females who did not tend to deliver their baby at the district hospital Bahawalpur, or who had traumatic low back pain and those who have low back pain due to any other underlying musculoskeletal disorder such as spondylolisthesis, lumbar spondylitis, spondylosis, etc. were excluded from our study.² Our current study started after the approval from the advanced study and research committee (ASRC) of the University of Health Sciences, Lahore.

The written consent form in English and Urdu was given to every participant before their recruitment in our study. $n=25$, pregnant females with low back pain who visited the gynecology OPD and gynecology ward of the district headquarters hospital, Bahawalpur who fulfilled the criteria of our current study. Certain consideration and rejection measures were selected. The data was collected by using questionnaires. First information was gathered regarding the general demographics, which included the age, body mass index, multigravida or primigravida. To estimate the severity of the pain visual analogue scale¹⁴ was used and the Oswestry low back pain disability questionnaire¹⁵ was employed. The Oswestry disability index is a specified tool

employed to measure the disability in patients with low back pain. This instrument comprises 10-item scales which include the intensity of pain, personal care, lifting, sitting, walking, sleeping, standing, work life, traveling and social life. It has six levels from zero to five.¹⁶ The results of this study were analyzed using a statistical package for social sciences version 23. Paired sample t-test was applied for statistical analysis to find out pre and post-test differences. The p-value was 0.000 which shows that results are statistically significant.

RESULTS

In table 1 it was shown that the descriptive

statistics for demographical data of the participants recruited in this study. The minimum age of participants recruited in this study was 22 years and the maximum age was 34 years. The results of the paired sample t-test on the score of the visual analog scale (VAS) was given in Table 2. The results showed a decrease in the score post-treatment in both groups. Table 3 showed the results of paired sample statistics on the score of the Oswestry disability index (ODI). The results showed us that there was a visible decrease in the score post-treatment. Table 4 indicated the results of the paired sample t-test for comparison between the groups. The p-value

Table 1: Descriptive Statistics for Demographics

Study Group		n	Minimum	Maximum	Mean	Std. Deviation
Short-term Exercises	Age	13	22.00	34.00	27.61	4.50
	Height	13	1.63	1.71	1.66	.026
	Weight	13	60.00	65.00	62.23	1.78
	BMI	13	21.94	22.92	22.42	.271
Long-term Exercises	Age	12	22.00	34.00	28.00	4.06
	Height	12	1.59	1.71	1.65	.039
	Weight	12	60.00	68.00	64.08	2.96
	BMI	12	23.01	23.83	23.41	.219

Table 2: Paired Sample Statistics for Visual Analogue Scale Score

Study Group			Mean	n	Std. Deviation	Std. Error Mean
Short Term Exercises	Pair 1	VAS Pre-treatment	6.07	13	1.55	.43
		VAS Post-treatment	2.61	13	1.50	.41
Long Term Exercises	Pair 1	VAS Pre-treatment	5.50	12	1.08	.31
		VAS Post-treatment	3.00	12	1.27	.36

was 0.000 which showed us that the results were significant.

DISCUSSION

There was a significant difference between the mean scores of pre-treatment and post-treatment scores of the VAS and ODI considering the severity and symptoms of low back pain. The results of our study showed that low back pain eventually decreased with a significant value of 0.000. In this way, our current study suggests that customized and pre-designed physical therapy might reduce the severity and intensity of low back pain and its associated disability in pregnant females. Previously conducted studies and already

available literature showed us positive feedback of physical therapy exercises to cause a reduction in the intensity of pain in the back and the pelvis. Shim and her co-workers¹⁷ reported 6 different types of physical therapy exercises in their study. Exercise has been recognized as the best option to reduce low back pain during pregnancy. The exercise program they employed included, pelvic tilting, knee pull, lateral straight leg raising, curl up and kegel exercises. These all were very similar to the exercise regime employed in this current study. Kluge and co-workers¹⁸ showed in their research that employing physical therapy exercises reduces low back pain during

Table 3: Paired Sample Statistics for Oswestry Disability Index Score

Study Group			Mean	n	Std. Deviation	Std. Error Mean
Short Term Exercises	Pair 1	ODI Pre-treatment	58.23	13	5.90	1.63
		ODI Post-treatment	33.61	13	4.09	1.13
Long Term Exercises	Pair 1	ODI Pre-treatment	56.83	12	6.39	1.84
		ODI Post-treatment	33.83	12	4.08	1.17

Table 4: Paired Sample t-Test for Comparison Between Groups

Study Group			Paired Differences							
			Mean	S.D	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
						Lower	Upper			
Short Term Exercises	Pair 1	ODI Pre & Post-treatment	24.61	6.75	1.87	20.53	28.69	13.14	12	.000
Long Term Exercises	Pair 1	ODI Pre & Post-treatment	23.00	7.93	2.28	17.96	28.03	10.04	11	.000

Figure 1: Comparison of Effects of Short-term and Long-term Pelvic Tilt Exercises with Age

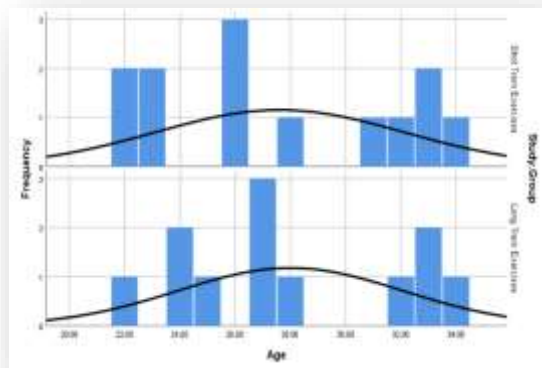


Figure 2: Comparison of Effects of Short-term and Long-term Pelvic Tilt Exercises with Height

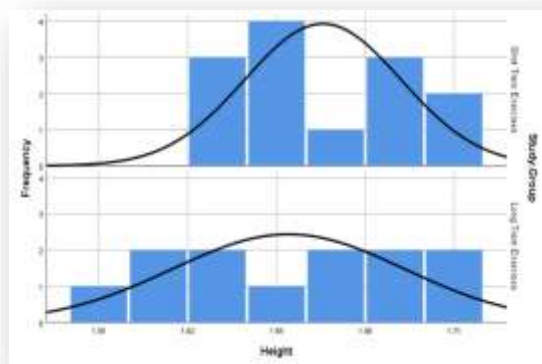


Figure 3: Comparison of Effects of Short-term and Long-term Pelvic Tilt Exercises with Weight

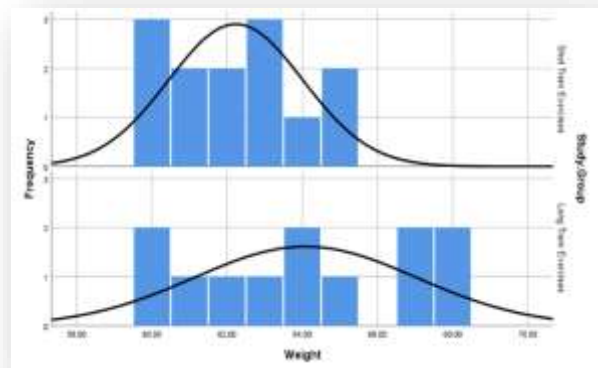
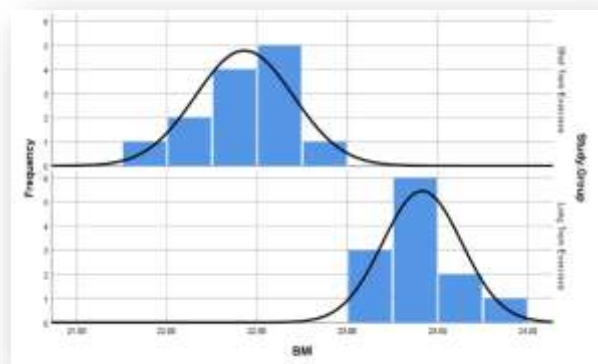


Figure 4: Comparing the effects of short-term and long-term pelvic tilt exercises with BMI



pregnancy and also tends to diminish the intensity of pain in the lumbar and pelvic region. Our current study also agrees with this finding. Another study conducted by Martins and co-workers¹⁹ reported that almost eight percent of pregnant females were observed to suffer from pain in the back, especially in the lumbar and sacroiliac regions. The risk factors and causes of this pain in the back are still unclear but some factors have been recognized such as already existing pain in the back before pregnancy, previous pregnancies, an increased weight and body mass index and certain serious muscular problems.²⁰ In our current study low back pain was diagnosed using the ODI. Both the groups, short and long-term, after the the implication of pelvic

tilt exercises reported minimal pain. Comparable findings were reported in a study conducted in the United States of America by Wang and co-workers.¹⁰ They reported that average pain in the lower back during pregnancy with physical therapy exercise was moderate in most of the cases. One more study conducted by Stapleton and co-workers²¹ reported comparable results to our current study. Their results showed that 35.5% of females suffering from severe pain in the back showed improvements after performing physical therapy exercises. In our current study, the mean score of the ODI for short-term exercises decreased from 58 to 33 post-treatment and for long-term exercises the pre-treatment score was 56 which decreased to 33.

This showed that the intensity of pain and disability gradually decreased after employing pelvic tilt exercises. In a study conducted in Bangladesh among 51 participants who suffered from low back pain during pregnancy, 70.59% of the participants reported having an increased low back pain while they worked.²² Our current agrees with these findings and recommends conducting further studies on comparing the severity of low back pain between working pregnant females and housewives and also comparing the results of physical therapy exercises on both of these groups. In our current study, it was commonly observed that age is also an associated risk factor among young pregnant females with a mean age of 28 ± 4.5 years.

Young pregnant females are more liable to suffer from lower back pain than any other age group.² Wang and co-workers¹⁰ also reported that pain in the lower back during pregnancy has been predicted by age. Stapleton and co-workers²¹ also stated that younger women are more vulnerable to suffering from pain in the lower gestation period than other age groups of females. The majority of the women during pregnancy are known to suffer from low back pain. Outcomes of some previously conducted studies report that only 50% of the females go for advice and consultancy from a doctor or physiotherapist whereas 70% of the females do consider lower back pain rather seriously.²³ Diagnosing lower back pain in earlier stages might decrease the risk of adverse pain because a female during pregnancy would have various modes of treatment. Pain in the lower back might lead to a wide variety in physical diagnosis but most of the females might improve their health status after delivering a child. The treatment choices for reducing lower back pain are physiotherapy exercises, electrical muscle stimulation, sacroiliac belts, dry needling, using drug therapy and relieving stress through certain

massage techniques and yoga.^{7, 23, 24}

Pregnant females might also reduce their weight by doing exercises and walking during their postpartum period and it might also help them to avoid the risk of suffering from lower back pain.¹² The most common way of treating a pregnant woman suffering from lower back pain is physical therapy exercises.² Performing the physiotherapy exercises will reduce the pain if the patient follows the physiotherapist to manage the lower back pain. Pregnancy is not a pathology, but the difficulties and consequences that are faced due to pregnancy must be dealt with accurately. Our current study recommends that emphasis on performing physical exercises in pregnant females must be encouraged. More studies, randomized control trials and reviews must be conducted in this field. Focusing specifically on pregnancy-related lower back pain could be better controlled by following an accurate exercise regime, techniques for relaxation and adjusting correct posture with an increase in body weight and must be prescribed by a well-qualified physical therapist. Our study strongly recommends creating awareness regarding the benefits of physical therapy exercises for pregnancy-related lower back pain. Our current study lacked generalizable results due to a smaller sample size and covering only a small city district hospital. Future researchers are recommended to conduct studies for more generable and accurate results.

CONCLUSION

The results of this study conclude that pelvic tilt exercises show positive short-term and long-term effectiveness in patients with pregnancy-related low back pain. The severity of the low back pain tends to decrease with pelvic tilt exercises in pregnant females having low back pain. Our current study also concludes that lower back pain during

pregnancy disturbs daily life activities, but physical therapy exercises and proper counseling would lead to a life without stress for a female in her gestation period. Our study concludes that pelvic tilt exercises play a key role in reducing low back pain during pregnancy.

DECLARATIONS

Consent to participate: Written consent had been taken from patients. All methods were performed following the relevant guidelines and regulations.

Availability of data and materials: Data will be available on request. The corresponding author will submit all dataset files.

Competing interests: None

Funding: No funding source is involved.

Authors' contributions: All authors read and approved the final manuscript.

REFERENCES

- Knobloch TJ. Responding to Alzheimer's disease and postmodernity with an ethic of reverence: Saint Louis University; 2003. <https://search.proquest.com/openview/9ba29171f020f4e2dd5f836ff88412e5/1?pq-origsite=gscholar&cb1=18750&diss=y>
- Arif A, Shahid G, Siddique MA, Aziz K, Fahim MF. Effects of exercises on pregnancy related low back pain: a quasi experimental study. *Journal of Bahria University Medical and Dental College* 2018; 8(3): 163-7. https://www.academia.edu/download/62268533/10_2018_Effects-of-Exercises-On-Pregnancy-Related-Low-Back-Pain-A-Quasi-Experimental20200303-80182-136mrpl.pdf
- Pennick V, Liddle SD. Interventions for preventing and treating pelvic and back pain in pregnancy. *Cochrane Database of Systematic Reviews* 2013; (8). <https://doi.org/10.1002/14651858.CD001139.pub3>
- Olsson C, Lena N-W. Health-related quality of life and physical ability among pregnant women with and without back pain in late

pregnancy. *Acta obstetrica et gynecologica Scandinavica* 2004; 83(4): 351-7. <https://doi.org/10.1080/j.0001-6349.2004.00384.x>

5. Bastiaanssen JM, de Bie RA, Bastiaenen CH, Essed GG, Van den Brandt PA. A historical perspective on pregnancy-related low back and/or pelvic girdle pain. *European Journal of Obstetrics & Gynecology and Reproductive Biology* 2005; 120(1): 3-14. <https://doi.org/10.1016/j.ejogrb.2004.11.021>

6. Mühlemann D, Mühlemann MB. Low back pain in pregnancy: diagnosis, treatment options and outcomes. *Praxis* 2015; 104(11): 565-74. <https://doi.org/10.1024/1661-8157/a002014>

7. Vleeming A, Albert HB, Östgaard HC, Stureson B, Stuge B. European guidelines for the diagnosis and treatment of pelvic girdle pain. *European Spine Journal* 2008; 17: 794-819. <https://doi.org/10.1007/s00586-008-0602-4>

8. Artal R, O'Toole M. Guidelines of the American College of Obstetricians and Gynecologists for exercise during pregnancy and the postpartum period. *British journal of sports medicine* 2003; 37(1): 6-12. <http://dx.doi.org/10.1136/bjism.37.1.6>

9. Korsten-Reck U, Marquardt K, Wurster K. Schwangerschaft und Sport. *Deutsche Zeitschrift für Sportmedizin* 2009; 60(5): 117-21. https://www.germanjournalsportsmedicine.com/fileadmin/content/archiv2009/heft05/15_uebersicht_korstenreck_509.pdf

10. Wang S-M, Dezinno P, Maranets I, Berman MR, Caldwell-Andrews AA, Kain ZN. Low back pain during pregnancy: prevalence, risk factors, and outcomes. *Obstetrics & Gynecology* 2004; 104(1): 65-70. DOI: 10.1097/01.AOG.0000129403.54061.0e

11. Antoniadis S. Preventing Back Pain During Pregnancy. Retrieved from <http://www.midwife.org/ACNM/files/ccLibraryFiles/Filename/000>

- 000000622012;4.
<https://doi.org/10.1002/14651858.cd001139>
12. Bailey A. Risk factors for low back pain in women: still more questions to be answered. *Menopause* 2009; 16(1): 3-4. DOI: 10.1097/gme.0b013e31818e10a7
13. Shahid AAG, Siddique MA, Aziz K, Fahim MF. Effects of Exercises On Pregnancy Related Low Back Pain: A Quasi Experimental. https://www.researchgate.net/profile/Muhammad-Fahim-3/publication/329465292_Effects_of_Exercise_s_On_Pregnancy_Related_Low_Back_Pain_A_Quasi_Experimental_Study/links/5c09eb15299bf139c7446f52/Effects-of-Exercises-On-Pregnancy-Related-Low-Back-Pain-A-Quasi-Experimental-Study.pdf
14. Begum MR, Hossain MA. Validity and reliability of visual analogue scale (VAS) for pain measurement. *Journal of Medical Case Reports and Reviews* 2019; 2(11). <https://www.researchgate.net/profile/Mohammad-Hossain-15>
15. Poder TG, Carrier N. Predicting EQ-5D-5L utility scores from the Oswestry Disability Index and Roland-Morris Disability Questionnaire for low back pain. *Journal of Pain Research* 2020; 623-31.
16. Fairbank JC, Pynsent PB. The Oswestry disability index. *Spine* 2000; 25(22): 2940-53. https://journals.lww.com/spinejournal/Fulltext/2000/11150/The_Oswestry_Disability_Index.17.aspx
https://journals.lww.com/spinejournal/Fulltext/2000/11150/The_Oswestry_Disability_Index.17.aspx
17. Shim M-J, Lee Y-S, Oh H-E, Kim J-S. Effects of a back-pain-reducing program during pregnancy for Korean women: A non-equivalent control-group pretest-posttest study. *International journal of nursing studies* 2007; 44(1): 19-28. <https://doi.org/10.1016/j.ijnurstu.2005.11.016>
18. Kluge J, Hall D, Louw Q, Theron G, Grové D. Specific exercises to treat pregnancy-related low back pain in a South African population. *International Journal of Gynecology & Obstetrics* 2011; 113(3): 187-91. <https://doi.org/10.1016/j.ijgo.2010.10.030>
19. Martins RF, Silva J. Back pain is a major problem for many pregnant women. *Revista da Associacao Medica Brasileira* (1992) 2005; 51(3): 144-7. <https://doi.org/10.1590/s0104-42302005000300014>
20. Gutke A, Östgaard HC, Öberg B. Association between muscle function and low back pain in relation to pregnancy. *Journal of rehabilitation medicine* 2008; 40(4): 304-11. DOI: 10.2340/16501977-0170
21. Stapleton DB, MacLennan AH, Kristiansson P. The prevalence of recalled low back pain during and after pregnancy: a South Australian population survey. *Australian and New Zealand journal of obstetrics and gynaecology* 2002; 42(5): 482-5. <https://doi.org/10.1111/j.0004-8666.2002.00482.x>
22. Chanda S. Prevalence of pregnancy related low back pain among the pregnant women at the selected hospitals in BANGLADESH: Bangladesh Health Professions Institute, Faculty of Medicine, the University ...; 2012. <http://hdl.handle.net/123456789/501>
23. Mogren IM. Previous physical activity decreases the risk of low back pain and pelvic pain during pregnancy. *Scandinavian journal of public health* 2005; 33(4): 300-6. <https://doi.org/10.1177/140349480503300410>
24. Sabino J, Grauer JN. Pregnancy and low back pain. *Current reviews in musculoskeletal medicine* 2008; 1: 137-41. DOI: <https://doi.org/10.1007/s12178-008-9021-8>