EFFECTIVENESS OF CORE STABILITY EXERCISES IN MANAGEMENT OF GESTATIONAL BACK PAIN IN SECOND AND THIRD TRIMESTER

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ABSTRACT

AIM The aim of study was to evaluate the effectiveness of core stability exercises and pelvic floor exercises in management of low back pain among pregnant women in second and third trimester.

METHODS The study is a randomized controlled trial on 60 pregnant women with low back pain in second and third trimester, aged between 17-40 years were recruited in study based on inclusion and exclusion criteria from three teaching hospitals. They were randomly allocated into two groups. Experimental group or exercise group received core stability and pelvic floor exercises and control group was treated by their medical doctors with medications and did not receive any physical therapy. Both groups were asked for follow up after one month. Visual analogue scale and Oswestry low back pain disability index were used as an outcome measure. Paired T-test and mean, median, mode and standard deviation were used for comparison.

RESULT Average age was 24±3.910 in experimental group and in control group mean age was 24 ±3.882. Significant difference was seen in pain intensity and disability among both groups. The effectiveness of core stability exercises showed reduction in pain intensity (p 0.000) however, the mean of reduction in pain intensity was greater in exercise group as compared to control group. Similarly, means of functional disability was decreased in exercise group (p 0.000). There were no complications reported by pregnant females.

CONCLUSION Core stability and pelvic floor exercises can relieve gestational back pain in second and third trimester of pregnancy and more effective than medications.

KEYWORDS Gestational back pain, Core stability exercises.

This article may be cited as: **Naeem A, Khan DA. Effectiveness of core stability exercises in management of gestational back pain in second and third trimester. Ann Allied Health Sci. 2015;1(1):5-9**

INTRODUCTION

Back pain is a major health issue in the world.[1] Various studies stated that low back pain can be caused by pregnancy, obesity,[2] weight lifting,[3] psychological factors and distress[4] and mechanical stress due to occupational activities.[5] About 50%-90% pregnant women are affected by low back pain between 6th and 9th month.[6, 7] Occurrence of back pain in pregnancy is about 57% to 69% while incidence is 61%.[8] Around 67% of pregnant women are suffering from severe back pain.[9] According to a study, back problem during pregnancy increases in the 5th to 7th month.[10]

Low back pain usually originates at lumbar region, sacro-iliac joint and symphysis pubis.[7] Hipp et al considered back pain disturbing the lumbar spine, sacro-coccyx, pelvis and other organs.[1] Causes of gestational back pain includes mechanical, postural, hormonal changes while a study found weakness of abdominal muscles and pelvic muscles which effects core stability but it is still unclear that cause is single or multi factors.[6, 9, 11]

Many studies are carried on effect of different exercises for the treatment of gestational back pain. Licciardone et al studied osteopathic manipulative treatment of back pain and related symptoms during pregnancy and founds that this technique slows worsening of back functioning during pregnancy during 3rd trimester.[7] Fang Yan et al studied effects of stability ball exercise programme on low back pain and daily life interference during 20 and 22 weeks of pregnancy and concluded that exercises have improved activities of daily living (ADLs) and reduced back pain.[12] Zadeh et al studied the effect of exercise on the intensity of low back pain and found that exercise reduced gestational back pain and

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Date Received: August 4, 2014
Date Revised: September 18, 2014
Date Accepted: November 15, 2014

improved flexibility of spine during 2nd and start of 3rd trimester.[13]

Core stability is maintained by transverse abdominis along with multifidi, thoracic diaphragm and pelvic floor muscles (Lee et al). It was found that core stability exercises produced better outcomes as compared to wearing maternity support belts (Zachovajevas et al).[14] Morkved suggested that specifically designed training program having number of exercises along with pelvic floor muscles strengthening was successful in reducing gestational back pain as compared to pelvic floor muscles exercises alone.[15]

Many studies showed that pregnant women who participate in exercise program addressing core strength, flexibility and muscular endurance have reduced postural changes and back pain severity.[16]

During gestational state, abdominals, back and pelvic muscles are strengthened by exercises which enhance the posture and ability of bearing weight. Exercises of low intensity may also lessen pain. Pain also decreases with exercises in 2nd half of pregnancy.

Kegel's exercises are also effective in decreasing gestational low back pain.[16] Core stability exercises involve transverse abdominis, multifidi, thoracic diaphragm and pelvic floor muscles. These exercises had positive effect on low back pain in 2nd and 3rd trimester of pregnancy.

No local studies are available and there is need to investigate the development of back pain during gestation so the aim of the study is to determine the effectiveness of core stability exercises in management of gestational back pain in 2nd and 3rd trimester.

METHODS

Randomized control trial study was carried out in Khyber Teaching hospital, Hayatabad Medical complex and Lady Reading Hospital located in Peshawar. It included 60 pregnant women aged between 17-40 years with back pain in 2nd and 3rd trimester after taking informed consent. Women in 1st trimester, having back pain before pregnancy, having any fetal complications or any other inflammatory diseases were excluded from the study. These women were randomly allocated into two groups. One group was experimental group or exercise group received core stability exercises and other group was control group which was treated by their medical doctors with medications without receiving any physical therapy treatment. They were asked to come for follow up after one month.

The main instruments used in this study were visual analogue scale (VAS) and Oswestry low back pain disability index. Gold standard scale which is used to measure the grade of pain is VAS. It is 10 cm line starting from 1 showing 'no pain' and ends at 10 showing 'worst pain'. Participants were asked to describe and express the intensity of pain from 0 to 10. Each participant pointed the intensity of pain on scale independently. Oswestry low back pain disability index is an important scale which is used to measure disability related to pain in people with low back pain. It consists of 10 sections with 5 scores. It is calculated in percentages. 0%-20% showing minimal disability, 21%-40% showing moderate disability, 41%-60% documenting severe disability, 61%-80% presenting crippled disability and 81%-100% depicting very severe disability.

Program was scheduled for core stability and pelvic floor exercises to strengthen transverse abdominis, multifidi, diaphragm and pelvic floor muscles. Which includes bridging exercise, bending leg lift (hook lying), heel walking (hook lying), wall squatting and knee abduction in side lying position and Kegel's exercises. Each woman was asked to perform exercise for 4 weeks 4-5 days per week and 2 sets per day. Each sets with 10-15 repetitions.

RESULTS

Total sample size of 60 patients was included in the study. The finding reveals that the mean age was 24.87 + 3.9 years in experimental group and 24.97 + 3.8 years in control group. On initial assessment Oswestry disability index for back pain showed that experimental group had 47.20 + 13.231 mean and control group mean was 43.27+11.197. The initial VAS scores reveal that there was a mean of 5.97+1.299 in experimental group and 5.70+1.055 in control group. On follow up after 4 weeks the post Oswestry score in experimental group had a mean of 22.80+6.122 and control group

TABLE 1

	Group	N	Mean	SD
Age	Experimental	30	24.87	3.910
	Control	30	24.97	3.882
Trimester	Experimental	30	1.37	.490
	Control	30	1.33	.479
History of pain	Experimental	30	2.67	.994
	Control	30	2.70	1.088
Pre-Oswestry	Experimental	30	47.20	13.231
	Control	30	43.27	11.197
Pre-VAS	Experimental	30	5.97	1.299
	Control	30	5.70	1.055
Post. Oswestry	Experimental	30	22.80	6.122
	Control	30	32.30	11.284
Post VAS	Experimental	30	2.30	.952
	Control	30	3.40	1.192

TABLE 2

Pre VAS Categories			
Trimester	2	3	**Total**
Second Trimester	34	5	39
Third Trimester	19	2	21
Total	53	7	60

TABLE 3

Pre-Oswestry groups				
Trimester	2	3	4	**Total**
Second Trimester	15	18	6	39
Third Trimester	11	6	4	21
Total	26	24	10	60

mean was 32.30+11.284. Similarly, the post VAS score in experimental group had mean of 2.30+0.952 and control group mean was 3.40+1.192 (Table 1).

DISCUSSION

The study showed significant decrease in intensity of gestational back pain among pregnant women in second and third trimester after core stability exercises and after receiving medications from their gynecologist's for management of back pain. However, improvement of gestational back pain is more in pregnant women of experimental or exercise group in which core stability exercises were given. (p 0.000 with 95% of confidence interval).

In experimental group pain intensity was more (mean 3.27) than in control group (mean 3.23) and when compared the decrease level of pain intensity between two groups, pregnant women in experimental group receiving core stability exercises had significant reduction in gestational back pain intensity by (mean 2.13+ 1.367).

In previous study shows the effect of exercise in gestational low back pain. When study started no difference was observed in intensity of pain among 2 groups and after giving exercises there was significant reduction of low back pain among exercise group in the end of study while back pain was increased in a group without exercises. Abdominals and hamstrings strengthening exercise were given to one group.[13]

Same type of study was conducted by in which he evaluated intensity of low back pain among pregnant women before and after giving specific physical therapy treatment and found reduction of low back pain among group who received intervention ($p < 0.05$).[17] One study found the effect of maternity support garments on gestational low back pain and concluded that use of maternity support garments decreases the low back pain during taking rest and performing activities of daily living.[18]

In previous study no significant changes in pain and functional limitations were observed between 2 groups. Pregnant females were allocated randomly among 2 groups. One group received exercises while other group was control group.[19]

While a systematic review found the evidences about different physical therapy interventions during pregnancy for low back pain and pelvic pain to improve the functional abilities and outcomes among pregnant women when compared with other interventions or no intervention. It was found that in four trials validity was moderate. Physical therapy interventions found more helpful in improving low back pain and pelvic pain during pregnancy were exercises, acupuncture therapy and pelvic support garments.

Further research is required to find out other physical therapy interventions used by therapist in order to assess low back pain and pelvic pain during pregnancy.[20] It was concluded that physical therapy is more effective that is 42.4% as compared to maternity support garments to control the low back pain during and after pregnancy. Activation of transverse abdominis muscle was observed in a group receiving physical therapy treatment.[14]

In South Africa a study was conducted to find whether exercise decrease gestational back pain or not. Pregnant women were randomly allocated to two groups and found reduction in pain intensity ($p<0.01$) and improvement of functional ability during pregnancy (p 0.06) in a group receiving exercise program which includes particular stabilizing exercises while no changes were observed in second group in which exercises were not given,[21] while in our study reduction in pain intensity and disability was observed in both groups. This study also showed significant reduction of functional disability among pregnant women with gestational back pain in second and third trimester (p 0.000 with 95% of confidence interval) in experimental group after core stability exercises.

Pre-disability scores in both groups were high. In experimental or exercise group it was (mean 3.00) and in control group (mean 2.83) which shows that gestational back pain could create adverse problems in second and third trimester of gestation. Significant decrease (mean 1.53 ± 13.433) in functional disability among pregnant women receiving core stability exercises was observed.

Systematic review was done by author to find out the physical therapy interventions effectiveness in management of low back pain and pelvic pain during pregnancy and concluded that more studies (total 9 studies) were based on exercise therapy which reduces the pain intensity

and disability among pregnant women. Recommendations based on evidence for use of exercise therapy can be made for the management of low back pain and pelvic pain during pregnancy.[22]

According to one study pregnant women in group receiving exercise or training program with low back pain and pelvic girdle pain during pregnancy showed no improvement in intensity of pain, disability and also no effect of training or exercises in frequency of gestational back pain and pelvic girdle pain,[23] while in another study concluded that pregnant women receiving training program showed significantly reduction that is from 56% to 44% (p 0.03) in gestational back pain. In this study pelvic floor muscles training was given at home and group training includes combination of exercises like pelvic floor, aerobic exercises and other additional exercises.[15]

The major limitations were that the sample size was small. Due to different backgrounds of females communication and making them understand was also a major issue. As both treatments proved to be effective in this population, further work should be done on a larger population to prove one of these treatments more effective.

CONCLUSION

Conclusion of this study is that, core stability exercises are effective in reducing gestational back pain in second and third trimester among pregnant women. These exercises are also effective in decreasing the functional disability among pregnant women and enhance the functional abilities.

Regarding the role of exercises in antenatal back pain, very little work has been done. Further work should be done on different population. Furthermore it is also suggested that studies should be done on effectiveness of core stability exercises on antenatal or postnatal exercises.

An important factor that needs to be taken in consideration is weight of pregnant women. Research should be done to find the impact of increased weight on back pain during gestation.

As exercise has an important role in decreasing gestational back pain, so they should be included in health care plan of pregnant women.

ACKNOWLEDGEMENT

We acknowledge the study participants who took time out for this study and shared their views.

NOTES ON CONTRIBUTORS

The study was part of AN Bachelors in Physical Therapy Education. DAK supervised the dissertation, and was involved in every part of the analysis, idea's development, and write-up.

CONFLICT OF INTEREST

Authors declare no conflict of interest.

ETHICS APPROVAL

The approval/permission was obtained from Khyber Medical University Research and Ethics Board.

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