



CLINICAL ARTICLE

The effect of exercise on the intensity of low back pain in pregnant women

A. Garshasbi^{a,*}, S. Faghih Zadeh^b

^aDepartment of Obstetrics and Gynecology, Shahed University, Faculty of Medicine, 1481973411 Tehran, Iran

^bDepartment of Bio Statistics, Tarbiat Modaress University, Faculty of Medical Sciences, Tehran, Iran

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KEYWORDS

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Abstract

Objective: To investigate the effect of exercise during pregnancy on the intensity of low back pain and kinematics of spine. **Method:** A prospective randomized study was designed. 107 women participated in an exercise program three times a week during second half of pregnancy for 12 weeks and 105 as control group. All filled a questionnaire between 17–22 weeks of gestation and 12 weeks later for assessment of their back pain intensity. Lordosis and flexibility of spine were measured by Flexible ruler and Side bending test, respectively, at the same times. Weight gain during pregnancy, Pregnancy length and neonatal weight were recorded. **Result:** Low back pain intensity was increased in the control group. The exercise group showed significant reduction in the intensity of low back pain after exercise ($p < 0.0001$). Flexibility of spine decreased more in the exercise group ($p < 0.0001$). Weight gain during pregnancy, pregnancy length and neonatal weight were not different between the two groups. **Conclusion:** Exercise during second half of the pregnancy significantly reduced the intensity of low back pain, had no detectable effect on Lordosis and had significant effect on flexibility of spine.

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1. Introduction

Back pain during pregnancy is a common condition often regarded as an unavoidable drawback of a normal pregnancy. Several studies have shown that at least 50% of women experience some kind of back pain during some period of pregnancy [1–7].

* Corresponding author. Tel.: +98 218830160; fax: +98 218829142.

E-mail address: ahiagarshasbi@obgyn.net (A. Garshasbi).

Table 1 Characteristics of study population

	Exercise group N=107	Control group N=105	p-value
Age (years±S.D.)	26.27±4.87	26.48±4.43	0.432
Weight (kg±S.D.)	67.08±12.8	55.42±12.90	0.171
Height (cm±S.D.)	160.75±5.64	159.87±6.55	0.646
BMI (kg/m ²)	25.98±4.82	25.58±5.12	0.603

Östgaard et al. showed that rate of these complications in athletic women was less than nonathletic women [7]. Meanwhile it is not obvious that in nonathletic pregnant women, exercise can reduce the intensity of low back pain.

The etiology and pathogenesis of back pain related to pregnancy is unclear. Most hypotheses have been focused on changed load resulting from increased weight and decreased stability of the pelvic girdle due to hormonal changes [8,9]. Some studies have revealed a correlation between circulating levels of the hormone relaxin and pelvic pain in pregnancy, while others have found no such correlation [8,9].

Back pain affects daily activities and accounts for most of the sick leave among pregnant women in Scandinavian countries [10]. Prevention and treatment of back pain related to pregnancy would thus have considerable implications for the women themselves and for the society in terms of quality of life, public health costs and productivity [11,12].

Exercise is becoming increasingly popular during pregnancy. One goal of exercise during pregnancy is to restore optimal biomechanics [13]. Lumbo-pelvic stabilization may be achieved by exercise aiming at appropriate posture and enhanced muscle function. No study has shown significant effects of exercise on back pain during pregnancy.

The purpose of the present study was to evaluate the effectiveness of special exercise during pregnancy in preventing or reducing low back pain.

2. Materials and methods

2.1. Study population and design

A prospective randomized study was carried out between April 2003 and January 2004 at Department of Obstetrics and Gynecology, Hazrat Zaynb Hospital, Tehran, Iran. The Ethics Committee of the Medical Faculty approved it at Shahed University. Women who were primigravid, between 20 and 28 years old, 17–22nd weeks of gestation, housewives and were high school graduated were given opportunity to participate in the present study. Women with any absolute and relative contraindications to

aerobic exercise during pregnancy according to ACOG new guidelines in 2002; history of exercise before pregnancy and history of orthopedic disease or surgery were excluded. Using sealed envelopes, the women who accepted the offer were randomized into two groups; one group was offered to exercise three times a week for 12 weeks, the other group was not. The total number of women in the exercise and control groups were 107 and 105, respectively. All the women in the exercise group were informed about warning signs according to ACOG guidelines, to terminate exercise and being excluded from study. All women gave their informed consent.

2.2. The questionnaire

The women in the exercise and control group were asked to fill a questionnaire. This questionnaire focused on low back pain according to KEBK questionnaire, which was changed according to Iranian culture and behaviors. The KEBK questionnaire had 25 questions and every question was scored between 0 (without pain), 1 (mild pain), 2 (moderate pain), 3 (severe pain), 4 (very severe pain). Women's total score considered equal to their low back pain intensity.

Data about age, height, prepregnancy weight and BMI was also given.

The second KEBEK questionnaire was completed after ending the exercise in the exercise group and after 12 weeks in the control group.

Flexibility of spine on the left and the right side was measured by Side Bending Test. Lordosis angle of lumbar spine was measured by Flexible ruler (Fiskars, USA). The two measurements were repeated in the two groups at the same time that second questionnaire was completed.

Data about weight gain during pregnancy, gestational age at delivery and neonatal weight was recorded.

2.3. The exercise programs

This program was scheduled for strengthening of abdominal muscles, Hamstrings muscles and to

Table 2 Low back pain in study population and effect of exercise on it

Low back pain	Exercise group N=107	Control group N=105	p-value
Before exercise	23.60±18.09	31.63±20	0.484
After exercise	30.48±15.46	33±20.39	0.006
	p<0.001	p<0.001	

Table 3 Lordosis of spine in study population and effect of exercise on it

Lordosis	Exercise group N=107	Control group N=105	p-value
Before exercise	45.65±3.05	35.36±3.06	0.949
After exercise	39.15±4.89	40.44±4.04	0.887
	p<0.001	p<0.001	

increase traction of Iliopsoas and Para vertebral muscles.

The exercise programs were included 15 movements in 60 min. These movements were: 5 min of slow walking, 5 min of extension movements, and 10 min of general warming up, 15 min of anaerobic exercise, 20 min of specific exercise and 5 min return to the first position. The exercises were recommended by Tarbiat Modares Faculty of Sport and tested for pregnant women by physiotherapists. The women were offered to exercise three times a week. A midwife supervised all women. The intensity of the exercise was controlled by maternal pulse rate. For pulse rates exceeding 140 per minute, the exercise stopped. Every woman who missed three sessions was excluded from the study.

2.4. Statistical analysis

Results were analyzed using the SPSS for Windows. Comparisons between the exercise group and the control group were carried out using t-Test, Fisher’s Exact Test and Chi-Square-Test. To analyze the low back pain intensity before and after exercise, McNemar Test was used. The Wilcoxon was used for analysis of low back pain between the two groups. A p value smaller than 0.05 was considered significant.

3. Results

A number of 2358 primigravida pregnant women who had the conditions of the study registered at

Table 4 Spine flexibility in study population and effect of exercise on it

Flexibility	Exercise group N=107	Control group N=105	p-value
Right side			
Before exercise	19.27±3.26	19.05±2.46	0.837
After exercise	12.91±4.09	14.56±4.47	0.013
	p<0.001	p<0.001	
Left side			
Before exercise	18.81±3.06	18.60±3.59	0.884
After exercise	12.58±4.17	14.12±4.45	0.003
	p<0.001	p<0.001	

Table 5 Maternal weight gain and pregnancy outcome

	Group	N	Mean±S.D.	p-value
Weight gain during pregnancy (kg)	Exercise	107	14.1±3.8	0.63
	Control	105	13.8±5.2	
Pregnancy length (weeks)	Exercise	107	38.2±3.3	0.51
	Control	105	38.4±2.7	
Weight of the neonate (g)	Exercise	107	3426±675	0.82
	Control	105	3500±431	

Hazrat Zaynab prenatal clinic during the study period. Two hundred and eighty women were invited to participate in the study. Sixty of these women were declined from participation since they could not take part in the exercise group. Fourteen women could not participate because of recurrent urinary tract infection, threatened abortion and lack of time. Of the remaining 266 women, 161 were randomized to the exercise group and 105 women to the control group. All women in the two groups answered the questionnaire. Fifty-four women in the exercise group were excluded due to exclusion criteria of study.

The mean age was 26 in the two groups. There were no differences between the two groups regarding age, weight, height and BMI (Table 1).

In the exercise group 73 women (68%) and in the control group 78 women (70.5%) experienced some kind of low back pain during pregnancy.

Intensity of low back pain in the exercise group before and after exercise was significantly decreased, but in the control group, it was increased (Table 2).

Lordosis was significantly increased in the two groups with no major differences between the two groups (Table 3).

Flexibility that was measured on both sides of spine before exercise in the two groups was not significantly different. After ending the exercise, flexibility of spine in the two groups was signifi-

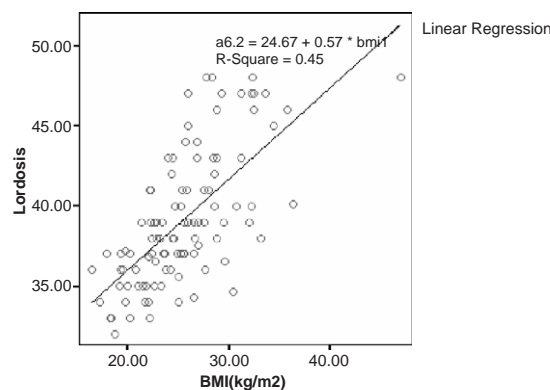


Figure 1 Correlation between body mass index and Lordosis.

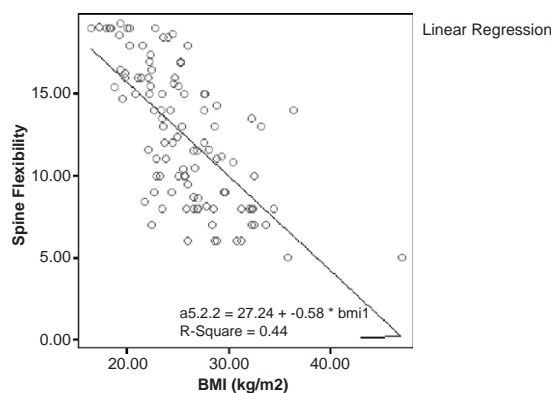


Figure 2 Correlation between body mass index and spine flexibility.

cantly decreased, and there was significant difference between the two groups (Table 4).

There was no significant difference between the two groups according to maternal weight gain, pregnancy length and neonatal weight (Table 5).

The correlation between age, height, weight, BMI, lordosis and flexibility of spine with low back pain was analyzed. There was weak correlation between weight ($r=0.04$, $p<0.03$), BMI ($r=0.04$, $p<0.03$), spine flexibility ($r=0.06$, $p<0.01$) and lordosis ($r=0.05$, $p<0.02$) with low back pain.

There is strong correlation between lordosis ($r=0.45$, $p<0.000$) (Fig. 1) and spine flexibility ($r=0.44$, $p<0.000$) (Fig. 2) with BMI.

In the exercise group, 90% of women said they wanted to do the same exercise in their next pregnancy and will advise other pregnant women to exercise.

4. Discussion

This is the first study that shows the effect of exercise on pregnant women's low back pain with deletion of any variables. No difference was showed in pain intensity between the women in the two groups at the beginning of the study. After ending the exercise programs, women in the exercise group showed lower intensity of low back pain in comparison to the beginning of study. In the control group, intensity of low back pain increased as pregnancy advanced. As noted earlier subjects were randomly assigned in to the two groups, also the physiotherapist who measured the variables was blinded to the groups and the results of low back pain intensity. All women were primigravida housewives. As a result, the exercise can reduce the intensity of low back pain.

The results of this study are similar to the results of other studies regarding frequency of low back pain during pregnancy: 70–74% of pregnant women experienced some kind of low back pain during some periods of their pregnancy [6,7].

The biomechanical factors that were measured in this study provided little explanation of the causes of low back pain during pregnancy. The same result was obtained by Östgaard et al., who only found lordosis and abdominal diameters to be related to back pain, but the correlations were weak [7]. In this study, increased lordosis had weak correlation with low back pain. The exercise in this study did not have any affect on lordosis. Dumas et al. found that exercise had no detectable effect on lordosis during pregnancy [14].

A positive correlation between increased flexibility and low back pain was observed, suggesting that when weight increases, some instability may occur in the sacroiliac joint.

In conclusion, the results of this study suggests that exercise during the second and beginning of the third trimester of pregnancy could reduce the intensity of low back pain and increase flexibility of spine.

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