THE EFFECTIVENESS OF PREGNANCY REHABILITATION: EFFECTS ON LOW BACK PAIN AND CALF CRAMPS DURING PREGNANCY AND PREGNANCY OUTCOME

Esra Arıkan Beyaz MD,[1] Emel Özcan Prof. MD,[2] Ayşegül Ketenci Prof. MD,[2] Mehmet Murat Beyaz MD[3]

[1] İstanbul Education and Research Hospital, Physical Medicine and Rehabilitation Clinic, Fatih, İstanbul

[2] İstanbul University, İstanbul Medical Faculty, Department of Physical Medicine and Rehabilitation, İstanbul

[3] Private Hisar Hospital, Sports Medicine, Ümraniye, İstanbul

ABSTRACT

Objective: *Our purpose was to investigate the effects of our pregnancy rehabilitation program on pregnancy outcome, experience of labor and delivery of the mothers, low back pain and leg cramps experienced during pregnancy.*

Material and Method: *We designed a clinical controlled trial. We prepared a pregnancy rehabilitation program that consists of counseling on pregnancy physiology and ergonomics, nutrition and preparation for labor and delivery in addition to the exercises.*

The exercise program was consisted of range of motion (ROM), stretching, posture, strengthening, breathing, Kegel's, relaxation and aerobic exercises. According to American College of Obstetricians and Gynecologists (ACOG) recommendations a total of 36 pregnant women were selected for this study. The pregnant women who could attend exercises three days a week constituted the exercise group (n=15), whereas those pregnants who could not participate in the exercises comprised the control group (n=21).

Results: *Frequency and severity of low back pain and weight gain were found to be less in the exercise group compared to the control group. The exercises affected the experience of the labor and delivery of the mothers in a better way. The other pregnancy outcome parameters were found similar in both groups. No adverse effects in the exercise group were noted both for the babies and for the mothers.*

Conclusion: *Our pregnancy rehabilitation program seems to be safe for both pregnant women and their babies and to be effective for preventing low back pain and excessive weight gain during pregnancy. This program also seems to have positive effects on the experience of labor and delivery.*

Key Words: *Pregnancy, exercise, pregnancy outcome, education, rehabilitation.* ***Nobel Med 2011; 7(2): 67-74***

GEBELİK REHABİLİTASYONUNUN ETKİNLİĞİ: GEBELİK SIRASINDAKİ BEL AĞRISI VE BALDIR KRAMPLARINA VE GEBELİK SONUÇLARINA ETKİLERİ

ÖZET

Amaç: Gebelik rehabilitasyonu programımızın gebelik sonuçları, annelerin doğum ve travay deneyimi ile gebelik sırasındaki bel ağrısı ve baldır kramplarına etkisini araştırmayı amaçladık.

Materyal ve Metod: Klinik kontrollü bir çalışma tasarladık. Egzersizlere ilave olarak gebelik fizyolojisi, ergonomik eğitim, gebelikte beslenme ile doğum ve travay yardımı eğitiminden oluşan bir gebelik rehabilitasyonu programı hazırladık. Egzersiz programı range of motion (ROM), germe, postür, güçlendirme, solunum, Kegel, gevşeme ve aerobik egzersizler içermekte idi. Amerikan Obstetrik ve Jinekologlar Derneği (ACOG) önerilerine göre gebelikte egzersize herhangi bir kontrendikasyonu olmayan toplam 36 gebe seçildi. Haftada 3 gün egzersizlere devam edebilecek gebeler egzersiz (n=15), devam edemeyecek gebeler ise kontrol grubunu (n=21) oluşturdu.

Bulgular: Kontrol grubu ile kıyaslandığında egzersiz grubunda bel ağrısı sıklık ve ciddiyeti daha az, kilo alımı daha düşük olarak bulundu. Egzersizler annelerin doğum ve travay deneyimlerini olumlu etkiledi.

Diğer gebelik sonuçları her iki grupta benzer bulundu. Egzersiz grubunda anneler ve bebeklerinde herhangi bir yan etkiye rastlanmadı.

Sonuç: Gebelik rehabilitasyonu programımızın gebeler ve bebeklerinde güvenilir bulunup gebelikte bel ağrısından ve aşırı kilo alımından korunmada etkili olduğu; ayrıca doğum ve travay deneyimini olumlu etkilediği görüldü.

Anahtar Kelimeler: Gebelik, egzersiz, gebelik sonuçları, eğitim, rehabilitasyon. **Nobel Med 2011; 7(2): 67-74**

INTRODUCTION

Exercise is an indispensable part of life. In recent decades the effects of exercise and sports activities performed during pregnancy on pregnancy outcome have been examined more intensively. The questions addressing whether exercise can be continued during pregnancy or not, if so, how often and what types of exercises are safe at which intensity, has been tried to be determined. The answers have been sought through scientific studies for the question of whether exercises have side effects on mother, pregnancy and fetus or whether they affect pregnancy outcome. The data currently available show that exercises done in a controlled manner affect some pregnancy- related musculoskeletal complaints positively, such as low back pain, without having any negative effects on mother or fetus. On the other hand they do not cause any considerable change in labor, delivery and other pregnancy outcome parameters.[1-5] The potential risks of physical activity during pregnancy include hyperthermia, preterm delivery, fetal distress, intrauterine growth retardation (IUGR), and a minimal decrease in birth weight.[6] One of the biggest concerns regarding exercise during pregnancy is hyperthermia.

Hyperthermia during the first trimester, at the time of neural tube closure and organogenesis, has been linked to neural tube defects.[7,8] It is theoretically known that very strenuous physical exercise is likely to cause abortus.[9] The terms of pregnancy and rehabilitation are being used together nowadays.[10,11] Pregnancy rehabilitation includes physiology of pregnancy, physiology of exercise in pregnancy, maternal and fetal responds to exercise, functional disorders of muscle and skeleton, as well as exercises during pregnancy and after giving birth.[10] There are many studies in the literature investigating the effects of aerobic exercises per se, on fetal and maternal responds, fetoplacental growth, pregnancy outcome, and musculoskeletal disorders.[2-5,12-21] In addition, there are also studies performed on prenatal group exercise classes taking each of the stretching, strengthening, range of motion (ROM), relaxation and breathing exercises or various combinations of these exercises.[18,22,23] Moreover, many studies exist in the literature investigating the effects of Kegel exercises on pelvic floor muscle strength during pregnancy.[24,25] In the light of these studies, we prepared a complete pregnancy rehabilitation program except the exercises that are performed after giving birth. Our aim was to investigate whether and to what extent this program affects low back pain and calf cramps during pregnancy and pregnancy outcome.

MATERIAL and METHOD

Following a detailed analysis of the literature.[1-6,15,16,22,26-28] we prepared our own pregnancy rehabilitation program based on the recommendations of American College of Obstetricians and Gynecologists (ACOG)[1,2,3] and American College of Sports Medicine.[29] We investigated whether and to what extent this comprehensive pregnancy rehabilitation program→

affected pregnancy and delivery outcomes, low back pain and calf cramps. At the beginning, a total of 36 pregnant women were included in the study; 15 and 21 pregnant women comprised the exercise and the control groups, respectively. The pregnant women, on whom the study was carried out, had been sent from the Outpatient Clinic and The Maternal-Child Unit of the Department of Obstetrics and Gynecology at Istanbul Medical Faculty. Both of the exercise and control groups were composed of non-smoker and non-drinker pregnant women between 18-35 years of age, who were in the 2nd trimester; who did not have any contraindication[1-7] for exercises during pregnancy according to the ACOG guidelines. All of participants in our study were selected among those having similar physical activity level and who were not sedentary before pregnancy. Written consent was received from the pregnant women as well as their gynecologists and husbands. We designed a clinical controlled study.

The eligible pregnant women,[1-6,13] who were able to maintain exercise program 3 days a week, constituted the exercise group, while the ones who could not join the exercise program 3 days a week but would attend the 1st and 2nd assessments constituted the control group. Considering the high rates of abortion in pregnant women in the first trimester associated with high-impact exercise program[9] and concern for hyperthermia,[6] we initiated the exercise program in the second trimester. The program continued up to the thirty-seven weeks of gestation from the first assessment that was done in the second trimester. The first assessments were made at the beginning and the second assessments were made at the 30th-33rd week of pregnancy. The parameters of the first assessment were set according to the studies in the literature as well as follow-up parameters and pregnancy outcome parameters.[6,14,30,31] In addition to aerobic exercises concerning our rehabilitation program, we also prepared an exercise program comprising non-aerobic exercises including ROM, stretching, posture, strengthening, breathing, relaxation, and Kegel exercises. We prepared an education program including counseling on physiological changes in pregnancy, pregnancy-related musculoskeletal functional disorders, prevention of these disorders, ergonomic counseling, proper body mechanics as well as information about nutrition during pregnancy and preparation towards labor and delivery. At the beginning, training was provided to the exercise group, taking about an hour and including physiological and locomotor system changes during pregnancy, proper posture, proper body mechanics and low back protection principles. All the pregnant women were informed about the necessity of an extra calorie intake for the physiological requirements during pregnancy and exercise. Furthermore, a brief information and a text about nutrition during pregnancy were given. Examinations with respect to the complaints of locomotor system in pregnant women were conducted, appropriate treatment modalities were produced, and during the assessments of these complaints, the questions about the changes of locomotor system during pregnancy were answered. We recommended that all the pregnant women in the control group to participate the regular theoretical training program in Maternal-Child Unit of the Department of Obstetrics and Gynecology at Istanbul Medical Faculty. In this program theoretical information were given about physiological changes in pregnancy, proper posture, proper body mechanics, training about preparation→

Table 1: The comparison of the numerical variables of the exercise and the control groups in the first assessment

	Exercise	Control	t	p
Age	24.533 ± 3.22	25.19 ± 3.51	-0.57	0.57
Weight	61.20 ± 5.06	59.42 ± 6.00	0.93	0.35
Height	161.93 ± 5.40	161.33 ± 5.10	0.34	0.73
Weekly working hours	37.86 ± 10.19	38.47 ± 8.09	-0.20	0.84
Gestational week at the 1st assessment	18.46 ± 2.20	19.52 ± 2.29	-1.39	0.17
Abortion	0.00 ± 0.00	0.00 ± 0.00	0.00	0.00
Curettage	0.06 ± 0.25	0.00 ± 0.00	1	0.33

Table 2: Some demographic features of the exercise and the control groups

	z	p
Occupation	-7.4	0.45
Income	-1.02	0.30
Education	-1.88	0.05
Smoking	-1.75	0.07
Alcohol use	-0.88	0.37

Table 3: Comparison of pregnancy outcome parameters between the groups

Pregnancy outcome	Exercise	Control	t	p
1st stage of labor (c)	410.4 ± 168.9	550.0 ± 164.9	-2.00	0.05
2nd stage of labor (c)	41.8 ± 25.9	59.1 ± 60.0	-0.88	0.38
3rd stage of labor (c)	14.0 ± 8.8	14.1 ± 6.6	-0.02	0.98
Gestational week at birth	39.4 ± 0.8	40.1 ± 1.1	-1.94	0.06
Hospitalization period (days)	1.8 ± 1.3	2.3 ± 1.4	-1.09	0.28
Birth weight (gram)	3472 ± 0	3452 ± 350.4	0.13	0.89
Height of the baby (cm)	50.5 ± 1.5	50.71 ± 1.4	-0.35	0.72
HC of the baby (cm)	34.5 ± 1.3	33.8 ± 9.3	1.76	0.08
Apgar score (1.′)	8.4 ± 0.8	8.5 ± 0.5	-0.44	0.66
Apgar score (5. ′)	9.6 ± 0.4	9.5 ± 0.5	-0.51	0.61
Total labor period (′)	466.3 ± 184.0	619.5 ± 201.1	-1.86	0.07

′ : minute

Table 4: Weight gain in the groups				
Weight (kilogram)	**Exercise group**	**Control group**	**t**	**p**
Prepregnancy weight	57.3 ± 5.5	53.5 ± 6.0	1.91	0.06
Total weight gain during pregnancy	13.9 ± 2.1	16.5 ± 3.7	-2.68	0.01*
* Statistically significant: p<0.05				

Table 5: Types of birth in the groups		
Groups	**Vaginal birth (%)**	**CS (%)**
Exercise group	73.3	26.7
Control group	57.1	42.9

for labor and the care of mother and baby following birth. The pregnant women in the exercise group joined the exercise program three days a week, every other day. Which at the 30th week, training on birth preparation was provided to the exercise group.

The pregnant women in the exercise group were recommended to continue breathing and relaxation exercises and to walk at they were already accustomed to from previous exercise sessions target heart rate {(220-age) x0.6} for 30 minutes on the days left from the three-day exercise program until the thirty-seventh weeks of gestation. From the thirty-seventh weeks of gestation with the approval of their gynecologists, they were encouraged to do these exercises every day until delivery. The sessions were conducted in groups of 6 pregnant women under the supervision of a physiatrist. First, warm-up work on a bicycle ergometer for 5-10 minutes, then aerobic exercises at the target heart rate {(220-age) x0.6} for 20 minutes and cool-down exercises for 5-10 minutes were applied. Afterwards, posture, stretching, ROM, toning and breathing exercises and Kegel exercises were performed sitting on the floor cushion, then standing and lying on the floor cushion. The sessions were ended after the resting pulse rate turned back through the relaxation exercises performed by lying on one side. During the sessions, the pulses were checked continuously and body temperatures were checked 2 times within the first and second half-hours. The importance of maintaining adequate hydration during exercise sessions was emphasized. The participants were encouraged to drink water before, after and every 20 minutes during the exercise sessions.

During the first assessment, the following informations were recorded: age, height, weight, gestational week, marital status, educational level, occupation, physical load of their occupation (light, middle, heavy), job satisfaction for the working ones (dissatisfied, moderately satisfied, highly satisfied), working hours per week, income levels (low, middle, high), smoking and alcohol consumption before pregnancy, number of abortions and curettages, whether an infertility treatment was administered or not, whether the pregnancy was unwanted or wanted, problematic marriage, whether the pregnant women or her family had any history of psychiatric disorder or locomotor system disorders diagnosed prior to pregnancy. Low back pain (with visual analog scale: VAS) and calf cramps were investigated and locomotor system examinations and neurological examinations were performed during the assessments.

During the second assessment gestational week, low back pain and calf cramps were again questioned in addition to same examinations. During the follow-up period, pregnancy outcome were noted besides the parameters in the 1st and 2nd assessments.

The data were recorded from the pregnancy outcome, such as birth weight, gestational week at birth, weight gain (total weight at the end of the 1st and 2nd trimesters and at birth), labor and delivery experience of the mother {5 pointed scale (Likert's scale): 0=very easy, 1=a little hard, 2= bearable, 3= very hard, 4= unbearable}, complications associated with birth and labor, complications encountered in the newborn period, tear in the perineum, whether episiotomy was applied or not, if so, whether it was median or paramedian, birth type, caesarean section (CS) delivery rate, if CS was performed, whether it was elective or indicated, total period of labor, durations of labor stages (1st, 2nd, 3rd), APGAR scores at the 1st and 5th minutes, height and head circumference (HC) of the baby, duration of hospitalization and use of medication during the labor (birth induction, use of analgesic, epidural anesthesia, spinal anesthesia and others).

Information concerning experience of labor and delivery was obtained from the patient herself, while the other parameters were obtained from the questionnaires for gynecologists and from the records of the delivery room.

Statistical analysis

Statistical analyses were made by using SPSS (Statistical Package for Social Science) by using independent t test, Mann-Whitney–U test and one-way analysis of variance (ANOVA). Statistical significance was set at p<0.05 as and 95% was regarded as confidence interval.

RESULTS

In the first assessment, the ages, heights, weights, occupations, weekly working hours, job positions,→

educational levels and income levels of our exercise and control groups were statistically similar (p>0.05). Occupation was physically heavier in the exercise group compared to the control group (p=0.02). In both groups, smoking and alcohol consumption, curettage, miscarriage, the number of infertility treatment, and of problematic marriage prior to pregnancy were similar (p>0.05). Some demographic features of the groups are shown in Table 1 and Table 2.

In the first assessment, the musculoskeletal system symptoms between the two groups appeared to be similar (p>0.05). Also the findings of locomotor examination were not statistically significant (p>0.05) at the beginning. In the 2nd evaluations, frequency of low back pain was significantly less in the exercise group compared to that of the control group (p<0.001). While severity of low back pain (VAS) decreased in the exercise group between the 1st and 2nd assessments (p<0.001), it increased significantly in the control group (p=0.0001). Calf cramps were similar in the 1st and 2nd assessments (p=0.76 and p=0.05, respectively).

The birth types were did not differ between the exercise and the control groups (p=0.32, z=-0.98). Vaginal birth rate was found to be 73% in the exercise group, while it was 57% in the control group; and CS rates were 26% and 42% in the exercise group and the control group, respectively. All the CSs (100%) in the exercise group were indicated, while the rate of indicated CS was 88% for the control group; and the rate of elective CS was noted as 11% in the control group. The birth weight was found similar (p=0.89) between the groups. In our program, no significant difference was found between the exercise group and control group in terms of premature birth. All the stages of labor (1st, 2nd and 3rd stages) and total labor durations were found shorter in the exercise group compared to the control group, but this difference was not statistically significant; and p values were found as 0.05, 0.38, 0.98 and 0.07, respectively. It was found out that all the pregnant women, who gave a vaginal birth, were applied episiotomy regularly in our program; in the control group, tear of perineum during birth was observed in only one case (z=-0.84 and p=0.39). Total weight gain during pregnancy was statistically less in the exercise group in comparison to the control group (p=0.01). Some parameters of pregnancy outcome and weight gain are shown in Table 3 and Table 4, respectively. Types of the births are shown in Table 5. Complication rates for birth and labor were found similar (p=0.05) in the groups. Birth and labor complications are shown in Table 6 (p=0.05, z=-6.7). Any congenital abnormality was not observed in the exercise group. In the control group, two (9.5%) congenital abnormalities were noted as cleft palate and congenital cyanotic heart disease. No significant difference was found between the exercise group and control group in terms of congenital abnormality (p=0.22, z=-1.21). It was reported that pregnant women in the exercise group perceived delivery and labor more easily than those in the control group (z=-2.42, p= 0.01).

Table 6: Obstetric and neonatal complications in the groups

	Exercise group (%)	Control group (%)
Meconium in amniotic fluid	0	4.8
Fetal distress	6.7	4.8
Uterine atony, protraction disorder	6.7	9.5
Early membrane rupture	13.3	23.4
Oligohydramniose	0	4.8
Multiple complications	6.7	23.4
Neonatal complications	6.7	4.8

DISCUSSION

The data available show that aerobic exercises do not have a negative effect either on birth or on other maternal and fetal outcomes (2-5,13-15,17-20). It was largely accepted that the exercise programs carried out in accordance with ACOG criteria do not cause significant changes in pregnancy outcome.[3,32] Suitable exercise and education programs are highly effective on experience of labor, weight gain and for preventing from some of the physical discomforts during pregnancy.[1-5,33] The effects of maternal physical activity have been studied on humans and laboratory animals and the most frequent side effect has been reported as low birth weight.[6] However, there are some challenging results obtained from different research groups. In some studies, an increase in uterine contractions due to exercises during pregnancy was associated with prematurity and low birth weight, while some other studies did not reported any associations. Particularly high-impact exercise was associated with an increased risk of miscarriage but no association was seen after 18th week of gestation.[9] In our study we did not observe any premature birth, low birth weight and abortion in both of the groups. Association between 3 unfavorable pregnancy results namely premature birth, low birth weight, preeclampsia / gestational hypertension and five of the occupational exposures such as long working hours, shift, manual / heavy lifting, standing, heavy physical workload were examined in a meta-analysis carried out on 53 published papers. Evidences for each 5 occupational exposures causing premature birth were commonly encountered. There was not any evidence requiring restriction of the occupation related activities. However, especially during late→

pregnancy, long working hours, long-time standing and heavy physical workload are not recommended. Well-designed cohort studies, which would systematically show the relation between pregnancy outcome and occupational exposures, are needed.[34] In our study, it is noted that occupation in the exercise group was physically heavier in comparison to control group. However, the job positions were similar in the groups. In our groups, the gestational age at birth, birth weight, APGAR scores (at the 1st minute and at the 5th minute) were found to be similar. Our results showed that occupation was not associated with low birth weight and premature birth. In our study it was found that total weight gain was considerably high in the control group.

Some studies reported that factors such as difficult birth and use of forceps cause various injuries in pelvic floor structures and sphincter muscles. Perineal tear, external sphincter tear and pudendal nerve injury are the examples for these injuries. It was reported that serious perineum tears are generally associated with median episiotomy.[35] All the episiotomies apart from the median episiotomy that was applied to a pregnant woman in the exercise group were paramedian. Tear in the perineum during vaginal birth was reported for only one case in the control group and the rate of tear in the perineum was found similar in our groups. Complications during birth were found similar in our exercise (6 pregnant women) and control groups (10 pregnants), as well.

In a study carried out on female athletes, Zahaireva (1972) reported that the 2nd stage of labor was found shorter probably depending on strong abdominal muscles and the 1st stage was longer probably depending on uterus rigidities and strong muscle tonus. Although Zahaireva hypothesized that strong abdominal muscles produce more pressure during birth, other researchers reached a consensus that physical condition has not any effect on the duration of labor.[21] It is generally accepted that aerobic condition during pregnancy does not shorten the duration of labor.[3,21] No statistically significant difference was detected between our groups in terms of the stages of labor.

Sternfeld et al. reported that the rate of CS did not differ by exercise level in their studies, in which they examined pregnancy outcome of the pregnant women at 4 different exercise levels.[32] In our study, the rate of vaginal birth was 73.3% in the exercise group, while it was 57.1% in the control group; the rate of birth by CS was 26.7% and 42.9% in the exercise and control groups, respectively. In conclusion, birth types both in the exercise and in control groups were found statistically similar. WHO (World Health Organization) reports the rate of caesarean delivery as about 20%, while USA reports the rate as 23%.[32,36] Although the rate of caesarean delivery in or study was higher than these rates, the difference is probably due to limited number of subjects in our groups. Some studies have found shorter labor and fewer obstetric interventions in exercising women during pregnancy when compared to the non-exercisers.[7]

In a study carried on 131 pregnant women in good condition, Clapp examined the effect of running and/or aerobic programs continued in the 2nd half of pregnancy period, on birth outcomes. It was reported that 87 of these pregnant women continued their exercise program and 41 quitted the program before the end of the first trimester. It was stated that in the group that continued the exercise program, lower CS rate, less use of epidural anesthetic, less vaginal or abdominal operative intervention, and less fetal stress findings were detected. Additionally it was established that the exercise performance during pregnancy and type of exercise did not have any significant effect on the duration of birth. Moreover, it was noted that running and performing ballistic motions in aerobics throughout pregnancy (not in accordance with ACOG guidelines) did not increase premature birth or early membrane rupture incidence. Excessively increased labor duration and arrest disorder at the 2nd stage of the labor were found significantly increased in the group that quitted the exercise program.[32] In a research carried out with a survey answered by 467 women, pregnancy and birth complications associated with pelvic floor muscles (PFM) were found significantly less in the women, who received training during pregnancy. For the pregnant women, who joined the training and exercise program for PMF, the active pushing phase in the 2nd stage of the labor exceeding 60 minutes was relatively less.[24,24,33] In our study, 2nd stage exceeding 60 minutes was observed to one of the pregnant women for each of the exercise and control groups (at the 90th and 180th minutes, respectively). The 1st, 2nd and 3rd stages of labor were found similar in the groups. In our program, no significant difference was found between the exercise group and control group in terms of use of medication.

In a prospective research carried out on more than 700 pregnant women, who gave birth in 6 centers in England, the relation between expectations during birth and labor experience were examined. It has been showed that the pregnant women generally experienced their expectations, and the breathing and relaxation exercises became useful for the ones who had such an expectation. Anxiety about labor pain was found related to bad emotional state after the→

birth. In another study carried out on a small group consisting of twelve subjects, it was reported that moderate physical activity in the 2nd and 3rd trimesters had positive effects on providing mood stability.[14,37] In our study, we noted through self-statements that the pregnant women in the exercise group perceived labor easier in comparison to the control group.

It is estimated that virtually all women experience some degree of musculoskeletal discomfort during pregnancy.[38] It was reported that exercise during pregnancy is helpful in preventing and decreasing some physical discomforts of pregnancy such as low back pain, leg cramps, edema in legs and varicose veins. In a study in which 388 pregnant women at 18 to 42 years of age performing aerobic exercises at four different intensity levels were observed from the 16,5th pregnancy week to birth. No statistically significant relation was observed between the pregnancy outcome and exercise level in any trimester prior to or throughout pregnancy, and pregnancy symptoms were found inversely correlated with exercise levels.[20] It was reported that a 12-week training and exercise program specially designed for low back pain was highly effective for preventing low back pain and performing daily activities, but it had no effect in terms of missing workday.[39] Our data were also consistent with the results[20,31,39] showing that the exercises have positive effect on low back pain.

In the studies examining the effects of exercise during pregnancy, exercise groups were generally composed of women who were physically active, white, from middle to upper socio-economic class, working outside their homes, volunteers, who had different health-diet habits, body compositions and anesthesia choices. It is difficult to make a clear interpretation in the studies with small groups. The exercise definitions such as exercise type (aerobic, isometric, stretching, relaxation etc.), whether it is weight-bearing or not, activity type (walking, stationary bicycle etc.), duration (minute) and frequency (1-5 times a week) are also not clear. Furthermore, there have been significant changes in the guidelines of ACOG. In the guidelines issued in 1985, 15-20 minutes of exercise for 3 days a week was recommended for the eligible pregnant women who were physically active before pregnancy; but it was reported in the guidelines issued in 2002 that even the pregnant women who were sedentary before pregnancy could start new exercise programs during pregnancy and such exercises could be performed every day or most of the days of the week.[40]

In many studies it was reported that the eligible pregnant women without obstetric and medical contraindications could continue suitable exercises, especially aerobic exercises, and that continuing such exercises created positive effects on birth in several aspects and on some physical complaints during pregnancy such as low back pain and calf cramps; and that such exercises improved or at least protected the normal fitness and such exercises did not cause any negative effect on maternal or fetal outcomes; however such exercises did not give rise to any change or ameliorate the perinatal outcomes.[3,16] Our results were generally found to be compatible with the previous studies.

The limitations of our study were the small sample size and randomization the pregnants to maintain or not to join the exercises three days a week. Well-designed studies with larger and homogenous groups, which will shed light on the effects of exercise during pregnancy, are needed. In addition to the potential effects of regular exercises, physical activities and occupational effects– clearly defined for inference on their potential effects– on mother and the baby, their potential effects on the health outcomes of the mother and baby and the relations between them should be illuminated in the near future as well. In the studies to be carried out from now on, more specific information should be obtained about the exercise levels and suitable exercise types for each trimester, protection against over warming and recommendations on nutrition.[40]

It was observed that our pregnancy rehabilitation program was found to be effective in protection against low back pain and preventing excessive weight gain; and that it had positive effect on the experience of labor and delivery, without showing any negative effect on the mothers or the babies.

CORRESPONDING AUTHOR: Esra Arıkan Beyaz, MD. Physical Med. and Rehabilitation Clinic, İstanbul Edu. and Research Hosp., Samatya, İstanbul earikanbeyaz@yahoo.com

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