

## ASSESSMENT OF POSTURAL CHANGES, LOW BACK PAIN, DISABILITY AND DAILY LIFE ACTIVITIES ACCORDING TO THE STATE OF EXERCISE IN PREGNANCY

### EVALUAREA MODIFICĂRILOR POSTURALE, LOMBALGIILOR, DIZABILITĂȚII ȘI ACTIVITĂȚILOR DIN VIAȚA DE ZI CU ZI, ÎN FUNCȚIE DE EFECTUAREA DE EXERCII FIZICE ÎN SARCINĂ

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#### Abstract:

**Aim:** In the present study, we investigated postural changes, low back pain, disability and daily life activities according to the state of exercise in the pregnant.

**Methods:** The study was conducted with 160 pregnant women aged 18-35 years, who were admitted to Aydın Maternity Hospital for pregnancy follow up, who could speak and understand Turkish, who were graduates of at least elementary school, whose gestational age was 20 weeks and above. Questionnaire form, Visual Analogue Scale, Oswestry Scale, Katz Daily Life Activity form and New York Posture Analysis form were obtained.

**Results:** Mean age of the participants was found as 26.43±3.96 years. Of the pregnant women, 65 were detected to do exercise. Mean duration of standing was found as 5.7±1.58 hours daily and mean duration of sitting was found as 6.40±1.59 hours. Mean body weight before pregnancy was 60.35±8.15 kg, mean body weight during pregnancy was found as 71.41±7.94 kg. Daily life activity scores were found higher, low back pain scores were found lower, posture was better and pain influenced daily life activities less among pregnant women who do exercise compared to the ones who do not (p<0.05).

**Conclusion:** Results of the study have revealed that doing exercise has positively affected postural changes, low back pain and daily life activities.

#### Rezumat\*:

**Scop:** În studiul de față au fost investigate modificări posturale, lombalgii, dizabilități și activități din viața de zi cu zi, în funcție de starea gravidei.

**Metode:** Studiul a fost realizat pe 160 de femei însărcinate cu vârste cuprinse între 18 și 35 de ani, care au fost admise la Aydın Maternity Hospital pentru urmărirea sarcinii, care puteau să vorbească și să înțeleagă limba turcă, care au absolvit școala elementară, a cărei vârstă gestațională a fost de peste 20 de săptămâni. Au fost obținute formularul de chestionar, Scala Analogică vizuală, Scala Oswestry, formularul de activitate Katz Daily Life și formularul de analiză a posturii din New York.

**Rezultate:** Vârsta medie a participanților a fost de 26,43 ± 3,96 ani. Dintre femeile gravide, 65 practicau exerciții fizice. Durata medie a perioadei de a sta în picioare a fost de 5,7 ± 1,58 ore pe zi, iar durata medie a ședinței de 6,40 ± 1,59 ore. Greutatea medie corporală înainte de sarcină a fost de 60,35 ± 8,15 kg, greutatea medie a corpului în timpul sarcinii a fost de 71,41 ± 7,94 kg. Scorurile de activitate zilnică au fost mai mari, scorurile de dureri de spate au fost mai mici, postura a fost mai bună și durerea a influențat activitățile din viața de zi cu zi mai puțin în rândul femeilor însărcinate care fac exerciții fizice în comparație cu cele care nu fac (p < 0.05).

**Concluzie:** Rezultatele studiului au relevat faptul că efectuarea exercițiilor fizice a afectat pozitiv modificările posturale, durerile de spate scăzute și activitățile din viața de zi cu zi.

**Key-words:** pregnancy, exercise, posture, backache, daily life activities

**Cuvinte cheie:** sarcină, exercițiu, postură, dureri de spate, activități din viața de zi cu zi

#### Introduction

Pregnancy is a normal process of women's life. The physiologic changes during pregnancy

influence biochemistry and anatomy of organs and systems. Body weight increases 15%-25% during pregnancy and this means a great load on

tendons, ligaments and joints [1].

Women carry more risk for complications and meet more problems during pregnancy due to general body changes [2,3]. Enlargement of uterus and increased thoracic volume shift the center of gravity forward. Pelvis is inclined to the same direction and lumbar lordosis increases [1]. Two main back pain types are seen during pregnancy: Low back pain and pelvic girdle pain. Some women complain from lumbo-pelvic pain which includes both [4]. These complaints usually appear at 20-28th weeks of gestation. However some women may feel these pain types in earlier stages of pregnancy [4]. Morgen and Pohjanen (2005) have reported that pain started at mean 22.1 week of gestation [4]. The same study has reported that symptoms could begin at 12th week of gestation; this condition could be influenced by hormone levels, changes in tissue hydration, laxity in joint structure. This pain may be mild or severe.

Most women feel low back pain during pregnancy, both increased weight and also specific physiology of the spine may lead to pain [1]. Gutke et al. (2008) have reported that low back pain is seen four fold greater among pregnant women compared to non-pregnant women [6]. The pain during pregnancy has a negative effect on quality of sleep and working capacity [7]. Kristiansson et al. (1996) have reported in their prospective study that women who reported high pain score (30%) have stated that they had difficulties in their normal activities [8]. Fast et al. (1987) have reported that pregnant women feel low back pain which result in chronic sleepiness [5]. Physical activity of pregnant women were detected to decrease due to low back pain in the ratio of 30% [9] and low back pain was detected to increase stress risk and anxiety [9,10].

Benefits of exercise during pregnancy are as follows: Exercise balances circulation when regulates digestion, provides weight control, supports muscular activities which are required during delivery, relieves the mother socially and psychologically, reduces diabetes risk and has positive effects on post-partum recovery [11]. Exercise was also reported to prevent back pain, swelling of feet, varices, hemorrhoid problems [12,13]. However no studies could be encountered in literature investigating the

influence of exercise on physical and functional changes in pregnancy. The aim of the present study is to investigate postural changes, low back pain, disability and daily life activities according to the state of exercise.

## Methods

### Experimental design

The study was conducted as analytic and cross-sectional.

Study universe and sample: The universe of the study was composed of the pregnant women aged 18-35 years, who were admitted to Aydın Maternity Hospital for pregnancy follow up, who could speak and understand Turkish, who were graduates of at least elementary school, whose gestational week was 20 or above.

Power analysis was used for specifying sample. Sample size was found at least 143 at moderate effect (0.3), with .80 power, Alpha=0.05, Df=05. In addition, when 10% loss was taken into consideration, at least 157 pregnant women were decided to be included in the study and the study was completed with 160 women. These pregnant women were assigned randomly. A total of 65 women were specified regardless of duration and type of the exercise.

### Data collection tools

- Personal data form was prepared by the researchers after review of the literature and composed of 27 questions inquiring socio-demographic, obstetric characteristics and exercise.
- Visual analogue scale is a 10 cm scale where 0 indicates “no pain”, 10 indicates “the worst pain”. Patients were asked to mark the point which corresponds to their pain severity [14].
- Oswestry Disability Index (ODI) is composed of 10 subgroups and they are scored between 0-5. Subgroups inquire pain severity, self-care, lifting-carrying, gait, sitting, standing, sleep, sexual life, travelling and social life. Overall score varies between 0-50. Disability increases as overall score increases [15,16].
- Katz Daily Living Activity Questionnaire (DLA) specifies the activities required for basic needs for daily living, developed by

Katz et al. in 1963. The index is composed of 6 questions inquiring data about taking bath, dressing, relieving oneself, movement, excretion, nutrition activities. The score is “1” if the subject can independently do daily life activities, and the score is “0” if the subject can do daily life activities dependently [17].

- New York Posture Analysis Method (NYPAM) is scored by observing posture changes which can occur in 13 different body parts. The score is “5” is the posture is regular, “3” if the posture is moderately impaired, “1” if the posture is severely impaired. Maximum possible score is 65 and minimum possible score is 13. According to standard assessment criteria, overall score is interpreted as “very good” if  $\geq 45$ , “good” if it is 40-44, “moderate” if it is 30-39, “weak” if it is 20-29 and “poor” if it is  $\leq 19$  [18,19].

**Data collection:**

The study was conducted with the pregnant women who met inclusion criteria (aged between 18-35 years, speaking and understanding Turkish, graduates of at least elementary school) at Aydın maternity Hospital between 1 September 2017 and 28 February 2018, interviews were done in non-stress test (NST) room and posture analyses were done. Pregnant women were informed about the study and the subjects who agreed for participation were included in the study. Data collection forms were filled out by the participants, posture analyses were evaluated with New York posture analysis form by the physiotherapist. Mean duration of interviewing was 20 min.

**Ethical issues:**

Ethics committee approval (number:2014-03/08) was obtained from local ethics committee and the institution. Women were informed about the aim of the study, verbal informed consent was obtained in accordance with privacy policy. They were informed about that data would be kept hidden, identity data are not required and the study would be conducted in accordance with voluntariness principle.

**Statistical analysis**

Data were analyzed using SPSS 20.0 package program. Number, percent, standard

deviation, minimum-maximum values, t-test and Pearson correlation analysis were used. A p level of  $<0.05$  was taken as statistically significant.

**Results**

Descriptive characteristics of 160 women, comparisons according to Katz, New York, ODI (%) and ODI scores, VAS scores, comparisons between some characteristics and the scores obtained from the scales are presented in Table 1.

	Mini- mum	Maxi- mum	Mean	Standard deviation
Age (years)	19,00	39,00	26,43	3,96
Height (cm)	155,00	180,00	163,2 9	3,71
Body weight before pregnancy (kg)	4,00	97,00	60,35	8,15
Body weight (kg)	52,00	111,00	71,41	7,94
Duration of standing (hr)	3,00	12,00	5,67	1,58
Duration of sitting (hr)	2,00	10,00	6,40	1,59
VAS	1,00	9,00	4,62	1,33
KATZ	2,00	6,00	5,70	0,77
NEWYORK	14,00	68,00	53,01	13,04
ODI (%)	0,00	21,00	10,64	4,05
ODI	0,00	42,00	21,29	8,11
Marriage age (years)	17,00	34,00	21,10	2,62
Age at first pregnancy (yr)	17,00	28,00	22,03	2,57
Number of abortions	1,00	4,00	1,18	0,58
Number of curettage	1,00	4,00	1,80	1,30

Tab. 1. Descriptive characteristics of pregnant women (n=160)

As seen in Table 2, a significant difference was detected in Katz score, New York score, ODI (%), ODI score and VAS score between the women who were doing (n=65) and not doing exercise (n=95) (p<0.05). Significance was found in favor of New York among women who were doing exercise, and significance was found in favor of ODI (%), ODI and VAS among women who were not doing exercise. Daily life activity score was found higher, low back pain scores were lower, posture was better and pain influenced Daily life activities less in women who were doing

exercise compared to women who were not doing exercise ( $p < 0.05$ ).

SCALES	State of doing exercise	N	Mean	Standard deviation	t	p
KATZ	Doing exercise	65	5,92	0,41	3,13	<b>.00</b>
	Not doing exercise	95	5,55	0,91		
NEWYORK	Doing exercise	65	56,12	9,84	2,54	<b>.01</b>
	Not doing exercise	95	50,87	14,50		
ODI (%)	Doing exercise	65	9,03	3,84	4,39	<b>.00</b>
	Not doing exercise	95	11,75	3,84		
ODI	Doing exercise	65	18,06	7,67	4,39	<b>.00</b>
	Not doing exercise	95	23,49	7,68		
VAS	Doing exercise	65	4,08	1,18	4,53	<b>.00</b>
	Not doing exercise	95	4,99	1,30		

Tab. 2. Comparison of mean scores of the scales according to state of exercise

A significant relationship was detected between ages of the women and total number of pregnancies, ODI and VAS. A positive correlation was detected between Katz scores and New York scores and a negative and moderate correlation was detected between Katz

scores and number of pregnancies, ODI scores and VAS. A moderate and negative correlation was detected between New York scores and ODI, VAS, total number of pregnancies (Table 3).

		NEWYORK	ODI	VAS	KATZ	Age	Total number of pregnancies	Age at first pregnancy
Age	r	-0,29**	0,37**	0,30**	-0,29**	0,21**	0,33**	-0,19*
	p	0,00	0,00	0,00	0,00	0,01	0,00	0,01
NEWYORK	r		-0,66**	-0,65**	0,56**	-0,37**	-0,54**	0,28**
	p		0,00	0,00	0,00	0,00	0,00	0,00
ODI	r			0,71**	-0,58**	0,37**	0,48**	-0,22**
	p			0,00	0,00	0,00	0,00	0,00
VAS	r				-0,56**	0,29**	0,44**	-0,27**
	p				0,00	0,00	0,00	0,00
KATZ	r					-0,40**	-0,56**	0,35**
	p					0,00	0,00	0,00
Age	r						0,71**	0,27**
	p						0,00	0,00
Total number of pregnancies	r							-0,33**
	p							0,00

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

Tab. 3. Correlation between some characteristics of pregnant women and the scores obtained from scales

### Discussion

Postural changes during pregnancy, the influence of these changes on pain and disability and also influence of exercise on these parameters are of great importance. Pregnant women are recommended doing exercise for

minimizing the problems related with the musculo-skeletal changes developing during pregnancy [20]. The results of the study which investigates postural changes, low back pain, disability and daily life activities according to doing exercise have revealed that low back pain

scores are low, daily life activity scores are high, posture was better and pain influenced daily life activities less in pregnant women who were doing exercises.

Daily life activity scores were found higher in pregnant women who were doing exercise compared to the ones who were not. All women were found to perform taking a bath, dressing, relieving, movement, evacuation and nutrition which are the main activities for maintaining daily life independently and exercise influenced these activities positively.

The present study has revealed less severe low back pain and lower VAS scores. Positive effects of exercise on low back pain was shown in many studies [21,22,23,24]. Backhausen et al. (2017) have detected positive effects of water exercise on low back pain during pregnancy [25]. Ozdemir et al. (2015) have also found a statistically significant difference between control and exercise groups with regard to Oswestry scale and VAS scores in their randomized controlled study conducted for investigating the influence of exercise in pregnant women who experience low back pain [26]. The results were consistent with ours as it also reports that exercise relieves low back and back pain and improves functioning of pregnant women.

Virgara et al. (2018) used modified Oswestry scale for analyzing the association between low back pain and functional disability in 96 pregnant women and found a moderate correlation between low back pain and functional disability ( $\rho = 0.51$ ,  $p < 0.001$ ), this correlation was higher in our study ( $\rho = 0,71 < 0.01$ ) [27].

In literature, it is seen that posture is not stressed when focused on disability and pain. Sencan et al. (2018) have used Oswestry disability index and VAS scale in their study including 1500 pregnant women in eastern region of Turkey however they did not analyze posture [28]. Michoński et al. (2016) have analyzed posture using surface topography device between weeks 17 and 37 of gestation and also used Oswestry index [29]. The authors have found  $50.9 \pm 2.4^\circ$  kyphosis,  $58.1 \pm 2.1^\circ$  lordosis and  $4.7 \pm 1.7^\circ$  for vertical balance angle. They have found a  $7.4^\circ$  change in kyphosis angle,  $8.4^\circ$  change in lordosis angle

and  $5.5^\circ$  change in vertical balance angle and calculated Oswestry disability index moderate and severe (22 to 58 %). In our study, posture score of the pregnant women was found as 56,12 in pregnant women who were doing exercise and 50,87 in pregnant women who were not doing exercise using New York posture analysis where  $\geq 45$  corresponds to “very good”. In other words, it may be stated that a severe impairment was not observed in posture in our study. Posture of the pregnant women who were doing exercise was found better despite the absence of regular exercise content.

In our study, number of pregnancies and pain scores were found to negatively affect daily life activities. However the women whose posture was better were found to do daily life activities much better. Disability and pain scores of pregnant women whose postural changes were more were found higher.

Not inquiring the duration, type and intensity of the exercise done by the pregnant women is a limitation of our study. However it's supporting literature about the benefits of exercise, using assessments tools like new York posture analysis, VAS, Katz daily life activity scale, Oswestry disability index together increases its originality.

### Limitation of study

The study was carried out using the convenience sampling method. Because of this, the data obtained are representative only of the women participating in the study.

### Conclusion

It was concluded that doing exercise has positively influenced pregnancy-related postural changes, low back pain and daily life activities. Pregnant women should be encouraged for doing exercise in order to eliminate the negative effects of pregnancy-related postural changes. In addition, studies are required conducted with different types of exercise and through follow up of women.

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\* translation made by editors

**Acknowledgements**

The authors thank the pregnant women who agreed to participate in this study for their effort and contribution.

**Sources of funding:** None.

**Conflicts of interest:** The authors have no conflicts of interest relevant to this article.

**Contribution of authors:**

Research design: N.O, A.C; validation of the methodology N.O, A.C, F.U; data collection N.O, data analysis and / or data interpretation: A.C, F.U; writing-preparing the original text N.O, A.C, F.U; review and editing: N.O, A.C, F.U.