

## The Comparison of Physical Activity, Disability, and Quality of Life of Pregnant Women in Different Trimesters

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**ABSTRACT Objective:** The purpose of this study was to compare the physical activity, disability, and quality of life in pregnant women in different trimesters. **Material and Methods:** This was a retrospective cohort study and a total of 91 pregnant women (first trimester n=20, second trimester n=34, third trimester n=37) were enrolled. The physical activity levels were evaluated with the International Physical Activity Questionnaire; the disability was evaluated with the Oswestry Low Back Pain Questionnaire, and the quality of life levels was determined with the Short Form-36 questionnaire. **Results:** The demographic features of the pregnant women were similar in different trimesters ( $p>.05$ ). The comparison of their physical activity levels in terms of trimesters, the level of moderate and vigorous physical activities, and the activity level of walking showed no difference ( $p>.05$ ). The total physical activity level in the second trimester was higher than in the first trimester ( $p=.048$ ); the level of disability due to low back pain was significantly higher in the third trimester than other trimesters ( $p=.003$ ); and the physical function parameter of the quality of life scale was significantly lower in the third trimester compared to the first and the second ones ( $p=.001$ ). However, there were no significant differences in the other parameters of the quality of life ( $p>.05$ ). **Conclusion:** The levels of physical activity, physical functioning and disability varied in different trimesters. It can be stated that the progress of the pregnancy decreases physical function and triggers disability due to low back pain; however, the change in the level of physical activity is related to the adaptation to pregnancy and not to gestational age.

**Keywords:** Pregnancy; quality of life; disability evaluation; exercise

Physical activity is described as body movement that consumes energy and involves muscle contraction.<sup>1</sup> Physical activity protects individuals against cardiovascular diseases, reduces obesity, and related risks and improves life quality.<sup>2</sup> It has been believed, for many years, that women who engage in physical exercises at a high level have an easier time of giving birth. Although pregnancy is an exciting and enjoyable process with blissful expectations, the physiological changes that women experience during this period compromise the line separating between a healthy status and being ill.<sup>3,4</sup> Pregnant women carry certain risks, which can mark this period as a time of fearful crisis for them.<sup>3,5</sup> Women who are active during pregnancy have been shown to develop fewer complications during pregnancy and the postnatal period.<sup>5,6</sup> However, despite the recent growing popularity of exercise and physical activity in every segment of society, studies have found that a sedentary lifestyle is more common in pregnant women than adult non-pregnant women.<sup>7-9</sup> Active pregnant women have also been shown to exercise at lower intensity and frequency and for a shorter time

compared to their pre-pregnancy rates. Many obstetric risks that affect both the mother and the baby, such as gestational diabetes, preeclampsia, and preterm labor, have been observed less in women who were active during pregnancy.<sup>10</sup> In addition, it has also been found that physical activity is effective in preventing musculoskeletal problems and excessive weight gain and in protecting mental health. Physical activity, therefore, is recommended to protect and improve maternal, fetal, and neonatal well-being and to accelerate postpartum recovery.<sup>5</sup>

Emotional, social, and psychological factors affect physical health. Physical health, in turn, is affected by being active and has a positive impact on life quality and functionality.<sup>11</sup> Back pain is the most common problem among the musculoskeletal issues that appear during pregnancy, and almost 50% of pregnant women are reported to have a functional inability due to back pain.<sup>12-14</sup> Many women have stated that back pain during pregnancy not only affect their job but also their daily life activities and quality.<sup>15,16</sup> As pregnancy progresses, women prefer to engage in less strenuous activities or limit the volume of these activities.<sup>7,9</sup>

## AIM

The American College of Obstetricians and Gynecologists (ACOG) recommends that pregnant women exercise at a moderate level for at least 30 min five days in a week.<sup>5</sup> The results reported on this issue in previous studies are unclear. This, in part, is due to the small sample size and insufficient measurement methods that were used to assess the changes in physical activity, life quality, and functional inability levels during pregnancy.<sup>17-19</sup> There has been no comparative study assessing physical activity, functional inability, and life quality during different trimesters. Therefore, the present study aims to compare these variables in terms of physical activity, functional inability and life quality with trimesters in pregnancy. The hypothesis of the study is that physical activity, functional inability, and life quality in pregnant women can differ according to the specific trimesters.

## MATERIAL AND METHODS

### POPULATION AND SAMPLE OF THE STUDY

This was a retrospective cohort study conducted during 2017-2018. The data of the pregnant women visiting the Gynecology and Obstetrics Department Outpatient Clinic of Baskent University Medical Faculty for routine follow-up were obtained from the hospital information system. The pregnant women with any cardiovascular disease, other medical complications (hemorrhage, preeclampsia, etc.) and/or cognitive disorders were excluded from the pregnancies reached. Demographic information, physical activity status, disability and quality of life scores of the remaining 91 pregnant women (first trimester n=20, second trimester n= 34, third trimester n=37) were analyzed.

### PHYSICAL ACTIVITY LEVEL

The participants' physical activity was determined using the valid Turkish version of the International Physical Activity Questionnaire (IPAQ).<sup>20</sup> IPAQ includes 27 questions, which assess the sub-parameters of physical activities, including housework, garden work, job, and free-time activities, engaged in over the last seven days. Scores were calculated using time (moments) and frequency (days) in all fields for the long version of IPAQ. Estimated metabolic equivalent (MET) was used to determine the activities and the requisite MET score was calculated. The activity level scoring covers walking, moderate physical activity, intense physical activity, and total score. The participants were categorized as inactive (<600 MET), minimally active (600–1500 SME), and very active (>3000 MET).<sup>21</sup>

### FUNCTIONAL DISABILITY LEVEL DUE TO LOW BACK PAIN

The valid and reliable Turkish version of the "Oswestry Low Back Disability Questionnaire" was used in the present study to determine functional inability due to back pain.<sup>22</sup> The questionnaire has ten subgroups and is scored between 0 and 5. The subgroups of this questionnaire address the severity of pain, lifting and carrying, walking, sitting, standing, sleeping, traveling, and sexual and social

life. The total score of the questionnaire ranges from 0–50 with higher total scores indicating high functional inability due to back pain.<sup>23</sup>

### QUALITY OF LIFE

The valid and reliable Turkish Short Form–36 (SF–36) was used to determine the quality of life.<sup>24</sup> The scale has eight subscales, namely, physical and social function, physical and emotional role limitations, mental health, vitality, pain assessment, and general health perception. The assessment of the scale was performed in terms of the experience of the participants over the last four weeks. Each subscale is scored between 0–100, with higher scores indicating better quality of life level.<sup>25</sup>

### DATA ANALYSIS

The sample size of IPAQ was calculated according to IPAQ values, which were the main parameters. The mean and standard deviations, based on these parameters from the literature, were determined as described by Harrison et al. In order to achieve a type 1 error probability of 0.05 and a power of 80%, an optimum sample size of 19 pregnant women was found to suitable for each trimester.<sup>26</sup>

The numeric data obtained from the participants are shown within the range of the median and highest. The suitability of variables for a normal distribution was assessed using visual (histogram and other graphs) and analytical methods (Kolmogorov-Smirnov). The Mann Whitney–U test was used, since the difference between the two

groups did not meet the parametric test prerequisites, while Kruskal Wallis Test was used as the difference between three or more groups did not meet the parametric test prerequisites. The significance level was accepted as  $p < 0.05$ . All data were analyzed using the Statistical Package for Social Science (SPSS) 17.0.

## RESULTS

There was no difference in the participants' age and height according to trimesters ( $p > 0.05$ ) (Table 1). No statistical difference was found between energy levels during moderate physical activity, vigorous physical activity and walking when physical activity levels were compared ( $p > .05$ ). Total physical activity was significantly higher in the second trimester than in the first trimester ( $p = .048$ ). Functional disability level due to back pain in the third trimester was significantly higher than in other trimesters. Physical and emotional role limitation, life quality, pain, general health perception, vitality, social function, and mental health subscales were similar among the pregnant women in different trimesters; however, the physical functions in the pregnant women as assessed by SF–36 were significantly weaker in the third trimester than that in the first and second trimesters (Table 2, 3).

## DISCUSSION

This study was planned to determine how physical activity, functional inability, and life quality levels

**TABLE 1:** Descriptive characteristics of pregnant women according to trimesters.

	1 <sup>st</sup> trimester (n=20)	2 <sup>nd</sup> trimester (n=34)	3 <sup>rd</sup> trimester (n=37)	P
<b>Age</b>				
(Median (min-max), year)	27 (21-37)	30 (19-38)	28 (19-36)	.434
<b>Body Height (cm)</b>				
(Median (min-max), year)	164 (153-178)	168 (150-175)	165 (150-176)	.449
<b>Body Weight (kg)</b>				
(Median (min-max), year)	60 (50-74)	65 (48-114)	76 (59-110)	<.001*
<b>BMI</b>				
(Median (min-max), year)	22 (16.7-29.1)	23.6 (18.3-37.2)	27.7 (20.6-38)	<.001*

Min. The least, max: The largest; BMI: Body mass index; \* $p \leq .001$ ; Kruskal Wallis Test.

**TABLE 2:** Comparison of pregnant women's physical activity, functional inability and life quality levels in 3<sup>rd</sup> trimester.

		1 <sup>st</sup> Trimester	2 <sup>nd</sup> Trimester	3 <sup>rd</sup> Trimester	p
		Median (min-max year)	Median (min-max year)	Median (min-max year)	
IPAQ Questionnaire	Walking	156.5 (0-2772)	478.5 (0-6237)	445.2 (0-2772)	.109
	Moderate level of physical activity	0 (0-480)	0 (0-2160)	0 (0-3360)	.666
	Vigorous level of activity	0 (0-1920)	0 (0-2880)	0 (0-4320)	.825
	Total level of activity	156.5 (0-3732)	594 (0-8157)	478.5 (0-8076)	<b>.048*</b>
Functional disability	Oswestry Low Back Pain Score	16.7 (0-46)	23 (0-74)	32 (0-74)	<b>.003*</b>
Quality of Life (SF-36 Sub Parameters)	Physical Function	70 (15-100)	65 (0-100)	45 (0-95)	<b>.001*</b>
	Physical Role Limitation	25 (0-100)	68.8 (0-100)	25 (0-100)	.257
	Pain	52 (22-100)	62 (10-100)	42 (0-100)	.059
	General Health	72 (40-92)	72 (25-97)	67 (25-92)	.444
	Vitality	60 (25-95)	55 (10-90)	55 (10-80)	.727
	Social Function	75 (25-100)	75 (12.5-100)	62.5 (12.5-100)	.526
	Emotional Role Limitation	66.7 (0-100)	100 (0-100)	66.7 (0-100)	.608
	Mental Health	64 (28-92)	64 (24-92)	64 (28-92)	.960

Min: The least; max: The largest; **IPAQ:** International Physical Activity Questionnaire; **SF-36:** 36, \* $p \leq .05$  Kruskal Wallis Test.

**TABLE 3:** Comparison of pregnant women's physical activity, functional inability and life quality levels in 3<sup>rd</sup> trimester.

		1 <sup>st</sup> trimester p	1 <sup>st</sup> -3 <sup>rd</sup> trimester p	2 <sup>nd</sup> -3 <sup>rd</sup> trimester p
Physical Activity Level	Total activity level	.020*	.054	.413
Functional disability	Oswestry low back pain score	.724	.007*	.003*
Quality of Life	Physical Function	.260	.001*	.002*

\* $p \leq .05$ , Mann Whitney U test.

change in pregnancy during different trimesters. In the study, no linear decrease during pregnancy in terms of physical activity level was observed. Rather, physical activity increased from the first to second trimester, while physical activity level decreased from the second to third trimester. This can be explained by the various factors that likely prevent pregnant women from exercising in the first trimester. Fatigue and nausea are the major barriers to exercise in the first trimester.<sup>27</sup> These symptoms, however, decrease after the second trimester, which is the point where adaptation to the pregnancy starts. During this period, pregnant women tend to feel more energetic. The increase in physical activity of pregnant women in the second trimester can be attributed to this development. Reduced fear of losing the baby and being in a more positive mood also play a role during this period.<sup>28</sup> In the third trimester, physical activity de-

creases again due to postural-related issues related to fetal growth. The most important factors during this period are excessive enlargement of the uterus and biomechanical issues caused by abdominal weight gain.<sup>27</sup> Another important reason for the decrease in physical activity is the increase in both maternal and fetal energy consumption for the purpose of protecting the energy balances of pregnant women.<sup>29</sup>

Another main observation in the study was that functional disabilities due to back pain did not change in the first and second trimesters but dramatically increased in the third trimester. The reason for this increase is that a major change in body composition occurs in the last trimester, as internal and external loads on the body proliferate in line with biomechanical changes.<sup>30</sup> Some earlier studies have commonly reported functional inability due to back pain.<sup>12</sup> Furthermore, some studies

have found that back pain and functional inadequacy level increase linearly with the advancement of pregnancy.<sup>13</sup> The results of these studies were parallel to those from the present study and support the opinion that back pain and functional ability loss can be due to the biomechanical reasons as the pregnancy advances.

Regarding the life quality, we observed that the physical and emotional role limitation of life quality and the pain, general health perception, vitality, social function, and mental health parameters did not change in the period spanning the beginning of the pregnancy up to the point of labor. Some previous studies, in contrast to our results, observed a decrease in the life quality parameters related to pregnancy.<sup>31</sup> This difference can be attributed to the differences in the education level and sociocultural and economic status of the participants, as there may be many independent factors affecting life quality. The physical function parameters of life quality of the pregnant women in the present study did not change from the first trimester to the second trimester; however, they decreased dramatically when the participants were in the third trimester. This finding agreed with earlier reports. It has been found in the literature that the physical function of pregnant women decreases nearer the delivery time.<sup>32-34</sup>

The primary limitation of the study was that the study group included pregnant women with similar sociocultural features who were followed in the same hospital. This fact must be considered when making generalizations about pregnant women from different sociocultural levels. However, as the study aimed to assess physical activity, life restrictions, and functional incapacities in pregnant women in different trimesters, the similar demographic characteristics of the pregnant women

and the fact that they belong to a homogeneous group were important in terms of neutralizing the variations in the study.

## CONCLUSION

The results showed that the progress of pregnancy decreases physical function and triggers functional inability due to back pain; however, changes in physical activity were not related with the gestational age but rather with the adaptation to pregnancy. In pregnancy, the physical activity programs recommended for increasing the quality of life and functioning of the pregnant woman and minimizing the complications related to pregnancy should be planned individually according to the characteristics of the trimester in an individual pregnant woman. Furthermore, it is recommended that physical activity, quality of life, and functionality of pregnant woman should be assessed during the pregnancy to prepare correct and effective plans. The results of this assessment will be a guide for physical activity planning directed toward protecting and improving maternal and fetal health.

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*During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.*

### **Conflict of Interest**

*No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.*

### **Authorship Contributions**

*All authors contributed equally while this study preparing.*

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