

The Relationship between Pregnancy-Related Low Back Pain, Kinesiophobia, and Physical Activity in the Third Trimester

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Received: 19.08.2021

Accepted: 26.10.2022

ABSTRACT

Objective: The aim of this study is to examine the relationship between pregnancy-related low back pain, kinesiophobia, and physical activity during the third trimester of pregnancy.

Methods: Fifty-one pregnant women between the ages of 18-40, at the gestational age of 27 weeks and above were included in the study. The intensity of pregnancy-related low back pain was assessed with the Numerical Pain Scale, kinesiophobia with the Tampa Kinesiophobia Scale, and physical activity levels with the short form of the International Physical Activity Questionnaire.

Results: Only 4 (7.8%) subjects had high levels of physical activity, 12 (23.5%) had moderate, and 35 (68.6%) had low levels of physical activity. A strong positive correlation was found between low back pain and kinesiophobia in the third trimester of pregnancy ($r = 0.796$; $p < 0.001$). There was no statistically significant relationship between low back pain and physical activity or between kinesiophobia and physical activity ($r = -0.097$; $p = 0.498$ and $r = -0.212$; $p = 0.135$ respectively).

Conclusion: Pregnancy-related low back pain can cause kinesiophobia during pregnancy, and kinesiophobia may cause limitations of movements. Considering the negative effects of pregnancy-related low back pain and kinesiophobia during pregnancy, the evaluation of pain, and kinesiophobia by health professionals is important during this period.

Keywords: low back pain, kinesiophobia, physical activity, pregnancy

1. INTRODUCTION

Pregnancy is a natural phenomenon, during which women experience physical, physiological, biomechanical, and psychological changes (1-3). Physical problems experienced during pregnancy differ according to the characteristics of the mother, the pregnancy process, and the trimesters. While nausea-vomiting, nasal congestion, fatigue, and breast tenderness are observed in the first trimester, these problems stop in the second trimester but conditions such as constipation, headache, and hypotension can be observed. In the third trimester; fatigue, insomnia, edema in the lower extremities, varicose veins, shortness of breath, and joint pain are experienced due to the developing and growing fetus and the preparation of the mother's body for birth (1).

Low back pain is one of the most common musculoskeletal complaints during pregnancy, and pregnancy-related low back pain can have adverse effects on the pregnant woman's life (4). However, pregnancy-related low back pain increases in the later stages of pregnancy due to reasons such as weight gain, the growing fetus, and the displacement of the center

of gravity (4-7). Kinesiophobia, which is also defined as the avoidance of movement, anxiety about movement, or fear of pain due to movement, may develop in patients with low back pain (8,9). Some activities during pregnancy can increase low back pain, and increased musculoskeletal pain brings on pain-related fear that leads to avoidance of activities (2,10,11). Considering that pregnancy-related low back pain in pregnant women will negatively affect daily life activities, the fear of movement may increase as pregnancy progresses (2). There is limited literature investigating kinesiophobia in pregnancy and almost all of the studies investigating the relationship between pregnancy-related low back pain and kinesiophobia focus on the postpartum period (2,10,11). In a study investigating pregnant women in the postpartum period, higher levels of kinesiophobia were reported in moderately disabled cases due to pregnancy-related low back pain (10). In another study by Gutke et al. (11), it was shown that disability due to postpartum lumbopelvic pain was associated with kinesiophobia. To the best of our knowledge, only one study questioned kinesiophobia related

to pregnancy-related low back pain in late pregnancy and reported that kinesiophobia negatively affected depressive symptoms 1 month after delivery (2).

Physical activity decreases for many different reasons during pregnancy and this risk increases in the later stages of pregnancy (12). De Sousa et al. (13) reported that sedentary pregnant women experienced more severe pain than active women. On the other hand, it is possible that the risk of low back pain increases in cases where physical activity decreases irrespective of the pregnancy (14), and that kinesiophobia is observed in patients with low back pain (15,16). Based on this information, we hypothesized that increasing pregnancy-related low back pain increases kinesiophobia and decreases physical activity among pregnant women in their third trimester. This study aims to examine the relationship between pregnancy-related low back pain, kinesiophobia, and physical activity in the third trimester of pregnancy.

2. METHODS

This cross-sectional study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of Erciyes University under protocol number 96681.246.2019/727. Written informed consent was obtained from all subjects included in the study.

2.1. Participants

The pregnant women followed up for antenatal care in the Kayseri City Hospital, Gynecology and Obstetrics Clinic formed the study sample. Inclusion criteria were being aged between 18-40 years, having a spontaneous pregnancy, having low back pain due to pregnancy, and having a gestational age of 28 weeks and above. The exclusion criteria were high-risk pregnancy detected by the physician, pregnancy with assisted reproductive techniques, having a different type of pain other than pregnancy-related low back pain, having gestational diabetes, having chronic neurological, endocrine, orthopedic, and rheumatological diseases before pregnancy, and low back pain longer than 3 months due to any reason before pregnancy. The low back pain was diagnosed by the obstetrician according to the International Classification of Functioning (ICF) criteria (17).

Assessments

2.2.1. Demographic Variables

Socio-demographic characteristics such as age, education level, occupation, smoking, alcohol use, being on medication, previous pregnancies and the number of children, the gestational week, a multiple pregnancy, and weight gain during pregnancy were recorded.

2.2.2. Numerical Rating Scale

The Numerical Rating Scale (NRS) is a scale containing 11, 21, or 101 points, and one end of the scale reflects “no pain”

while the other end represents “the worst pain possible”. It is one of the most frequently clinically used scales due to its ease of administration in the assessment of pain intensity. In practice, the patient is asked to choose the number that best reflects the severity of their pain on a scale with numerical values (18). In our study, an 11-point NRS (0= no pain, 10= unbearable pain) was used to evaluate the pregnancy-related low back pain levels of the women. The subjects were informed about the use of the scale before evaluation and were asked to rate and circle the number that reflected their pain on the scale from 0 to 10.

2.2.3. Tampa Kinesiophobia Scale

The Tampa Kinesiophobia Scale (TKS) is a questionnaire used for rating the fear of movement. A 4-point Likert scoring system (1= strongly disagree, 4= strongly agree) is used for each of the 17 items on the scale. The total score ranges from 17 to 68 where higher scores indicate increased severity of kinesiophobia. A total score is calculated after the inversion of the scores of items 4, 8, 12, and 16 (9,19). The fear of movement of the pregnant women included in the study was evaluated using the Turkish version of the TKS (9). The subjects were asked to mark the option that suited them best for each item, and the total score was calculated.

2.2.4. International Physical Activity Questionnaire – Short Form

The International Physical Activity Questionnaire (IPAQ) is a tool developed by researchers from various countries with the support of the World Health Organization to measure physical activity. The Turkish validity and reliability of the questionnaire, which has a long form consisting of 27 items and a short form of 7 items, was conducted by Sağlam et al. (20). The short form of IPAQ was used in this study, which assesses physical activity across a variety of domains including walking, moderate and vigorous activity in the past week (or last 7 days), and estimated time spent sitting per week. The vigorous, moderate, and walking scores were calculated by reported minutes within each category by an average metabolic equivalent (MET) score (3.3 MET for walking, 4 MET for moderate activity, 8 MET for vigorous activity), and the total physical activity score was calculated by summing the results of all categories. The question about sitting time (sedentary behavior), which is not a part of the summed physical activity score, is not included in the physical activity total score (20,21) in our study either. Based on IPAQ total score, physical activity levels were classified as high (>3000 MET-min/week), moderate (600-3000 MET-min/week), and low level (<600 MET-min/week).

2.3. Statistical Analysis

Correlation coefficients ranging from 0.293 and 0.604 were reported for the relationship between kinesiophobia (evaluated with the TKS) and low back pain (15,22). In this study, we hypothesized to detect a significant relationship

between kinesiophobia and low back pain with a correlation coefficient of 0.400 in pregnant women. The sample size was determined as 46 subjects but was increased by 10% in case of possible missing values to a total of 51 subjects to detect this relationship with a 95% confidence level and 80% power (23). Qualitative variables are presented as percentages and quantitative variables are shown as means with standard deviations. Data analyses were performed using the SPSS V.20 (SPSS Inc., USA) program. The Kolmogorov–Smirnov and Shapiro-Wilk tests were used to evaluate whether the data had a normal distribution. Spearman correlation coefficient and statistical significance were calculated to detect the relationships between variables. The significance level was accepted as $p < 0.05$.

3. RESULTS

None of the pregnant women included in the study were on medication other than supplementary vitamin/mineral pills used under physician supervision during pregnancy. Although none of the pregnant women used alcohol, 5 of them (10%) were smokers. Only 1 case had multiple (twin) pregnancy. Other demographic and clinical characteristics of the women included in the study are shown in Table 1. The intensity of low back pain, kinesiophobia scores, physical activity scores and levels are shown in Table 2.

Table 1. Demographic and clinical characteristics

	X ± SD	MIN – MAX
Age (year)	28 ± 5.19	19 – 38
Gestational age (week)	36.3 ± 2.8	28 – 40
	n	%
Educational level		
Primary school	13	25.5
Secondary school	17	33.3
High school	14	27.5
University medium degree	5	9.8
University higher degree	2	3.9
Occupation		
Housewife	43	84.3
Official	3	5.9
Self-employed	3	5.9
Other	2	3.9
Weight gain (kg)		
5 – 10	3	5.9
11-15	15	29.4
16-20	25	49
≥ 21	8	15.7
Number of previous pregnancies		
0	14	27.5
1	17	33.3
2	15	29.4
≥ 3	5	9.8
Number of miscarriages		
0	47	92.1
1	3	5.9
2	1	2

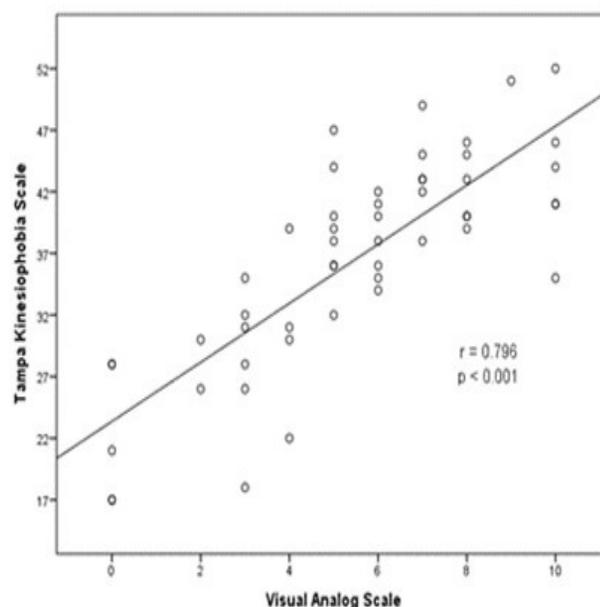
X ± SD = mean ± standard deviation; MIN – MAX = minimum – maximum

As a result of the study, a strong positive correlation ($r = 0.796$; $p < 0.001$) was found between low back pain and kinesiophobia in pregnant women. There was no statistically significant relationship between low back pain and physical activity ($r = -0.097$; $p = 0.498$) and between kinesiophobia and physical activity ($r = -0.212$; $p = 0.135$) (Figure 1).

Table 2. Pregnancy-related low back pain, kinesiophobia and physical activity scores and physical activity levels of subjects

	X ± SD	MIN – MAX
VAS	5.47 ± 2.87	1 – 10
TKS	36.5 ± 8.56	17 – 52
IPAQ (MET-min/week)		
Vigorous	23.5 ± 168	0 – 1200
Moderate	206.7 ± 734.2	0 – 5040
Walking	586.9 ± 943.3	0 – 2772
IPAQ Total	807.3 ± 1216	0 – 5544
Sitting	365.3 ± 226.7	45 – 900
	n	%
The physical activity level according to IPAQ		
Low	35	68.6
Moderate	12	23.5
High	4	7.8

X ± SD = mean ± standard deviation; MIN – MAX = minimum – maximum; VAS = Visual Analog Scale; TKS = Tampa Kinesiophobia Scale; IPAQ = International Physical Activity Questionnaire; MET = metabolic equivalent task



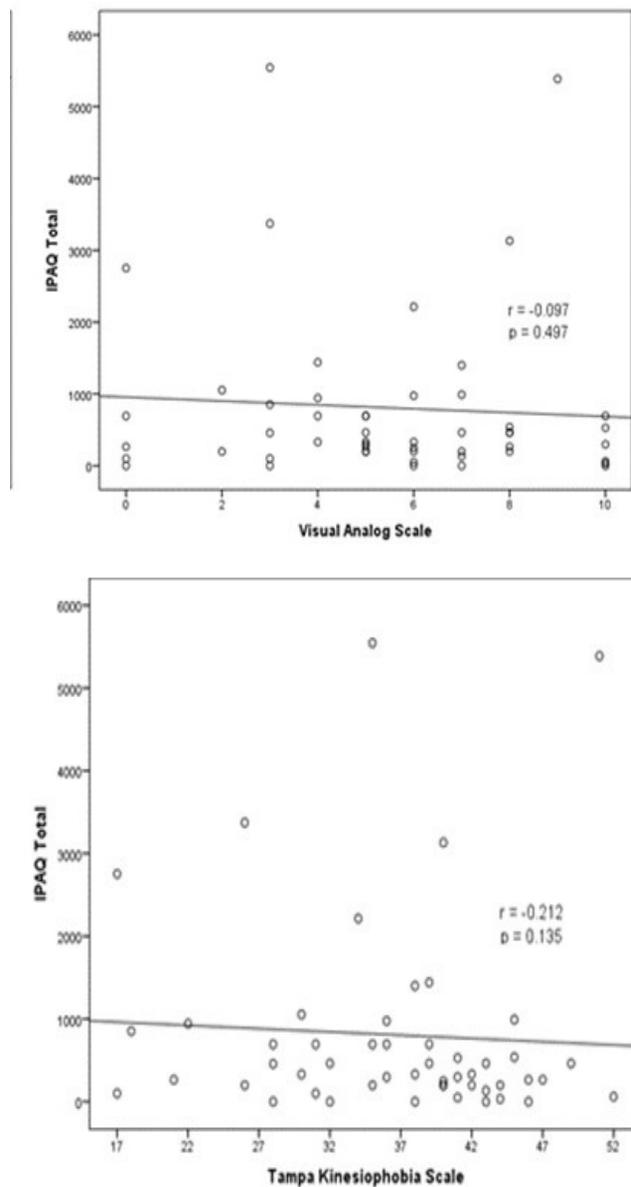


Figure 1. The relationships between pregnancy-related low back pain and kinesiophobia and physical activity. IPAQ_ International Physical Activity Scale

4. DISCUSSION

This study is one of the limited studies investigating kinesiophobia caused by pregnancy-related low back pain in the literature. The relationship between pregnancy-related low back pain, kinesiophobia, and physical activity in the third trimester was investigated and a strong positive correlation was found between low back pain and kinesiophobia, while no statistically significant correlation was found between kinesiophobia and physical activity, and between pregnancy-related low back pain and physical activity.

Hormonal, vascular, and biomechanical changes that occur in the body during pregnancy to adapt to the growing fetus play a role in the etiology of low back pain, which is one of the most common types of pain in pregnancy (13). Low

back pain during pregnancy causes limitations on the ability to work efficiently, leading to poor quality of life (24,25). Since it is known that the occurrence of low back pain and the symptoms increase as the pregnancy progresses (24), pregnant women in their third trimester were included in our study.

Kinesiophobia is defined as the fear of movement that occurs after a painful injury and limits physical movement (9,19). It has been reported that kinesiophobia reduces the quality of life and increases disability in patients with low back pain (8,15,22). However, while there are a limited number of studies investigating kinesiophobia in pregnancy, most of these studies focus on the postpartum period (2,10,11). In a study conducted by Gutke et al. (11), it was reported that pain severity, quality of life, and kinesiophobia explained the postpartum disability due to lumbopelvic pain and that lumbopelvic pain was observed in one in three postpartum women. In another study investigating disability in the postpartum period due to pregnancy-related low back pain, it was found that kinesiophobia increased in subjects with pregnancy-related low back pain with moderate disability (10). Ebina et al. (2) reported that depressive symptoms increased in late pregnancy and 1 month after delivery in women with pregnancy-related low back pain, and pointed out that approaches to treating kinesiophobia in late pregnancy may reduce the risk of postpartum depressive symptoms. On the other hand, it was demonstrated that kinesiophobia scores decreased in the group treated by a physiotherapist for pregnancy-related low back pain through the third week postpartum (26). In this study, a strong correlation was found between pregnancy-related low back pain and kinesiophobia after the evaluation in the third trimester. Although most of the studies in the literature examine the relationship between kinesiophobia and pregnancy-related low back pain that continues in the postpartum period, we think that it is important to evaluate kinesiophobia during pregnancy to ensure a healthier pregnancy considering the negative effects of kinesiophobia. In addition, pregnancy-related low back pain can be observed from the beginning of pregnancy, although it is more common in the later stages of pregnancy. It would be more helpful for future studies to include all three trimesters of pregnancy.

Physical activity constitutes one of the objectives of multidisciplinary programs for chronic low back pain (27,28). However, the pain was also stated as the main barrier to performing physical activities (28). Marshall et al. (29) showed that the fear of movement significantly mediated the relationship between pain and disability, and the effect of fear on pain-related disability was not related to regular physical activity in patients with chronic low back pain. In another study, no relationship was reported between kinesiophobia and physical activity in patients with low back pain (30). In addition, it has been reported that individuals who exercise do not have work-related kinesiophobia and that they have a lower level of disability, and a low risk of developing low back pain (31). There are a lot of studies in the literature investigating the level of physical activity during

pregnancy and/or during specific periods of pregnancy, and these studies show that physical activity decreases in late pregnancy (12,13,32). It has been reported that sedentary pregnant women are likely to have higher lumbar and pelvic pain intensity than physically active pregnant women (13). In our study, only 4 (7.8%) pregnant women had a high level of physical activity, 12 (23.5%) had moderate, and 35 (68.6%) had a low level of physical activity. Similarly, in a study conducted in Turkey, it was shown that the physical activity levels of pregnant women were low (33). According to a study conducted by Kitiş et al. (34) in Turkey, low physical activity levels of women (regardless of pregnancy) over the age of 20 were evaluated using the short form of IPAQ, and it was reported that 72.5% of these women did not consider exercising. The authors also reported in the same study that most of the women were housewives (67.9%) and had children (82.6%). The method of assessing physical activity and demographic information in our study was similar to the study performed by Kitiş et al. (34). The pre-pregnancy physical activity level of the subjects included in the study was not questioned, so we do not know whether the low physical activity level is due to pregnancy. One reason why physical activity was not associated with kinesiophobia and pregnancy-related low back pain in our study may be explained by the low level of physical activity among women in our country before pregnancy. Another reason may be that more than half of the participants had a low physical activity level, and the sample size of participants with high and moderate physical activity levels was small. The fact that the physical activity levels were not distributed in similar percentages among the participants may have caused the outcome of no statistically significant relationship between physical activity and the other parameters, and the low physical activity levels of the majority (68%) of the patients may have caused the outcome of lack of correlation. More studies should be conducted with a similar percentage of participants from all three levels (low, moderate, and high) of physical activity.

Kinesiophobia due to pregnancy-related low back pain may also increase according to the pain intensity (10). In addition, pregnancy-related low back pain is associated with limitations on the woman's ability to work effectively, leading to reduced quality of life, and as a result, women's productivity in daily life activities decreases (24,25,35). Based on this information, it is important to note that kinesiophobia may affect daily life activities, although no relationship was found between physical activity and kinesiophobia in our study.

Non-pharmacological treatments such as soft tissue mobilization, posture training, stabilization exercises, and electrotherapy approaches, which are generally applied by physiotherapists, have been suggested to be used first in the treatment of low back pain during pregnancy (24,36). In addition, increasing physical activity during pregnancy has many positive effects such as an increase in the quality of life and cardiorespiratory fitness, a decrease in depressive symptoms, the risk of preterm birth, and gestational diabetes (37). For this reason, we think that it is important

to identify the pregnant women in need of such treatment with comprehensive evaluations from the early stages of pregnancy to maintain the pregnancy in the best way for both the mother and the baby.

Several limitations may have affected our findings. First, pregnancy-related low back pain was not divided into categories such as lumbar, pelvic, or both. Second, the time and duration of the onset of pain were not questioned. Third, multidimensional scales such as the McGill Melzack Pain Questionnaire, etc. were not used. The NRS is simple and easy for patients to understand, but given the subjectivity of the scale, the complexity of symptoms, and the multifactorial aspect of pain, individuals may have had difficulty isolating the perception of pain from other psycho-cognitive factors. Fourth, the lack of homogeneous physical activity levels among the sample in the study and the fact that the majority of the subjects (68%) had low physical activity levels may have caused the outcome of no correlation. The last and most important limitation is that the pre-pregnancy physical activity levels of the subjects are unknown. Future studies investigating all stages of pregnancy from the beginning should be conducted. We also believe that prospective follow-up studies would be more useful in understanding the process. Studies with a similar sample size with various physical activity levels can provide a better comparison of the effects of kinesiophobia and pregnancy-related low back pain between physical activity levels.

5. CONCLUSION

In this study, although it was noted that pregnancy-related low back pain in the third trimester of pregnancy causes kinesiophobia, no relationship was found between physical activity and pregnancy-related low back pain or between physical activity and kinesiophobia. However, a relationship was found between pregnancy-related low back pain and kinesiophobia. Kinesiophobia may cause limitations of movements, especially daily life activities during pregnancy. Moreover, the results of our study showed that more than half of the pregnant women had low physical activity levels in the third trimester. Considering the negative effects of pregnancy-related low back pain and kinesiophobia during pregnancy, it is important to monitor and evaluate pain, and kinesiophobia during this period by health professionals.

Funding: The authors received no financial support for the research.

Conflicts of interest: The authors declare that they have no conflict of interest.

Ethics Committee Approval: This study was approved by Ethics committee of Erciyes University (Date: 23/10/2019; Number of approval: 2019/727)

Peer-review: Externally peer-reviewed.

Author Contributions:

Research idea: BKV

Design of the study: BKV, AA, ENT, GF, MS

Acquisition of data for the study: AA, ENT, GF, MS

Analysis of data for the study: BKV, MY

Interpretation of data for the study: BKV, MYG, HA

Drafting the manuscript: BKV

Revising it critically for important intellectual content: BKV, MYG, HA

Final approval of the version to be published: BKV, HA

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How to cite this article: Kepenek Varol B, Aydoğdu A, Temur EN, Fırat G, Selvi M, Yazıcı Gülay M, Aksoy H. The Relationship between Pregnancy-Related Low Back Pain, Kinesiophobia, and Physical Activity in the Third Trimester. *Clin Exp Health Sci* 2023; 13: 25-31. DOI: 10.33808/clinexphealthsci.984617