Musculoskeletal pain, kinesiophobia, and quality of life in obese patients

Sabriye Ercan¹, Furkan Hasan Küçük¹, Aydan Örsçelik², Cem Çetin¹

¹Department of Sports Medicine, Süleyman Demirel University, Faculty of Medicine, Isparta, Turkey; ²Department of Sports Medicine, University of Health Sciences, Gülhane Faculty of Medicine, Ankara, Turkey

ABSTRACT

Objectives: This study aims to examine musculoskeletal pain, kinesiophobia, and quality of life in individuals with normal body mass index and in individuals with obesity, and to determine the relationship between the variables.

Methods: In the study; individuals aged between 20-65 years, with a body mass index of 30 kg/m² and above (Group obesity) with obesity, and individuals with a range of 18.5-24.9 kg/m² (Group normal) were included. General Practice Physical Activity Questionnaire, Orebro Musculoskeletal Screening Questionnaire, Short Form-12 Health Survey, and Kinesiophopia Causes Scale were applied to the participants for primary care.

Results: When the descriptive characteristics of the individuals in the sample which were divided into two groups as the Group normal (n = 82; 22.6 ± 1.7 kg/m²) and Group obesity (n = 92; 33.0 ± 2.8 kg/m²) were analyzed; while a difference was determined in terms of sex, education level and presence of chronic disease (p < 0.05), no difference was found in terms of age, marital status and regular drug use for the treatment of chronic disease (p > 0.05). Although the activity level rates of Group obesity were lower according to the physical activity questionnaire classification for primary care, no statistically significant difference was found between the groups (p = 0.090). More musculoskeletal pain was found in the individuals of the obesity group (p = 0.003), the physical sub-dimension score of the general quality of life questionnaire was negatively affected (p = 0.014), and a difference in favor of phobia was determined in all domains of the kinesiophobia causes scale (p < 0.001). There was a weak positive correlation between body mass index and musculoskeletal pain, while a moderate positive correlation with kinesiophobia.

Conclusions: Although physical activity level is similar to individuals with normal body mass index, musculoskeletal pain and kinesiophobia are higher in individuals with obesity, and their quality of life is negatively affected.

Keywords: Obesity, kinesiophobia, pain, quality of life

Obesity is a public health problem with personal, social, and financial burdens and increasing its importance globally [1]. Individuals affected by obesity face deep functional and physical limitations. These individuals experience musculoskeletal problems such as joint pain, functional impairment, and walking difficulties [2]. The prevalence of joint pain, especially in load-bearing segments such as the waist,
Pain, kinesiophobia, and quality of life in obesity

Increases linearly with high body mass index (BMI) values [3].

Since obesity is associated with clinical conditions related to pain, it is also associated with low physical and emotional well-being. As obesity rates increase, the rates of musculoskeletal disorders and related physical effects also increase [4, 5]. Therefore, obese patients with low back and joint pain experience significant functional limitations and injuries [6]. Here, it is faced with a dual problem, including physical activity limitation in daily life due to movement difficulties and pain caused by excess weight [6]. On the other hand, both conditions affect each other. For example, decreased physical activity due to pain may cause an increase in body weight [6]. On the other hand, individuals with obesity often experience shortness of breath, musculoskeletal disorders, and joint pain during physical activity. These situations which are experienced during exercise can negatively change the perception of individuals with obesity towards the benefits of movement and physical activity. As a result of all these, fear of pain and movement may occur [7]. The pain felt evokes avoidance behaviors against the movement, leading to an ever-increasing spiral of inactivity and more avoidance from exercise [7]. Studies have shown that pain-related fear of movement is strongly associated with perceived and detected injury in individuals with low back pain [7]. Therefore, fear of movement in obese individuals with musculoskeletal complaints may be a clinically important condition called 'kinesiophobia'.

Kinesiophobia is an extreme fear of physical movement and activity, which results from the fear of a painful injury or re-injury and creates a sense of vulnerability [8, 9]. Avoidance behaviors that develop due to kinesiophobia cause the continuation of the cycle of avoiding physical activity. Thus, the mobility and functional limitations of individuals may deteriorate. Patients with a diagnosis of obesity and chronic pain may report higher levels of kinesiophobia and may be exposed to more physical activity restrictions than those with lower BMIs [10]. To clarify the relationship between kinesiophobia, obesity, and pain; it can be predicted that it will facilitate the development of individual and targeted treatment approaches and increase the quality of life of individuals affected by obesity [10].

This study hypothesizes that musculoskeletal pain will be higher in individuals with obesity, although physical activity level is similar to individuals with normal body mass index, obese patients will have high kinesiophobia levels and all these differences will have negative effects on the quality of life of obese patients. In this study, it was aimed to determine the relationship between the variables by examining musculoskeletal pain, kinesiophobia, and quality of life in individuals with normal body mass index and individuals with obesity.

METHODS

The study started after the research protocol was approved by the local ethics committee's decision dated 08/01/2021 and numbered 9.

Individuals aged between aged 20-65 years, with a body mass index of 30 kg / m² and above, or between 18.5 - 24.9 kg / m², who were in our hospital as companions were included to the study. Those who have had joint or back surgery in the last 2 years, those who have had a musculoskeletal injury in the last 6 months, those with cognitive and psychiatric disorders, unstable angina or uncontrolled arterial hypertension, severe pulmonary hypertension, recent cardiac arrhythmia, or myocardial infarction, other clinical conditions (malignancy, etc.) which may be worsened by physical exertion, slightly overweight individuals with BMI less than 18.5 kg / m² or between 25.1 - 29.9 kg / m² were excluded from the study.

To all individuals who voluntarily participated in the study; General Practice Physical Activity Questionnaire, Orebro Musculoskeletal Screening Questionnaire, Short Form-12 Health Survey, Kinesiophobia Causes Scale was applied.

Applied Measurement Tools

General Practice Physical Activity Questionnaire

This questionnaire was developed in England to evaluate the level of physical activity in primary health care institutions and adapted into Turkish by Noğay et al. [11]. Questionnaire consists of a total of 7 questions under the headings of activity level at work, the activity level in the last 1 week and walking speed. According to the answers given to the questionnaire, activity
levels are divided into 4 groups as inactive, moderately inactive, moderately active, and active. The Turkish version of the Questionnaire has a Cronbach alpha coefficients value of 0.74 [11].

Orebro Musculoskeletal Screening Questionnaire
This questionnaire, which was developed to determine the risk of musculoskeletal pain by screening method, was adapted into Turkish by Öncü et al. [12]. Questionnaire consists of a total of 25 questions, 4 of which contain the descriptive information of the participant and 21 of which will be reflected in the scoring. According to the answers given to the questionnaire, a score can be obtained between 0 and 210. An increase in the score indicates that the risk of pain increases. The Turkish version of the Questionnaire has a Cronbach alpha coefficients value of 0.96 [12].

SF-12 General Quality of Life Questionnaire
The Turkish adaptation of this 12-question questionnaire, which aims to evaluate the general quality of life of individuals with its physical and mental sub-dimensions, was carried out by Soylu and Kütük [13]. The physical component score of the questionnaire; general health, physical functionality, physical role, and bodily pain sub-dimensions; the mental component score is calculated according to the answers given to the sub-dimensions of social functionality, emotional role, mental health, and energy. A score between 0-100 can be obtained separately from both component scores of the questionnaire. The higher the score obtained, the better the health status. The Turkish version of the Questionnaire has a Cronbach alpha coefficients value of 0.73 for physical component score of SF-12 (PCS-12) and 0.72 for mental component score of SF-12 (MCS-12) [13].

Kinesiophopia Causes Scale
This 20-question scale, which aims to examine the causes of kinesiophobia with its biological and psychological dimensions, was adapted into Turkish by Çayır et al. [14] The scale has two sub-dimensions, biological and psychological. The new version of the scale varies between 0-5 points. An increase in the total score of the scale and its sub-dimensions indicates an increase in kinesiophobia. The intra-class correlation coefficient was computed in order to conduct a reliability investigation on The Turkish version of the scale. The scale's overall ICC value was discovered to be 0.863. [14].

Power analysis
The power of the study was examined by post hoc analysis. The α error level was accepted as 0.05 in the G*Power v.3.1 program [15]. The power (1-β err prob) was 0.88 while the effect size was 0.49 for OMSQ, the power (1-β err prob) was 1.00 while the effect size was 1.29 for KCS, the power (1-β err prob) was 0.68 while the effect size was 0.37 for PCS.

Statistical Analysis
The conformity of the continuous variables to the normal distribution was evaluated with the Shapiro-Wilk test. Descriptive statistics were reported as numbers and percentages for categorical variables; mean and standard deviation for continuous variables. Comparisons of continuous variables between two independent groups; independent samples t-test was compared with normal distribution condition and Mann-Whitney U test when normal distribution condition was not met. The Chi-Square test tested the differences between the ratios of categorical variables between groups. Correlation Analysis was used to investigate relationships between continuous variables when the normality assumption was not met, and the Spearman correlation coefficient was also computed; otherwise, the Pearson correlation coefficient was considered. SPSS (IBM Corp. Released 2015. IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp.) was used for statistical analysis. The type I error rate was accepted as 5%. A weak correlation was accepted if r = 0.20-0.39 and a moderate correlation if r = 0.40-0.69 [16].

RESULTS
In the study, the normal body weight (Group normal, n = 82) with the mean body mass index 22.6 ± 1.7 kg / m² and the obesity class with 33.0 ± 2.8 kg / m² (Group obesity, n = 92), a total of 174 people's data were analyzed. The mean age of individuals in the Group normal was 42.5 ± 8.8 years, while those in the Group obesity were calculated as 44.8 ± 8.3 years (p = 0.075) (Table 1).
Table 1. Descriptive characteristics of groups

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Group normal</th>
<th>Group obesity</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>43.7 ± 8.6</td>
<td>42.5 ± 8.8</td>
<td>44.8 ± 8.3</td>
<td>0.075</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>28.1 ± 5.7</td>
<td>22.6 ± 1.7</td>
<td>33.0 ± 2.8</td>
<td>&lt; 0.001**</td>
</tr>
<tr>
<td>Sex, n (%)</td>
<td></td>
<td></td>
<td></td>
<td>&lt; 0.001**</td>
</tr>
<tr>
<td>Female</td>
<td>128 (73.6)</td>
<td>72 (87.8)a</td>
<td>56 (60.9)b</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>46 (26.4)</td>
<td>10 (12.2)a</td>
<td>36 (39.1)b</td>
<td></td>
</tr>
<tr>
<td>Education Level, n (%)</td>
<td></td>
<td></td>
<td></td>
<td>&lt; 0.001**</td>
</tr>
<tr>
<td>Secondary school</td>
<td>21 (12.1)</td>
<td>3 (3.7)a</td>
<td>18 (19.6)b</td>
<td></td>
</tr>
<tr>
<td>High school</td>
<td>40 (23)</td>
<td>11 (13.4)a</td>
<td>29 (31.5)b</td>
<td></td>
</tr>
<tr>
<td>University</td>
<td>113 (64.9)</td>
<td>68 (82.9)a</td>
<td>45 (48.9)b</td>
<td></td>
</tr>
<tr>
<td>Marital status, n (%)</td>
<td></td>
<td></td>
<td></td>
<td>0.456</td>
</tr>
<tr>
<td>Married</td>
<td>146 (83.9)</td>
<td>67 (81.7)</td>
<td>79 (85.9)</td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>28 (16.1)</td>
<td>15 (18.3)</td>
<td>13 (14.1)</td>
<td></td>
</tr>
<tr>
<td>Chronic disease (Yes), n (%)</td>
<td>71 (40.8)</td>
<td>26 (31.7)a</td>
<td>45 (48.9)b</td>
<td>&lt; 0.021*</td>
</tr>
<tr>
<td>Medication use for chronic disease treatment (Yes), n (%)</td>
<td>61 (35.1)</td>
<td>24 (29.3)</td>
<td>37 (40.2)</td>
<td>0.131</td>
</tr>
</tbody>
</table>

Data are shown as mean ± standard deviation or n(%). BMI = Body Mass Index. Independent Samples t-Test was used for age. Mann-Whitney U was used for body mass index. Chi-square test was used for other descriptive characteristics value. *p-value is significant at the 0.05 level (2-tailed), **p-value is significant at the 0.01 level (2-tailed). a-b = There is a difference between them at Chi-square test.

Participants in the Group normal had controlled hypertension (n = 9), diabetes (n = 3), thyroid disease (n = 6), rheumatic disease (n = 6), migraine (n = 2), asthma (n = 2), vitiligo (n = 1). Participants in the Group obesity had controlled hypertension (n = 18), diabetes (n = 13), thyroid disease (n = 4), rheumatic disease (n = 2), osteoporosis (n = 1), migraine (n = 4), asthma (n = 3), angioedema (n = 1), epilepsy (n = 1), polycystic ovary syndrome (n = 1), fibromyalgia (n = 1), psoriasis (n = 1). When the descriptive features of the groups are examined; while a difference was determined in terms of sex, education level, and presence of chronic disease (p < 0.05). No difference was found in terms of marital status and regular drug use for the treatment of chronic disease (p > 0.05) (Table 1).

When the activity levels of the groups were evaluated with the General Practice Physical Activity Questionnaire, although the activity level rates of Group obesity were lower, no statistically significant difference was found between the groups (p > 0.05) (Table 2).

According to the results of the measurement tools

Table 2. Physical activity levels of groups

<table>
<thead>
<tr>
<th>Activity Level</th>
<th>All n (%)</th>
<th>Group normal n (%)</th>
<th>Group obesity n (%)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inactive</td>
<td>4 (2.3)</td>
<td>0 (0)</td>
<td>4 (4.3)</td>
<td>0.090*</td>
</tr>
<tr>
<td>Moderately inactive</td>
<td>33 (19)</td>
<td>13 (15.9)</td>
<td>20 (21.7)</td>
<td></td>
</tr>
<tr>
<td>Moderately active</td>
<td>45 (25.9)</td>
<td>23 (28)</td>
<td>22 (23.9)</td>
<td></td>
</tr>
<tr>
<td>Active</td>
<td>92 (52.9)</td>
<td>46 (56.1)</td>
<td>46 (50)</td>
<td></td>
</tr>
</tbody>
</table>

*Chi-square test was used.
Table 3. Musculoskeletal pain, kinesiophobia level and quality of life of the groups

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Group normal</th>
<th>Group obesity</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OMSQ</td>
<td>85.7 ± 29.6</td>
<td>78.5 ± 28.4</td>
<td>92.2 ± 29.2</td>
<td>0.003 **</td>
</tr>
<tr>
<td>SF-12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCS-12</td>
<td>42.7 ± 6.6</td>
<td>44.0 ± 6.4</td>
<td>41.6 ± 6.6</td>
<td>0.014 *</td>
</tr>
<tr>
<td>MCS-12</td>
<td>42.6 ± 5.4</td>
<td>42.6 ± 5.2</td>
<td>42.5 ± 5.6</td>
<td>0.816</td>
</tr>
<tr>
<td>KCS Total Score</td>
<td>2.8 ± 0.8</td>
<td>2.3 ± 0.6</td>
<td>3.2 ± 0.8</td>
<td>&lt; 0.001 **</td>
</tr>
<tr>
<td>KCS-Biological Domain</td>
<td>2.8 ± 0.9</td>
<td>2.3 ± 0.6</td>
<td>3.3 ± 0.8</td>
<td>&lt; 0.001 **</td>
</tr>
<tr>
<td>KCS-Psychological Domain</td>
<td>2.7 ± 0.9</td>
<td>2.2 ± 0.7</td>
<td>3.1 ± 1.0</td>
<td>&lt; 0.001 **</td>
</tr>
</tbody>
</table>

Data are shown as mean ± standard deviation. OMSQ = Örebro Musculoskeletal Screening Questionnaire, SF-12 = Short Form-12 Health Survey, PCS = Physical component score of SF-12, MCS = Mental component score of SF-12, KCS = Kinesiophobia Causes Scale.

Mann-Whitney U was used for OMSQ. Independent Samples t-test was used for other value, *p-value is significant at the 0.05 level (2-tailed), **p-value is significant at the 0.01 level (2-tailed).

Table 4. The relationship of body mass index with pain, kinesiophobia, and quality of life

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Group normal</th>
<th>Group obesity</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OMSQ</td>
<td>r</td>
<td>0.222**</td>
<td>0.090</td>
<td>0.036</td>
</tr>
<tr>
<td></td>
<td>p value</td>
<td>0.003</td>
<td>0.421</td>
<td>0.736</td>
</tr>
<tr>
<td>PCS-12</td>
<td>r</td>
<td>-0.144</td>
<td>0.067</td>
<td>0.064</td>
</tr>
<tr>
<td></td>
<td>p value</td>
<td>0.058</td>
<td>0.547</td>
<td>0.542</td>
</tr>
<tr>
<td>MCS-12</td>
<td>r</td>
<td>-0.024</td>
<td>-0.192</td>
<td>0.052</td>
</tr>
<tr>
<td></td>
<td>p value</td>
<td>0.758</td>
<td>0.084</td>
<td>0.625</td>
</tr>
<tr>
<td>KCS Total Score</td>
<td>r</td>
<td>0.534**</td>
<td>0.118</td>
<td>0.186</td>
</tr>
<tr>
<td></td>
<td>p value</td>
<td>&lt; 0.001</td>
<td>0.293</td>
<td>0.076</td>
</tr>
<tr>
<td>KCS-Biological Domain</td>
<td>r</td>
<td>0.537**</td>
<td>0.114</td>
<td>0.116</td>
</tr>
<tr>
<td></td>
<td>p value</td>
<td>&lt; 0.001</td>
<td>0.310</td>
<td>0.269</td>
</tr>
<tr>
<td>KCS-Psychological Domain</td>
<td>r</td>
<td>0.471**</td>
<td>0.096</td>
<td>0.223*</td>
</tr>
<tr>
<td></td>
<td>p value</td>
<td>&lt; 0.001</td>
<td>0.392</td>
<td>0.033</td>
</tr>
</tbody>
</table>

OMSQ = Örebro Musculoskeletal Screening Questionnaire, PCS = Physical component score of SF-12, MCS = Mental component score of SF-12, KCS = Kinesiophobia Causes Scale.

Correlation test was used, “r” was used for indicating Pearson correlation coefficient; and “rs” was used for the Spearman correlation coefficient, *: P - value is significant at the 0.05 level (2-tailed), **: P - value is significant at the 0.01 level (2-tailed). A weak correlation was accepted if r = 0.20-0.39 and a moderate correlation if r = 0.40-0.69.

in which musculoskeletal pain, kinesiophobia level, and quality of life were evaluated, more musculoskeletal pain was found in individuals in the Group obesity, the physical sub-dimension score of the general quality of life questionnaire was negatively affected, a difference in favor of phobia was determined in all domains of the kinesiophobia causes scale (p < 0.05) (Table 3).

In the correlation analysis made considering all the participants, a weak positive relationship was found between body mass index and musculoskeletal pain, and a moderate positive relationship with kinesiophobia. When the analyzes were repeated according to the groups, only in Group obesity was a weak positive correlation was determined between the body mass index and the psychological domain of kinesiophobia (p < 0.05) (Table 4).
DISCUSSION

Individuals affected by obesity face physical limitations. These individuals frequently experience musculoskeletal problems such as joint pain, functional impairment, and walking difficulties [10]. Since obesity is associated with clinical conditions related to pain, it is also associated with losses in physical and emotional well-being [1]. Pain that increases with movement can cause individuals with obesity to have difficulties while maintaining physical activity. The perception that will be created by the difficulty felt during physical activity creates fear of movement due to pain and may cause a decrease in the quality of life in individuals with obesity [6]. All these situations are an indication that the fear of movement that develops in obese individuals with musculoskeletal complaints may be clinically important and should be rehabilitated.

In our study, when the descriptive characteristics of the individuals in the sample, which were divided into two groups as normal body mass index and obese patients, were examined; while a difference was determined in terms of sex, education level, and presence of chronic disease, no difference was found in terms of age, marital status and regular drug use for the treatment of chronic disease. Obesity is higher in males and individuals with lower education levels than the university level. In addition, additional chronic diseases of individuals diagnosed with obesity were observed more frequently. In addition, in a study comparing the obese patient and the normal group, the obese patient group was found to be older than the normal group, and the rate of women was found to be higher than men. While more patients were classified as 'working' in the obese patient group, more individuals were identified as 'student' in the normal group. A higher rate of additional chronic disease was found in the obese patient group. Among the normal and obese group, depression (13.8% vs. 12.9%), anxiety (3.1% vs. 2.9%), and arthritis (7.7% vs. 12.9%) prevalence was not found to be different. It has been found that obese patients use more narcotic drugs for pain control compared to the normal group and less of them use nonsteroidal anti-inflammatory drugs for pain control [7]. In a study by Alqahtani et al. [17], comparing the obesity patient group with the normal group, most of the participants in both groups were found to be single and their income level was found to be close. Gomes-Neto et al. [18], in a study comparing the quality of life of people with knee osteoarthritis (OA) with and without obesity, no statistically significant difference was found between the groups in terms of sociodemographic characteristics and duration of OA.

In our study, although physical activity levels of individuals with obesity were lower according to the General Practice Physical Activity Questionnaire classification, no statistically significant difference was found between the groups (p > 0.05). In parallel, in a study conducted with 200 female university students in Saudi Arabia in 2017 using the same questionnaire, although the activity level rates of the obesity group were lower, no statistically significant difference was found between the groups [17]. However, in a study conducted with 4716 adults in Iran, a statistical difference was found in the activity level ratios of the obesity group, reflecting that individuals with obesity were less active [19]. Although there is no statistically significant difference in various studies, results reflecting that individuals with obesity are less active have been determined. This situation, which was also revealed in our study, shows that individuals with obesity are less physically active than individuals with normal body mass index.

In our study, more musculoskeletal complaints were found in individuals with obesity. In the literature, there is a lot of evidence pointing to the coexistence of obesity and pain complaints [20-22]. In the study of Smuck et al., less than 3% of people in the normal BMI range reported low back pain in the last 3 months, while 7.7% of obese patients and 11.6% of morbidly obese patients reported low back pain [23]. The results of a population-based study of more than 30000 people over a 10-year period in Norway show that individuals with a diagnosis of obesity, who are not physically active, have a higher risk of developing chronic arm pain [24]. Results of another large population-based study that included prospective follow-up for over ten years showed that people with a diagnosis of obesity developed a higher number of low back pain complaints than those without a diagnosis of obesity [25]. In another study by Maclellan et al. [26], multisite musculoskeletal pain was found to be common and severe in obese patients. In another study that studied 6079 Latin American women between the ages of 40-59, it was concluded that obesity is an iden-
tifiable risk factor for musculoskeletal pain in middle-aged women [27]. The results of a survey conducted with more than 1 million people in the United States showed a linear increase in chronic pain cases as BMI increases [28]. Similarly, Hitt et al. [29] showed a linearly increasing relationship between obesity and pain. At the end of the study, it was found that the higher the BMI, the more common the complaint of pain, and the probability of suffering from pain in patients with morbid obesity was four times higher than those without a diagnosis of obesity [29].

In the general quality of life questionnaire, we used in our study, the physical sub-dimension scores of the obesity-diagnosed group were negatively affected, while the mental sub-dimension scores were not. It is known that obesity has various negative effects on the functional capacity and quality of life of people. In a study conducted in the USA, a negative correlation was found between BMI and the physical sub-dimension scores of the general quality of life questionnaire, but no significant correlation was found for the mental sub-dimension scores [30]. In another study, it was shown that obesity is associated with low quality of life in patients with low back pain [7]. However, according to the research results reported in the literature, the relationship between mental health and obesity is not consistent. While some studies have shown that obesity is associated with lower mental sub-dimension scores and well-being [31, 32], others have not [33, 34].

In our study, a difference in favor of phobia was determined in all sub-scales of the Kinesiophobia Causes Scale. There are very few studies [1, 6, 7, 10] in the literature examining the relationship between obesity and kinesiophobia. In a study by Varallo et al., in patients with chronic low back pain; the relationship between obesity, pain intensity, and kinesiophobia was evaluated. Their findings revealed that kinesiophobia in individuals with low back pain and obesity mediates the relationship between pain intensity and injury [6]. According to the results of another cross-sectional study conducted on 106 participants with obesity and chronic low back pain, kinesiophobia was found to be an important factor in increasing pain-related disability and pain intensity in individuals with chronic low back pain and obesity [1]. Studies supporting this explanation have been previously reported by Vincent et al. [7] reported. It was found that adults affected by moderate obesity and chronic low back pain reported higher levels of kinesiophobia compared to those of normal weight, and obese adults with chronic low back pain had a higher fear of movement than adults without a diagnosis of obesity with chronic low back pain [7]. In addition, another study overweight older observed that the degree of kinesiophobia was a significant predictor of low back pain severity and perceived disability in adults with low back pain [10].

**Limitations**

The first limitation of our study is that it is a cross-sectional study. The second is that the sample consists of individuals from a single center and accompanying individuals in our hospital. On the other hand, it is important that it is a few studied topics in the literature. This study has several strengths, such as the use of validated, reliable measurement tools, the achievement of an adequate sample size, and the fact that it presents data on a population for which there is still little research.

**CONCLUSION**

Although the physical activity level of an individual with obesity is similar to that of individuals with a normal body mass index, musculoskeletal pain and kinesiophobia are higher, and the quality of life is negatively affected. In the light of the data obtained, it is thought that kinesiophobia should not be ignored when planning an exercise for an individual with obesity, and treatment approaches for kinesiophobia should also be exhibited.

**Authors’ Contribution**

Study Conception: SE; Study Design: SE; Supervision: CÇ; Funding: N/A; Materials: SE, FHK, AÖ; Data Collection and/or Processing: SE, FHK, AÖ; Statistical Analysis and/or Data Interpretation: SE; Literature Review: SE, FHK, AÖ, CÇ; Manuscript Preparation: SE, FHK, AÖ and Critical Review: SE, FHK, AÖ, CÇ.

**Conflict of interest**

The authors disclosed no conflict of interest during the preparation or publication of this manuscript.
Financing

The authors disclosed that they did not receive any grant during conduction or writing of this study.

Acknowledgements

The abstract of this study was presented as an oral presentation at International Sports Medicine Congress and the 18th Turkish Sports Medicine Congress to be held between December 3-5, 2021 (Online).

REFERENCES

28. Stone AA, Broderick JE. Obesity and pain are associated in...