Does kinesiophobia limit physical activity and quality of life in asthmatic patients?

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Kinesiophobia has been studied in musculoskeletal and neurological diseases. The aim of this descriptive study was to assess the level of kinesiophobia in stable asthmatic patients, and to determine whether it is an obstacle to physical activity and quality of life. A total of 62 asthmatic patients and 50 healthy control subjects were assessed using the tampa kinesiophobia scale (TSK) for kinesiophobia, International Physical Activity Questionnaire-Short Form (IPAQ-SF) for physical activity levels, and Asthma Quality of Life Questionnaire (AQLQ) for quality of life. A high degree of kinesiophobia was determined in 54.8% of the asthmatic patients. The TSK scores were significantly higher ($P < 0.001$), and the AQLQ scores were lower in the asthma group than in the control group ($P < 0.001$). The IPAQ-SF level and AQLQ score were lower ($P < 0.001$ for both) in the asthmatic group with a high kinesiophobia score. The TSK score was significantly associated with IPAQ-SF score ($r = -0.889$; $P < 0.001$) and AQLQ score ($r = -0.820$; $P < 0.001$) in asthmatic patients. According to linear regression analysis, kinesiophobia explained 84.40% of QoL and physical activity. Patients with a stable asthma were observed to have a high level of kinesiophobia compared with healthy subjects. High kinesiophobia levels may increase the disease burden by negatively affecting participation in physical activity and quality of life. While developing asthma education programs for asthma patients, it should be remembered that even in the stable period, kinesiophobia can develop. Preventive and therapeutic programs should include precautions to improve quality of life and physical activity against the effects of kinesiophobia. *International Journal of Rehabilitation Research* **45: 230–236 Copyright © 2022 Wolters Kluwer Health, Inc. All rights reserved.**

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Introduction

Asthma is a heterogeneous disease characterized by chronic airway inflammation, varying expiratory airflow limitation, as well as time-varying respiratory symptoms such as wheezing, dyspnea, chest tightness, and cough. These variations are often triggered by exercise or physical activity, exposure to allergens or irritation, weather changes, or viral respiratory diseases [1,2]. Asthma symptoms develop during activity in 90% of untreated asthmatics, airway obstruction due to exercise is seen in 40–90% of asthmatics, and sometimes, exercise and physical activity may be the sole cause of an asthma attack [2]. Exercise-induced respiratory distress may decrease physical activity and quality of life for patients with asthma, making them less independent in daily life [1].

Physical activity may also provoke disease-related symptoms or insufficient control of asthma in patients. In past, asthmatics patients were regarded as individuals who avoid physical exertion to prevent attacks. Therefore, participation in activity programs is limited in many asthmatic patients due to the nature of the disease. Moreover, when the level of physical activity of patients with asthma is examined, there is consistent evidence that many of these patients have low levels of physical activity and prefer a sedentary lifestyle [3–5]. However, new research suggests that increased physical activity is associated with favorable outcomes such as better asthma management, fewer exacerbations, and lower healthcare utilization [6].

Kinesiophobia is defined as 'an excessive, irrational, and debilitating fear of movement and activity resulting from a feeling of vulnerability to painful injury or reinjury' [7]. In the presence of kinesiophobia, patients think that movement will cause injury/illness and pain/limitation again, and this process leads to reduced physical fitness, avoidance of activity, functional disability, depression, and decreased quality of life in the long term [7,8].

Kinesiophobia has been studied primarily in musculoskeletal and neurological diseases [9–11]. It has been reported that patients with chronic obstructive pulmonary disease (COPD) have fear of movement because of worsening symptoms such as dyspnea, fatigue, chest pain, and tightness during exercise [12]. Kinesiophobia is,

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therefore, an important clinical obstacle to participation in therapy programs, and it is seen as a cause of physical insufficiency and noncompliance with rehabilitation and physical activity programs [13]. Although it has also been investigated in cardiopulmonary areas besides COPD, such as coronary heart disease, myocardial infarction, pulmonary hypertension, and implantable cardioverter defibrillator [12,14–16], to the best of our knowledge, there is no study in literature that has investigated kinesiophobia in asthmatic cases.

Kinesiophobia may occur due to anxiety, fear, disease-related symptoms, and comorbidities, or related to lived experiences. In this study, we aimed to examine whether a permanent fear of moving may also develop in relation to disease experiences in asthmatics. Therefore, the primary objective of this study was to assess the levels of kinesiophobia, physical activity, and quality of life in patients with stable asthma and to compare these patients with healthy subjects. The secondary aim was to investigate whether kinesiophobia is an obstacle to physical activity and diminishes the quality of life.

Methods

Subjects

This cross-sectional study included 62 (male/female ratio: 1.06) patients aged 18–65 who were diagnosed with asthma and 50 healthy peers (male/female ratio: 1.00) as a control group. Asthma diagnosis was based on the physician examination and the Global Initiative for Asthma criteria [2], was required to have been under medical treatment for at least 6 months with no changes in drugs during the previous 4 weeks, and to be considered clinically stable (i.e. without exacerbations or changes in medication during the last 30 days).

Patients were also excluded if they had a diagnosis of unstable cardiovascular disease, or any other pulmonary, neurological, cognitive, or musculoskeletal disease that would affect the results. Asthmatic patients who were invited by their physicians to voluntarily participate in this study and agreed to take part in the study were evaluated. The sample size was calculated using G Power analysis; a sufficient number of patients were included in the study and the risk of type 1 error was reduced. The control group consisted of 50 volunteers, aged 18 and 65 years, with no unstable cardiac disease, physical disability, or cognitive impairment. The University Ethics Committee approved the study. All patients and healthy volunteers read and signed an informed consent form before the study.

Study design

The demographic data of the subjects were recorded (sex, age, weight, height, BMI, educational status, sex, history of any chronic disease, smoking use, and pain history). BMI was calculated by using self-reported height and weight. Participants were separated into four groups according to BMI value: <20, >20–25, >25–30, and >30 kg/m^2. Chronic diseases were recorded, including allergic rhinitis, chronic rhinosinusitis, diabetes, and hypertension (defined as currently taking medication for the condition). The pain history included complaints related to musculoskeletal problems. Data were collected using questionnaires in face-to-face interviews.

Instruments used for assessment

Tampa kinesiophobia scale

Tampa Kinesiophobia Scale (TKS) is a self-report questionnaire to measure avoidance of exercise and fear of movement. The scale, which has two subscales, is based on the model of fear-avoidance, fear of physical activity-related activities, fear of movement, and fear of reinjury. The activity avoidance subscale is defined by the belief that activity may result in (re)injury or increased pain (including 1, 2, 7, and 9–12 items of the scale). The somatic focus subscale is examined by the belief in underlying and serious medical problems (items 8 and 36). Each of the 17 statements is scored on a 4-point Likert-type response scale ranging from 'strongly disagree' to 'strongly agree'. Four items (4, 8, 12, and 16) are reverse coded. The total score ranges from 17 to 68, with higher scores indicating a higher degree of kinesiophobia. The cutoff point of the scale was defined as 37. Patients with a score of at least 37 were evaluated as high kinesiophobia and those with a score of less than 37 points as low kinesiophobia [13].

The Turkish version of the TSK, which was validated for the Turkish population by Tunca Yilmaz *et al.* [17], was used in this study.

International Physical Activity Questionnaire-Short Form

The International Physical Activity Questionnaire (IPAQ) is a community-based questionnaire that allows the assessment of physical activities at different levels in accordance with international forms and records the duration of physical activities performed in the last week. The IPAQ has a long and short form. The short form is specifically designed to determine the physical activity of adults aged 15–69 years. IPAQ evaluates many physical activities including: (a) leisure physical activities, (b) home and garden activities, (c) physical activities related to work, and (d) physical activities related to transportation. The IPAQ-Short Form (IPAQ-SF) contains the specific types of three of the four activities mentioned [18]. The Turkish IPAQ-SF was used in this study [19]. The physical activity status of participants was grouped as follows: (a) inactive [≤600 metabolic equivalent MET)-min/week]; (b) minimum active (>600 up to ≤3000 MET-min/week); and (c) active (>3000 MET-min/week) [20].

Asthma Quality of Life Questionnaire

The Asthma Quality of Life Questionnaire (AQLQ) is a scale consisting of 32 items to assess the quality of life

specific to asthma. This survey measures the quality of life during the previous 2 weeks. Each item in the AQLQ is rated equally. The score of each health area is calculated separately, and the overall AQLQ score is calculated as the average of the main scores. The score of each area and the overall AQLQ score ranges from 1 to 7 (1: severe impairment, 7: no impairment) [21]. In this study, the Turkish form of AQLQ was used [22].

Statistical analysis

The Statistical Package for Social Sciences Version 18.0 software was used for the analysis of the study data. Conformity of the data to normal distribution was evaluated using the Kolmogorov–Smirnov test. Variables were expressed as mean and SD values, frequency, and percentage. As the data showed normal distribution, the independent samples *t*-test was used in the comparisons of variables. Associations between the TKS and the International Physical Activity Questionnaire-Short Form, and the AQLQ were examined with Pearson's correlation analysis as the data met parametric assumptions. The strength of correlations was evaluated as 0.00–0.25 = little or none, 0.25–0.50 = reasonable, 0.50–0.75 = moderate to good, and 0.75–1 = good to exceptional [23]. A kinesiophobia score of at least 37 was evaluated as high kinesiophobia, and a score of less than 37 points as low kinesiophobia [7]. The level of statistical significance was accepted as $P < 0.05$. Multivariable logistic regression analysis was also used to evaluate the association between kinesiophobia and physical activity, and the quality of life in asthmatic patients.

Results

From a total of 121 participants initially enrolled, 112 fully completed the evaluation forms. The 62 asthmatic patients comprised 30 females and 32 males with a mean age of 36.77 ± 6.05 years and the control group of 50 healthy volunteers comprised 25 females and 25 males with a mean age of 36.18 ± 5.96 years. The two groups had similar physical and demographic characteristics in terms of BMI values, duration of education, history of chronic illness, smoking, and pain history. High kinesiophobia levels were determined in 54.8% of patients. The patient characteristics are shown in Table 1.

The kinesiophobia scores of the patients with asthma are shown in Table 2. In item 1 of the scale, 51.6% of the patients agreed with the statement, 'I'm afraid that I might injure myself if I exercise'. Item 14-It's really not safe for a person with a condition like mine to be physically active, and item 15-I can't do all the things normal people do because it's too easy for me to get injured-were agreed with by 53.2% of the patients.

The mean kinesiophobia values were 39.58 ± 5.78 (min–max: 34–58) in the asthma group and 23.46 ± 3.94 (min–max: 17–32) in the control group. The comparisons of kinesiophobia, physical activity, and quality of life levels in the patients with asthma and healthy subjects are shown in Table 3. The kinesiophobia levels of the patients with asthma were significantly higher than those of the healthy subjects. The activity avoidance subscale and somatic focus subscale values were significantly higher than those of the healthy control group. On the other hand, kinesiophobia levels were found similar according to pain, chronic illness history, and smoking status ($P > 0.05$).

Patients with asthma were examined in two groups as low and high kinesiophobia according to their TSK score. Physical activity levels were lower, and quality of life was worse in the group with a high kinesiophobia score. The differences between the groups are shown in Table 4.

The data were analyzed according to the groups' physical activity status. In the asthma group, TKS and AQLQ levels were found to be lower than the healthy group in all the physical activity levels. Comprehensive results are shown in Table 5.

Correlations between the TSK score and IPAQ-SF and AQLQ scores of the asthma group are shown in Table 6. A statistically significant correlation was found between the TSK score and IPAQ-SF ($r = -0.889$) and AQLQ ($r = -0.820$) scores ($P < 0.001$ for all). Higher kinesiophobia levels were determined to be related to lower levels of physical activity and quality of life. A positive correlation was found between quality of life and physical activity levels ($r = 0.739$; $P < 0.001$).

Multivariate linear regression analysis was performed to predict the kinesiophobia variable using quality of life and physical activity variables. As a result of the analysis, a significant regression model was created [F (2, 59) = 156.69; $P < 0.001$], and 84.40% of the variance in the dependent variable ($R^2_{\text{adjusted}} = 0.844$) was explained by the independent variables. The independent variable of physical activity predicted the dependent variable of kinesiophobia positively and significantly [$\beta = -0.003$; t (59) = –8.30; $P = 0.001$; $pr^2 = -0.53$]. The independent variable of quality of life also predicted the dependent variable positively and significantly [$\beta = -1.63$; t (59) = –4.78; $P < 0.001$; $pr^2 = -0.27$] (Table 7).

Discussion

In this study, comparisons were made of kinesiophobia, physical activity levels, and quality of life are compared between patients with stable asthma and healthy control subjects, and the respective results were reported and discussed. Kinesiophobia can be a significant health problem among patients with asthma. The central aspect that makes this study valuable in the literature is that it is the first study to have examined kinesiophobic effects in asthmatic patients, associated with the general disease nature, and to have investigated the effect

Table 1 Sociodemographic characteristics of study participants

	Asthma group ($n = 62$)	Control group ($n = 50$)	
Variables	Mean (SD)	Mean (SD)	*P*-value
Age (years)	36.77 (6.05)	36.18 (5.96)	0.605
BMI (kg/m^2)	24.34 (3.18)	24.20 (3.53)	0.145
Duration of education (years)	12.83 (2.72)	12.16 (2.13)	0.152
	n **(%)**	*n* **(%)**	*P*-value
Sex			
Male	32 (51.60)	25 (50.00)	0.865
Female	30 (48.40)	25 (50.00)	
BMI			
Normal weight	37 (59.7)	31 (62.0)	0.839
Overweight	23 (37.1)	15 (30.0)	
Obese	2 (3.2)	4 (8.0)	
History of any chronic illness			
No	15 (24.20)	10 (20.00)	0.596
No	47 (75.80)	40 (80.00)	
Smoking			
Yes	30 (48.40)	22 (44.00)	0.644
No	32 (51.6)	28 (56.00)	
Pain history			
Yes	20 (32.30)	12 (24.00)	0.336
No	42 (67.70)	38 (76.00)	
Physical activity status			
Inactive	9 (14.5)	3 (6.0)	<0.001
Minimum active	20 (32.3)	29 (58.0)	
Active	33 (53.2)	18 (36.0)	
Kinesiophobia levels			
Low kinesiophobia	28 (45.2)	0	<0.0001
High kinesiophobia	34 (54.8)	0	

of kinesiophobia on physical activity and quality of life. The study results demonstrated that asthma patients had a higher level of kinesiophobia than the healthy control group. Moreover, the physical activity levels and quality of life were determined to be lower in the asthma group than in the healthy control group. There were significant differences between asthmatics and healthy controls in kinesiophobia and quality of life according to physical activity status. Higher kinesiophobia levels were found to cause lower physical activity levels and quality of life. Furthermore, in relation to these findings, it was determined that physical activity and quality of life independent variables predicted the kinesiophobia variable positively in asthmatic patients.

As kinesiophobia increases the tendency to not take sufficient physical activity, it is seen as an obstacle not only in the treatment of musculoskeletal diseases but also in the exercise-based treatment of cardiorespiratory diseases [24,25]. Fear of movement prevents participation in exercise in many cardiorespiratory system pathologies such as coronary artery disease, myocardial infarction, heart failure, and COPD [12,25–27]. Participation in physical activity and quality of life may be low in coronary artery patients who are known to have high kinesiophobia [28], and it has been suggested that kinesiophobia is more likely to occur in patients with heart-related problems [29]. Decreasing the level of kinesiophobia may affect the emotional motivation of the individual and encourage them to be more physically active [30].

Observational studies have shown that the duration of daily physical activity and active energy expenditure are lower in asthmatic patients than in healthy individuals [31–33]. Patients with asthma often reduce their participation in regular exercise and physical activity, with the concern that symptoms will be triggered [32,33]. It has also been observed that they restrict daily physical activities such as climbing stairs and walking compared with healthy peers, leading to an increased risk of developing other serious health problems and greater inactivity. Mancuso *et al.* [34] reported that asthmatic individuals perceive their illness as an obstacle to physical activity participation, and this results in inactivity. Vahlkvist *et al.* [35] highlighted that decreased physical activity in children with asthma was associated with insufficient asthma control and showed a significant correlation between greater improvement in asthma control and daily physical activity. These studies can reinforce the ideas that individuals with asthma see their disease as an obstacle to physical activity, and the lack of control of their asthma results in kinesiophobia. Indeed, it was shown that kinesiophobia is associated with disease symptoms such as pain, fatigue severity, and dyspnea levels in COPD [12].

The aim of this study was to investigate whether kinesiophobia develops as a result of general asthma-related experiences. Since the groups were similar in terms of BMI, chronic disease history, smoking, and pain parameters, the study results were not affected by these parameters. The results support the idea that previous fears are sufficient for the patient to develop kinesiophobia, even in the stable phase of asthma. All asthma patients in this study were kinesiophobic, and the lowest kinesiophobia score was 34. The physical activity levels and quality of life scores were lower in the asthma group than in the control group. It was also observed that the physical activity levels and quality of life scores of patients with low kinesiophobia were better than those of patients with high kinesiophobia scores. High physical activity levels were particularly striking in the low kinesiophobia group. Considering that asthma is a lifelong chronic disease, continuing physical activity and exercise participation are vital. One of the long-term goals of asthma management is to maintain the physical activity level [2]. Therefore, determining the predictive factors for adherence and participation is essential for the prevention of comorbidities associated with inactivity.

One of the most important treatment goals is the increased disease management quality in patients with asthma. Good management is possible with the patient's compliance with the treatment. Kinesiophobia may be an important parameter affecting the compliance of the patient to pulmonary rehabilitation and physical activity programs. TSK scores of more than 37 indicate a high level of kinesiophobia. The kinesiophobia scores of the current study patients with asthma indicated that 54.8% of the subjects had a high

Table 2 Kinesiophobia score distributions of the asthma patients according to the scale items

Item No.	Scale items	Strongly disagree *n* (%)	Somewhat disagree *n* (%)	Somewhat agree *n* (%)	Strongly agree *n* (%)
1	I am afraid that I might injury myself if I exercise	0	7 (11.3)	23 (37.1)	32 (51.6)
2	If I were to try to overcome it, my pain would increase	26 (41.9)	22 (35.5)	11 (17.7)	3 (4.8)
3	My body is telling me I have something dangerously wrong	29 (46.8)	21 (33.9)	10 (16.1)	2 (3.2)
4	My pain would probably be relieved if I were to exercise	44 (71.0)	12 (19.4)	6 (9.7)	0
5	People are not taking my medical condition seriously enough	26 (41.9)	24 (38.7)	10 (16.1)	2 (3.2)
6	My accident has put my body at risk for the rest of my life	16 (25.8)	27 (43.5)	15 (24.2)	4 (6.5)
7	Pain always means I have injured my body	23 (37.1)	25 (40.3)	12 (19.4)	2 (3.2)
8	Just because something aggravates my pain does not mean it is dangerous	27 (43.5)	28 (45.2)	6 (9.7)	1 (1.6)
9	I am afraid that I might injure myself accidentally	27 (43.5)	26 (41.9)	8 (12.9)	1 (1.6)
10	Simply being careful that I do not make any unnecessary movements is the safest thing I can do to prevent my pain from worsening	1 (1.6)	8 (12.9)	25 (40.3)	28 (45.2)
11	I would not have this much pain if there weren't something potentially dangerous going on in my body	20 (32.3)	26 (41.9)	15 (24.2)	1 (1.6)
12	Although my condition is painful, I would be better off if I were physically active	19 (30.6)	27 (43.5)	14 (22.6)	2 (3.2)
13	Pain lets me know when to stop exercising so that I don't injure	2 (3.2)	4 (6.5)	19 (30.6)	37 (59.7)
14	It is really not safe for a person with a condition like mine to be physically active	1 (1.6)	9 (14.5)	19 (30.6)	33 (53.2)
15	I can not do all the things normal people do because it is too easy for me to get injured	1 (1.6)	12 (19.4)	16 (25.8)	33 (53.2)
16	Even though something is causing me a lot of pain, I do not think it is actually dangerous	52 (83.9)	7 (11.3)	3 (4.8)	0
17	No one should have to exercise when he/she is in pain	0	6 (9.7)	24 (38.7)	32 (51.6)

Table 3 Comparison of kinesiophobia, physical activity and quality of life levels between the groups

	Asthma group ($n = 62$)	Control group ($n = 50$)	
Parameters	Mean (SD)	Mean (SD)	*P*-value
IPAQ-SF	2249 (1333)	2593 (1330)	0.177
AQLQ	3.61 (1.27)	6.18 (1.13)	**0.001**
TSK	39.58 (5.78)	23.46 (3.94)	**0.001**
TSK-AA	16.10 (2.77)	9.80 (2.29)	**<0.001**
TSK-SF	8.76 (2.56)	5.80 (1.16)	**<0.001**

Bold indicates statistically significant of P values.
AQLQ, Asthma Quality of Life Questionnaire; IPAQ-SF, International Physical Activity Questionnaire-Short Form; TSK, tampa kinesiophobia scale; TSK-AA, tampa kinesiophobia scale - activity avoidance subscale; TSK-SF, tampa kinesiophobia scale - somatic focus subscale.

Table 4 Comparison of quality of life and physical activity status according to the kinesiophobia levels of the patients with asthma

	Low Kinesiophobia[a] ($n = 62$)	High Kinesiophobia[b] ($n = 50$)	
Parameters	Mean (SD)	Mean (SD)	*P*-value
IPAQ-SF	3456.43 (388.93)	1255.29 (954.44)	<0.0001
AQLQ	4.5 (0.64)	2.88 (1.20)	<0.0001

AQLQ, Asthma Quality of Life Questionnaire; IPAQ-SF, International Physical Activity Questionnaire-Short Form.
[a]Tampa kinesiophobia scale points <37.
[b]Tampa kinesiophobia scale points > 37.

degree of kinesiophobia. It is thought that negative experiences of asthmatics related to dyspnea and chest tightness during activity cause fear of movement. Moreover, participating regular physical activity is low in many asthmatics because they mistakenly believe that they should restrict exercise participation [36]. The inclusion of the definition of kinesiophobia into asthma education programs after the first diagnosis could increase awareness and prevent adverse events based on asthma. This study will be of guidance in creating awareness of kinesiophobia in asthma and for comparisons with other studies.

Quality of life, which is a key outcome measure of how diseases affect the individual's life, has been shown to deteriorate in asthma patients [37]. Asthma-induced physiological and psychological disorders significant impact on quality of life [38]. Improvement in quality of life in asthma patients indicates better asthma control, and there has been shown to be a strong relationship between symptom control and quality of life in asthma patients [39]. From a scan of the literature, no study could be found, which has compared disease-specific quality of life and physical activity and kinesiophobia in patients with asthma. The current study results showed that the disease-specific quality of life was worse than in healthy individuals and was related to kinesiophobia level in asthmatic patients. Another result in this study was that poor physical activity status may be a trigger for diminished quality of life levels.

There are several limitations to this study. TSK is not disease-specific and most of the items were related to pain

Table 5 Comparison of kinesiophobia, quality of life and physical activity levels according to the physical activity status

		IPAQ-SF status		
		Inactive	Minimum active	Active
Paramaters	Groups	Mean (SD)	Mean (SD)	Mean (SD)
TKS	Asthma group	50.0 (4.24)	42.10 (2.19)	35.21 (1.50)
	Healthy group	28.0 (4.0)	24.28 (3.76)	21.39 (3.20)
	P	0.002	<0.001	<0.001
AQLQ	Asthma group	1.67 (0.86)	3.20 (0.89)	4.39 (7.89)
	Healthy group	4.67 (1.16)	6.17 (1.10)	6.44 (1.04)
	P	0.029	<0.001	<0.001
IPAQ-SF	Asthma group	382.22 (133.23)	1158.50 (431.42)	3419.70 (374.43)
	Healthy group	500.0 (50.0)	2018.96 (1057.66)	3867.22 (455.28)
	P	0.052	0.001	0.001

AQLQ, Asthma Quality of Life Questionnaire; IPAQ-SF, International Physical Activity Questionnaire-Short Form; TKS, tampa kinesiophobia scale.

Table 6 Correlations between the TSK, IPAQ-SF and AQLQ in patients with asthma

	IPAQ-SF	AQLQ
TSK	−0.889*	−0.820*

AQLQ, Asthma Quality of Life Questionnaire; IPAQ-SF, International Physical Activity Questionnaire-Short Form; TSK, Tampa Kinesiophobia Scale.
*$P < 0.001$.

Table 7 Multivariate linear regression analysis with tampa kinesiophobia scale

	Unstandardized		95% CI	Standardized			
Variable	β	SE	Lower–upper	β	*t*	$R^2_{adjusted}$	*F*
						0.844	165.69
Constant	51.564	0.899	49.76–53.36	-	57.36		
AQLQ	−1.63	0.342	−2.31 to −0.95	−0.359	−4.781		
IPAQ-SF	−0.003	0.001	−0.003 to −0.002	−0.624	−8.30		

AQLQ, Asthma Quality of Life Questionnaire; CI, confidence interval; IPAQ-SF, International Physical Activity Questionnaire-Short Form; SE, standard error.

symptoms. But there were many studies using this scale to assess the kinesiophobia level in respiratory disease, and they found significant results [12,40,41]. Pulmonary function tests have not been evaluated in our study due to the cost of the test, and this may be another limitation.

In conclusion, it was concluded that kinesiophobia in patients with stable asthma is higher than in healthy subjects and is associated with physical activity and quality of life. The levels of physical activity and quality of life decrease as the kinesiophobia level increases. This study demonstrated that kinesiophobia is a serious problem for asthmatics; it can cause inactivity and decrease quality of life. In the next studies, the relationship between kinesiophobia, asthma symptoms, pain, fatigue severity, and comorbidities can be researched. It can be recommended that kinesiophobia and preventive methods should be added to asthma patient education programs, and kinesiophobia levels should be assessed when planning pulmonary rehabilitation programs to improve the quality of life and physical activity in patients with asthma. Further, studies are needed to determine the impact of kinesiophobia on the outcomes of pulmonary rehabilitation and to develop programs that incorporate physical activity counseling for kinesiophobia in patients with asthma.

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Ethics approval: this study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of Marmara University (21.02.2019/35).

Clinical trial number: NCT04181905.

Conflicts of interest

There are no conflicts of interest.

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