Acıbadem Univ. Sağlık Bilim. Derg. 2024; 15 (4)
https://doi.org/10.31067/acusaglik.1474356

ORIGINAL ARTICLE / ARAŞTIRMA YAZISI

Rehabilitation / Rehabilitasyon

Investigation of Sleep Quality and Kinesiophobia Levels in Individuals with Fibromyalgia with Physical Activity Levels

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ABSTRACT

Purpose: It is known that physical activity is necessary for all dimensions of the disease in individuals with Fibromyalgia. This study investigated how sleep quality and kinesiophobia levels were affected in individuals with Fibromyalgia according to their physical activity levels.

Methods: Our study was planned as a cross-sectional study of fibromyalgia individuals who applied to Ankara Medipol University's physiotherapy and rehabilitation department. The sample consists of one hundred sixty-eight volunteer participants. Physical activity levels of individuals, using the International Physical Activity Questionnaire (IPAQ), sleep quality, using the Pittsburg Sleep Quality Index (PSQI), and kinesiophobia levels, using the Tampa Kinesiophobia Scale (TKS), were evaluated.

Results: It was determined that the total physical activity of fibromyalgia patients was 1213.21±141.19 METmin/week; that is, they had a low physical activity level, and 50.6% were not physically active. The mean PSQI total score was 8.23±1.32, and the mean TKS total score was 43.12±2.19. It was determined that, a weak negative correlation was observed between IPAQ and PSQI ($r=-0.26$) ($p<0.05$), and a moderate negative correlation was observed between IPAQ and TKS ($r=-0.32$) ($p<0.05$). When individuals were evaluated at three different levels according to their physical activity levels, a significant difference was found between different physical activity levels and PSQI and TKS scores ($p<0.05$).

Conclusion: As a result, as the physical activity levels of individuals with fibromyalgia increase, sleep quality, and kinesiophobia levels are positively affected. This study highlights the importance of adequate regular physical activity to improve sleep health and prevent kinesiophobia in individuals with Fibromyalgia.

Keywords: Fibromyalgia, Physical Activity, Sleep quality, Kinesiophobia.

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ÖZET

Amaç: Fibromiyaljili bireylerde hastalığın tüm boyutları için fiziksel aktivitenin gerekli olduğu bilinmektedir. Bu çalışmada, fiziksel aktivite düzeylerine göre Fibromiyaljili bireylerde uyku kalitesi ve kinezyofobi düzeylerinin nasıl etkilendiği araştırılmıştır.

Yöntem: Kesitsel olarak planlanan çalışmamız Ankara Medipol Üniversitesi Fizyoterapi ve Rehabilitasyon bölümüne başvuran fibromiyaljili bireylerde planlandı. Örneklem yüz altmış sekiz gönüllü katılımcıdan oluşmaktadır. Bireylerin fiziksel aktivite düzeyleri Uluslararası Fiziksel Aktivite Anketi (UFAA) ile, uyku kalitesi Pittsburg Uyku Kalitesi İndeksi (PUKİ) ile, kinezyofobi düzeyleri ise Tampa Kinezyofobi Ölçeği (TKÖ) kullanılarak değerlendirildi.

Bulgular: Fibromiyalji hastalarının total fiziksel aktivite miktarının 1213.21±141.19 METmin/hafta olduğu, yani düşük fiziksel aktivite düzeyi olduğu ve %50.6'sının fiziksel olarak aktif olmadığı belirlendi. PUKİ toplam puanı ortalaması 8.23±1.32, TKS toplam puanı ortalaması ise 43.12±2.19 idi. UFAA toplam skor ile PUKİ arasında zayıf negatif korelasyon ($r=-0.26$) ($p<0.05$), UFAA toplam skor ile TKS arasında ise orta derecede negatif korelasyon ($r=-0.32$) ($p<0.05$) olduğu belirlendi. Bireyler fiziksel aktivite seviyelerine göre üç farklı düzeyde değerlendirildiğinde, farklı fiziksel aktivite düzeyleri ile PUKİ ve TKÖ puanları arasında anlamlı farklılık bulundu ($p<0.05$).

Sonuç: Sonuç olarak fibromiyaljili bireylerin fiziksel aktivite düzeyleri arttıkça uyku kalitesi ve kinezyofobi düzeyleri olumlu yönde etkilenmektedir. Bu çalışma, Fibromiyaljili bireylerde uyku sağlığını iyileştirmek ve kinezyofobiyi önlemek için yeterli düzenli fiziksel aktivitenin önemini vurgulamaktadır.

Anahtar Kelimeler: Fibromiyalji, Fiziksel Aktivite, Uyku kalitesi, Kinezyofobi.

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Received: 26.04.2024
Accepted: 09.07.2024

Fibromyalgia Syndrome (FMS) is a disease that affects approximately 2.7% of the world's population, accompanied by widespread body pain and psychosomatic findings. Although it is more common in women than men, it is most common in the age group of 25-55 (1). Pathologies such as pain, sleep disturbance, anxiety, depression, fatigue, cognitive dysfunction, and gastrointestinal system disorders, which are among the most common findings of FMS, impair functionality and cause deterioration in quality of life (2). Published multidisciplinary publications emphasize the importance of patient education and physical activity (PA) in improving health in individuals with fibromyalgia (3). Despite these proven benefits, many individuals with fibromyalgia do not practice PA regularly (4). Many FMS patients believe physical activity will reduce their perceived pain levels. However, it is still reported that the physical activity levels of patients with FMS are generally lower than those of healthy controls (5). Various factors, such as fatigue, pain, and fear of movement, cause physical inactivity.

Kinesiophobia, defined as a fear of movement, means avoidance of physical activity due to excessive fear and anxiety about pain, which reduces mobility and muscle strength and subsequently triggers the fear of moving more. Kinesiophobia is present in more than 38% of FMS patients (6).

Anxiety about increased pain in patients with FMS prevents the individual from moving and reduces activities of daily living, which causes more injury avoidance and fear of movement in individuals. This vicious cycle of fatigue in fear of movement increases the risk of chronic pain and depressive mood (7). Due to chronic pain, individuals may adopt a more sedentary lifestyle by limiting their physical activities. Chronic pain and sleep disturbance, among the most common symptoms of FMS, may be related (8). However, there is no consensus on whether pain triggers sleep disturbance or whether sleep disturbance causes pain. Sleep disturbance is typically seen in 80% of patients with FMS. Frequent waking at night, restless sleep, and weakness and fatigue are among the complaints. Although patients with FMS have shorter sleep durations than healthy subjects, the shortened sleep duration seen in these individuals is also associated with low physical activity levels (9).

According to the results of a review published in 2023, it was stated that PA is still insufficient in individuals with fibromyalgia, and interventions are needed to prevent physical inactivity and to make individuals physically active (10). The relationship between sleep quality and disease symptoms has been demonstrated in individuals with fibromyalgia, and studies indicate that high levels of physical activity positively affect sleep quality (11,12). Studies have reported that kinesiophobia levels are higher in individuals with fibromyalgia than in healthy individuals, which may affect other symptoms (13,14). The literature has reported that the absolute evaluation of kinesiophobia in individuals with FMS and the necessity of developing protective techniques against this condition will provide helpful information when creating a treatment program (15,16).

Few studies show that physical activity positively affects sleep quality and kinesiophobia in individuals with fibromyalgia (17,18). Small sample sizes and methodological inadequacy are standard limitations of literature studies. In addition, the effect of different levels of physical activity, which is an essential factor, on sleep quality and kinesiophobia levels has not been examined. Additionally, in most studies that examined the relationship, the sample group was only women.

Our study aims to examine the effects of physical activity levels on sleep quality and kinesiophobia levels in individuals with fibromyalgia and to emphasize the importance of developing individuals' awareness of increasing their physical activity levels, especially by drawing attention to the effects of a lack of physical activity on individuals with fibromyalgia.

Material and Methods

Study Design and Population

In the power analysis performed in the G*power program with Pearson correlation coefficient r = 0.30 and 80% power (alpha = .05, bidirectional), it was determined that 148 people were needed to complete the analyses. Considering the 20% dropout assumption, 178 volunteers aged between 29-55, diagnosed with FMS according to the 2010 American College of Rheumatology criteria by a specialist physician and admitted to the Ankara Medipol University Department of Physiotherapy and Rehabilitation, were invited to our cross-sectional study between 21/06/2023 and 21/09/2023. After 10 participants did not want to complete the evaluation, our study was completed with 168 participants. The patients were excluded from our study were patients with systemic

infectious and inflammatory rheumatic diseases, fractures, orthopedic surgery in the last year, cancer patients, vestibular problems, neurological problems, psychiatric diseases, pregnancy, breastfeeding status, and metabolic and endocrine system diseases. The Principles of the Declaration of Helsinki conducted our study. Ethics Committee approval was obtained from Ankara Medipol University Non-Interventional Clinical Research Ethics Committee (Date: 14/02/2023 Decision No: 021) before the start of the study. After the participants were informed about the study, the consent form was signed, and an evaluation was made with data collection questionnaires.

Measuring Methods

After the participants' demographic information was obtained, physical activity levels, sleep quality, and kinesiophobia levels were evaluated through questionnaires.

The International Physical Activity Questionnaire (IPAQ), which evaluates the physical activity levels of individuals with a total of 7 questions in 4 separate sections, classifies individuals according to their physical activity levels as being physically inactive (<600 MET min/week), having low physical activity (600-3000 MET- min/week), and having sufficient physical activity (>3000 MET-min/week) (19). We used the Turkish version of IPAQ (20). The Pittsburgh Sleep Quality Index (PSQI), which we use to determine sleep quality, comprises 19 questions and seven subcomponents (21). The total score obtained from the 4-point Likert-type scale ranges from 0 to 21, and the Turkish version of the questionnaire was used in our study (22). Higher scores indicate poor sleep quality.

Tampa Kinesiophobia Scale (TKS), a four-Likert type, measures individuals' injury/re-injury and fear-avoidance status with 17 questions (23). The scores obtained from the scale, which we used the Turkish version in our study, ranged from 17 to 68, while high scores indicate a high level of kinesiophobia (24).

Statistical Analysis

Statistical analysis was performed with the Social Science Statistical Package (SPSS) version 26.0 (SPSS et al., USA). We determined whether the variables were normally distributed using visual and analytical methods. Mean±standard deviation was used for normally distributed numerical variables. The relationship between physical activity levels, sleep quality, and kinesiophobia levels was determined using Pearson correlation analysis. The sign of the correlation coefficient gives the direction of the relationship. The (-) sign indicates a negative relationship and the (+) sign indicates a positive relationship. The correlation coefficient gives the magnitude of the relationship. 0.00 – 0.19: very low, 0.20 – 0.39: Low, 0.40 – 0.59: medium, 0.60 – 0.79: high, 0.80 – 1.00: very high (25). A one-way ANOVA analysis was used to determine the relationship between three levels of physical activity, sleep quality, and kinesiophobia.

Results

The age, BMI, and gender of the participants who participated in the study we completed with 168 individuals with fibromyalgia are shown in Table 1.

Table 1: Demographic characteristics of participants

		Participants (n=168)	
		X±SD	
Age (years)		42.12±3.62	
BMI (kg/m^2)		23.10±1.79	
Gender (%)		n	%
	Female	144	86.71
	Male	24	13.29

X±SD: mean±SD, m: meter, kg: kilograms, BMI: body mass index, n:sample size

While the average physical activity value of individuals with fibromyalgia was 1213.21±141.19 MET-min/week, the average PSQI scores were 8.23±1.32, and the average TKS results were 43.12±2.19 (Table 2).

Table 2: Participants' physical activity, sleep quality and kinesiophobia scale measurement results

	Participants (n=168)
	X ± SD
IPAQ Total physical activity (MET-min/week)	1213.21±141.19
PSQI Total (0-21)	8.23±1.32
TKS Total (17-68)	43.12±2.19

X±SD: mean±SD, IPAQ: International Physical Activity Questionnaire, MET: metabolic equivalent, min: minute, PSQI Pittsburgh Sleep Quality Index, TKS: Tampa Kinesiophobia Scale n:sample size

Table 3 shows that 50.6% of the participants were not physically active, 20.24% had low physical activity, and only 29.16% had sufficient physical activity. In our study, a weak negative correlation was observed between IPAQ total physical activity and PSQI (r=-0.26) (p<0.05), and a moderate negative correlation was observed between IPAQ total physical activity and TKS (r=-0.32) (p<0.05, Table 4).

Table 3: Physical activity levels of Participants

	Participants (n=168)	
	n	%
Physical activity level		
Physically Inactive (<600 MET- min/week)	85	50,6
Low Physical Activity Level (600 – 3000 MET-min/week)	34	20,24
Physical Activity Level Suffcient (>3000 MET-min/week)	49	29,16

MET: metabolic equivalent, min: minute, n: sample size

Table 4: The relationship between average value of total physical activity of participants' and sleep quality and depression total scores

	Participants (n=168)
	IPAQ Total Physical Activity (MET-min/week)
PSQI Total	r: -0.26 p: 0.001*
TKS Total	r: -0.32 p: 0.001*

**p < 0.05, IPAQ: International Physical Activity Questionnaire, PSQI: Pittsburgh Sleep Quality Index, TKS: Tampa Kinesiophobia Scale,*

Table 5 compares the PSQI and TKS mean scores of the participants according to different physical activity levels, and a significant difference was found between the three levels according to physical activity levels (p<0.05, Table 5).

Table 5: Comparison of sleep quality and kinesiophobia levels according to participants Physical Activity Levels.

	Physical Activity Level			
	Physically Inactive n=85	**Low Physical Activity Level n=34**	**Physical Activity Level Sufficient n=49**	**Test and p-value**
PSQI Total	9.71±3.15	8.89±2.11	6.31±3.22	F=7.166 p=0.012
TKS Total	51.76±1.27	46.11±1.61	32.89±4.21	F=8.291 p=0.022

Bold values indicate p < 0.05, MET: metabolic equivalent, min: minute, PSQI: Pittsburgh Sleep Quality Index, TKS: Tampa Kinesiphobia Scale, n: sample size

Discussion

This study showed that the physical activity levels of individuals with fibromyalgia are not sufficient, and their sleep quality and kinesiophobia levels are negatively affected.

Our study determined that the average physical activity of individuals with fibromyalgia was 1213.21±141.19 MET-min/week, and only 29.16% had sufficient physical activity. Studies in the literature have observed that the physical activity levels of individuals with fibromyalgia are insufficient (10,23). Additionally, it has been stated that their inability to engage in physical activity causes many negative situations, especially physical ones. Physical activity levels of individuals with fibromyalgia were found to be insufficient in our study, similar to the literature, and it was determined that this insufficiency negatively affected the sleep quality and kinesiophobia levels of the participants.

We found the mean PSQI total score to be 8.23±1.32. Additionally, a weak negative correlation was found between IPAQ total physical activity and PSQI, and the average sleep quality levels of individuals with high physical activity levels were better than others. The literature contains studies similar to ours, showing that physical activity affects sleep quality in individuals with fibromyalgia (26-27). In a review, they stated that physical activity had a negligible effect on sleep levels and pointed out that more meditative exercises may be more effective (27). Similarly, a published meta-analysis showed that more meditative exercises, including traditional Chinese exercises, were influential in affecting sleep quality (26). We think that individuals with fibromyalgia who engage in physical activity feel more energetic and robust, which may have caused them to be more active in daily life and need more energy, affecting their ability to sleep more comfortably at night. In addition, physical activity may have helped individuals improve their sleep quality by affecting many physical parameters, especially pain. However, since we did not question the type of physical activity they did in our study, we may have found the correlation value to be lower. Additionally, no studies in the literature show how different physical activity levels affect sleep quality. Based on our study's results, we can say that the participants with sufficient physical activity has the best sleep quality.

Although a few studies address the importance of kinesiophobia in individuals with fibromyalgia (11,13,28,29), no study has evaluated its relationship with different physical

activity levels. As a result of our research, the average TKS total score was found to be 43.12±2.19. Additionally, a moderate negative correlation was found between IPAQ total physical activity and TKS, and it was observed that the kinesiophobia levels of individuals with fibromyalgia were negatively affected by the decrease in physical activity. In correlation with our study, it has been shown in the literature that kinesiophobia levels are positively affected by physical activity in individuals with fibromyalgia (6,13,30). Particularly in studies, it has been stated that physical activity affects kinesiophobia levels in individuals with fibromyalgia, with its psychosocial benefits (11), its relevance to pain control models, and its positive effects on quality of life (28,29). Our study found that kinesiophobia levels were lower, especially in individuals with high physical activity levels. We think the most important reason for this is the physical and psychosocial gains from physical activity, especially pain. In addition, adequate physical activity improves individuals' self-confidence and increases their mobility. We think that all these affected the results of our study.

This study once again emphasizes the importance of increasing physical activity and living an active life. One of the strengths of our study is that we classified the outcome measures according to different physical activity levels. The most important limitation of our study is that the types of physical activity individuals did were not questioned. Another limitation is that pain was not evaluated, which may affect physical activity levels. Another limitation is that the numbers of men and women are not homogeneous.

Conclusion

Our study emphasizes the importance of directing individuals with fibromyalgia to adequate physical activity to improve sleep health and prevent kinesiophobia and guides the literature. While individuals with fibromyalgia are referred to physical activities, their kinesiophobia levels should also be evaluated and led to appropriate actions. Future studies may investigate the effects of different types of physical activity on different dimensions in individuals with fibromyalgia.

Declarations

Funding

None

Conflicts of Interest/ Competing Interests

None

Ethics Committee Approval

Ethics committee approval was obtained from the Ankara Medipol University Non-Interventional Clinical Research Ethics Committee before starting the study (Date: 14/02/2023 Decision No: 021).

Availability of Data

Available upon request.

Authors' Contributions

HIB created the study idea, reached the individuals who participated, and brought it to the literature. MB organized the study method, created evaluation forms, made necessary evaluations of the individuals for the study, collected the data, analyzed the data, entered it into the system, and brought them to the literature. Both authors have read and approved the final version of the manuscript.

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