ORIGINAL ARTICLE

Examination of the Quality of Life and Physical Fitness Status of Healthcare Students in the Post-pandemic Process

Pandemi Sonrası Süreçte Sağlık Hizmetleri Öğrencilerinin Yaşam Kalitesi ve Fiziksel Uygunluk Durumlarının İncelenmesi

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ABSTRACT

Background: Measures taken during the coronavirus pandemic and remote implementation of education have led young people to spend less time on physical activity and become sedentary. This situation not only contributes to an increase in fat mass and therefore an increase in body mass index, and the early onset of various non-communicable chronic diseases but also poses a threat to the physical fitness of healthy young people. Furthermore, all of these negative effects significantly affect the quality of life. During the period when a gradual exit from pandemic conditions is taking place and face-to-face education has started, the aim was to determine the physical fitness and quality of life perceptions of adult young people by collecting physiological and health-related quality of life data and to evaluate them from a physiological perspective by identifying the possible link between these fundamental parameters, if any.

Materials and Methods: The data of a total of n=213 students from 7 different programs attending İstanbul University-Cerrahpaşa, Vocational School of Health Services in the 2021-2022 academic year were collected using a survey method.

Results: When we look at the ratio of participants, it was observed that daily step count, which is one of the indicators of physical fitness, was higher in males than females, but there was no significant difference. General health perception scores were low at 38.37 points. The value of the general change perception in health over the past year was also determined to be 55.94 points.

Conclusion: With this study, it has been concluded that it is not a safe approach to directly correlate daily step count with physical fitness alone and that more precise judgments can be reached by adding different parameters such as heart rate and calorie expenditure, instead of just accepting 9.500 daily steps as a clear indicator of physical fitness. It also suggests that studies to be conducted in the coming years to correlate participants' quality of life perceptions with their physical fitness should be supported.

Keywords: Physical fitness, quality of life, pandemic, health parameters

ÖZ

Amaç: Koronavirüs pandemisi sürecinde uygulanan önlemler ve eğitimin uzaktan gerçekleştirilmesi, gençlerin fiziksel aktiviteye daha az zaman ayırmasına ve hareketsiz (sedanter) hale gelmesine neden olmuştur. Bu durum, yağ kitlesinin artışına, dolayısıyla vücut kitle indeksinin artışına ve çeşitli bulaşıcı olmayan kronik hastalıkların erken başlamasına katkıda bulunabileceği gibi sağlıklı gençlerin fiziksel uygunluğuna karşı bir tehdit de oluşturmaktadır. Dahası, tüm bu olumsuz etkiler yaşam kalitesini önemli ölçüde etkilemektedir. Pandemi koşullarından kademeli bir çıkışın gerçekleştiği ve yüz yüze eğitimin başladığı dönemde erişkin gençlerin gerek fizyolojik gerekse sağlıkla ilişkili yaşam kalitesi verilerini toplayarak onların fiziksel uygunluğu ve yaşam kalite algılarını belirlemesi, eğer var ise bu temel parametreler arasındaki bağlantıyı tespit ederek fizyolojik bir bakış açısı ile değerlendirmesi amaçlandı.

Gereç ve Yöntemler: Çalışmada 2021-2022 eğitim öğretim yılında eğitimine başlayan İstanbul Üniversitesi-Cerrahpaşa, Sağlık Hizmetleri Meslek Yüksekokulu'nda eğitim gören 7 ayrı programdan toplam n=213 öğrencinin verileri anket yöntemi ile toplandı.

Bulgular: Katılımcıların oranına baktığımızda 64 adet erkek, 149 adet kadın öğrencinin verileri değerlendirildiğinde fiziksel uygunluğun göstergelerinden biri olarak kabul edilen günlük adım sayısının erkeklerde kadınlara oranla daha yüksek olduğu ancak

anlamlı bir farklılığın oluşmadığı gözlendi. Genel sağlık algısı puanlarının 38,37 gibi düşük bir puanda kaldığı görüldü. Son bir yılda sağlıkta olan genel değişim algısını değeri de 55,94 puan olarak tespit edildi.

Sonuç: Bu çalışma ile günlük adım sayısının kendi başına fiziksel uygunluk ile direkt olarak ilişkilendirmenin güvenli bir yaklaşım olamayacağı, yalnızca günlük 9,500 adımın fiziksel uygunluğun net bir göstergesi olarak kabul etmek yerine kalp hızı, kalori harcanması gibi farklı parametrelerin de eklenmesi ile daha kesin yargılara ulaşılabileceği kanısına ulaşılmıştır. Ayrıca katılımcıların yaşam kalitesi algılarının fiziksel uygunlukları ile ilişkilendirilebilmesi için ilerleyen yıllarda gerçekleştirilecek çalışmalar ile desteklenmesi gerektiğini düşündürtmektedir.

Anahtar Kelimeler: Fiziksel uygunluk, yaşam kalitesi, pandemi, sağlık parametreleri

Introduction

The measures taken during the Coronavirus disease-2019 (COVID-19) pandemic and the remote implementation of education have led young people to spend less time on physical activity (PA) and become more sedentary. This situation poses a threat not only to the healthy physical fitness (PF) of young people but also may contribute to an increase in body mass index (BMI) and the early onset of various non-communicable chronic diseases (hypertension, myocardial infarction, lung disease, sleep apnea syndrome) (1), which can affect their quality of life (QoL) significantly.

PF is the ability to perform daily physical activities without harming people's physiological, psychological, and social health (2). As a fundamental health indicator at both individual and societal levels, PF includes anthropometric, metabolic, and neuromotor variables from a physiological perspective (3). PF is positively associated with PA (4), meaning that the higher the level of PA, the better the individual's PF (5). Evidence has shown that regular PA is inversely associated with overweight and obesity (6). When PA is insufficient, sedentary living time increases, leading to the deterioration of health and motor performance (7). To cope with this situation, children and adolescents are recommended to engage in moderate to vigorous PA for at least 60 minutes (8), while in the analysis of PA levels, it is emphasized that the importance of taking more than 9,500 steps per day for healthy living and PF (9).

BMI is widely used to measure inadequate nutrition, overweight, and obesity and is considered a global health indicator (10,11,12). Although some studies have claimed that BMI could effectively reflect the PF of ordinary university students (13), others have discussed the relationship between various components of PF and BMI in children (14) and adolescents (15). Therefore, monitoring the BMI of students is of great importance for understanding their physical development, but it is not clear whether using only the BMI index in the PF assessment reflects students' PF and health.

The World Health Organization (WHO) defines the QoL as the perception of an individual's position in life about their culture and value systems, goals, expectations, standards, and concerns. QoL is influenced by various factors such as physical and mental health, level of independence, social relationships, personal beliefs, and environmental conditions. It is a theoretical framework used to evaluate the living conditions of diverse communities (16). The short form-36 (SF-36) is a widely accepted and standardized tool used to measure health-related QoL (17).

Numerous articles have been published on both remote education and students' physiological conditions related to the COVID-19 pandemic (18,19,20,21,22), but there are limited publications that examine the situation developing after the pandemic (23,24). Monitoring all these changes in physiological parameters is necessary not only as a stop and detection but also to facilitate predicting negative situations that may occur in the future.

This study aims to collect data on the physiological and health-related QoL of my students who are studying in seven different programs in the 2021-2022 academic year, where a gradual exit from pandemic conditions and face-to-face education began, and to determine their PF and QoL perceptions, to evaluate these basic parameters from a physiological perspective by identifying the relationship between these basic parameters, if any, and to create a basis for other studies to be conducted in the future.

Material and Methods

Participants:

Data from a total of n=213 students from 7 different programs studying at İstanbul University-Cerrahpaşa, Vocational School of Health Services (I.U-C, VSHS) in the 2021-2022 academic year were collected through a survey application. Surveys that were not filled out completely were not included in the database. No identification information was recorded from the participants, and the survey was completely anonymous and based on voluntary participation, so no consent form was required from the participants.

Measurements and Procedures:

Survey application:

The survey was conducted with the permission of the I.U-C, VSHS administration and was completely anonymous. The survey form was conducted through I.U-Cerrahpaşa's official survey portal. The LimeSurvey-based survey portal is a free and open-source online statistical survey web application. On the survey's welcome page, participants were instructed on how to fill out the form. The implementation of the survey was left open-ended, and a detailed explanation was provided about the objectives, the survey structure, the compilation method, and the anonymity of the test. The study was approved by the Local Ethics Committee of İstanbul Yeni Yüzyıl University (2023/02-1042).

It consists of two main parts:

(1) Survey questions related to socio-demographic characteristics: Consisting of questions collecting information on age, weight, height, and mean daily step count as indicator of PA. Participants were asked to provide the daily step count data collected by their smart phones. BMI (kg/m^2) was calculated using these measurements. According to the BMI values recommended by the WHO, students were divided into four categories representing thin, normal weight, overweight, and obese individuals with BMI values of <18.5 kg/m^2, 18.5-23.9 kg/m^2, 24-27.9 kg/m^2, and ≥28 kg/m^2, respectively (13).

(2) QoL survey (SF-36): The SF-36 Health Survey is a standardized and widely used tool for assessing HRQOL worldwide. SF-36 has 36 items in 8 sections: Eight question scales; physical function (10 items), physical role limitation (4 items), emotional role limitation (3 items), vitality (4 items), mental health (5 items), social function (2 items), pain (2 items), and general health perceptions (5 items). Each scale consists of 2-10 questions, and low scores indicate low HRQOL. The Turkish validity and reliability study of the scale was conducted by Koçyiğit et al. (25).

Except for the second question of the scale, the other questions are evaluated considering the individuals' conditions in the last 4 weeks. The second question focuses on the participants' general perception of changes in their health in the last year. The 4th and 5th questions of the scale are answered in yes/no format, while the Likert-type rating is used for other health items. The subscales are evaluated on a 0-100 scale.

Statistical Analysis

To confirm the normality of the variables, the Kolmogorov-Smirnov test was used. The data of non-parametric variables were normalized using Blom's normal score transformation. Mean, standard deviation (SD), minimum, and maximum values were used to characterize the sample by gender in the descriptive analysis. Student's t-test was applied to compare the means of the groups. The comparison of PF variables according to compliance or non-compliance with PA recommendations was confirmed using covariate analysis adjusted for gender. A significance level of p<0.05 was determined for all tests. Statistical analysis was performed using GraphPad Prism v.8.0.1 software.

Findings

When looking at the participants, 64 male, and 149 female students took part in the study. The reported values of the participants showed a significant difference in body composition that could be considered representative of Türkiye as a whole. When comparing BMI values, it was observed that the proportion of male students was significantly higher than that of female students. The daily step count, which is considered an indicator of physical fitness, was higher in men than in women, but no significant difference was observed due to the high SD rates caused by very different minimal and maximal values (Table 1).

When looking at the distribution of BMI values among male and female participants, it was observed that the total percentage of overweight and obese men was higher than that of male participants (Table 2). Although the average step count of male participants was higher than that of female participants, there was a 10% excess of overweight and obese men in their percentages.

In terms of determining the quality of life, when looking at the criteria used, it was observed that the participants rated their physical functions as quite good (88.86 points). When looking at the other criteria, it was found that the average scores for physical role limitations (51.24), emotional role limitations (47.19), vitality (46.39), mental health (48.08), and social functioning (53.34) were all in the average range. One of the most interesting findings was that the general health perception score remained low at 38.37 (Table 3).

The value of the second question of the scale, which refers to the general perception of health changes in the past year, was also determined to be 55.94 points.

Discussion

Numerous studies have been conducted about students whose movement has been restricted and who have had to follow their classes and even exams from computers and/ or smart devices during the pandemic period, but studies identifying the situation of students in the post-pandemic period are still being carried out. The success of students in school life is closely related to their physical fitness, quality of life, and overall well-being. It is clear that these factors, which can directly affect student success, are the result of a combination of emotional, behavioral, and cognitive

Table 1. Demographic characteristics of the participants and physical activity values

	Male					Female					p-value	Significance
	n	Avg.	SD	Lowest	Highest	n	Avg.	SD	Lowest	Highest		
Age (years)	64	20.34	1.56	18	24	149	19.88	1.152	18	25	0.0345	*
Length (cm)	64	176.6	5.51	167	188	149	161.3	6.04	152	173	<0.0001	***
Body weight (kg)	64	75.32	15.89	50	115	149	58.67	11.68	46	100	<0.0001	***
BMI (kg/m^2)	64	24.11	4.91	17	35	149	22.53	4.03	18.25	35.43	0.024	*
Step (daily avg)	64	9921	7961	800	30000	149	7338	7761	300	24600	0.6738	
Values are given as mean and standard deviation (SD). *p<0.05, ***p<0.001, BMI: Body mass index												

Table 2. Body mass index (BMI) rates of participants

BMI ratio (%)	Male	Female
Slim	7.69	11.61
Normal weight	58.47	63.87
Excess weight	13.84	18.07
Obese	20	6.45
Values are given as percentages (%)		

Table 3. Quality of life index values of participants

Criterion	Substance	Avg	SD
Physical function	10	88.86	10.76
Physical role constraint	4	51.24	13.19
Emotional role limitation	3	47.19	6.74
Wellness	4	46.39	7.63
Mental health	5	48.08	14.19
Social function	2	53.34	8.23
Pain	2	58.00	31.05
General perception of health	5	38.37	12.88
Values are given as mean and standard deviation (SD)			

dimensions on a physiological basis. Smartphones have now reached a level of necessity, even addiction, especially among young individuals, and this situation is reported to cause many undesirable conditions such as depression, anxiety disorders, substance use, musculoskeletal disorders, and sleep problems. Some studies indicate that this situation can negatively affect the QoL and PF (26,27).

Despite all these negative aspects, smartphones and other devices that work with them are widely used today. One of their usage areas covers the healthcare field, and many personal health parameters are measured through these devices. This sector, which is developing with increasing diversity and measurement reliability, is causing important developments in the field of health sciences. Smartphones have also begun to be the subject of many studies in the field of health sciences (28,29).

Many data that can be associated with health can be collected through systems such as accelerometers and gyroscopes within these devices. These data are data that can be used to detect and monitor FU (3). FU is one of the most important indicators of healthy growth and development in children affected by different PA levels. Although it can provide more accurate and reliable data on PA density when measured objectively (30), this study aimed to determine whether a connection could be established between daily step count, a simple PA value obtained from participants' smart devices, and FU, assuming that the data obtained from students' smart devices could provide reliable data on physical fitness. However, it was found that although the percentage of overweight and obese male participants was higher, their average step counts were higher than those of female participants. When the step counts of overweight and obese individuals were compared within themselves, no significant correlation was observed. This finding contradicts a study by Bovet et al. (31), which showed a strong inverse relationship between overweight and various standardized PF tests in adolescents in an African country.

From a physiological perspective, this inverse relationship is consistent with low PA being a possible determinant of obesity in this sample of adolescents. Considering that the physical function criterion has the highest score on the QoL index, and the physical role limitation criterion is slightly above 50 points, it can be thought that the participants' QoL is good in terms of their physical fitness, but it should also be considered that the fitness score is below 50 points.

The WHO defines the QoL as "an individual's perception of their position in life in the context of the culture and value systems in which they live and concerning their goals, expectations, standards, and concerns". This perception can be more positive or negative depending on the meanings that individuals attach to their life experiences. Attributing a positive value and meaning to life experiences, even in the face of difficulties, is a fundamental characteristic of resilient individuals (32). In our study, I.U-C, VSHS students gave average scores for their general quality of life. Perhaps

one of the most interesting findings is that the perceived general change in health over the past year was rated at 55.94, while the overall health perception scores remained low at 38.37. Indeed, average scores for emotional role limitation, mental health, and social functioning criteria also support this perception. This situation may have arisen from various reasons. While returning to school after the pandemic period was seen positively by the students, the fact that the health perception score was below 40 in the past four weeks may reflect the influence of recent environmental factors.

Study Limitations

The analysis of more data, which can be obtained by enriching the data obtained from the participants, can help to establish a connection between the QoL and physical fitness.

Conclusion

This study suggests that daily step count alone is not a safe approach to directly correlate with PF and that adding other parameters such as heart rate and calorie expenditure can lead to more accurate conclusions. Furthermore, it is necessary to support the perception of the participant's QoL with studies to be carried out in the coming years to correlate it with their physical fitness.

Contributions: I would like to thank my students for their contributions to this study.

Ethics

Ethics Committee Approval: The study was approved by the Local Ethics Committee of İstanbul Yeni Yüzyıl University (2023/02-1042).

Informed Consent: No identification information was recorded from the participants, and the survey was completely anonymous and based on voluntary participation, so no consent form was required from the participants.

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