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AN INVESTIGATION OF RELATIONSHIP BETWEEN SMOKING AND PHYSICAL ACTIVITY IN HEALTH CARE PROFESSIONALS

ORIGINAL ARTICLE

ABSTRACT

Purpose: Smoking and physical inactivity are two major health problems that concern the public. Although the relationship between physical activity level and smoking status is defined in different study groups, this relationship is not clearly defined in health care professionals who are thought to be a guide for community health. Therefore, our study aimed to examine the relationship between smoking and physical activity level in healthcare professionals.

Methods: A total of 193 healthcare professionals (median age; 38 [interquartile range-IQR; 34-45] years, body mass index; 24 [IQR; 21-27] kg/m^2), 102 smokers and 91 non-smokers, who worked in an educational research hospital, participated in the study. Physical activity was assessed using the International Physical Activity Questionnaire. Smoking history was taken in the smoker group, and the Fagerström Test for Nicotine Dependence was administered to determine the nicotine addiction level.

Results: The demographics of the groups were similar (p>0.05). Walking activity, moderate physical activity and total physical activity scores were significantly lower in smokers than non-smokers (p<0.001, p=0.021, and p=0.001, respectively). The total physical activity score in the smoking group was showed a moderate negative correlation with the nicotine dependence and the amount of cigarette consumption (r=-0.462 and r=-0.483, respectively, p<0.05).

Conclusion: The level of physical activity in smokers' health professionals was found to be low. As the amount of cigarette consumption and nicotine dependence increases, the level of physical activity decreases. In this crucial population, further studies should be undertaken to improve both smoking cessation and physical activity.

Key Words: Health Care Professionals; Physical Activity; Smoking.

SAĞLIK PROFESYONELLERİNDE SİGARA İÇİCİLİĞİ İLE FİZİKSEL AKTİVİTE ARASINDAKİ İLİŞKİNİN İNCELENMESİ

ARAŞTIRMA MAKALESİ

ÖZ

Amaç: Sigara içiciliği ve fiziksel inaktivite toplumu ilgilendiren iki büyük sağlık sorunudur. Farklı çalışma gruplarında fiziksel aktivite düzeyi ve sigara içiciliği ile ilgili ilişki tanımlanmış olsa da, toplum sağlığı için yönlendirici olduğu düşünülen sağlık profesyonellerinde bu ilişki net olarak tanımlanmamıştır. Bu nedenle çalışmamızın amacı sağlık profesyonellerinde sigara içiciliği ile fiziksel aktivite düzeyi arasındaki ilişkinin incelenmesiydi.

Yöntem: Çalışmaya bir eğitim araştırma hastanesinde görev yapmakta olan, 102 sigara içen, 91 sigara içmeyen toplam 193 sağlık çalışanı (ortanca yaş; 38 [çeyrekler arası aralık-ÇAA: 34-45] yıl, beden kitle indeksi; 24 [ÇAA: 21-27] kg/m^2) katıldı. Katılımcıların fiziksel aktivite düzeyleri Uluslararası Fiziksel Aktivite Anketi ile değerlendirildi. Sigara içen grupta sigara öyküsü alındı ve nikotin bağımlılığı düzeyini belirlemek için Fagerström Nikotin Bağımlılık Testi uygulandı.

Sonuçlar: Grupların demografik özellikleri benzerdi (p>0,05). Sigara içen grupta yürüme aktivitesi, orta şiddetli ve total fiziksel aktivite skorları sigara içmeyenlere göre anlamlı olarak düşük bulundu (sırasıyla, p<0,001, p=0,021 ve p=0,001). Sigara içen grupta total fiziksel aktivite skorunun nikotin bağımlılık test skoru ve sigara tüketim miktarı ile orta derecede zıt yönlü ilişkili olduğu görüldü (sırasıyla, r=-0,462 ve r=-0,483, p<0,05).

Tartışma: Sigara içen sağlık profesyonellerinde fiziksel aktivite düzeyi düşük bulundu. Sigara tüketim miktarı ve nikotin bağımlılığı arttıkça fiziksel aktivite düzeyi azalma yönündedir. Bu önemli populasyonda hem sigara bırakma hem de fiziksel aktiviteyi geliştirme konusunda ileri çalışmalar yapılmalıdır.

Anahtar Kelimeler: Sağlık Profesyonelleri; Fiziksel Aktivite; Sigara İçiciliği.

INTRODUCTION

Healthcare professionals are considered as a source of information for healthy-living and as role models because they affect the behaviors of individuals such as regular physical activities, dietary habits, health and stress management (1). Accordingly, along with the responsibility of preserving and improving their health, healthcare professionals play a crucial role in raising awareness, providing guidance, developing positive behavior and creating a healthy society (2).

In addition to being one of the leading preventable causes of mortality and morbidity, smoking brings about not only physiological health problems but also psychological, social and economic losses. In our country, smoking causes 120 thousand deaths per year (3). In studies conducted on healthcare professionals, a high prevalence of smoking has been noted, and these studies suggest that the smoking habits of healthcare professionals and their attitude towards quitting smoking should be known (4-6).

Physical activity has a globally increasing importance in the prevention and control of various chronic diseases such as obesity, coronary artery disease, hypertension, diabetes, depression, anxiety, and osteoporosis (7). It is indicated that the increase in regular physical activity leads to a decrease in medication use; helps preserve functional independence; and increases the quality of life (8). Thanks to its many health benefits, physical activity also plays a critical role in preventive rehabilitation among healthy individuals and in the fight against chronic diseases (9). In recent years, health improving behaviors and physical activity have remained relevant for many chronic diseases. Moreover, that shows the healthcare professionals working in this field has a huge responsibility (10).

Although the relationship between smoking and physical activity in various populations has already been investigated in many other studies (11-14), there has been no study conducted on healthcare professionals. Accordingly, the aim of this study was the investigation of the relationship between smoking and physical activity in healthcare professionals working in a training and research hospital.

METHODS

This cross-sectional study was conducted on 203 voluntary healthcare professionals (medical doctor, nurse, physiotherapist, psychologist, dietitian, social worker) working at Health Sciences University Dr. Suat Seren Chest Diseases and Surgery Training and Research Hospital between September 2013 and January 2014. The study was accepted by the ethic Committee of the Dr. Suat Seren Chest Diseases and Surgery Training and Research Hospital on 04.17.2013 with serial number 318. The participants were informed about the study, and their written consent was obtained. The inclusion criteria were to be between the ages of 18 and 65 years and be a healthcare profession and volunteer to participate in the study. The study excluded individuals with systemic diseases that might affect physical activity behaviors; individuals with a body mass index (BMI) over 35 kg/m^2 (15).

The demographic and physical features (age, sex, BMI, occupation, education), and smoking histories of the participants were recorded. Study and control groups were formed out of smokers and non-smokers. Regular smoker defined as at least one regular smoker per day (6). The physical activity levels of all participants were evaluated according to the International Physical Activity Questionnaire, and the participants were classified as physically inactive participants, minimally active and sufficiently active (16). Additionally, Fagerström Test for Nicotine Dependence was applied to the group of smokers in order to determine the level of nicotine dependence (17). In order to use the International Physical Activity Questionnaire and Fagerström Test for Nicotine Dependence, we first received approval via e-mail from the authors who developed the Turkish version. After the demographic data was investigated, the questionnaires were handed out to the participants and collected the next day, considering their busy schedules.

International Physical Activity Questionnaire

The short form of the questionnaire consisting of seven questions was used for the evaluation of physical activity. The questionnaire determines how many days in a week and how much time (minutes) in a day were spent on (a) vigorous physical

activities, (b) moderate physical activities, and (c) walking activity over the past couple of weeks. According to the questionnaire, individuals spend 8.0 MET on "vigorous physical activities," 4.0 MET on "moderate physical activities," and 3.3 MET on "walking." Minutes and days are multiplied by the MET score for each class and "MET-minute/week" score is calculated. Following the calculation, a MET score under 600 is regarded as physically inactive; a MET score between 600 and 3000 is regarded as minimally active, and over 3000 is regarded as sufficiently active. The validity and reliability study of the Turkish version of the questionnaire was conducted by Saglam et al. (18).

Fagerström Test for Nicotine Dependence

This test is a test of six questions used for determination of nicotine dependency. The test questions are as follows, respectively: "How soon after waking do you smoke your first cigarette?; Do you find it difficult to refrain from smoking in places where it is forbidden? e.g., bus, hospital, cinema, etc.; Which cigarette would you hate most to give up?; How many cigarettes a day do you smoke?; Do you smoke more frequently during the first hours after waking than during the rest of the day?; Do you smoke even if you are so ill that you are in bed most of the day?". The scoring is different for each question, and nicotine dependency is graded as low (score 0-3), moderate (score 4-6), and high (score ≥7). The validity and reliability study of the Turkish version of the test was conducted by Uysal et al. (19).

Statistical Analysis

All of the data obtained were analyzed using the 'Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL, USA) 20.0 for Windows' statistics software. Shapiro Wilk Test was used for analyzing whether the data showed normal distribution or not. While categorical variables were expressed as percentages (%), continuous variables were expressed as the median and interquartile range (IQR). Correlation analyses were performed using the Spearman Correlation Test. Mann Whitney U Test was used in the comparison of ordinal variables in the groups and Fisher's Exact Test was used for nominal variables. Binary logistic regression analysis was used to predict being physically inactive adjusting variables. The statistical significance level was determined as $p<0.05$.

RESULTS

A total of 203 healthcare professionals participated in our study. The data from 10 participants, who failed to fill out the questionnaire completely, were excluded from the analysis. As a result, the data from 193 healthcare professionals (median age=38, IQR=34-35 years), 102 smokers and 91 non-smokers, were evaluated.

The age, BMI, gender and education level distributions were observed to be similar among the participants when the demographic characteristics

Table 1: Demographic and Clinical Features of All Participants.

Variables	All (n=193)	Smokers (n=102)	Non-smokers (n=91)	p
	Median (IQR)	Median (IQR)	Median (IQR)	
Age (years)	38 (34-45)	37 (34-42)	39 (34-48)	0.399
Body Mass Index (kg/m²)	24 (21-27)	24 (21-28)	24 (21-27)	0.214
	n (%)	n (%)	n (%)	
Female Gender	101 (52.3%)	54 (52.9%)	51 (56.0%)	0.665
Education				
High School	38 (19.7%)	25 (24.5%)	13 (14.3%)	0.074
University	155 (80.3%)	77 (75.6%)	78 (85.7%)	
Profession				
Medical Doctor	60 (31.4%)	32 (31.4%)	28 (30.8%)	0.092
Nurse	79 (41.0%)	43 (43.1%)	36 (39.6%)	0.714
Health Licensor	17 (8.9%)	5 (4.9%)	12 (13.2%)	**0.042***
Health Technician	36 (18.7%)	21 (20.6%)	15 (16.4%)	0.464

*p<0.05. Mann Whitney U Test, Fisher Exact Test. Data are expressed as median (interquartile range, IQR) or percentages.

Table 2: Comparison of Physical Activity Scores between the Groups.

Variables	All (n=193)	Smokers (n=102)	Non-smokers (n=91)	p
	Median (IQR)	Median (IQR)	Median (IQR)	
Total Physical Activity (MET-min/week)	1230 (716-1413)	1188 (693-1386)	1310 (772-1584)	**0.001***
Vigorous Physical Activity (MET-min/week)	0 (0-160)	0 (0-160)	0 (0-240)	0.057
Moderate Physical Activity (MET-min/week)	0 (0-320)	0 (0-320)	0 (0-360)	**0.021***
Walking Activity (MET-min/week)	990 (693-1188)	924 (594-1040)	1188 (743-1386)	**<0.001***
Sitting Duration (min)	360 (320-480)	360 (240-480)	360 (240-420)	0.325

*p<0.05. Mann Whitney U Test. Data are expressed as median (interquartile range-IQR).

of the groups were compared (p>0.05, Table 1). Although there was not much of a difference in the distribution of occupations in groups, the number of health licensors was significantly lower in the non-smoker group (p=0.042, Table 1).

When the physical activity scores were compared, the walking activity, moderate physical activity, and total physical activity scores were observed to be significantly lower in the smoker group (p<0.001, p=0.021, and p=0.001, respectively, Table 2). Even though the physical activity score was higher and sitting duration was lower in the non-smoker group, there was no significant difference between the groups (p=0.057 and p=0.325, respectively, Table 2).

As a result of the evaluation of the physical activity scores of all participants, 17% (n=32) were found physically inactive, 70% (n=136) were found minimally active, and only 13% (n=25) were found sufficiently active. The physical activity distributions within the groups are shown in Figure 1.

When the smoking histories of the participants in the smoker group were analyzed it was observed that the median age to start smoking was 20 (IQR=18-23) years; the smoking period was 15 (IQR=10-20) years; smoking consumption per year was 10 (IQR=7-8) packxyears. The median of nicotine dependence test scores was 3 (IQR=1-5), and nicotine dependence levels were found out to be low.

When the parameters related to physical activity were analyzed in the smoker group, while no correlation was found between the moderate to vigorous physical activity parameters and any other parameter (p>0.05), there was a moderate negative correlation between walking activity, and BMI and smoking consumption (r=-0.513, r=-0.416, respectively, p<0.05, Table 3). There was a moderate negative correlation between total physical activity and nicotine dependence test, smoking consumption and BMI (r=-0.462, r=-0.483, and r=-0.533, respectively, p<0.05, Table 3). In the logistic regression model, to be smoker had a risk

Table 3: Investigation of the Factors Related with Physical Activity in Smoker Group.

Variables	Total Physical Activity	Vigorous Physical Activity	Moderate Physical Activity	Walking Activity	Sitting Duration
Age	0.036	0.121	0.417	-0.290	0.533
Body Mass Index	**-0.533****	-0.413	0.011	**-0.513***	0.378
Smoking Consumption	**-0.483***	-0.021	-0.047	-0.416*	0.002
Age to Start Smoking	0.263	0.369	0.632	0.055	0.033
Smoking Period	-0.299	-0.714	0.144	-0.042	0.352
FTND	**-0.462***	0.571	-0.058	-0.413	0.017

*p<0.05. **p<0.001. Spearman Correlation Test. FTND: Fagerstrom. Test for Nicotine Dependence.

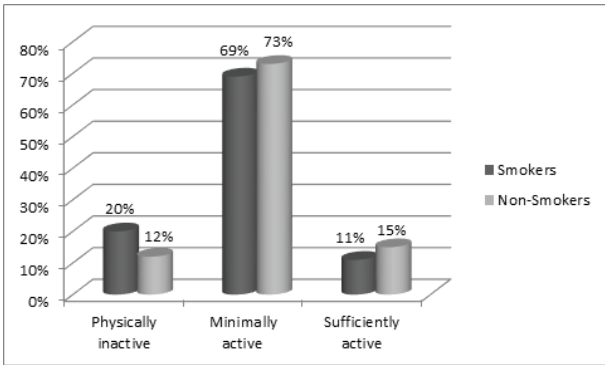

Figure 1: Physical Activity Levels of Participant in the Groups.

of being physically inactive 1.83 times more than those who did not smoke (95% CI 1.12% to 3.89%, p=0.026).

DISCUSSION

In our study, where we analyzed the relationship between smoking and physical activity levels in healthcare professionals who work at a training and research hospital. Walking activity, moderate physical activity and total physical activity scores in smokers were found to be lower than those of non-smokers. In addition, total physical activity was found to be negatively associated with cigarette consumption and nicotine dependence, while walking activity was negatively associated with cigarette consumption.

According to Disease Control and Prevention Center (2007) and World Health Organization (2008) data, smoking and physical inactivity are the leading causes of morbidity and mortality in Europe and the United States (20,21). The relationship between smoking and physical activity in various disease groups and healthy individuals has been a favorite study subject for many years. In most of the studies conducted, physical activity levels were found to be lower in smokers compared to non-smokers (11-13,22). While this relationship is at a lower level among the young population, it was higher in adults, and this was claimed to be due to the increase in smoking consumption (11). In our study, similar to the literature, walking activity was found to have a negative correlation with smoking consumption; and total physical activity was found to have a negative correlation with smoking consumption and nicotine dependence test score.

In a study conducted by Charilaou et al., a negative correlation was found between nicotine dependence and physical activity in adolescents and young adults (11). A study by Heydari et al. conducted in Tehran with 2602 participants revealed that there was a relationship between smoking and age and level of education. The study also concluded that physical inactivity was 4.88 fold higher among smokers (12). In another study from Brazil, no correlation was found between pulmonary function and physical activity evaluated using an accelerometer in smoking adults. It was, however, emphasized that smoking history should be investigated thoroughly (13). In another study that observed the changes in smoking behaviors and related factors among smoking Australian young women for 10 years, the moderate and high physical activity levels were found to be positively correlated with being an ex-smoker. The findings, emphasized the importance of the role of physical activity in relapse prevention (22).

Although the total physical activity scores, moderate physical activity scores and walking activities of the groups in our study varied, the sitting durations and vigorous physical activity scores showed similarity. This similarity, particularly regarding the sitting duration, maybe due to the fact that the smoker group included more people working in a standing position for long hours. However, this is only an assumption considering that their sitting durations in the workplace or at home were not the same. Although there was no significant difference, the vigorous physical activity score was lower in smokers. This result might be that smokers are usually more depressive, and have more isolated lives (23). Similar to the literature, in our study population, smokers group did not usually take part in team sports such as football, basketball which have been involved in the vigorous physical activity section of the questionnaire that we used.

Our study was conducted on healthcare professionals, who were expected to be informed about the importance of physical activity due to their educational background and the events they attend such as congresses, symposiums, and meetings. Healthcare professionals can play a significant role in promoting physical activity in local communities (24). Moreover, physically active healthcare professionals are more likely to do guide

their patients towards developing a habit of daily physical activity (25).

In our study, the number of physically active people was quite low in both smokers (11%) and non-smokers (15%). In the literature, physical activity levels vary in different studies with healthcare professionals. In the study by Teferi et al., physical activity levels were evaluated in healthcare professionals, medical doctors, nurses and physiotherapists, and moderate physical activity was detected in 73.7% of the participants. In the study, the occupation group with the highest physical activity level was physiotherapists. The study also revealed that physiotherapists gave more physical activity recommendations to their patients compared to medical doctors and nurses (26). Similarly, in another study, the physical activity level of medical doctors was found to be lower than that of other healthcare professionals. This study also concluded that physical activity levels were related to having a higher income and self-motivation (27).

Contrary to previous studies, it was reported in a study conducted with 50 healthcare professionals in New Zealand that the daily average step count of the participants was around 10620 and 65% of the participants reached the minimum recommended physical activity levels (28). A study conducted on 1651 health sciences students in Greece revealed that 14.2% of the participants engaged in health-improving physical activities. However, no strong negative correlation was detected between smoking and physical activity (29).

To the best of our knowledge, this is the first study in the literature that investigated the relationship between smoking and physical activity in healthcare professionals. Another important aspect of the study was that the relationship between physical activity and nicotine dependence in smoking healthcare professionals had never been defined before. Thus, our regional study focused on this particular group will contribute to the literature as behaviors related to health, such as smoking and physical activity, vary from one society to another.

In our study, we used the validated and reliable Turkish version of the International Physical Activity Questionnaire. Even though this scale is suitable for the evaluation and categorization of physical activity, not being able to use activity monitors with daily energy tracking producing more objective results due to technical shortcomings may be considered as a limitation to our study. Another limitation was not being able to conduct a subgroup analysis for different occupation groups due to the relatively small size of our sample groups.

Smoking causes 5.4 million deaths per year around the globe, and this number is estimated to be over 8.0 million by 2030 (21,30). Moreover, despite all known benefits, physical activity levels are insufficient in approximately 60% of the world population (11,21). The use of physical activity in the prevention of harmful behaviors such as smoking, alcohol consumption, unhealthy diets, and sedentary lifestyles has been attracting considerable attention in recent years (31). In light of this information, it becomes evident that both smoking and physical inactivity are important issues concerning public health that should be taken into consideration. There is still a need for further studiy on a broader scale among healthcare professionals, using subgroup analyses, detailed sociodemographic investigations, using objective evaluation methods.

In conclusion, despite its well-known benefits, the level of physical activity is low among healthcare professionals who are considered to be role models for raising awareness in society regarding healthy behaviors. Considering the relationship between smoking and low levels of physical activity, the population should be guided towards programs that would help them quit smoking and improve their physical activity levels.

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Conflict of Interest: The authors declare no conflict of interest.

Ethical Approval: The study protocol was approved by the Ethics Board for Dr. Suat Seren Chest Diseases and Surgery Training and Research Hospital.

Informed Consent: A written informed consent form was obtained from all participants.

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