Correlation Between Levels of Physical Activity and The Occurrence of Depression among Patients in Family Medicine Clinics

Zivana Gavric[1], Brankica Markovic[2], Anna Cukafic[2]

ABSTRACT

Lack of physical activity is associated with the causes of illness, death and incapacitation. To determine the level of physical activity and the presence of depression, and level of correlation between physical activity and the appearance of depression in patients. In clinic family medicine, with pilot study, in the first half of 2010 years, through the Interview with 141 patients, completed the questionnaires: International Physical Activity Questionnaire (IPAQ) and Patient Health Questionnaire (PHQ-9). The data were processed according to the instructions for questionnaires for PHQ-9 and IPAQ. The tested patients were aged 18-69 years, median 44 years (± 14.3). Of the total number of respondents 104 (73.76%) had values of PHQ-9 score ≤ 4. The largest number of respondents during the week 73 (51.77%) had moderate 23 (16.31%) low and 45 (31.91%), vigorous physical activity. Low levels of physical activity is present in people with depression PHQ-9 score of ≥ 5, which require treatment, as compared to subjects whose PHQ-9 score for depression ≤ 4 but no statistically significant difference p>0.05 (x^2=2.477; df=2). With increasing physical activity in patients with PHQ-9 score ≤ 4, increases are the value of the correlation is R2 = 0.85. And vice versa in patients whose PHQ-9 score above 5, with increasing PHQ-9 score reduces the variables for physical activity (R2 = 0.90). Moderate physical activity is associated with a reduction of depression. Physical activity in all age groups is essential for the promotion of health.

Key words: *Physical activity, family doctor, depression, PHQ-9 score, the IPAQ value*

Aile Hekimliği Kliniğinde Görülen Hastalar Arasında Depresyon Varlığı ve Fiziksel Aktivite Düzeyi Arasındaki Korelasyon

ÖZET

Fiziksel aktivite yokluğu hastalıklar, ölüm ve kapasite azlığı ile ilişkilidir. Çalışmada hastalarda depresyonun varlığını ve fiziksel aktivitenin derecesini ve bu ikisi arasındaki korelasyonu saptamayı amaçladık.Bu pilot çalışmada aile hekimliği kliniğinde 2010 yılının ilk yarısında 141 hastaya mülakat ile : International Fiziksel aktivite anketi (IPAQ) ve PHQ-9 (Hasta sağlığı anketi) anketleri doldurtuldu. Veriler PHQ-9 ve IPAQ yönergelerine göre işlendi. Çalışmaya alınan hastaların median yaşı 44 idi (range 18-69). Ankete yanıt veren hastalardan 104 (73.76%)'ü 4 ve daha az PHQ-9 skoruna sahipti. çalışmaya katılanların büyük çoğunluğu (73 hasta (51.77%)) orta derecede, 23 (16.31%)'ü düşük derecede ve 45 (31.91%)'i de yoğun fizik aktiviteye sahipti. Depresyon PHQ-9 skoru 5 ve üzerinde olan hastalarda düşük fizik aktivite mevcuttu. Bu oran PHQ-9 skoru ≤ 4 olan hastalar ile mukayese edildiğinde istatistiksel olarak anlamlıydı (p>0.05)(x^2=2.477; df=2). PHQ-9 skoru ≤ 4 olan hastalarda artan fizik aktivite ile korelasyon katsayısı artar (R2 = 0.85). Tersi şeklinde PHQ-9 skoru 5'in üzerinde olan hastalarda, PHQ-9 skorunda azalma fizik aktivite skorunda da azalmayla birlikteydi (R2 = 0.90). orta derecede fizik aktivite depresyonda azalma ile ilişkiliydi. Tüm yaş gruplarında sağlığın korunması için fiziksel aktivite esastır.

Anahtar kelimeler: *Fizik aktivite, aile hekimliği doktoru, depresyon, PHQ-9 skoru, IPAQ değeri.*

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INTRODUCTION

Nowadays, besides the leading risk factors for health such as smoking, poor nutrition, increasing cholesterol and blood sugar, hypertension, physical inactivity and stress, depression is also very important.

It is recognized that the growing epidemic of obesity is linked to recent decline in physical activity levels and depression. Current assessment of World Health Organization (1) in 2007 report is that 60% to 85% of adults worldwide "are not active enough to benefit their health." Accurate assessment of physical activity is essential for planning, implementing, and evaluating public health programs and policies addressing this issue (2). The physical and psychological benefits of physical activity are well documented and are highlighted in the Chief Medical Officer's report which recommends at least 30 minutes of moderate intensity physical activity a day (3). A lack of physical activity is the major factor contributing to diverse diseases, disability and mortality. Preliminary studies of WHO related to risk factors report that sedentary life style is one of ten leading causes of death and disability (4).

The role of primary health care is essential in promoting healthy lifestyles and physical activity in people of all ages and in the prevention of chronic diseases with which we encounter more and more nowadays. Physical inactivity is very associated with the occurrence of depression. Depression is marked as a leading cause of disability and premature death in persons aged 18-44 years worldwide and is expected to be the second leading cause of disability in persons of all age until 2020 (4,5). The International Physical Activity Questionnaire (IPAQ, 2007) were developed as a set of internationally comparable, valid, and reliable instruments (6) that examine self-reported Physical Activity and sedentary behaviors (7). Family doctors in primary care have more opportunity to see a patient with depression than with any other disorder, except with hypertension. Patient Health Questionnaire (PHQ-9) is an excellent screening tool for depression in primary health care (8,9,10).

Research indicates that regular exercise can reduce depressive symptoms. There is, however, a need for more clinical trials on depression and physical activity to be conducted before exercise can be recommended as an alternative to more traditional pharmacological and behavioral therapies (11).

There is also evidence to suggest that exercise has antidepressant and anxiolytic effects that protect individuals against the harmful consequences of stress (12).

In study Babyaket et al. (13) assessed the status of 156 adult volunteers with major depressive disorder (MDD) 6 months after completion of a study in which they were randomly assigned to a 4-month course of aerobic exercise, sertraline therapy, or a combination of exercise and sertraline. The presence and severity of depression were assessed by clinical interview using the Diagnostic Interview Schedule and the Hamilton Rating Scale for Depression (HRSD) and by self-report using the Beck Depression Inventory. Assessments were performed at baseline, after 4 months of treatment, and 6 months after treatment was concluded (ie, after 10 months). After 4 months patients in all three groups exhibited significant improvement; the proportion of remitted participants (ie, those who no longer met diagnostic criteria for MDD and had an HRSD score <8) was comparable across the three treatment conditions. After 10 months, however, remitted subjects in the exercise group had significantly lower relapse rates than subjects in the medication group. Exercising on one's own during the follow-up period was associated with a reduced probability of depression diagnosis at the end of that period (14).

Aim of this study to establish the level of physical activity among patients in family medicine clinics, to establish the existence of symptom depression among patients in family medicine clinics, and to determine correlation between level of physical activity and PHQ-9 scores including depression measure in patients admitted to family medicine clinics.

MATERIALS AND METHODS

In Family Medicine Clinic in Banjaluka, in the first half of 2010, we have conducted a pilot study including 141 patients who filled the questionnaires: IPAQ short form and PHQ-9 interviews.

A family doctor in family medicine clinic took informed consent from patients before the inter¬view. Criteria for inclusion in the study were: age ≥18 years and informed consent regarding to acceptance to participate to study. Criteria for exclusion from the study were: younger than 18 years, the existence of mental disorders and dis¬eases that may limit physical activity. Collected data were prepared and processed according to the

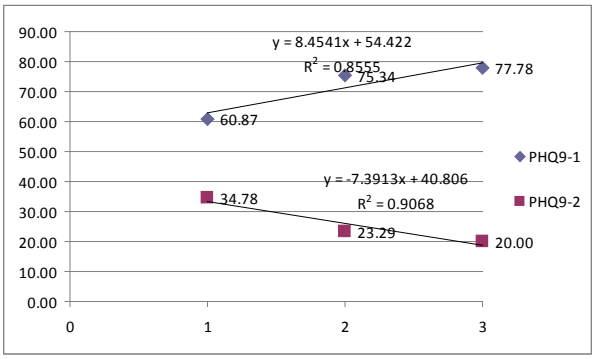

***Figure 1**. Correlation between level physical activity and PHQ-9 score*

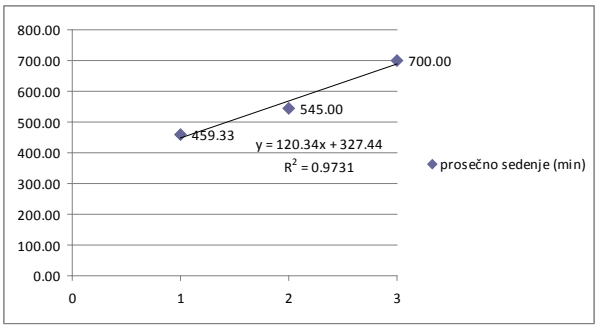

***Figure 2**. Correlation between average level seating and PHQ-9 score*

instruc¬tions given for the IPAQ questionnaire (7) and PHQ-9 (5- 7). The PHQ-9) developed by Pfizer Inc. has proven to be an excellent means of monitoring levels of severity of depression over time. During the course of monitoring patient adherence to depression treatment plans, care managers utilize a variety of forms that both assist in the collection and summarization of information about individual patient status. These forms also provide an essential means of coordinating communication for care managers and clinicians.

IPAQ, used for physical activity measurement, is designed to assess the level of physical activity for per¬sons 18-69 years old (7). Both categorical and continu¬ous indicators of physical activity are possible from both IPAQ forms. However, given the non-normal distribution of energy expenditure in many populations, it is sug¬gested that the continuous indicator be presented as median minutes/week or median (metabolic equivalent tasks) MET –minutes/week rather than means (such as mean minutes/week or mean MET-minutes/week). The IPAQ Research Committee proposes that these data are reported as comparisons of median values and in¬ter quartile ranges for different populations. There are three levels of physical activity proposed to classify populations: Low, Moderate and High (Vigorous) (7). The selected MET values were derived from work undertak¬en during the IPAQ Reliability Study undertaken in 2000- 2001 (6). Using the Ainsworth et al. (14) data, compendium an average MET score was derived for each type of activity.

Statistical analysis included descriptive statistics and correlation analysis. For statistical data analysis, the following statistical parameters were used: frequency, percentage, Pearson's correlation coefficient, x^2-test with statistical significance level of 95%. For data processing we used SPSS software program.

RESULTS

From a total of 141 patients, 47.52% were male and 52.48% female. Most of the observed patients were employed (51.77%), others were pensioners (25.53%), unemployed (14.18%) and 8.51% students. In relation to the age of the patients, respondents were from 18 years to 69 years, while the mean age is 44 (± 14.3) years (Table 1). Of the total number of surveyed patients, 104 (73.76%) had PHQ-9 score less than 4 thus no need of depression treatment, while the assessment of depression is needed for treatment in 34 (11.24%) respondents, and only 2 patients or 2.13% had urgent need for combined treatment of depression. According to the values of the IPAQ test, which determines the level of physical activity, most of the (73; 51.77%) surveyed patients practiced moderate physical activ¬ity, 23 (16.31%) had a low value of physical activity and 45 (31.91%) had vigorous physical activity (Table 2).

Of 73 patients who had moderate physical activity, 55 of them (75.34%) had no symptom of depression. Of the 23 examined patients who have low levels of physical activity (39.13%) had symptoms of de¬pression. Low levels of physical activity is tended to be present in patients whose depression score was ≥ 5 and require treatment than those whose depression score ≤ 4, $p>0.05$ ($x^2=2.477$; df=2) (Table 3). Between levels of PHQ-9 score of depression and the IPAQ values for physi¬cal activity, there is a high degree of correlation. The increase

***Table 1**. Distribution of sample by gender, age and occupation*

	Frequency	Prevalence
	f	*%*
Total	*141*	*100*
-Male	*67*	*47.52*
-Female	*74*	*52.48*
Status		
-employees	*73*	*51.77*
-unemployed	*20*	*14.18*
-student	*12*	*8.51*
-pensioner	*36*	*25.53*
Age range		
Min	*18*	
Max	*69*	
Mean± SD	*44±14.3*	

***Table 2**. Frequency of PHQ-9 scores and IPAQ variables*

	Frequency	Prevalence
	f	*%*
Total	*141*	*100*
Variable PHQ-9 scor		
≤4 (no depression)	*104*	*73.76*
5-14 (assessment of depression is needed)	*34*	*24.11*
≥15 (depression)	*3*	*2.13*
Variable IPAQ		
Low	*23*	*16.31*
Moderate	*73*	*51.77*
Vigorous	*45*	*31.91*

in physical activity of low, moderate to vigorous in patients with PHQ-9 score ≤ 4, had a very high correlation R2 = 0.85. In people with the values of PHQ-9 score ≥ 5 there is also a very high correlation with the values of physical activity and the degree of correlation was R2 = 0.91, where the highest percentage of respondents had engaged in low levels of physical activity and the lowest percentage of patients with this PHQ-9 score practiced vigorous physical activity (Figure 1). In the length of time during the week that patients sitting, there is a high degree of correlation between the average sitting time during the week in minutes and PHQ-9 score (R2 = 0.87), depression occurs more frequently in patients who are sitting more (Figure 2).

DISCUSSION

Association between moderate physical activity and all cause mortality was investigated in a study in Germany and it was found that moderate physical activity compared to sedentary lifestyle has a clearly protective role dependant on the level of physical activity ($p<0.001$) in women, but not in men. Moderate physical activity of 2.5 hours per week decreases the relative risk of all cause mortality by 0.65 in women and by 0.90 in men (17).

In our sample less than 1 / 5 of patients was physically active in a form of walking over the week, while the rest had moderate and heavy physical activity.

The study about relation between physical activity and mental health conducted in 15 countries of European Union included 16230 persons. The conclusion of the study is that those who are physically more active, are in general of better mental health (18).

The importance of physical activity as a therapy for clinical or sub clinical depression or anxiety and improvement of life quality through enhanced self-esteem, improved mood, reduced stress and anxiety, resilience to stress, or improved sleep is reported in the study conducted in the UK. Regular moderate training should be considered an important part of treatment of depression and anxiety, as well as improving mental health in general population (19).

Richard et al. (20) conducted a meta-analysis of exercise as a treatment for depression. The empirical evidence is convincing that exercise either alone or in combination with other evidence-supported treatment is effective in treating clinically significant depression. The challenge lies in translating the convincing evidence into effective practice. This commentary focuses on the barriers that clinicians encounter in utilizing exercise in the face of depressive symptoms, pessimism, low motivation, and physical inactivity and withdrawal. Also they discuss some practical suggestions to enhance the likelihood that patients with depression implement and maintain exercise behaviors to improve their mood (20).

***Table 3**. Frequency of PHQ-9 scores in relation with IPAQ variables*

	PHQ-9 score							
	≤4* no depression		5-14* Assessment of depression is neede		≥15 Depression		Total	
IPAQ	f	%	f	%	f	%	f	%
Low*	14	60.87	8	34.78	1	4.35	23	100
Moderate*	55	75.34	17	23.29	1	1.37	73	100
Vigorous	35	77.78	9	20.00	1	2.22	45	100
Total	104	73.76	34	24.11	3	2.13	141	100

$x^2=2.477$, $d f = 2$, $p>0.05$

A study at the University of Illinois examined the effects of 2 physical activity modes, walking and low-intensity resistance/flexibility training, on depressive symptoms and physical self-esteem over a 5-year period among older adults. Results suggest that older adults who participate in walking or low-intensity resistance/flexibility training experience sustained reductions in depression symptoms and increases in physical self-esteem (21).

To assess the effectiveness of an aerobic exercise program compared with standard medication (ie, antidepressants) for treatment of MDD in older patients, conducted a 16-week randomized controlled trial.

One hundred fifty-six men and women with MDD (age, ▫50 years) were assigned randomly to a program of aerobic exercise, antidepressants (sertraline hydrochloride), or combined exercise and medication. Subjects underwent comprehensive evaluations of depression, including the presence and severity of MDD using Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition criteria and Hamilton Rating Scale for Depression (HAM-D) and Beck Depression Inventory (BDI) scores before and after treatment. Secondary outcome measures included aerobic capacity, life satisfaction, self-esteem, anxiety, and dysfunctional cognition's.

After 16 weeks of treatment, the groups did not differ statistically on HAM-D or BDI scores adjustment for baseline levels of depression yielded an essentially identical result. Growth curve models revealed that all groups exhibited statistically and clinically significant reductions on HAM-D and BDI scores. However, patients receiving medication alone exhibited the fastest initial response; among patients receiving combination therapy, those with less severe depressive symptoms initially showed a more rapid response than those with initially more severe depressive symptoms (22).

In study relationship between light and strenuous exercise and depression, as well as gender differences in this relationship, in a representative sample of 860 elderly Swedish suburb-dwelling men and women in age cohorts from 60 to 96 years, drawn from participants in the Swedish National Aging and Care study. The relationship between depression and self-reported changes in exercise status over time was also examined. Exercise activities were measured with four survey questions, and depression, with the Montgomery Asberg Depression Rating Scale. The inactive elderly had higher depression scores than more active individuals, both in terms of light and strenuous exercise. The continuously active group had lower depression scores than both continuously inactive individuals and individuals reporting a shift from activity to inactivity during the preceding year. Light exercise had a somewhat stronger effect on depression for women (23).

In conclusion, for this study population from Bosnia and Herzegovine, most patients had moderate physical activity, and there is a correlation between levels of physical activity and PHQ-9 score for depression. Those who had depression were engaged in less physical activity. A role of the family doctor is very important in counseling patients about physical activity in the prevention of health problems and depression.

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