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## RELATIONSHIP OF PHYSICAL ACTIVITY AND QUALITY OF LIFE AMONG FEMALE UNIVERSITY STUDENTS FROM MONTENEGRO

### POVEZAVA MED TELESNO DEJAVNOSTJO IN KAKOVOSTJO ŽIVLJENJA MED ŠTUDENTKAMI IZ ČRNE GORE

#### ABSTRACT

The main goal of this research was to determine the relationship between physical activity and the quality of life of female students from Montenegro. The sample of respondents consisted of 128 female students of the University of Montenegro, average age  $20.9 \pm 3.28$  years. Two measuring instruments were used in the research: a modified short version of the IPAQ questionnaire for assessing physical activity (light, moderate, intensive and total) and a modified version of the WHOQOL BREF questionnaire for assessing quality of life (physical health, mental health, social relationships, satisfaction with quality of life). Basic descriptive parameters were calculated for each variable, while regression analysis was used to establish the mentioned relationship. The results showed that female students are moderately physically active, and that total, moderate and intense physical activity is associated with physical health, mental health and satisfaction with social relationships. Total and moderate physical activity aren't related to satisfaction with quality of life. Light physical activity is only associated with psychological health (concentration, satisfaction with sleep). The results of this study confirmed the significant connection between physical activity and quality of life among female students in Montenegro and represent a strong argument that should initiate an adequate reaction, primarily from the professional and scientific society, but also from the executive authorities in order to strengthen the promotion of the active lifestyle of the student population in Montenegro, and decreasing the epidemic of physical inactivity.

**Keywords:** physical exercises, healthy lifestyle, girls, faculty, Montenegro

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#### IZVLEČEK

Glavni cilj te raziskave je bil ugotoviti povezavo med telesno aktivnostjo in kakovostjo življenja študentk iz Črne gore. Vzorec anketirancev je sestavljalo 128 študentk Univerze Črne gore, povprečne starosti  $20,9 \pm 3,28$  let. V raziskavi sta bila uporabljena dva merska instrumenta: modificirana kratka različica vprašalnika IPAQ za oceno telesne dejavnosti (lahka, zmerna, intenzivna in skupna) in modificirana različica vprašalnika WHOQOL BREF za oceno kakovosti življenja (telesno zdravje, duševno zdravje), socialni odnosi, zadovoljstvo s kakovostjo življenja). Za vsako spremenljivko smo izračunali osnovne opisne parametre, za ugotavljanje omenjenega razmerja pa smo uporabili regresijsko analizo. Rezultati so pokazali, da so študentke zmerno telesno dejavne in da je popolna, zmerna in intenzivna telesna aktivnost povezana s fizičnim zdravjem, duševnim zdravjem in zadovoljstvom v socialnih odnosih. Popolna in zmerna telesna aktivnost nista povezani z zadovoljstvom s kakovostjo življenja. Lahka telesna aktivnost je povezana le s psihičnim zdravjem (koncentracija, zadovoljstvo s spanjem). Rezultati te študije so potrdili pomembno povezavo med telesno aktivnostjo in kakovostjo življenja študentk v Črni gori in predstavljajo močan argument, ki bi moral sprožiti ustrezen odziv predvsem strokovne in znanstvene javnosti, pa tudi izvršne oblasti, da bi krepitev promocije aktivnega življenjskega sloga študentske populacije v Črni gori ter zmanjševanje epidemije telesne nedejavnosti.

**Ključne besede:** telesna vadba, zdrav način življenja, dekleta, fakulteta, Črna gora

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## INTRODUCTION

Physical activity represents all the movements that increase energy consumption above the consumption that is achieved at rest (Ostojic et al., 2009). In this type of activity, the same authors include everyday activities such as walking, riding a bicycle, climbing the stairs, housework, and going shopping. It also represents one of the most important aspects of healthy lifestyles at any age. Despite that, the latest data from the World Health Organization are extremely worrying, because they show that 28% of the world adult population and even 81% of adolescents are not physically active enough (WHO, 2022). According to the same research, women are less active than men - every third woman and every fourth man are physically inactive, and physical inactivity is more prominent in high-income countries, compared to the countries with medium and low monthly income. The World Health Organization (2022) says that, as for Europe, 31% of the population over 15 years of age are not physically active enough. Also, in the neighbouring countries of Montenegro, research done in the youngest EU country, indicates similar problems, almost 60% of the adult population in Croatia spend less than 30 minutes walking, and almost 65% of them do not participate in any form of physical exercise (Croatian Institute for Public Health, 2016). A similar problem was observed in another neighbouring country, almost 90% of the adult population in Serbia spend less than 30 minutes a day walking/riding a bicycle, 23% of the population has an excessive sedentary lifestyle, i.e. they spend more than seven hours a day in a sitting position, while, on the other hand, 11% of them engage in aerobic activities for at least 150 minutes per week (Republic Institute for Statistics, 2021). Previous research conducted in Montenegro did not indicate a different situation; namely, only 13% of the adult population exercises more than three times a week, of which only 8% engage in physical activity every day, and as much as 44% of the adult population maintain a sedentary lifestyle (Institute for Public Health of Montenegro, 2022).

The data mentioned in the previous paragraph indicates that physical inactivity has become a public health problem, both in the world and in the region, but also in Montenegro. Numerous health problems are associated with insufficient physical activity, which leads to the heart diseases, arterial hypertension, malignant diseases, diabetes, obesity, and depression (Ostojic et al., 2009; WHO, 2022). It has long been known that engaging in physical activity contributes to improving the quality of life, which represents the individual's perception of their own position in life in the context of culture and system of values in which they live, as well as in relations to their own goals, expectations, standards and interests (Saxena, & Orley, 1997). Apart from the individual perception of the individual, another important aspect of the quality

of life is multidimensionality. It requires the assessment of numerous dimensions of life in order to evaluate the quality of life. Different researchers mention different areas, but a deeper analysis of research and definition of quality of life shows that there are a certain number of areas that stand out as universal and appear in most research. Based on the analysis of numerous studies and definitions of quality of life, Cummins (1997) determines that seven basic areas appear in most research: health, emotional well-being, material well-being, close relationships with other people (family, friends, partner, significant others), productivity, social community and security. Some studies (Vuletic & Mujkic, 2002) show that the basis of people's quality of life is primarily health (physical and mental), followed by social relationships (family, friends, love). The importance of physical activity is reflected in the comprehensiveness of the positive impact it has on human life from the physical, psychological and social aspects (Malcic, & Jurisin, 2018). The mentioned authors believe that, when it comes to the physiological aspect, physical activity is an effective way of preventing and treating various infectious and non-infectious diseases, and it affects the preservation and improvement of health. In adulthood, according to the same authors, practicing physical activities helps preserve the obtained motor skills, with the goal of preserving the vital body functions. Also, Malcic and Jurisin (2018) say that moderate physical activities stimulate the functioning of the human immune system, as well as that, from a psychological aspect, sports-recreational activities have a positive effect on both, the cognitive and affective domains of the personality, and have also been shown to be a significant factor of socialization in adults, so engaging in them in one's free time can affect the prevention of destructive behaviour.

Unlike the general population, research on a sample of students has shown that most members of the mentioned population are aware of the importance of physical activity; however, for various reasons, the most dominant of which is lack of time, they do not pay enough attention to physical activity (cited in Stojmenovic, & Milosavljevic, 2017). Research on a sample of students was done by Macanovic and associates (2013) and they concluded that 77% of students of both sexes are physically active, 55% of them engage in physical activity two to three times a week, and 24% engage in physical activity only 30 minutes a week. The same authors state that the percentage of students who spend four hours a day sitting is 39%, and eight hours a day is 29%, as well as that boys are more physically active than girls. According to some other researches (cited in Malcic, & Jurisin, 2018), physical activity of students is generally represented in a lower level of moderate physical activity, whereas male students are more active than female students. Also, female students are more prone to the sedentary way of life

(Obradovic, 2020). On the other hand, numerous studies (Da Costa Silva et al., 2021; Aijbewa et al., 2021; Wang et al., 2014; Chacon Cuberost et al., 2019; Banerjee et al., 2021) indicate a significant relationship between physical activity and quality of life, and they confirmed that physical inactivity significantly affects the appearance of stress, anxiety and depression in young people. Several studies (Rodriguez Ayllon et al., 2018; Romero Perez et al., 2020) have also pointed out the fact that a regular exercise program and better physical shape contribute to better mental health of young people, as well as to the improvement of positive thoughts about themselves, higher self-esteem and emotional well-being, and reduce depressive thoughts.

As the results from previous researches clearly indicate the insufficient physical activity of female students in Montenegro, but also in a wider area, as well as the significant relationship between physical activity and quality of life that has not been thoroughly investigated in Montenegro so far, the main goal of this research was to determine the relationship between physical activity and the quality of life of the female student population in Montenegro, considering the very specific socio-economic circumstances that the population of Montenegro faces in the transition period.

## METHODS

The study sample consisted of 128 female students with an average age of  $20.9 \pm 3.28$  years old from the University of Montenegro. Given that this research was part of a much larger scientific study, this paper encompasses a sample of undergraduate and master's students from Niksic, who did not engage in sports, and who did not have regular physical education classes at the organizational units of the University of Montenegro that they attended (Faculty of Philosophy and Faculty of Philology). Applying the given criteria, the sample was selected by random selection. Given that the population of students at the Faculty of Philosophy and Philology in Niksic is made up of a very small percentage of male respondents, as well as the fact that some of them play sports, which was a criterion for exclusion, they were not included in the research. The reason for this is that we cannot make relevant and reliable conclusions based on that number.

Research was undertaken at the faculties mentioned in the previous paragraph, with the procedure determined in advance, and with the official permit from the administrators of the organizational unit. The survey was conducted in the classrooms of the Faculty of Philosophy in the summer semester of 2023. The survey and the assessment scale were anonymous, and

the examination was voluntary, so the subjects could withdraw at any time; but, not a single participant did that. However, the questionnaires that were not completely filled in, or were illegibly written to the extent that the data could be interpreted with certainty, did not enter the final database of empirical data, which was later used for analysis.

A sample of measuring instruments consisted of the short version of the IPAQ questionnaire for the assessment of physical activity in the last week (Craig et al., 2017) and the World Health Organization Quality of Life Brief Version (WHOQOL BREF) assessment scale for the assessment of quality of life in the last two weeks (Skevington et al., 2004). The modified short version of the IPAQ questionnaire contains six variables for assessment of total physical activity (intense, moderate and light activity) in the domain of housework and gardening, time spent in recreation and walking in the last week. The modified version of the WHOQOL BREF scale contains 12 variables which assesses the quality of life in the domain of physical health (satisfaction with health), psychological health (enjoyment in life, concentration, security, energy, satisfaction with sleep, satisfaction with self, ability to perform daily tasks, negative feelings), social relationships (satisfaction with personal relationships) and overall quality of life (satisfaction with quality of life, opportunities for activities in free time) in the previous two weeks.

For every variable that is used for assessment of level of physical activity and quality of life, the elementary descriptive parameters were calculated: arithmetic mean and standard deviation. These parameters of assessment of physical activity were represented by IPAQ values (MET minutes – metabolic equivalent). According to the IPAQ, there are 3 levels of physical activity: light, moderate and intensive (IPAQ Research Committee, 2005). On the other hand, each of 12 variables from the modified version of the WHOQOL BREF scale were calculated with five levels (1 - not at all; 2 - not; 3 - partially; 4 - mainly; 5 - completely), while the linear regression analysis ( $p \leq 0.05$ ) was used to determine the relationship between physical activity and quality of life (physical activity - independent variable, quality of life - dependent variable).

## RESULTS

The first table shows the basic descriptive parameters (arithmetic mean and standard deviation) when it comes to the intensity of physical activity by days/per week and MET minutes/per week that the participants performed in housework and garden work, recreation and walking/strolling, as well as their overall physical activity.

Table 1. Physical activity of female students in Montenegro during a week.

Activity		Mean	SD
Intense physical activity	d/w	.96	0.81
	MET min/w	179.37	160.47
Moderate physical activity	d/w	2.89	1.01
	MET min/w	278.90	112.39
Light physical activity	d/w	3.81	1.14
	MET min/w	160.39	49.43
Total	d/w	2.55	1.45
	MET min/w	618.66	160.47

Notes. d/w – days on week; MET min/w - MET minutes per week.

From the first table it can be seen that the female students that participated in the study spend on average less than one day per week (0.96) in performing hard housework and garden activities, spending an average of  $179.37 \pm 160.47$  MET minutes. When it comes to moderate physical activity, they perform it, on average, almost three days a week (2.89) that is,  $279.90 \pm 112.39$  MET minutes. They perform light physical activity, walking, almost four days a week (3.81) and spend  $160.39 \pm 49.43$  MET minutes in it. Female students engage in physical activity on average for  $2.55 \pm 1.45$  days during one week, and their total average weekly physical activity is  $618.66 \pm 160.47$  MET minutes.

The second table shows the basic descriptive parameters (arithmetic mean and standard deviation) regarding the quality of life of the participants from this study in the domain of physical health, mental health, social relations, and satisfaction with the quality of life.

Table 2. Basic descriptive parameters of the quality of life of female students in two weeks.

Questions	*Mean	SD
Satisfaction with health	4.52	.73
Enjoyment of life	3.47	.95
Concentration	3.71	1.01
Security	4.30	.90
Energy	3.96	1.11
Satisfaction with sleep	3.89	.86
Ability for perform daily task	3.88	1.05
Self-satisfaction	3.81	.83
Satisfaction with personal qualities	3.85	1.00
Negative feelings	1.99	.82
Satisfaction with personal relationships	3.88	1.03
Satisfaction with the quality of life	3.68	.88
Opportunities for activities in free time	3.34	1.29

Notes. \*mean of the 1-5 rating scale of the WHOQOL questionnaire.

From the second table, it can be seen that female students are, on average, satisfied with the quality of life ( $3.66 \pm .88$ ) and opportunities for activities in their free time ( $3.34 \pm 1.29$ ), while they are very satisfied with their physical health ( $4.52 \pm .73$ ). As for mental health, the answers show that female students are on average or slightly above average satisfied with it (enjoyment of life ( $3.47 \pm .95$ ); concentration ( $3.71 \pm 1.01$ ); security ( $4.30 \pm .90$ ); energy ( $3.96 \pm 1.11$ ); opportunities for activities in free time ( $3.34 \pm 1.29$ ); satisfaction with sleep ( $3.89 \pm .86$ ); satisfaction with self ( $3.81 \pm .83$ ); satisfaction with personal qualities ( $3.85 \pm 1.00$ )), except when it comes to feelings, which, in the previous two weeks, were at a relatively low level ( $1.99 \pm .82$ ). Also, they are on average satisfied with social relations ( $3.88 \pm 1.03$ ).

The third table shows the results of linear regression analysis in regards to the connection between intense physical activity, moderate physical activity, light physical activity, as well as total physical activity, with the quality of life of the participants from this study.

Table 3. Correlation between physical activity and quality of life of female students in Montenegro.

Questions	Intense physical activity		Moderate physical activity		Light physical activity		Total physical activity	
	t	p	t	p	t	p	t	p
Satisfaction with health	7.80	.00*	13.68	.00*	1.33	.25	14.20	.00*
Enjoyment of life	13.67	.00*	14.68	.00*	.37	.54	19.24	.00*
Concentration	8.67	.00*	9.61	.00*	10.82	.00*	16.38	.00*
Security	3.10	.08	6.61	.01*	.19	.66	5.78	.01*
Energy	4.98	.02*	2.19	.14	.65	.42	6.15	.01*
Satisfaction with sleep	7.00	.00*	13.46	.00*	12.31	.00*	17.88	.00*
Ability for perform daily task	17.42	.00*	17.86	.00*	.00	.95	24.87	.00*
Self-satisfaction	13.97	.00*	22.99	.00*	2.91	.09	28.80	.00*
Satisfaction with personal qualities	3.95	.04*	7.69	.00*	1.75	.18	7.99	.05*
Negative feelings	9.72	.00*	19.99	.00*	8.07	.00	24.63	.00*
Satisfaction with personal relationships	12.39	.00*	25.93	.00*	.12	.78	23.95	.00*
Satisfaction with the quality of life	1.74	.19	1.84	.17	.96	.32	2.43	.12
Opportunities for activities in free time	12.57	.00*	12.68	.00*	2.24	.13	19.42	.00*

From the third table, it can be seen that intensive physical activity, moderate physical activity, light physical activity, as well as total physical activity are not related to the satisfaction with the quality of life female students that participated in the research study. On the other hand, intensive physical activity, moderate physical activity, as well as total physical activity are associated with opportunities for activities in free time, satisfaction with health, enjoyment in

life, concentration, satisfaction with sleep, ability to perform daily tasks, satisfaction with personal relationships, satisfaction with oneself, satisfaction with personal qualities and negative feelings. Intensive and total physical activity are related to the energy of the participants from this study, whereas moderate physical activity is not. Total and moderate physical activity are associated with female students' sense of security, but intense physical activity is not. The results also show that light physical activity is associated with concentration and sleep satisfaction, while it is not associated with other variables.

## DISCUSSION

Physical activity, apart from its positive effect on physical health, plays an important role in improving the mental health, because it raises self-esteem and self-confidence, improves cognitive functions, and socialization enables the maintenance of a normal sleep rhythm and stable mental health (Maric et al., 2020). According to the recommendations by the World Health Organization, it is necessary to engage in moderate physical activity for 150-300 minutes per week, or in intensive physical activity lasting up to 150 minutes, for obtaining the positive effects on health (WHO, 2020). The results obtained by this research show that the total level of physical activity of female students is at a moderate level (618.66 MET minutes), which would correspond to engaging in moderate-level physical activity with duration of 150 minutes per week. Therefore, it is a fact that the obtained results are quite in line with the results of the previous research (Macanovic et al., 2013; Malcic, & Jurisin, 2018), and that the female students exercise on average less than three days a week, i.e. their total physical activity is at the level of low moderate.

This research once again confirmed that the lack of time is a big obstacle when it comes to engaging in physical activity (Stojmenovic, & Milosavljevic, 2017), so the lowest average value fell to the variable related to opportunities for activities in free time. In contrast to that, it was encouraging to see the fact that the participants from this study were very satisfied with their physical health, and that the appearance of negative feelings is at a low level. On the other hand, the results of the regression analysis show that there is no statistically significant relationship between physical activity and satisfaction with the quality of life of the female students who participated in the study. Certainly, it needs to be taken into account that some other factors as well, such as the academic stress (Nesic et al., 2019), economic status (Ilic et al. 2010), and others may play an important role regarding the satisfaction with the quality of life. Total,



intensive and moderate physical activity significantly affect physical health, mental health, and satisfaction with social relationships, which confirms the results of previous researches on the positive impact of physical activity on the level of mental health (Clow et al. 2013), improvement of social relationships and interaction with others (Huang, & Humpreys, 2012; Downward, & Rasciute, 2014; Ruseski et al., 2014), and physical health (Grant et al., 2009). However, light physical activity (walking/strolling), according to the research results, is only associated with concentration and sleep satisfaction. The relationship between physical activity and quality of life is very little researched (cited in Kelly et al., 2018), however, some research shows that there is a small to moderate relationship between walking and physical/mental health and social relationships (Blacklock et al., 2007).

The modern sedentary way of life, which begins in childhood, attributes to the negative energy consumption that becomes a threat, to only to physical, but also the mental health of children and adolescents, i.e. to the occurrence of depression. Be it children or adolescents, the research confirms that physical activity contributes to physical and mental health, and helps prevent the diseases (cited in Hills et al., 2007). Regular physical activity has a positive effect on the operation of the cardio-vascular and respiratory organs and parts of the locomotor apparatus, so the bones become firmer, it prevents a sudden increase in body mass, the appearance of diseases related to obesity, as well as psychological problems (Mitic, 2011). The results of this research indubitably show a significant relationship between physical activity and the quality of life of female students in Montenegro. Given that the level of physical activity among female students in this research is low moderate, a new research question arises, as well as a very well-founded assumption, that increasing the level of physical activity among female students in Montenegro could significantly affect the improvement of their quality of life, which should be the subject of some subsequent research that would have to be carried out very soon. Until the research in question is carried out, however, it is very important to think about the preparation of official guidelines that would serve the purpose of promoting both physical and mental health, as well as an active lifestyle, all with the aim of decreasing the epidemic of physical inactivity that has serious consequences on physical and mental health (Hills, 2007).

## CONCLUSION

The results of this study confirmed the significant relationship between physical activity and quality of life among female students in Montenegro, and represent a strong argument that

should initiate an adequate measures, primarily from the professional and scientific society, but also from the executive authorities in order to strengthen the promotion of the active lifestyle of the student population in Montenegro, and decrease the epidemic of physical inactivity. On the other hand, like most studies that do not include the entire population, this study has certain limitations, since the inclusion of female students from other geographical areas of Montenegro might yield different results, since there is a significant number of both natural and social factors in individual regions. Nevertheless, the main recommendation for further research is to launch an initiative that would establish an official system for monitoring the physical activity and quality of lifestyles, primarily for the student population, but monitoring the same parameters for the general population in Montenegro is also something that needs to be worked on.

### **Declaration of Conflicting Interests**

There are no conflict of interests.

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