

GENDER DIFFERENCES IN QUALITY OF LIFE AND EXERCISE MOTIVATION OF ADOLESCENTS OF AVERAGE AND INCREASED BODY MASS¹

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Abstract: The main aim of this transversal study was to examine the relevant differences between the constructs of quality of life and exercise motivation among male and female adolescents of average and increased body mass. The sample included high school students from Valjevo (N = 337). The average age of the participants was M = 16.53 years (SD = .38). Two measuring instruments were used: The Exercise Motivations Inventory-2 (EMI-2) and The Kidscreen Questionnaire -27 (TKQ). The results of the Cronbach's alpha suggested that the questionnaires used in the research have satisfactory level of reliability and internal consistency, and are valid for assessing adolescent population in Serbia.

The research has shown that there are internal and external motives for adolescents' exercise motivation, and that the male adolescents more favourably perceive the quality of life. Statistically significant gender differences were found, there was higher level of the evaluation of the TKQ construct among male adolescents than female adolescents which is the consequence of a more substantial view of physical well-being, pleasant feelings and moods, good family and social environment, as well as the ability to organize and arrange free time. It was also found that participants with average body mass prefer the perception of own physical activity and health more than their peers with increased body mass. Male adolescents do physical exercise for enjoyment, challenge, competition, strength and endurance, as well as for social reasons (factors such as belonging to a group, pressure, and acceptance), whereas female participants are more willing to exercise in order to control their body mass. The results of the Mann–Whitney U test revealed relevant gender differences: adolescents with average body mass are more likely to exercise because they enjoy the activity, while adolescents with increased body mass are more stimulated by the possibility of body mass regulation ($p \leq .01$).

This research discussed practical implications of the results on creating the motivation for exercise and quality of life among adolescents of both sexes with normal and increased body mass (BM).

Keywords: *motives, adolescence, body mass index, physical exercise, mood and emotions*

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INTRODUCTION

Gender differences in the quality of life and exercise motivation among adolescents of average and increased body mass have been the research subject of many authors (Bull et al., 2020; Cilar Budler et al., 2022; Guthold et al., 2020). Some of the authors (Lee et al., 2018) have noted that the quality of life is complex and includes various lifestyles and individual actions. In their study Poulain et al. (2019) view the quality of life as overall happiness which involves real factors, personal valorisation of physical, material, social and affective possibilities, where individual development and overall behaviour are dominant in one's personal system of values. According to a research conducted by Ihm (2018), determining the quality of life is influenced by various factors, starting from satisfying biological needs, to characteristic social, spiritual, cultural, and historical situations. Certain authors (Grant et al., 2018) claim that personal perception of satisfaction with life dominates this term, which is defined as the overlap between real life and what one expects. This research also identifies the quality of life as a link between adolescents and their competence to plan to achieve certain goals, while other authors (Twenge et al., 2018) isolate free time as a significant determinant in recognizing personal lifestyle. In the study of Fischer-Grote et al. (2019) family life and peer relationship are regarded as significant predictors of the quality of life, which is presented as a multidimensional experience caused by reality and a person's values.

Searching for the causes of the high level of personal happiness, authors examined various latent dimensions such as the level of nutritional status and physical activity in adolescence. The authors of another study (Van Sluijs et al., 2020) noted that physical activity involves any body movement that includes activating skeletal muscles and spending energy. Lowry et al. (2021) claim that physical activity is a necessary element for realizing the most advantageous functioning of the body, especially proper body growth and development, and improvement of psychophysical health. Physical exercise is a significant way of training aimed at preserving and improving body shape, as noted in another study (Marotta et al., 2022). The aforementioned authors believe that moderate daily exercise has positive influence on physical, mental and social well-being of an individual. Generally speaking, if professionally organized, physical exercise can motivate adolescents to create and adopt healthy habits (Palenzuela-Luis et al., 2022). According to another study (Arruda et al., 2022), regular training during adolescence correlates to the decrease of negative health conditions and illnesses, meaning that it minimizes the danger of negative changes in the skeletal system such as osteoporosis later in life. In addition, physical exercise is in relevant interaction with the decrease of body mass and risk of coronary disease, and the improvement of spiritual health, and consequently the increase of self-respect and self-confidence (Huffman et al., 2018). In their study, Asam et al. (2019) note that physical exercise represents a successful strategy for dealing with stress, especially depression and anxiety. The same authors claim that the effects of physical exercise lead to better social communication and acceptance of personal skills. The findings of other empirical studies that deal with these phenomena are not consistent, and the authors point out that they should be analysed by integrating all the factors of the process of socialization (Khamidovna & Khudayberganov, 2022). These authors also found that when compared to the physically non-active young population, athletes manifest more developed communication skills, social skills, and a tendency to be team players because physical exercise can affect their physical constitution and social position among peers. However, Romanova et al. (2022) claim that the contemporary phenomenon of hypokinesia is more and more dominant as a generator of health problems. These results indicate that the lack of physical exercise is linked to the growing dangers of increased body mass index (BMI) and peer violence, which has a particularly negative influence on psychosocial difficulties among adolescents. However, despite the well-known scientific effects that exercising has on psychophysical and social health, the fact remains that the intensity of exercise is visibly low in modern society, especially among female adolescents which is reflected in increased body mass (Ivanović & Ivanović, 2012; Ivanović & Ivanović, 2018; Ivanović, & Ivanović, 2021; Pope & Harvey, 2015).

Motivation is a mental process which encourages a person to engage in physical activity (PA), to determine the orientation and coordinate the intensity and length of the activity (Thomas & Azmitia, 2019). The aforementioned authors believe that if we are to motivate people to exercise, it would be important to identify the mental and physiological factors which encourage them to be physically active. Seeing how the increased body mass (BMI) is a growing occurrence, obesity has become a serious health condition which is particularly significant during the sensitive and formative period of adolescence where lack of physical activity and increased BMI are dangerous, and

therefore researching this subject matter has become a necessity (Ivanović et al., 2014; Ivanović & Ivanović, 2016). In addition, the lack of physical exercise and the increase in body mass lower the quality of life and can lead to premature death, so it is important to develop effective prevention programs and actions that can directly change the existing condition. Identifying the motivation and motives for exercising of an individual of a certain age, as well as their characteristics can influence more efficient planning. In order to understand better the needs and actions of adolescents and gain better insight into the way they experience happiness, it is necessary to identify the factors which define or influence it.

The main motive for the focus of our research on this complex problem is the fact that such studies so far have not been conducted on the Serbian adolescent population, so the main aim of this research was to examine the quality of life and exercise motivation, and the difference in assessing the aforementioned constructs among adolescents depending on gender and BMI. It is very significant to explore this phenomenon as it can have significant methodological and theoretical implications for both further research and practice.

In accordance with the results of earlier empirical studies, theoretical predictions and the aim of this research, and with the application of adequate statistical tools, the following hypotheses were formulated: H_1 – male participants are expected to score their quality of life, meaning the variables of physical well-being, mood, and feelings higher than female participants; H_2 – the assumption is that the variables of physical well-being and health have statistically significantly lower values in male participants with increased body mass than in their peers with average body mass; H_3 – adolescents with normal body mass and those with increased body mass generally evaluate the quality of life identically; H_4 – it is believed that internal (enjoyment, challenge, competition, strength, and endurance) and external motives (belonging to a group) stimulate male participant to exercise, while female participants are motivated more by the control of their body mass.

METHOD

Participants and procedure

This transversal research was conducted on a pertinent sample ($N = 337$) consisting of students from a secondary economy school and a technical vocational school in Valjevo, including: 222 male adolescents (51%) and 115 female adolescents (49%). The average age of the participants was 16.53 ($SD = .38$).

Before filling in the questionnaires, the students were given detailed instructions, and the aim of the research was explained to them, without explaining the purpose of each measuring instruments (in order to prevent desirable responding). The instructions were printed out on the test as well. The students were asked not to think too much about answers and in case of doubt choose an answer they favour more, and that there would be no consequences for quitting at any time. The research lasted for 45 minutes and was conducted by the authors of this study and the school psychologists. The research was anonymous and voluntary, and was conducted with the permission of school principals and students' parents.

The process of filling in the questionnaires and taking the anthropometric measurements (body mass and height) was organized in groups during the physical exercise classes. The anthropometric measurements were taken and that lasted approximately 30 minutes. Then, the participants were given the questionnaires: a) The Exercise Motivations Inventory-2, and b) The Kidscreen Questionnaire -27. That took approximately 30 minutes. The empirical research was conducted in October 2022.

The Exercise Motivations Inventory – EMI-2 (Vlašić et al., 2002)

The EMI-2 includes 54 items and it is created in a way that participants answer the question why an individual exercises or should exercise, and it includes 14 potential exercise motives: belonging to a group (for example, "To spend time with friends"), physical appearance (for example, "To have good figure"), challenge (for example, "So that I could develop skills"), competition (for example, "Because I like to compete"), enjoyment (for example, "Because I enjoy making effort"), disease prevention (for example, "In order to avoid getting sick"), agility (for example, "In order to get more agile"), health (for example, "Because I want to stay healthy"), refreshment (for example, "I find exercising refreshing"), social acceptance (for example, "In order to prove myself in front of others"), social pressure (for example, "Because others talk me into doing it"), strength/endurance (for example, "To increase

my strength/endurance”), stress management (for example, “Because exercising helps me cope with stress”), and control over body mass (for example, “In order to lose weight”).

The total score shows the importance individual motives have in the decision to engage in physical activity and it is determined as a mean value of answers on specific subscales. The answers to the items are marked on a five point Likert-type scale (from 1 – “*very untrue for me*” to 5 – “*very true for me*”). The participants are offered multiple answers that belong to specific motives, and they have to answer how true a certain item is for them.

The reliability of internal consistency (Cronbach’s Alpha) of the dimensions of the EMI-2 in this research is: belonging to a group ($\alpha = .79$), physical appearance ($\alpha = .90$), challenge ($\alpha = .92$), competition ($\alpha = .90$), enjoyment ($\alpha = .78$), disease prevention ($\alpha = .79$), agility ($\alpha = .86$), health ($\alpha = .92$), refreshment ($\alpha = .80$), social acceptance ($\alpha = .85$), social pressure ($\alpha = .91$), strength and endurance ($\alpha = .79$), stress management ($\alpha = .94$), and body mass control ($\alpha = .77$), which indicates that the metric characteristics of the questionnaire are satisfactory (Tabachnick & Fidell, 2013).

The Kidscreen Questionnaire -27 – TKQ (The Kidscreen Questionnaire -27; The Kidscreen Group Europe, 2006)

The TKQ examines the construct of the quality of life through the elements of physical, emotional, social, and behavioural well-being. The questionnaire contains 27 claims which measure six dimensions of the quality of life: fun and relationship with friends (for example, “Could you rely on your friends?”), school and learning (for example, “Were you doing well in school?”), physical activity and health (for example, “Were you physically active?”), mood and emotions (for example, “Were you feeling lonely?”), family and spare time (for example, “Were your parents fair to you?”), and financial resources (for example, “Did you have enough money for your own expenses?”). The participants needed to determine their level of agreement with a specific item on a five point Likert-type scale (1 – “*not at all*” to 5 – “*strongly agree*”). Negatively expressed items indicate that a higher score on a specific dimension means higher degree of the quality of life. The reliability of the coefficient of the internal consistency of each dimension of the questionnaire is satisfactory, and the value of Cronbach’s alpha reliability coefficient for specific scales for our sample is: friends ($\alpha = .90$), school and learning ($\alpha = .76$), physical activity and health ($\alpha = .82$), mood and emotions ($\alpha = 0,80$), family and spare time ($\alpha = .78$), and financial resources ($\alpha = .78$).

Body Mass Index – BMI (Lohman et al., 1988)

The height-weight indicator of nutrition - BMI shows whether the body mass in relation to the body height of the subject is average, more or less below/above the average. It is calculated in accordance with the international classification for children and adolescents based on the measured morphological variables: body weight in kilograms and body height in meters (Weber et al., 2013). In that way the numerical value is compared to the values presented in the table classified by age and gender in order to obtain the converted value which is in accordance with the border values of our sample, so each participant is classified by the guidelines of Italian authors (Cacciari et al., 2006) into one of the four following categories: underweight ($BMI \geq 18.5 \text{ kg/m}^2$), normal weight ($BMI = 18.5\text{--}24,99 \text{ kg/m}^2$), overweight ($BMI \geq 25 \text{ kg/m}^2$), and obesity ($BMI \geq 30 \text{ kg/m}^2$). Anthropometric measurements were conducted in accordance with the International Biological Programme.

Statistical analysis

The obtained data was first processed using the method of descriptive statistics, and then the Kolmogorov–Smirnov test was used for the examination of deviations from the obtained data distribution, and the Mann–Whitney U nonparametric test was used for testing the statistically significant differences between the two groups of data. The IBM SPSS 22.00 software (IBM Corporation, New York, USA) was used for processing the quantitative data.

RESULTS

The statistical parameters of the participants' assessments of the examined dimensions of The Kidscreen Questionnaire are presented in Table 1.

Table 1. Result distribution for TKQ questionnaire variables

Variables	<i>M</i>	<i>SD</i>	<i>C</i>	<i>Sk</i>	<i>Ku</i>	<i>K-S</i>
Friends	3.95	.82	4.08	5.52 (.18)	2.40 (.28)	1.39*
School and learning	3.47	.80	3.27	4.93(.15)	2.37(.26)	1.58*
Physical activity and health	3.66	.69	3.55	9.07(.16)	7.33(.31)	2.05**
Family and spare time	3.84	.76	3.78	7.38(.16)	2.94 (.31)	2.59**
Mood and emotions	3.89	.72	4.48	8.40 (.16)	4.53(.31)	2.44**
Financial resources	3.99	.88	4.60	10.30 (.16)	7-86 (.31)	3.29**

Legend. *M* = Arithmetic mean; *SD* = Standard deviation; *C* = median, measure of central tendency; *Sk* = skewness, with standard error for skewness; *Ku* = kurtosis, with standard error for kurtosis; *K-S* = Kolmogorov–Smirnov test; * $p \leq .05$, ** $p \leq .01$ ($N = 337$)

Having an insight into the matrix, one can see that participants perceive the quality of life on a generally high level. Maximum evaluations can be seen on the financial resources ($M = 3.99$, $SD = .88$), and friends ($M = 3.47$, $SD = .80$) variables. The values of the Kolmogorov–Smirnov test of normal distribution and standardized coefficients of skewness and kurtosis show that the applied variables do not have normal distribution, because the values ranged between -2 and +2 (Gravetter & Wallnau, 2014; Kim, 2013). Therefore, the nonparametric method of the inferential statistics of the Mann–Whitney U test was used to test the differences between the two independent samples.

Table 2 shows the descriptive parameters of the examined variables of the EMI-2 questionnaire.

Table 2. Result distribution for EMI-2 questionnaire variables

Variables	<i>M</i>	<i>SD</i>	<i>C</i>	<i>Sk</i>	<i>Ku</i>	<i>K-S</i>
Belonging to a group	3.05	1.28	3.00	7.16 (.15)	2.40 (.28)	2.46*
Physical appearance	3.79	1.17	3.92	5.943(.16)	4.55(.26)	2.58*
Challenge	3.65	1.30	3.82	9.07(.16)	7.33(.31)	2.05**
Competition	2.68	1.62	2.80	7.38(.16)	2.94 (.31)	2.59**
Enjoyment while exercising	3.35	1.25	3.18	8.40 (.18)	4.53(.31)	2.44**
Disease prevention	2.96	1.37	3.28	10.30 (.16)	7-86 (.31)	3.29**
Agility	3.63	1.30	3.71	3.35 (.27)	9.85(.31)	2.56**
Health	3.90	1.19	3.94	2.84 (.15)	3.78(.31)	2.67**
Refreshment	3.59	1.17	3.70	4.81(.16)	6.64(.31)	3.75**
Social acceptance	2.28	1.42	2.47	6.78(.15)	5.64(.31)	2.97**
Social pressure	1.03	1.27	.48	5.53(.16)	3.76(.31)	4.16**
Strength and endurance	3.93	1.09	4.30	3.68(.15)	8.95(.31)	2.65**
Stress management	3.23	1.40	3.30	2.84(.16)	7.68(.31)	2.95**
Body mass control	3.42	1.37	3.48	8.56(.16)	5.64(.31)	3.45**

Legend. *M* = Arithmetic mean; *SD* = Standard deviation; *C* = median, measure of central tendency; *Sk* = skewness, with standard error for skewness; *Ku* = kurtosis, with standard error for kurtosis; *K-S* = Kolmogorov–Smirnov test; * $p \leq .05$, ** $p \leq .01$ ($N = 337$)

The main descriptive parameters of the exercise motivation construct are in most cases distributed just above the mean value of the theoretical range, which means that the exercise motivation is average. The findings show that

adolescents consider social pressure, social acceptance, and competition to be the least important motives for exercising. They consider the most important motives to be health, strength and endurance, and physical appearance. The participants' answers reveal much about how they see the connection between physical exercise and improving and preserving their physical well-being. On the other hand, the distortion of the normality of answers on certain variables (the values of the Kolmogorov–Smirnov test of normal distribution and standardized skewness and kurtosis) allowed the use of nonparametric methods (LaMorte, 2017).

The findings obtained from the *Mann–Whitney U test*, with 1% risk, are shown in Table 3 and reveal the significant differences between the self-assessments of the quality of life construct based on gender, where compared to female adolescents, male adolescents have higher values on the numerical variables, the dimensions school and learning, physical activity and health, family and spare time, and mood and emotions.

Table 3. Differences between male and female participants on TKQ questionnaire dimensions

Variables	Male adolescents (H = 222)			Female adolescents (N = 115)			U	Z	p
	M	SD	C	M	SD	C			
Friends	4.09	.68	4.23	4.09	.66	4.23	42742.46	-.70	.45
School and learning	3.52	.80	70	3,26	.77	3.50	3962.60	-4.25	.01**
Physical activity and health	3.76	.70	3.70	3.62	.65	3.50	4961.30	-5.56	01**
Family and spare time	3,87	.93	3.92	3,59	.91	3.63	5675.00	-4.28	01**
Mood and emotions	3.99	.59	4,25	3,76	0,74	.66	4.859.30	-8.05	01**
Financial resources	4.18	.89	4.56	4.14	.87	4.20	6592.03	2.92	.98

Legend. M = Arithmetic mean; SD = Standard deviation; C = median; U – value of Mann–Whitney U test for independent samples; z – Standard value of u; *p – Probability of statistically significant difference (**p ≤ .01)

The Mann–Whitney U test for nonparametric data and z – standard values were used to calculate the statistically significant differences in the perceived construct of the quality of life depending on the body mass index (Table 4).

Table 4. Descriptive parameters of difference between male and female participants on BMI variable

Variables	ABM			EBM			U	Z	p
	M	SD	C	M	SD	C			
Friends	3.96	.68	4.19	3.95	.90	4.19	5811.00	-.105	.88
School and learning	3.29	0.80	3.35	3.28	.70	3.35	4729.20	-3.352	.67
Physical activity and health	3.59	0.67	3.55	3.40	.72	3.47	2591.44	-8.906	01**
Family and spare time	3.80	.77	3.78	3,76	.80	3.78	3670.03	-4.473	.45
Mood and emotions	3.99	.68	4,00	3.99	.57	3.99	7516.45	-6.128	.34
Financial resources	4.20	.80	4.49	4.26	,79	4.49	7282.00	-1.155	.43

Legend. ABM – average body mass; EBM – extra body mass; M – Arithmetic mean; SD – Standard deviation; C – median; U – value of Mann–Whitney U test for independent samples; z – Standard value (deviation of some results from the arithmetic mean presented as standard deviation); ** p – Probability of statistically significant difference (p ≤ .01)

Having an insight into the matrix, one can see that when compared to the participants of average BMI, the participants with increased BMI manifest significantly lower level of satisfaction on the variables physical activity and health.

The *Mann–Whitney U* nonparametric test was used to compare the results between male and female adolescents on the EMI-2 questionnaire variables (Table 5).

Table 5. Descriptive parameters of differences between male and female adolescents on EMI-2 questionnaire subscales

Variables	Average body mass			Excessive body mass			U	z	p
	M	SD	C	M	SD	C			
Belonging to a group	2.95	1.28	3.18	2.80	1.29	2.95	4874.25	-2.962	.01**
Physical appearance	3.68	1.27	3.96	4.05	1.07	4.30	5895.03	-1.837	.43
Challenge	3.68	1.30	4.01	3.39	1.18	3.44	7641.05	-2.860	01**
Competition	3.22	1.53	3.48	2.25	1.50	1.96	6085.40	-7.829	01**
Enjoyment while exercising	3.38	1.27	3.80	1.33	1.30	3.35	6784.06	-3.014	01**
Disease prevention	2.97	1.50	2.96	3.08	1.29	3.28	7942.00	-.655	.72
Agility	3.49	1.28	3.70	3.59	1.18	3.70	5692.03	-.254	.68
Health	4.00	1.21	4.28	3.99	1.19	4.30	4824.08	-.742	.57
Refreshment	3.59	1.19	3.70	3.60	1.21	3.68	8027.90	-.436	.46
Social acceptance	2.68	1.38	2.70	2.57	1.40	2.69	6078.12	-.560	01**
Social pressure	1.12	1.14	.78	1.05	1.20	.80	7902.94	-.382	01**
Strength and endurance	4.19	1.10	4.80	4.09	1.08	4.78	6092.44	-.620	01**
Stress management	3.19	1.40	3.19	3.15	1.38	3.20	5028.06	-.708	.77
Body mass control	2.98	1.38	3.18	3.05	1.42	3.20	4053.24	-.298	01**

Legend. M = Arithmetic mean; SD = Standard deviation; C = median; U – the value of the Mann–Whitney U test for testing the difference in the results of two independent groups of data; z – standard value (deviation of some result from the arithmetic mean presented as standard deviation); *p – Probability of statistically significant difference (**p ≤ .01)

The findings obtained using the *Mann–Whitney U* nonparametric and z – standard values show, with a 1% error, statistically significant differences on the EMI-2 questionnaire between male and female adolescents, in case of the following variables: belonging to a group, challenge, competition, enjoyment, social acceptance, social pressure, strength and endurance, and control over body mass. The variables belonging to a group, social acceptance, and social pressure are more important exercise motives to male than to female adolescents. In addition, male participants exercise more for the reason of enjoyment than female participants do. Males are also more motivated by the subscales challenge, competition, strength and endurance while engaging in physical activity. So, all the aforementioned motives are more important to male than female adolescents, except the body mass control variable, which is a bigger factor of motivation for female adolescents.

Table 6 shows the EMI-2 questionnaire results of the difference between the adolescents of both sexes depending on the body mass index.

Table 6. Descriptive parameters of differences between adolescents on EMI-2 questionnaire subscales depending on BMI

Variables	Average body mass			Excessive body mass			U	z	p
	M	SD	C	M	SD	C			
Belonging to a group	3.10	1.29	3.22	2.79	1.08	4.19	4803.25	-2.958	.45**
Physical appearance	3.70	1.30	3.98	3.77	1.07	4.30	5903.12	-1.765	.25
Challenge	3.70	1.28	3.99	3.60	1.20	3.48	5691.23	-2.900	.74
Competition	3.23	1.50	3.48	3.18	1.53	2.01	5643.09	-8.263	.58
Enjoyment while exercising	3.40	1.28	3.78	3.36	1.30	3.35	6904.17	-5.836	01**
Disease prevention	3.00	1.47	2.98	3.10	1.30	3.30	7075.26	-.698	.65
Agility	3.56	1.30	3.68	3.60	1.23	3.69	6541.93	-.364	.46

Health	4.01	1.20	4.28	4.00	1.12	4.29	5162.00	-.560	.34
Refreshment	3.59	1.19	3.70	3.60	1.20	3.98	4732.84	-.452	.56
Social acceptance	2.68	1.38	2.80	2.59	1.40	4.00	7096.42	-.290	.86
Social pressure	1.13	1.14	.79	1.98	1.20	2.00	3641.08	-.905	.70
Strength and endurance	4.19	1.99	4.80	3.95	2.03	1.98	6852.06	-.628	.29
Stress management	3.19	1.40	3.19	3.15	1.38	3.20	5294.05	-.785	.65
Body mass control	2.98	1.39	3.18	3.10	1.42	3.20	5093.76	-.543	01**

Legend. *M* = Arithmetic mean; *SD* = Standard deviation; *C* = median; *U* – the value of the Mann–Whitney U test for testing the difference in the results of two independent groups of data; *z* – Standard value (deviation of some results from the arithmetic mean presented as standard deviation); **p* – Probability of statistically significant difference (***p* ≤ .01)

The obtained findings indicate that there are statistically significant differences on the EMI-2 depending on BMI, on the variables enjoyment and body mass control. The values of the descriptive parameters indicate that participants with average body mass are more motivated by the internal motive of enjoyment than the participants with increased body mass, while the participants with increased body mass are more motivated by the external motive of body mass control than the participants with average body mass.

DISCUSSION

Seeing how the research so far conducted on the western cultures gave inconsistent results, the aim of this empirical cross-sectional study was to examine the quality of life and exercise motivation, as well as the differences in the assessment of these constructs among male and female adolescents depending on the body mass index. The obtained results show that there are statistically significant differences between the self-assessment of the quality of life depending on gender, where male participants showed higher scores on the variables school and learning, physical activity and health, family and spare time, and emotions and mood than female participants, which is in accordance with empirical studies (Nilles et al., 2022; Villafaina et al., 2021). In addition, empirical research by various authors (Bucur, 2017; Gomez-Baya et al., 2019) showed that male adolescents are more satisfied with life than female adolescents. The studies (Årdal et al., 2018; Villafaina et al., 2021) determined that during the period of youth the differences in the way male and female persons perceive the quality of life are quite striking, with females having a more negative view on their quality of life. This can be explained by the radical physical transformations girls go through at that period of life. During that period female adolescents are more exposed to contradictory social expectations while gender equality is still present within a social group. The findings of our research have shown that adolescents with increased body mass manifest significantly lower level of satisfaction with the physical activity and health variables than their peers with average BMI. If we take the starting hypothesis that participants with average BMI engage in physical activity more than their peers with increased body mass, then this result is in accordance with the expectations and findings of previous empirical studies (Cole & Lobstein, 2012; Boiché et al., 2014; Jalali-Farahani et al., 2014; Lizandra & Gregori-Font, 2021; Magiera et al., 2017; Weber et al., 2013) which established that male adolescents who are athletes have significantly better perception of their physical well-being than their female peers who do not practice any sport. In addition, other research results (Lizandra & Gregori-Font, 2021) show that a higher level of physical activity is beneficial for emotions and health. The results obtained using the nonparametric U test revealed relevant differences in exercise motivation with participants of both sexes in terms of the following variables: belonging to a group, challenge, competition, enjoyment, social acceptance, social pressure, strength and endurance, and body mass control. At the same time, three variables: belonging to a group, social acceptance, and social pressure are more significant exercise motives for male than for female participants. The findings are in accordance with various studies' results (Ivanović & Ivanović, 2018; Galan-Lopez & Ries, 2019; Sicilia et al., 2014), which show that gender differences regarding exercise motivation start from the early period of adolescence. In addition, the same authors found that the most important motives depend on gender: male participants are more incited by intrinsic motives such as strength, competition and challenge, while female participants are more incited by body mass control and physical appearance. Our sample provided identical results characterized by the expression of intrinsic and extrinsic motives. Comparing the findings on the EMI-2 questionnaire depending

on gender, gender difference in motivation can be linked to the differences in their real actions. That is confirmed by the results of several studies (Dominguez-Alonso et al., 2018; Guddal et al., 2019; Kueh et al., 2017; Ivanović & Ivanović, 2018; Roychowdhury, 2018; Sicilia et al., 2014) which found that due to the consequences of the aforementioned motivational mechanism, female adolescents engage in physical activity less than male adolescents. It is important to keep that in mind while creating preventive procedures and mediations that are aimed at improving well-being of adolescents who expose themselves to danger.

The calculated values of the descriptive parameters on our sample show significant differences in exercise motivation depending on BMI. The values of the measures of central tendency point out that adolescents of average body mass are more motivated to exercise by the intrinsic motive of enjoyment than their peers with increased body mass, while adolescents with increased body mass are more incited to exercise by the body mass control motive than their peers with average body mass. Finally, these results are significant because, according to different studies (Ahmed & Shekahawat, 2021; Fives et al., 2022), external motives lead to short-term physical exercise.

The results obtained in this research completely confirmed all of the four starting hypotheses: the first hypothesis that, based on the assessment of the physical well-being, health, mental happiness, emotions and mood variables, male participants perceive the quality of life on a higher level than female participants (H_1); the second hypothesis where it was expected that physical well-being and health are on a statistically lower level in adolescents with increased body mass than in those with average body mass (H_2); the third hypothesis where it is believed that adolescents with average body mass and those with increased body mass generally identically evaluate the quality of life (H_3); the fourth hypothesis which suggested that male participants are more incited to exercise by intrinsic motives (enjoyment, challenge, competition, strength and endurance) and extrinsic motives (belonging to a group), while female participants are predominantly motivated by an extrinsic motive - body mass control (H_4).

This empirical research has certain methodological limitations that should be taken into account while interpreting the obtained results, which can potentially limit the generalization of the results on the entire adolescent population. The limitations are: a) the pertinent sample is not sufficiently representative due to the geographical area; b) methodological variance and the self-assessment method due to which the possibility of giving dishonest or socially desirable answers cannot be excluded; and c) transversal design of the research which tests the participants within a given timeframe, thus preventing identification of the cause-effect link between the examined variables.

Still, even with the aforementioned limitations, this research contributed in determining the motives and understandings of the motivation of adolescents, and acquiring the basic knowledge for encouraging and preserving daily physical activity of adolescents and thus improving the quality of their lives. The findings indicate that adolescents need adequate programs which can motivate them to accept and keep an active lifestyle. Recognizing the motivational factors among young people with average body mass can be a model for creating preventive programs aimed at engaging adolescents in physical activity in school gyms and sports fields. Future research should examine the relations between the examined variables and adolescents' physical exercise, which would provide a more comprehensive insight into the examined phenomena among high school population.

We recommend the questionnaires tested in this study as reliable psychological tools for measuring exercise motivation and the quality of life among Serbian male and female adolescents. Despite the methodological limitations, the theoretical and empirical results of this study can be used as a basis for future research, but can also serve as a valid indicator for predicting adolescents' increased exercise motivation and the quality of life. With that in mind, we can say that further empirical research is needed, covering various cultures and geographical regions, and that it should include: a) various conceptualizations and operationalization of the EMI-2 and TKQ concepts in adolescence, and b) differently designed studies, meaning longitudinal studies.

CONCLUSIONS

The results of this study point to the importance of further research regarding the perception of the differences of the quality of life and exercise motivation during adolescence. The values of the *Cronbach α* coefficient revealed satisfactory reliability of internal consistency type for the EMI-2 and TKQ questionnaires, which implies that they can be regarded as valid instruments for examining adolescent population in Serbia. The findings revealed higher quality of life among male than female adolescents, which is manifested through the significant differences on most variables of the examined construct. In addition, the results have shown that adolescents with average body mass and those with increased body mass have almost identical perception of the quality of life. Young people with

average body mass also enjoy higher level of physical well-being than their peers with increased body mass. Summing up the obtained results of this empirical research, one can conclude that motivational factors among male high school students are significantly different from the motivational factors among female high school students. There are significantly more intrinsic and extrinsic factors that motivate male students, while female students are motivated to exercise mostly because of body mass control.

To conclude, the obtained findings of this transversal research can be an encouragement for future (longitudinal) research which can lead to a better understanding of gender differences in exercise motivation and the quality of life among male and female adolescents with average and increased body mass. Additionally, these results can inspire exercise motivation and improve of the quality of life among the high school population.

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