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**Articles and Statements**

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**Articles and Statements**

# The Sports Activities of Primary School Girls in Selected Slovak Regions

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**Abstract**

Study aim: The goal of the research was to determine the scope and the content of sports activities of primary school girls in selected Slovak regions.

Material and methods: In this research we focused on the sports activities of 993 primary school girls and analysed them using a questionnaire method. The research was classified by school type: urban and rural, as well as geographical region.

Results: More than 43 % of respondents that they mostly participate in sports for 1-2 hours daily. Approximately 50 % of them take part in sports recreationally and team sports of a "traditional" character predominate (57 %). The vast majority of girls (60 %) take part in sports activities outside. Participation in sports activities among girls is mostly recreational– the response frequency reached almost 50 % in all the research groups observed.

Conclusions: The research findings show that there are no statistically significant differences between the sports activities of primary school girls attending rural and urban schools during the working week. Respondents attending urban schools are more physically active during holidays compared to respondents attending rural schools additionally respondents from the Central Slovak Region are more physically active than respondents from the Eastern Slovak Region ($p<0.01$).

**Keywords:** sports activities, girls, primary school.

## 1. Introduction

The increase of lifestyle diseases shows the direct dependence of lifestyle on the lack of sports activities in most European countries. Physical inactivity has become a contributory factor to lifestyle diseases and to economic problems as well, with an impact on health care, and a slowdown in economic growth due to the frequent incapacity to work and premature death.

The early encouragement of children's participation in sports is of great importance to biological-social-psychological development, because the changes from individual into a social being are formed at the preschool age Berdychova (1982).

According to Galloway (2007), when we teach children the joy of movement, we try to make a habit out of it, which will accompany them through their life. Bartik and Kubis (2016) consider primary school age to be a sensitive and fundamental period in creating relations and habits

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towards sports activities. As stated by Korvas and Kysel (2013), the younger the individuals are the more important sports activities are to them – to their health and to their quality of life.

If the children spend their spare time with their parents, then sports activities become natural for them and they have a positive attitude towards them. As stated by Pavkova (2014), children learn from their parents how to spend and manage their spare time. She emphasises that spending spare time together is very important for family relationship formation.

The study by Moore et al. (1991) shows that active fathers influence the level of children's activities more than active mothers. The strongest impact was found on families in which both parents were physically active and, in comparison with the families in which both parents were inactive, the difference was up to six fold.

As stated by Oliveira et al. (2014) not even the rural population is protected from an inactive lifestyle, because they mainly prefer "sedentary" activities.

Understanding the physical activity level of the population is very important, as well as it being an essential part of the health service and school system response to current issues concerning the physical activity level of the whole population. Studies focused on sports activities evaluation can be divided into two groups:

- group 1 – objective records based on pedometers and accelerometers, for instance, the works of Tudor-Locke et al. (2004), Harris et al. (2009), Pagels et al. (2011), Czajka et al. (2015) and others,
- group 2 – based on questionnaire or survey, for instance the studies of Pratt et al. (1999), Nader et al. (2008), Łubkowska and Troszczyński (2011), Stranavska and Görner 2015), Novotna and Slovakova (2016), Kostencka et al. (2016) and many others.

It is evident, that both methods have their advantages and disadvantages. In this research the second method has been selected – a questionnaire considering the number of research samples and regions we wanted to map.

The purpose of the research was based on the grant project KEGA 002UMB-4/2014 "Innovation of sports activities of primary school students carried out in natural environment through playful activities using GPS." The aim of this study was to determine the scope and the content of sports activities of primary school girls in selected Slovak regions.

## 2. Material and methods

The main research method was an interrogative method – an anonymous and non-standardised questionnaire constructed by authors of this article. The survey was carried out among girls aged between 11 and 15 of the 5th and the 9th grades of selected primary schools in the Central and Eastern Slovak Regions during the first term of the 2014/2015 school year (refer to Figure 1). This selection of regions and schools was made randomly. The answer sheet of the questionnaire was processed and evaluated by the TAP3 programme of the Gamo Banská Bystrica Company.

The research consisted of 993 correctly completed questionnaires. The answers were classified by school type: urban and rural as well as region the Central and the Eastern Slovak Regions. Statistical significance of differences was assessed using the chi-square.

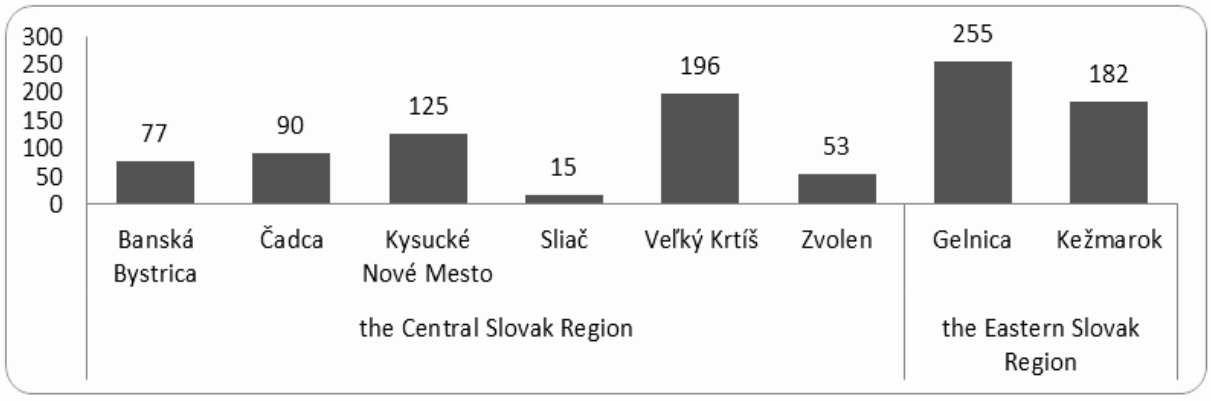



**Fig.1.** Research group of girls (N=993)

## 3. Results

Evaluating the first question which focused on the time the girls spent on sports activities during the working week, we did not find significant differences in the girls' responses between urban and rural schools. It can be stated that 20 % of girls take part in sports activities less than one hour during the working week and more than 40 % of girls spend one or two hours (Fig. 2).

Almost 1/3 of girls in all research groups spend more than two hours daily on sport activities during the working week. Comparing rural and urban schools and the regions, we did not find any significant differences (Table 1).

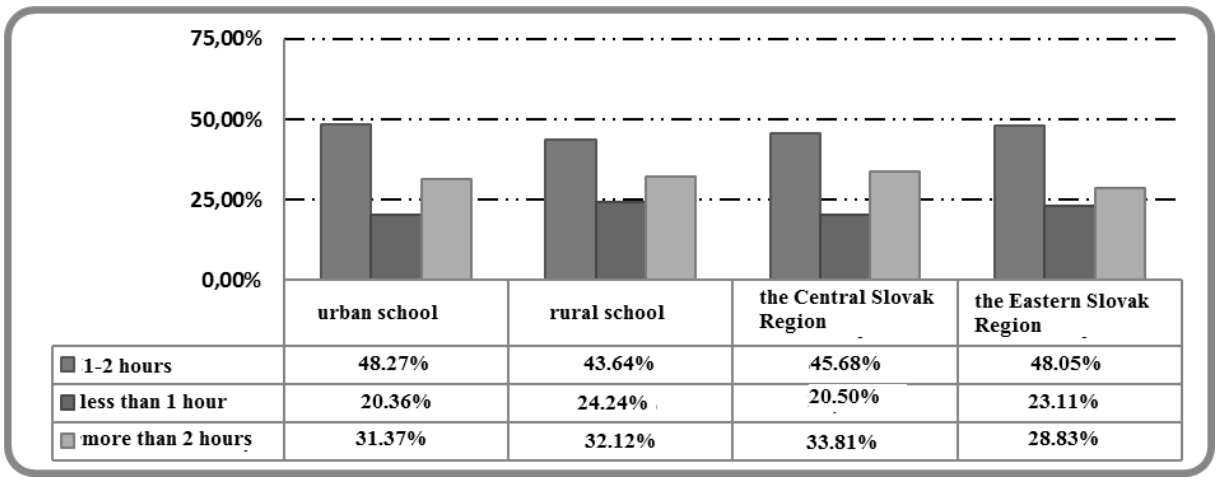



**Fig. 1.** Sports activities of girls during the working week (in hours)

**Table 1.** Statistical evaluation – sports activities of girls during the working week

| item | urban school/ rural school | Central Slovak Region/ Eastern Slovak Region |
|---|---|---|
| **statistical significance chi – quadrate test (value p)** | **n p= 0.2750** | **n p= 0.2250** |

***Legend:*** *statistical significance – p <0.01=**, p <0.05, =*, n= no statistical significance*

The following question was to assess how many hours per day the girls took part in sports during the weekend. The responses of the research groups were very similar (Fig. 3). Figure 3 shows that the girls take part in sports activities for 3-5 hours during the weekend.

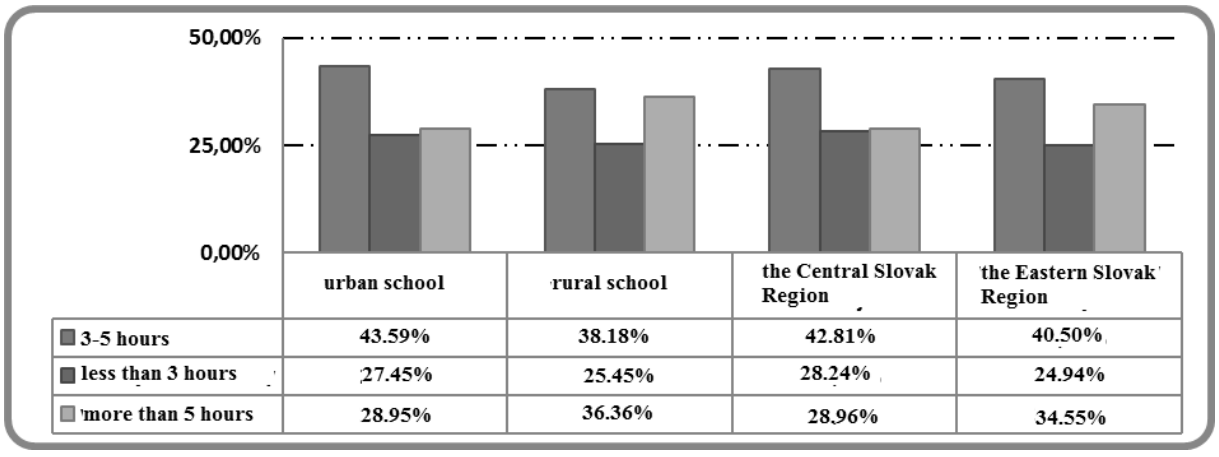



**Fig. 2**. Sports activities of girls during the weekend (in hours)

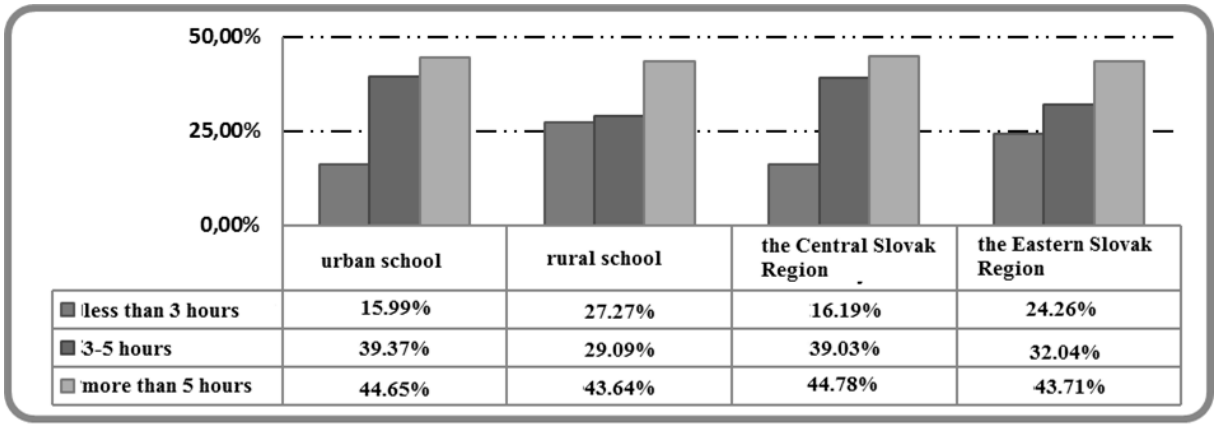
28.96 % of girls attending urban schools and 36.36 % of girls attending rural schools take part in sports for more than five hours per day and in terms of regions – 28.96 % of girls from the Central Slovak Region and 34.55 % from the Eastern Slovak Region. Not even these differences were statistically significant (Table 2).

**Table 2.** Statistical evaluation – sports activities of girls during the weekend (in hours)

| Item | urban school/ rural school | Central Slovak Region/ Eastern Slovak Region |
|---|---|---|
| **statistical significance chi – quadrate test (value p)** | **n p= 0.0574** | **n p= 0.1540** |

***Legend:*** *statistical significance – p <0.01=**, p <0.05, =*, n= no statistical significance*

A positive aspect to consider is that more than 40 % of girls from urban and rural schools as well as girls in the Central and Eastern Slovak Regions take part in sports activities for more than five hours per day during holidays. On the other hand 27.27 % of girls at rural schools and 24.26 % in the Eastern Slovak Region take part in sports activities for less than three hours per day (Fig. 4). The girls' responses, not only comparing urban and rural schools but also comparing the regions of Slovakia were statistically significant at a value of p<0.01 (Table 3).




| | urban school | rural school | the Central Slovak Region | the Eastern Slovak Region |
|---|---|---|---|---|
| less than 3 hours | 15.99% | 27.27% | 16.19% | 24.26% |
| 3-5 hours | 39.37% | 29.09% | 39.03% | 32.04% |
| more than 5 hours | 44.65% | 43.64% | 44.78% | 43.71% |

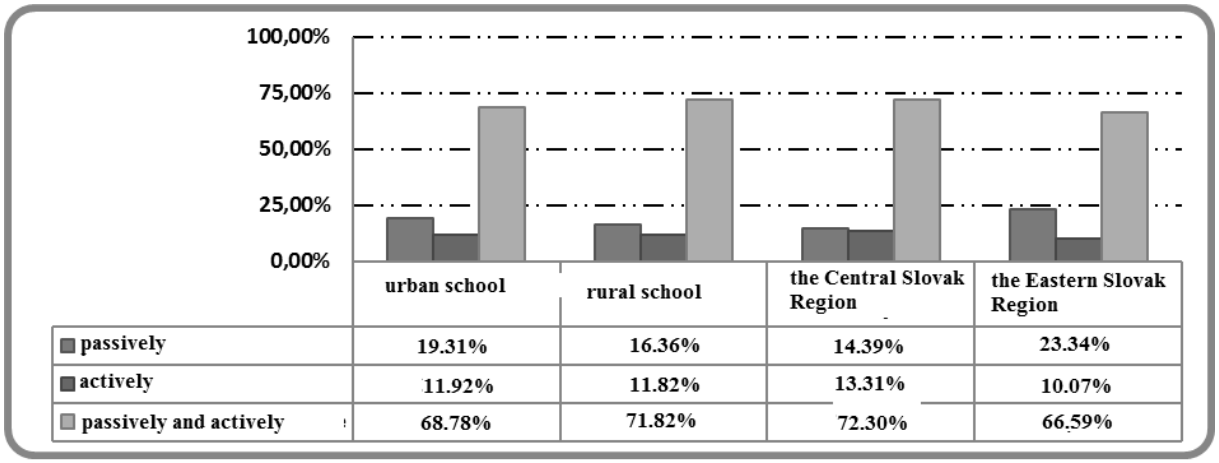
**Fig. 3.** Sports activities of girls during the working week in the summer holidays (in hours)

**Table 3.** Statistical evaluation – sports activities of girls during the working week in the summer holidays (in hours)

| item | urban school/ rural school | Central Slovak Region/ Eastern Slovak Region |
|---|---|---|
| **Statistical significance chi – quadrate test (value p)** | ** **p= 3.1405 E 05** | ** **p= 0.0032** |

***Legend:*** *statistical significance – p <0.01=**, p <0.05, =*, n= no statistical significance*

Almost ¾ of girls in all the research groups evaluated spend their spare time passively as well as actively.




| | urban school | rural school | the Central Slovak Region | the Eastern Slovak Region |
|---|---|---|---|---|
| passively | 19.31% | 16.36% | 14.39% | 23.34% |
| actively | 11.92% | 11.82% | 13.31% | 10.07% |
| passively and actively | 68.78% | 71.82% | 72.30% | 66.59% |

**Fig. 4.** Form of spare time activities

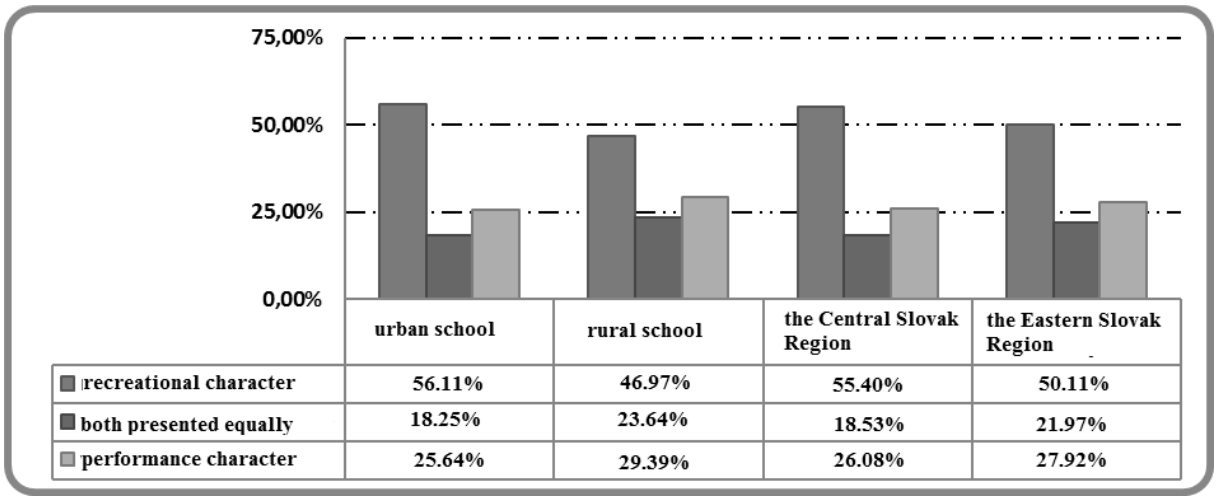
The answers of girls attending urban and rural schools were similar (Fig. 5) thus the response differences are not statistically significant. The girls' responses comparing the regions of Slovakia were statistically significant at a value of $p < 0.01$ and the girls from the Eastern Slovak Region were more passive (Table 4).

**Table 4.** Statistical evaluation – form of spare time activities

| item | Urban school/ Rural school | Central Slovak Region/ Eastern Slovak Region |
|---|---|---|
| **Statistical significance chi – quadrate test (value p)** | **n p= 0.51314** | ** **p= 0.0009** |

***Legend:*** *statistical significance – $p < 0.01$=**, $p < 0.05$, =*, n= no statistical significance*

The next question was to find out which kind of sports activity the girls prefer – recreational or competitive when one or both activities are presented equally. A recreational preference predominates in all the observed research groups (Fig.6). The frequency of responses ranges from 46.97 % (rural school girls) to 56.11 % (urban school girls).




| | urban school | rural school | the Central Slovak Region | the Eastern Slovak Region |
|---|---|---|---|---|
| recreational character | 56.11% | 46.97% | 55.40% | 50.11% |
| both presented equally | 18.25% | 23.64% | 18.53% | 21.97% |
| performance character | 25.64% | 29.39% | 26.08% | 27.92% |

**Fig. 5**. Character of sports activities

The competitive preference did not reach the value of 29.39 % (rural school girls) not even in one of the observed research group. Statistical evaluation of the response is presented in Table 5.

**Table 5.** Statistical evaluation – character of sports activities

| item | urban school/ rural school | Central Slovak Region/ Eastern Slovak Region |
|---|---|---|
| **Statistical significance chi – quadrate test (value p)** | * **0.0201** | **n p= 0.2186** |

***Legend:*** *statistical significance – p <0.01=**, p <0.05, =*, n= no statistical significance*

Sports activities in interest groups are preferred by the girls attending urban schools (58.97 %) and comparing regions, by 68.71 % of girls from the Central Slovak Region. The girls attending rural schools prefer sports activities outdoors close to their home (42.73 %) as well as in interest groups (40.61 %). The girls from the Eastern Slovak Region prefer sports activities outdoors as well (41.88 %). Less than 26 % of girls are interested in taking part in sports activities at sports grounds (Fig. 7). All responses concerning urban and rural schools as well as the regions of Slovakia were statisticaly significant at a value of p<0.01 (Table 6).

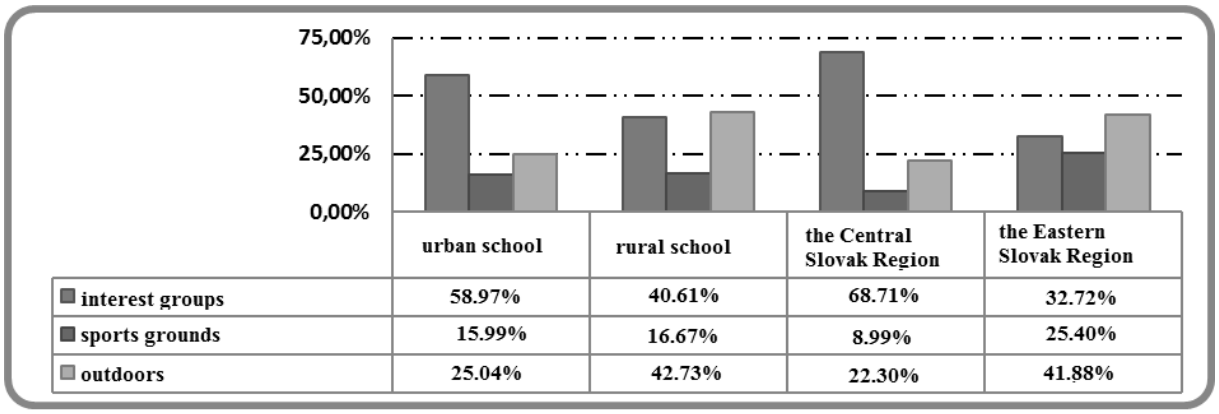



**Fig. 6.** Preferred location for sports activities

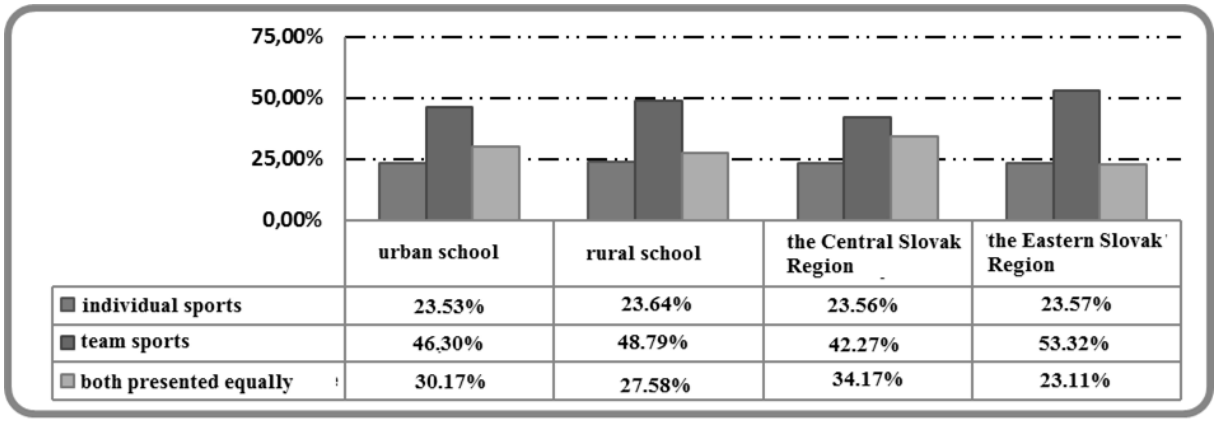
**Table 6.** Statistical evaluation – Preferred location for sports activities

| item | urban school/ rural school | Central Slovak Region/ Eastern Slovak Region |
|---|---|---|
| **Statistical significance chi – quadrate test (value p)** | ** **p= 1.2319 E-08** | ** **p= 3.8167 E-29** |

***Legend:*** *statistical significance – p <0.01=**, p <0.05, =*, n= no statistical significance*

Further research investigated the type of sport (team or individual) the girls preferred. The research results show that the girls definitely prefer team sports (almost 50 % in all the research groups observed). Just over 20 % of girls prefer individual sports.

The responses in terms of urban and rural school were not statistically significant but comparing the regions in Slovakia we recorded significant differences at a value of p<0.01.




| | urban school | rural school | the Central Slovak Region | the Eastern Slovak Region |
|---|---|---|---|---|
| individual sports | 23.53% | 23.64% | 23.56% | 23.57% |
| team sports | 46.30% | 48.79% | 42.27% | 53.32% |
| both presented equally | 30.17% | 27.58% | 34.17% | 23.11% |

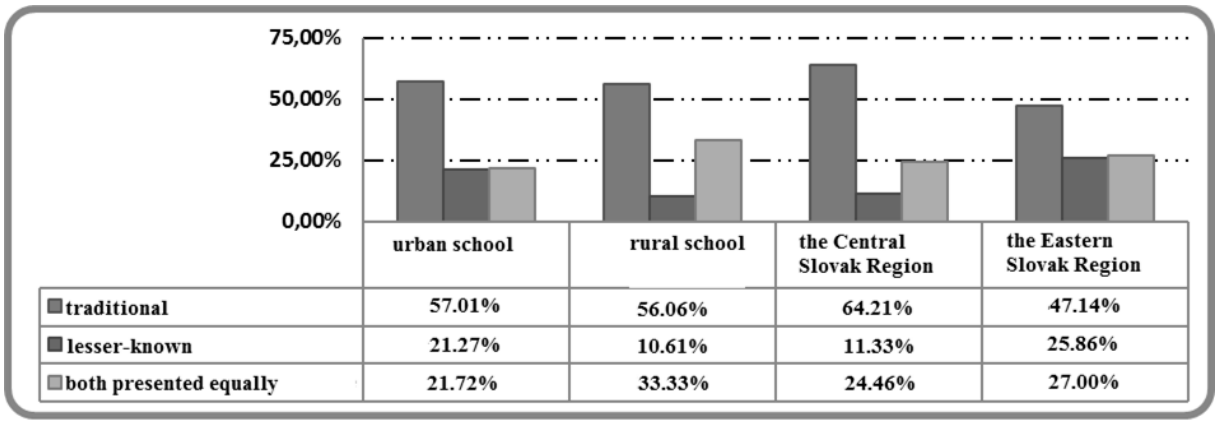
**Fig. 7.** Sports preference in girls

**Table 7.** Statistical evaluation – sports preference in girls

| item | urban school/ rural school | Central Slovak Region/ Eastern Slovak Region |
|---|---|---|
| **Statistical significance chi – quadrate test (value p)** | **n p= 0,6724** | ** **p= 0,0002** |

***Legend:*** *statistical significance – p <0.01=**, p <0.05, =*, n= no statistical significance*

Fig. 9 shows that the girls prefer traditional team sports. Only some girls attending urban schools prefer lesser-known team sports (21.27 %). In rural schools the preference is even lower at 10.61 %, with the Eastern Slovak Region at 25.86 % and the Central Slovak Region at 11.33 %. Evaluating these answers in terms of urban and rural school as well as in terms of regions the answers were statistically significant at a value of p<0.01 (Table 8).




| | urban school | rural school | the Central Slovak Region | the Eastern Slovak Region |
|---|---|---|---|---|
| traditional | 57.01% | 56.06% | 64.21% | 47.14% |
| lesser-known | 21.27% | 10.61% | 11.33% | 25.86% |
| both presented equally | 21.72% | 33.33% | 24.46% | 27.00% |

**Fig. 8.** Team sports preference among girls

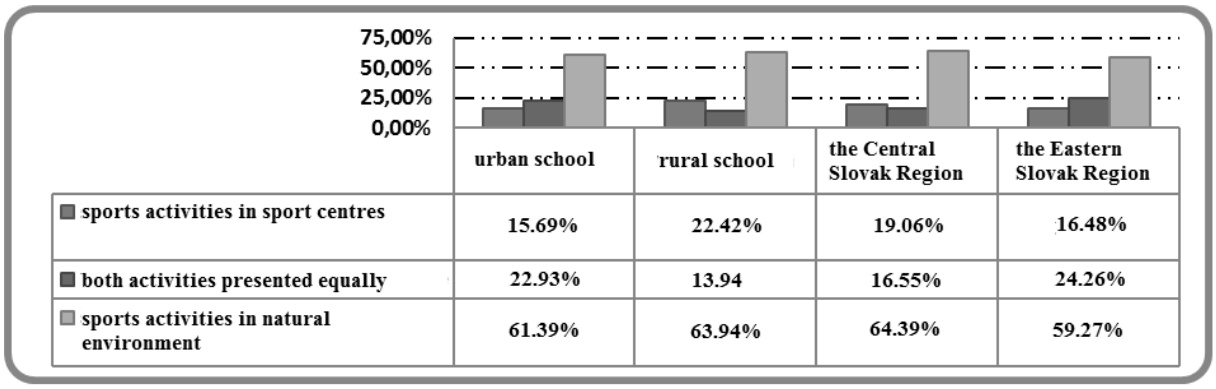
**Table 8.** Statistical evaluation – team sports preference among girls

| item | urban school/ rural school | Central Slovak Region/ Eastern Slovak Region |
|---|---|---|
| **Statistical significance chi – quadrate test (value p)** | ** **p= 2.5200 E-06** | ** **p= 6.4411 E-10** |

***Legend:*** *statistical significance – p <0.01=**, p <0.05, =*, n= no statistical significance*

Individual sports performed in a natural environment such as hiking, bicycle touring and Nordic walking predominate in the answers of all the observed groups. The frequency of answers was close to of 60 %.

The girls attending rural schools showed a higher preference for individual sports performed in sport centres (22.42 %). Higher percentage (19.06 %) was recorded in the girls' group from the Central Slovak Region versus 16.48 % from the Eastern Slovak Region (Fig. 10). The responses concerning both schools and regions were statistically significant at a value of p<0.01(Table 9).




| | urban school | rural school | the Central Slovak Region | the Eastern Slovak Region |
|---|---|---|---|---|
| sports activities in sport centres | 15.69% | 22.42% | 19.06% | 16.48% |
| both activities presented equally | 22.93% | 13.94 | 16.55% | 24.26% |
| sports activities in natural environment | 61.39% | 63.94% | 64.39% | 59.27% |

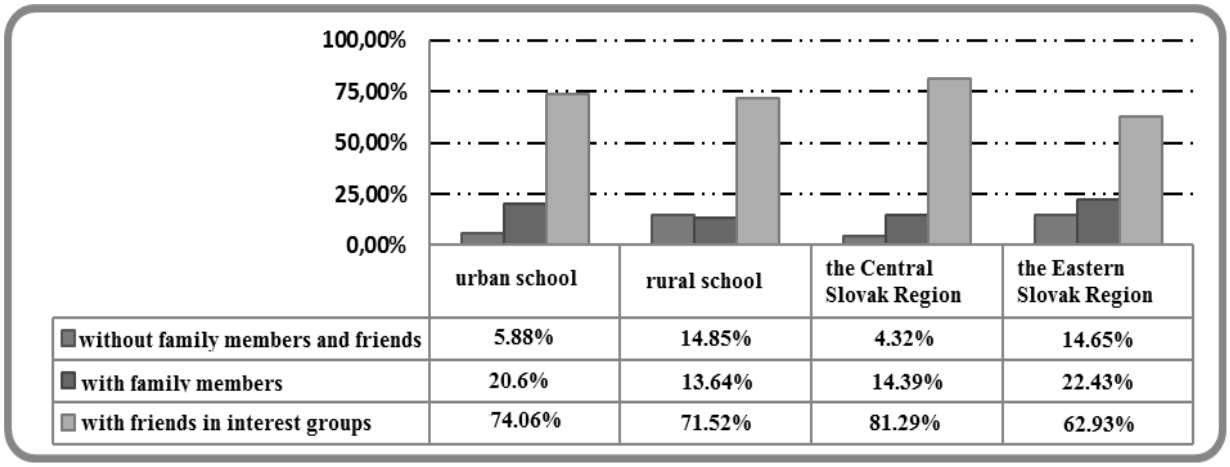
**Fig. 9**. Individual sports preference among girls

**Table 9.** Statistical evaluation – individual sports preferences among girls

| Item | urban school/ rural school | Central Slovak Region/ Eastern Slovak Region |
|---|---|---|
| **Statistical significance chi – quadrate test (value p)** | ** **p= 0.0006** | ** **p= 0.0098** |

***Legend:*** *statistical significance – p <0.01=**, p <0.05, =*, n= no statistical significance*

As presented in Fig. 11 the vast majority of girls take part in sports with their friends in interest groups. The percentage of answers in all the groups observed was higher than 62 %. The results show that the highest number (81.29 %) was in the Central Slovak Region. Girls attending urban schools prefer sports activities with family members (20.6 %) and in the Eastern Slovak Region this preference reached 22.43 %. The statistical evaluation of this question is presented in Table 10.




| | urban school | rural school | the Central Slovak Region | the Eastern Slovak Region |
|---|---|---|---|---|
| without family members and friends | 5.88% | 14.85% | 4.32% | 14.65% |
| with family members | 20.6% | 13.64% | 14.39% | 22.43% |
| with friends in interest groups | 74.06% | 71.52% | 81.29% | 62.93% |

**Fig. 10.** Persons performing sports activities together with girls

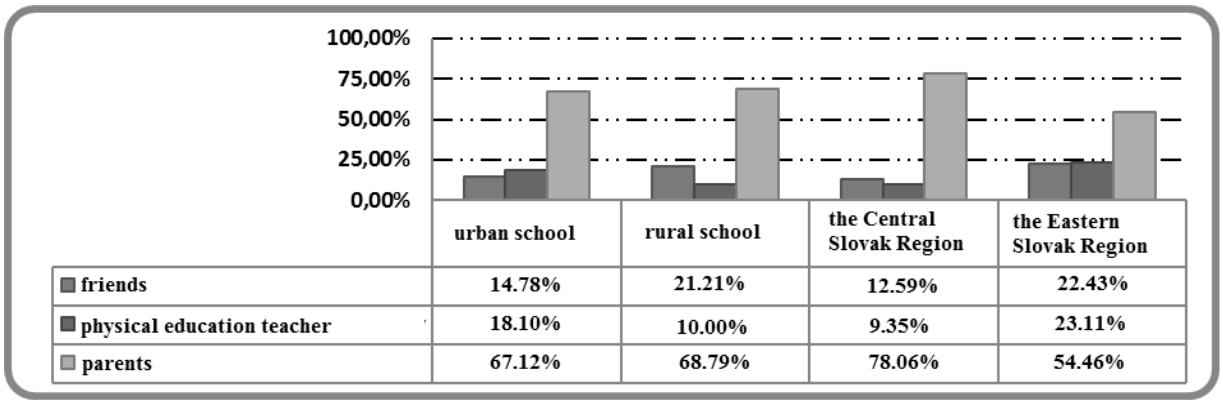
**Table 10.** Statistical evaluation – persons performing sports activities together with girls

| item | urban school/ rural school | Central Slovak Region/ Eastern Slovak Region |
|---|---|---|
| **statistical significance chi – quadrate test (value p)** | *** p= 3.2817 E-06** | **** p= 1.7424 E-11** |

***Legend:*** *statistical significance – p <0.01=**, p <0.05, =*, n= no statistical significance*

The research was focused also on which people the girls attached the most importance when participating in sports activities. It was found that the parents have the greatest importance and the percentage of answers was higher than 50 % (Fig. 12).

The girls attending rural schools (21.21 %) and the girls from the Eastern Slovak Region attached significant importance to friends. On the other hand, the girls attending urban schools (18.10 %) and up to 23.11 % of girls from the Eastern Slovak Region attached a great importance to the teacher of physical education and sport. The given differences are statistically significant at a value of p<0.01 % (Table 11).




| | urban school | rural school | the Central Slovak Region | the Eastern Slovak Region |
|---|---|---|---|---|
| friends | 14.78% | 21.21% | 12.59% | 22.43% |
| physical education teacher | 18.10% | 10.00% | 9.35% | 23.11% |
| parents | 67.12% | 68.79% | 78.06% | 54.46% |

**Fig. 11.** The person who brought the girls to participate in the sports activities

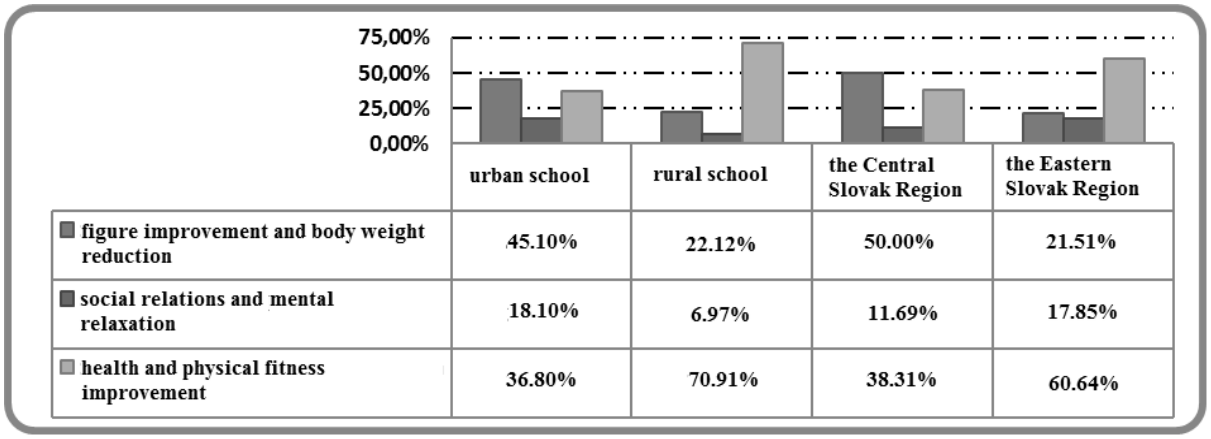
**Table 11.** Statistical evaluation – the person who brought the girls to participate in the sports activities

| Item | urban school/ rural school | the Central Slovak Region/ the Eastern Slovak Region |
|---|---|---|
| **Statistical significance chi – quadrate test (value p)** | **** p= 0.0005** | **** p= 1.1532 E-14** |

***Legend:*** *statistical significance – p <0.01=**, p <0.05, =*, n= no statistical significance*

Given this reasoning, we were further interested in the main motive among girls for participating in sports activities. The girls attending rural schools (70.91 %) as well as the girls from the Eastern Slovakia (60.64 %) consider the main motive the improvement of their health, physical fitness and strength.

On the other hand the girls attending rural schools (45.10 %) as well as the girls from the Central Slovak Region (50 %) preferred the answer "figure improvement and body weight reduction" (Fig. 13).




| | urban school | rural school | the Central Slovak Region | the Eastern Slovak Region |
|---|---|---|---|---|
| figure improvement and body weight reduction | 45.10% | 22.12% | 50.00% | 21.51% |
| social relations and mental relaxation | 18.10% | 6.97% | 11.69% | 17.85% |
| health and physical fitness improvement | 36.80% | 70.91% | 38.31% | 60.64% |

**Fig. 12.** The main motive among girls for participating in sports activities

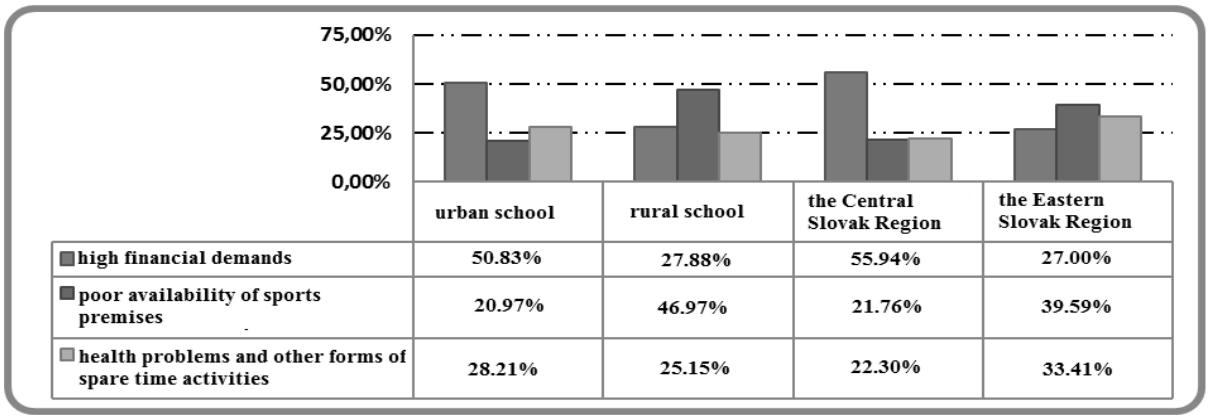
The girls attending rural schools prefer the making of social contacts and mental relaxation to a lesser extent (6.97 %) and the girls attending urban schools to a higher extent (18.10 %) as a main motive to participate in sports activities. A statistical evaluation is presented in Table 12.

**Table 12.** Statistical evaluation – the main motive among girls for participation in sports activities

| item | urban school/ rural school | Central Slovak Region/ Eastern Slovak Region |
|---|---|---|
| **Statistical significance chi – quadrate test (value p)** | ** **p= 3.8020 E-23** | ** **p= 3.8413 E-19** |

***Legend:*** *statistical significance – p <0.01=**, p <0.05, =*, n= no statistical significance*

The research was further focused on the factors which prevent the girls from participating in sports. Evaluating this question we found significant differences between the girls attending urban and rural schools (Fig. 14). The girls attending urban schools are restricted from sports by high financial costs (50.83 %) and the girls attending rural schools by the lack of sports premises close to their home (46.97 %). Across the regions the responses were different. The vast majority of girls in the Central Slovak region (55.94 %) consider "high financial demands" as a dominant factor which stops them from participating in sports and the girls from the Eastern Slovak Region the lack of sports premises close to their home (39.59 %). Evaluating this question concerning the girls of urban and rural schools as well as both regions, the responses were statistically significant at a value of p<0.01 (Table 13).




| | urban school | rural school | the Central Slovak Region | the Eastern Slovak Region |
|---|---|---|---|---|
| high financial demands | 50.83% | 27.88% | 55.94% | 27.00% |
| poor availability of sports premises | 20.97% | 46.97% | 21.76% | 39.59% |
| health problems and other forms of spare time activities | 28.21% | 25.15% | 22.30% | 33.41% |

**Fig. 13.** The main factor which prevents the girls from participating in sports

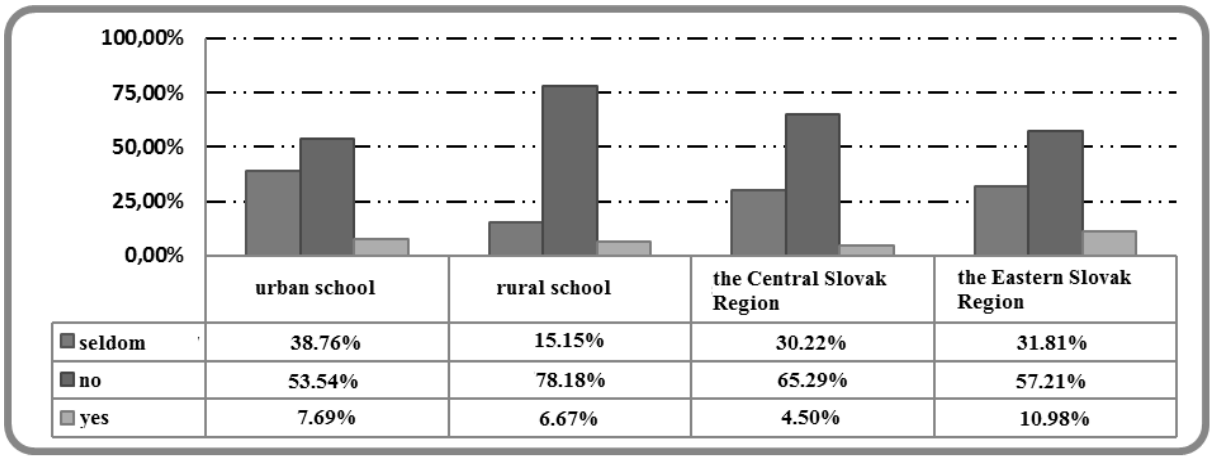
**Table 13.** Statistical evaluation – the main factor which prevents the girls from participating in sports

| item | urban school/ rural school | Central Slovak Region/ Eastern Slovak Region |
|---|---|---|
| **statistical significance chi – quadrate test (value p)** | ** **p= 1.1881 E-17** | ** **p= 3.9044 E-19** |

***Legend:*** *statistical significance – p <0.01=**, p <0.05, =*, n= no statistical significance*

The vast majority of girls do not watch the sports activities offered at schools. The rate of negative responses "no" reached 53.54 % (girls attending urban schools) to 78.18 % (girls attending rural schools). The girls from the Eastern Slovak Region are most interested in watching the offered sports activities, even though this interest did not exceed 11 % (Fig. 15).

The girls' responses in terms of urban and rural schools as well as in terms of the regions were statistically significant at a value of p<0.01 (Table 14).




| | urban school | rural school | the Central Slovak Region | the Eastern Slovak Region |
|---|---|---|---|---|
| seldom | 38.76% | 15.15% | 30.22% | 31.81% |
| no | 53.54% | 78.18% | 65.29% | 57.21% |
| yes | 7.69% | 6.67% | 4.50% | 10.98% |

**Fig. 14.** Interest in watching the offered sports activities among girls at schools or at place of their residence

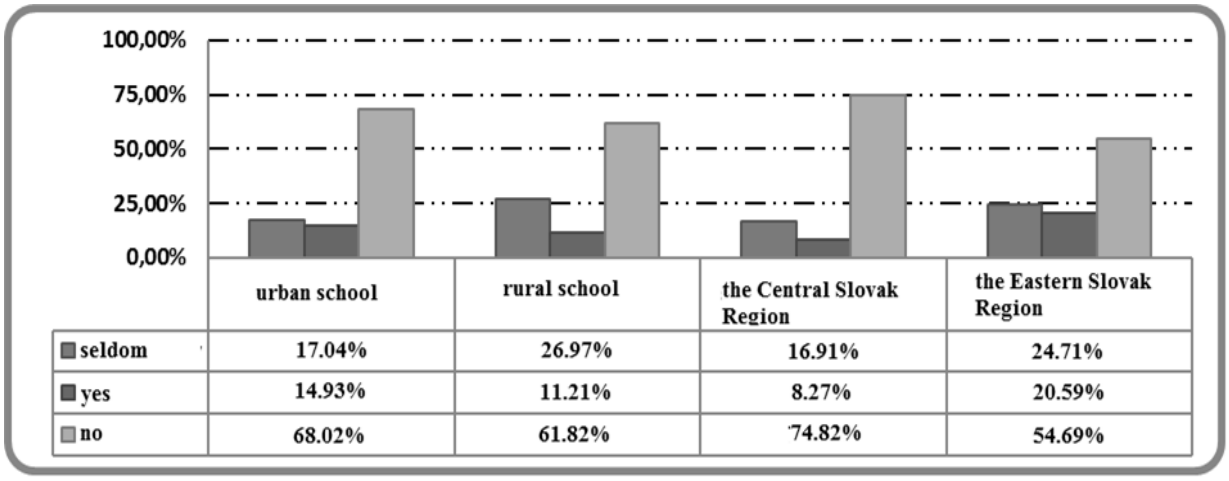
**Table 14.** Statistical evaluation – Interest in watching offered sports activities among girls at schools or at place of their residence

| item | urban school/ rural school | Central Slovak Region/ Eastern Slovak Region |
|---|---|---|
| **Statistical significance chi – quadrate test (value p)** | ** **p= 3.9751 E-14** | ** **p= 0.0002** |

***Legend:*** *statistical significance – p <0.01=**, p <0.05, =*, n= statistical significance*

The last question of the survey was to determine how the girls use the sports activities offered at schools or at place of their residence.

It was found out that the girls mostly do not use the sports activity offered at schools or at their place of residence. The rate of negative responses reached more than 50 %. The girls coming from the Eastern Slovak Region use these services somewhat. Their answer "yes" reached 20.59 % and "seldom" 24.71 % (Fig. 16). The girls' responses in terms of both aspects observed were statistically significant at a value of p < 0.01 (Table 15).




| | urban school | rural school | the Central Slovak Region | the Eastern Slovak Region |
|---|---|---|---|---|
| seldom | 17.04% | 26.97% | 16.91% | 24.71% |
| yes | 14.93% | 11.21% | 8.27% | 20.59% |
| no | 68.02% | 61.82% | 74.82% | 54.69% |

**Fig. 15.** Use of the sports activities offered to girls at school or at their place of residence

**Table 15.** Statistical evaluation – the use of sports activities offered to girls at school or at their place of residence

| item | urban school/ rural school | Central Slovak Region/ Eastern Slovak region |
|---|---|---|
| **Statistical significance chi – quadrate test (value p)** | **** p= 0.0008** | **** p= 1.7957 E-11** |

***Legend:*** *statistical significance – p <0.01=**, p <0.05, =*, n= no statistical significance*

**4. Discussion**

We found out that 20 % of girls take part in sports activities less than one hour during the working week and more than 40 % of girls spend one or two hours. The above mentioned students' groups support the results according to Nemec (2015) 45.83 % of respondents spend their spare time actively, at least two hours per working week and 31.82% of respondents one hour.

Our respondents take part in sports activities for 3-5 hours during the weekend. As stated by the study of Nader et al. (2008) children at the age of nine perform sports activities more than three hours during the working week or the weekend, and their activities decrease with advancing age. At the age of fifteen they participate for 49 minutes per day during the week and even less during the weekend – only 35 minutes per day. As stated by Nemec (2015), 42.8 % of secondary school students spend two hours on sports activities during the weekend and up to 37.12 % only one hour.

A positive aspect to consider is that more than 40 % of girls from urban and rural schools as well as girls in the Central and Eastern Slovak Regions take part in sports activities for more than five hours per day during holidays. On the other hand 27.27 % of girls at rural schools and 24.26 % in the Eastern Slovak Region take part in sports activities for less than three hours per day, which is considered alarming. This research only confirms the research by Antala (2012). They pointed out that physical education at schools is the only opportunity for many children to take part in sports activities. School inspections in the Czech Republic found that the amount of schools with extended studies in physical education in the school year 2009/2010 dropped about 14 % compared with 2009.

The research results show that the girls definitely prefer team sports (almost 50% in all the research groups observed). Just over 20 % of girls prefer individual sports. Our research results correlate with the findings of Antala (2012), Nemec (2015) and others, who also found that the favourite sports activity is team sports.

We found out that girls prefer traditional team sports. Only some girls attending urban schools prefer lesser-known team sports (21.27 %). In rural schools the preference is even lower at 10.61 %, with the Eastern Slovak Region at 25.86 % and the Central Slovak Region at 11.33 %. The research results confirm the research of Formankova and Frömel (1999), who found strong interest in volleyball amongst girls. The research of Antala (2012) using a sample of 622 primary school girls shows that the most sought-after sport is volleyball.

The girls attending rural schools prefer the making of social contacts and mental relaxation to a lesser extent (6.97 %) and the girls attending urban schools to a higher extent (18.10 %) as a main motive to participate in sports activities. According to Roskova (2010), the quality of life is connected with sport to such an extent that sports activities among children should be perceived as a part of their healthy lifestyle. Given this reasoning, we were further interested in the main motive among girls for participating in sports activities. The girls attending rural schools (70.91 %) as well as the girls from the Eastern Slovakia (60.64 %) consider the main motive the improvement of their health, physical fitness and strength. As stated by Litt et al. (2011), 94 % of adolescent girls responded that the main motive for participating in sports activities is health improvement.

On the other hand the girls attending rural schools (45.10 %) as well as the girls from the Central Slovak Region (50 %) preferred the answer "figure improvement and body weight reduction". Stackeová (2008) reached similar findings, that the main motivation to visit fitness centres is body weight reduction.

## 5. Conclusion

The research findings show that there are no statistically significant differences between the sports activities of primary school girls attending rural and urban schools during the working week. Respondents attending urban schools are more physically active during holidays compared to respondents attending rural schools and also respondents from the Central Slovak Region are more physically active than respondents from the Eastern Slovak Region ($p<0.01$).

Participation in sports activities among girls is mostly recreational– the response frequency reached almost 50 % in all the research groups observed. The girls especially prefer team sports – more than 42 % of respondents. We also found out that improvement in health and physical fitness is the main motive for participation in sports activities among girls.

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# Effect of Badminton and Basketball Skill Training on the Physical Self-Concept (Body Satisfaction) of Nigerian Adolescents

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**Abstract**

The purpose of the study was to examine the effect of sport skill acquisition in two selected sports on the body satisfaction of in-school adolescence. Experimental research design was adopted for the study. The Body Satisfaction Scale BSS, Slade, Dewey, Newton; Brodie, Kiemle (1990) was administered on 160 participants who took part in an eight week structured exercise intervention using the pre-post-test method. The mean and standard deviation of the pre and post treatment and A Two Way Analysis of Variance (ANOVA) was used to test for difference among means the result revealed significant effect in the pre and post treatment sport groups (<0.05). Scheffes' post hoc analysis was used to determine the location of the significant effect, (<0.05). The study concluded that only basketball skill training had a significant effect of participants body satisfaction (F = -2.94, P<0.05) while badminton skill training did not have any effect on participants body satisfaction (F = 1.11; P > 0.05) irrespective of sex and age.

**Keywords:** sport skill, self-perception, body satisfaction, gender, in-school adolescent, identity, badminton, basketball.

## 1. Introduction

Youth sport can offer a positive context for the development of identity, since youth can try out different activities in the process of establishing a sense of self. Involving oneself in a sport provides opportunities to reflect on one's strength and weaknesses and to gain a better understanding of who one is. Individuals form the majority of their identity during adolescent and the key components of identity formation are self-esteem and body image (body satisfaction) which are the two psychological well-being variables that were the focus of this present study. Exercise and, by extension , sport have long been known to produce beneficial effects in mental health, enhance self-esteem, participation in sport and exercise programmes can play an important role in supporting the formation of self-concept in adolescents and building self-esteem and self-confidence in people of all ages. Participating in sports and physical activities is more likely to enhance balance physical development, expand skill development opportunities and encourage sport participation that maximizes lifelong fitness and well-being.

Physical activity (exercise) is a proven way to increase self-esteem, being involved in physical activity is one way for adolescents to cope with the changing time in their life. Especially during puberty, this is regarded as a period of major transition in forming a positive or negative attitude towards one's self-esteem and body image among adolescents. An individual develops his/her body

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image based on "perceptions of body appearance, thoughts and belief regarding body shape and appearance, attitudes reflecting how individual feel about their body size and shape, and behaviours that embody actions related to appearance. Body image is central to adolescents self-definition, because they have been socialized to believe that appearance is an important basis for self-evaluation and evaluation by others. Adolescents' assessments of their self-worth are based on the judgments they imagined others makes of them.

Involvement in physical activity, exercise and sport promotes psychological well-being. Psychological well-being refers to how a person evaluates his or her life and according to the American College of Sport Medicine (ACMS) (2006), psychological well-being encompasses three dimensions: cognitive, affect and self-perception. Researchers have been particularly interested in the psychological well-being of adolescents, as the period is associated with an increase in self-consciousness and an increased likelihood to be self-critical.

Today sport is a topic that interest and engage many people especially adolescents, sport consists of training, and games, competition and display. Sport's unique and universal power to attract, motivate and inspire, makes it a highly effective tool for engaging and empowering individuals. Adolescents who participated in sport could use their energy, feel the joy of movement and savour the feeling that they were a part of a social group. Participation in physical activity has a role to play in personal development; it improves physiological and mental functioning and gives rise to feelings of physical, psychological and social competence.

Participating in sports and physical activities is more likely to enhance balance physical development, expand skill development opportunities and encourage sport participation that maximizes lifelong fitness and well-being. Physical activity (exercise) is a proven way to increase self-esteem, being involved in physical activity is one way for adolescents to cope with the changing time in their life. Especially during puberty, this is regarded as a period of major transition in forming a positive or negative attitude towards one's self-esteem and body image among adolescents. Adolescents' assessments of their self-worth are based on the judgments they imagined others makes of them. Involvement in physical activity, exercise and sport promotes psychological well-being researchers have been particularly interested in the psychological well-being of adolescents, as the period is associated with an increase in self-consciousness and an increased likelihood to be self-critical.

The psychosocial crises of the fifth stage, identity versus identity confusion centres on establishing a coherent identity. It is at this stage that Erikson (1959) described the young person as developing a sense of ego identity as he or she receives confirmations of integrated self-images from society. Empirical researches also indicated that, identity achievement status reflects the epitome of adolescent mental health, adjustment, self-esteem and is a predictor of positive social and psychological outcomes such as positive psychological well-being (Waterman, 2007).

The self-discrepancy theory was postulated by Higgins (1987) was used to guide this study and states that there are three basic domains of the self: the actual self, the ideal self, and the ought self. Self-discrepancy theory proposes that different emotions and behaviours will be felt depending on the type of discrepancy experienced by the individual. The theory explain the relationship between body image and satisfaction, body related emotions and behaviours. Self-discrepancy is beneficial to the study of body image because it provides an explanation for the emotions produced as a result of incompatible beliefs in relation to the body. These emotions can in turn be used to predict behaviour in individuals. An important aspect of self-discrepancy theory is that, unlike previous theories of belief incompatibility, self-discrepancy theory goes further into this examination to the extent that it links certain kinds of discomfort and emotions with distinct belief incompatibilities (Higgins, 1987).

Self-discrepancy theory also poses that there are two different standpoints for looking at the self: an individual's own standpoint or the standpoint of a significant other (Higgins, 1987). One major field of study when examining body image is the area of body satisfaction. Body dissatisfaction can occur when the perceived actual body does not match the perceived ideal or ought body whether this is from an individual, cultural or significant other's standpoint. Studies have shown that women are more susceptible than men to body dissatisfaction (Feingold, Mazzella, 1998; Rozin et al., 2001) and think of themselves as being less good-looking in comparison to other females than men think of themselves in comparison to other males (Feingold, Mazella, 1998). One possible reason for women's greater body dissatisfaction is that they have been socialized to

place importance on appearance and are pressured more than men to meet greater cultural demands for physical attractiveness (Fredrickson et al., 1998).

The implication/application of this theory is that sports are vehicles of identity, providing people with a sense of difference and categorizing how they are like some people and different from others. Individuals are able to develop a strong sense of self; a sense of belonging; and many opportunities to develop friendships which contribute to identity formation. Participation in physical activities, exercise or sports contributes to self-assessment and organized activities provide the opportunity for adolescents to look at themselves and gain an understanding of "who they are" (Hensen et al., 2003). While engaging in an activity and gaining these understanding participants are able to express and refine their identity and help to improve self-esteem, increase self-consciousness.

The resulting change in mental state of mind is one of the most common outcomes of an exercise programme where sport skills are learnt. Sport skills are specialized subsets of motor skills and the acquisition of sport skills expertise is both a product of development and a process for development, meaning that psychological development affects sport skill acquisition and that sport skill acquisition process results in psychological changes.

Some of the common desires of individuals who engage in sports are improvement within the physical, psychological and psycho-motor domains. Studies (Salokun, 1990, 1994; Griffin, Kirby, 2007; Temple, Stanish, 2008) seeking to establish the effects of sports participation on these variables are numerous globally; however, there is a paucity of such studies in Nigeria. While some have reported positive findings, a few others have yielded uncertain results especially with regards to sports like badminton and basketball. From the foregoing problems mentioned above, this study was conducted to investigate the effect of acquisition of sport skills such as bouncing, passing and dribbling in basketball; forehand serve and forehand overhead clear in badminton on the psychological well-being (self-esteem and body satisfaction) of adolescent boys and girls in Nigerian secondary schools. This study was interested in investigating other issues generated by the problems stated above which gave rise the research question; Can the acquisition of skills in the game of badminton and basketball influence the psychological well-being of adolescent boys and girls? Also, the following hypothesis was formulated for this study; there will be no significant effect on the psychological well-being (self-esteem and body satisfaction) of the adolescents who participated in badminton and basketball skills training and adolescents who did not participate in skill training based on age and sex. It is hoped that the findings of this study and the subsequent recommendations would be relevant in providing information about the relevance of active participation of adolescents and other age categories in exercise as it has a lot of health and psychological benefits. Also that the negative perception of parents and educational organization in Nigeria about active involvement in sports and physical education programmes will be changed.

Body image encompasses an individual's body related self-perceptions and self-attitudes, and is linked to self-esteem. Cash (2001) stated that body image is influenced by factor such as socialization, one's own physical appearance or characteristics, personality attributes, interpersonal experiences and cultural socializations.

## 2. Review of related literature

Body image is a multi-dimensional construct that involves internal, biological and psychological factors as well as external, cultural and social factors, and body satisfaction in a dimension of body image (Cash, Pruzinsky, 2002). Body image to a great extent is a major index of defining a person in terms of appearance. People especially adolescents are on self- induce dieting programmes, unstructured physical activity and taking a lot of supplements to maintain the "ideal" body image as advertised in thse media. Adolescents who are endomorphic often have a much distorted self-evaluation of themselves and believe that they are misfit in the society especially females who are particular about looking good in latest fashion. Body image has been defined as a "person's mental image and evaluation of his or her physical appearance and the effect of these perceptions and attitudes on behaviour" (De Panfilis et al., 2003). According to Hinds (2002) body image is the way a person feels about his or her body, it is the mental picture a person has about his or her body and includes feeling from facial features to body size.

According to Cash, Melnyk, Hrabosky, (2004b) body image attitudes consist of two sub-dimensions; evaluative body image pertains to cognitive appraisals and associated emotions about

one's appearance, including self-ideal discrepancies and body satisfaction-dissatisfaction evaluations. In contrast, investment body image refers to the cognitive-behavioural importance of appearance in one's personal life and sense of self, reflecting a dysfunctional investment in appearance, as opposed to more adaptive valuing and managing of one's appearance (Cash et al., 2004b). Extensive previous research has established significant and substantial relations between body image attitudes and psychosocial functioning and well-being. A negative body image (i.e., body dissatisfaction and dysfunctional body image investment) can have adverse psychosocial consequences, including poor psychological adjustment, poor self-esteem, increased depression and anxiety, emotional instability, impaired sexual functioning, and inadequate eating and exercise behaviours (Cash, Pruzinsky 2002; Donaghue, 2009; Grilo, Masheb, 2005; Matz et al., 2002). Research findings highlight the growing prevalence of a negative body image; however such discontent may vary in its impact on an individual's psychological well-being. For some individuals being dissatisfied with their body weight, or shape, or some facial feature, can have minimal or even benign implications; for others, the negative implications can be severe. Dysfunctional investment body image seems to have more adverse consequences to psychological well-being than evaluative body dissatisfaction, which per se is not considered as a valid indicator of emotional distress and psychosocial impairment (Cash et al., 2004c). Indeed, prior studies have confirmed that dysfunctional investment in appearance considerably exceeds the contribution of body dissatisfaction to the prediction of psychosocial functioning (e.g., Cash et al., 2004b). Jakatdar, Cash, Engle (2006) also found that body image investment, measured as cognitive errors or distortions related to body image thoughts, predicted quality of life and disturbed eating attitudes above and beyond evaluative body image. This notwithstanding, much of the literature on body image has focused on the evaluative component, neglecting body image investment (Cash, Pruzinsky 2002).

Neumark-Sztainer, Goeden, Story, Wall (2004) using (The Body Satisfaction..., 1953) a five point Likert-type scale measuring satisfaction with height, weight, body shape, waist, hips, thigh, stomach, face, body build, and shoulder. These parameters were measured with physical and sedentary activities. The participants included 4,746 boys and girls 11-18 years old. The result yielded that association between body dissatisfaction and physical activities were not significant but lower levels of body satisfaction were associated with high levels of physical activity levels. Ishak, Jamaluddin and Chew (2010) carried out a study to examine factors influencing student's self-concept among Malaysian students and the study included the physical self-concept (body satisfaction) of students and they reported that students with positive self-body image feel comfortable with their bodies whereas students with negative self-body image were not satisfied or feel uncomfortable with their bodies. According to Lerner, Steinberg (2004) teenagers who perceive themselves as physically unattractive tend to have poor self-evaluations and thus lower self-esteem, while those with positive body images tend to rate themselves more competently with higher reported self-esteem. Physical appearance directly links with self-esteem as feedback from peers, schools, parents, and other adults informs an adolescent's perception of body attractiveness.

In correlate with a study using the 70-item Physical Self-Description Questionnaire and the 23-item Body Esteem Scale used to determine how positively individual perceive themselves in terms of appearance and body image and how it affect the individual self-esteem. Data collected reported no significant age related difference in self-esteem, however, boys and girls felt similarly satisfied about their physical appearance, with both reporting positive feeling about physical appearance and general self-esteem. The benefits of sport participation were consistent for both sexes, making them feel better about themselves physically (appearance and competence) and generally. Fernandez-Aranda, Aitken, Badia, Gimenez, Solano, Collier, Treasure, Vallejo (2004) reported no gender difference in body satisfaction of adolescent in their study. According to Boyer, Petries (2007) though the relationship between gender and self-esteem is still not completely understood, there is evidence to suggest that females experience a decrease in self-esteem during adolescent. This evidence according to Boyer, Petries (2007) in contrary to the increasing self-esteem patterns found for adolescents in general. The author maintained however that when self-esteem levels for male and female adolescents are reported as a combined group, the higher levels of self-esteem for males may mask the patterns of female's self-esteem and produce an overall increasing trend in self-esteem for adolescents. Research on exercise, physical activity participation and body satisfaction has been mixed. There is experimental evidence that exercise enhances body

satisfaction (Salusso et al., 1991; William, Cash, 2001). Some studies however, show no significant influence of exercise on body satisfaction (Aine, Lester, 1995; Alfermann, Stoll, 2000; Tiggermann, Williamson, 2000).

In a study by Huang, Norman, Zabinski, Calfas and Patrick (2007) on body image and self-esteem among adolescents undergoing an intervention targeting dietary and physical activity behaviours. The study demonstrated a lack of adverse effects on self-esteem and body satisfaction among all study participants regardless of study group assignment and healthy dietary and physical activity behaviours.

This is in accordance with the review findings of Sallis, Prochaska, Taylor (2000) perceived physical appearance and body image/body satisfaction were unrelated to physical activity in adolescents. Also, an examination of factors associated with changes in physical activity in adolescent girls Neumark-Sztainer, Story, Hannan, Tharp and Rex (2003) found no association between physical activity and body satisfaction. Similarly, recent findings from the PASS study Inchley, Kirby and Currie (2008) revealed no significant association between physical activity and body satisfaction for boys and girls from P7 to S4. Also, there were no significant relationship between exercise activity and body image/body satisfaction in a study carried out by Frost and McKelvie (2005) to find out the relationship of self-esteem and body satisfaction to exercise on elementary school, high school and university students. A study by Richman and Shaffer (2000) on a sample of college female showed a positive correlation between sport participation and body image. Zabinski, Calfas, Gehrman, Wilflay and Sallis (2001) carried out a study on the effect of physical activity intervention on body image in university seniors of America. The study established a connection between body satisfaction and active participation in physical activity and sport. Olchowska-Kotafa and Chromik (2013) posited that there is a correlation between body satisfaction and the amount of time spent on physical activity. The correlation was observed in both male and female students. Sira and Ballard (2011) investigated gender differences in body satisfaction in college participants using the Self-perception Profile for College Students (Neemann, Harter, 1986) which assessed college student's degree of satisfaction with one's body. The author found that athletic competence greatly influenced body satisfaction. Seeking to establish the effects of sports participation on body satisfaction are numerous globally; however, there is a paucity of such studies in Nigeria. While some have reported positive findings, a few others have yielded uncertain results especially with regards to sports like badminton and basketball. From the foregoing problems mentioned above, this study was conducted to investigate the effect of acquisition of sport skills such as bouncing, passing and dribbling in basketball; forehand serve and forehand overhead clear in badminton on the psychological well-being (body satisfaction) of adolescent boys and girls in Nigerian secondary schools. This study was interested in investigating other issues generated by the problems stated above which gave rise the research question; Can the acquisition of skills in the game of badminton and basketball influence the body satisfaction of adolescent boys and girls? Also, the following hypothesis was formulated for this study; there will be no significant effect on the body satisfaction of the adolescents who participated in badminton and basketball skills training and adolescents who did not participate in skill training based on age and sex. It is hoped that the findings of this study and the subsequent recommendations would be relevant in providing information about the relevance of active participation of adolescents and other age categories in exercise as it has a lot of health and psychological benefits. Also that the negative perception of parents and educational organization in Nigeria about active involvement in sports and physical education programmes will be changed.

## 3. Methodology

### Research Design

The study employed the pre-test and post-test experimental design. The population for this study consisted of all in-school adolescents in junior and senior secondary schools in Osun State. The sample size comprised 160 students. The stratified random (intact-class) sampling technique was adopted in the selection of samples for the study. A Local Government Area (LGA) was selected randomly using balloting method. Out of the nine schools in the LGA, two co-educational secondary schools were selected purposively for the study. The purpose sampling technique was used because of their proximity to the intended facilities and the multi-representation of students from different background and age brackets which fully represents the target participants drawn

from the Junior Secondary School class 2 (JSS2) and the Senior Secondary School 2 (SSS2) classes respectively. The experimental groups were 40 participants each from Atakumosa High School Osu (Basketball), and Ibodi Grammar School, Ibodi (Badminton). The control groups (80 boys and girls) were 40 participants each from another intact-class from the same selected schools. Sex and age differentiation were put into consideration in the selection and these two classes needed for the study. All participants were novice or adolescents that have no knowledge of the skills of the selected sports. The research instrument used in the current study was the Body Satisfaction Scale BSS, Slade, Dewey, Newton; Brodie, Kiemle (1990) to measure body satisfaction. The scale asks participants to rate the degree of satisfaction with body parts on a 7-point Likert-type scale anchored by 1= very satisfied and 7= very unsatisfied. The reliability, and internal consistency of the scales were tested and the alpha coefficient was equal .88 in the present study. Inferential statistics such as the t-test, factorial design (sex and age), analysis of variance (ANOVA) through SPSS, was used to treat data collected. The level of significance for all analysis was at 0.05.

## 4. Results

Table 1 presents a descriptive of the means distribution of pre and post- treatment body satisfaction based on gender.

**Table 1.** Descriptive statistics showing pre and post-treatment group's body satisfaction by gender

| Groups | Sex | N | Pre-Treatment | | Post-Treatment | |
|---|---|---|---|---|---|---|
| | | | $\overline{X}$ | SD | $\overline{X}$ | SD |
| Basketball | Male | 22 | 92.2500 | 1.91881 | 95.9091 | .42640 |
| | Female | 18 | 89.6250 | 3.26999 | 95.1667 | 1.65387 |
| | Total | 40 | 91.2000 | 2.60165 | 95.5750 | 1.19588 |
| Badminton | Male | 24 | 94.59 | 6.91092 | 95.2917 | 1.62799 |
| | Female | 16 | 93.8889 | 12.08787 | 94.6250 | 2.41868 |
| | Total | 40 | 94.2750 | 9.27694 | 95.0250 | 1.98051 |
| Control | Male | 46 | 93.7174 | 6.48644 | 93.6739 | 4.25339 |
| | Female | 34 | 94.0294 | 4.46186 | 94.0294 | 3.37984 |
| | Total | 80 | 93.8500 | 5.68387 | 93.8250 | 3.88693 |
| Total | Male | 92 | 93.5435 | 5.86930 | 94.6304 | 3.26054 |
| | Female | 68 | 92.9559 | 6.97850 | 94.4706 | 2.80442 |
| | Total | 160 | 93.2938 | 6.34996 | 94.5625 | 3.06674 |

The result in Table 1 shows the means of pre and post-treatment body satisfaction score of male and female students in basketball, badminton and control. To ascertain if there was significant relationship between sex and body satisfaction among participants of various groups, a two way Analysis of Variance (ANOVA) was used, the result is summarized in Table 2.

**Table 2.** ANOVA summary table showing the difference in each of basketball, badminton and control groups' body satisfaction scores based on sex

| | Sum of Squares | | Df | Mean Square | | F | | Sig. |
|---|---|---|---|---|---|---|---|---|
| | Pre | Post | | Pre | Post | Pre | Post | |
| Corrected Model | 311.551[a] | 105.269[a] | 5 | 62.310 | 21.054 | 1.573 | 2.332 | >.05 |
| Intercept | 1215153.268 | 1261724.355 | 1 | 1215153.268 | 1261724.355 | 3.068E4 | 1.398E5 | <.05* |
| Groups | 274.540 | 83.184 | 2 | 137.270 | 41.592 | 3.466 | 4.608 | <.05* |
| Students' Sex | 35.463 | 4.331 | 1 | 35.463 | 4.331 | .895 | .480 | >.05 |
| Groups Students' Sex | 55.555 | 11.010 | 2 | 27.777 | 5.505 | .701 | .610 | >.05 |
| Total | 1399007.000 | 1432226.000 | 160 | | | | | |
| Corrected Total | 6411.194 | 1495.375 | 159 | | | | | |

* Sig = P < 0.05

Table 2 showed that students groupings (Basketball, badminton and control) have significant main effect on the students' pre-treatment self-esteem (F = 3.47; P<0.05) and on the post-treatment self-esteem (F = 4.61; P<0.05). To further determine the group responsible for the observed significant difference, a multiple-comparison (post-hoc) was attempted. Table 3 presents the summary of the post hoc analysis.

**Table 3.** Summary of Scheffes' post hoc analysis on effect of sport skills training on pre and post-treatment body satisfaction

| | | Pre-Treatment | | | Post-Treatment | | |
|---|---|---|---|---|---|---|---|
| (I) Students' Groups | (J) Students' Groups | Mean Difference (I-J) | Std. Error | Sig. | Mean Difference (I-J) | Std. Error | Sig. |
| Basketball | Badminton | -3.302* | 1.425 | *.022 | .580 | .680 | .396 |
| | Control | .366 | 1.227 | .766 | 1.686* | .586 | *.005 |
| Badminton | Basketball | 3.302* | 1.425 | *.022 | -.580 | .680 | .396 |
| | Control | -2.936* | 1.240 | *.019 | 1.107 | .592 | .063 |
| Control | Basketball | -.366 | 1.227 | .766 | -1.686* | .586 | *.005 |
| | Badminton | 2.936* | 1.240 | *.019 | -1.107 | .592 | .063 |

* Sig = P < 0.05

Table 3 above showed that there was significant difference between the pre-treatment of basketball/ badminton group (F = -3.30, P<0.05) and badminton/ control (F= -2.94, P<0.05) in terms of their body satisfaction. In the post-treatment group however, there was significant difference between the basketball and control. This result seems to suggest that the experimental group of basketball gained some significant increase in their psychological well-being after the 10 weeks training. This phenomenon was however not repeated in the badminton experimental group (F = 1.11; P>0.05). The study thus concludes that there was significant effect of basketball skill training on psychological well- being of school adolescent who train in basketball skills.

## 5. Conclusion

Result of the analysis with reference to psychological well-being of the body satisfaction variable indicated that there was a significant effect of sport skill training on the psychological well-being variable (body satisfaction) of participants who took part in skill sport training. There is also a significant effect in between groups while basketball skill training had a significant effect on the post treatment self-esteem of the participants; badminton skill training on the other hand had no significant effect on participant's body satisfaction.

The result of this present study is in line with Ishak, Jamaluddin and Chew (2010) who carried out a study to examine factors influencing student's self-concept among Malaysian students. The study included the physical self-concept (body satisfaction) of students and they reported that students with positive self-body image feel comfortable with their bodies whereas students with negative self-body image were not satisfied or feel uncomfortable with their bodies. The result of the present study is also consistent with the studies by Richman and Shaffer (2000) on a sample of college female showed a positive correlation between sport participation and body image. Zabinski, Calfas, Gehrman, Wilflay and Sallis (2001) carried out a study on the effect of physical activity intervention on body image in university seniors of America. The study established a connection between body satisfaction and active participation in physical activity and sport. Olchowska-Kotafa and Chromik (2013) posited that there is a correlation between body satisfaction and the amount of time spent on physical activity. The correlation was observed in both male and female students. Sira and Ballard (2011) investigated gender differences in body satisfaction in college participants using the Self-perception Profile for College Students (Neemann, Harter, 1986) which assessed college student's degree of satisfaction with one's body. The author found that athletic competence greatly influenced body satisfaction.

However, the interaction effects of badminton and basketball skill training on body satisfaction based on sex and age is not significant, this also agrees with some studies; Fernandez, Aitken, Badia, Gimenez, Solano, Collier, Treasure & Vallejo (2004); Boyer et al (2007). In other words, adolescent boys and girls who participated in the study felt satisfied with the body image they believed to be theirs. Furthermore, the result of the analysis, following the treatment by gender and age returned a no significant status. This result is consistent with those of previous studies.

## 6. Recommendation

Adolescents should be encouraged to acquire basic skill in sport so as to improve their self-image, and the sport program in whatsoever form should be to ensure the development of positive self-esteem in the participants. Individuals with low self-esteem and distorted body image should be made to participant regularly in organized programs for sports e.g. basketball and badminton. This implies that the school authorities should encouraged through the provision of adequate facilities and equipment, mass participation of student in sport skill training program and sports that have the capacity to generate objective and observable feedback effects(e.g. badminton and basketball) should be concentrated on.

It is also recommended that the practical aspect of physical education and sport should be emphasized in school as this will induce an unconscious display in hidden characteristics in participants. As the true self of an adolescent is better seen in situation of practical participation in games. To achieve that, adequate caution should be exercised in inculcating knowledge of sport skills and in reacting to participants responds to learning processes, teachers should guard against leading the youths to develop negative concept.

Finally, a public awareness campaign should be carried out using the media, social networks (facebook, twitters, WhatzApp, blogging etc.) and the Parent Teacher Association and social institutions to enlighten the populace especially parents of the positive benefit that participation in exercise, physical activity and sport will impact on the physical, educational, emotional, social and psychological well-being of adolescents and to allow them participate fully in organized school sports.

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# Leisure-Time Physical Activities among Adults

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**Abstract**

This article presents the partial findings regarding leisure-time physical activities done by middle-aged adults. In our study group (742 respondents, including 403 women and 339 men) significantly ($p < 0.01$) 56.3 % (n = 191; $\chi^2 = 103.2323$; df-4) of the men and only 31 % (n = 125) of the women stated that they like doing sports activities in their leisure time as a kind of active rest. The most popular leisure-time physical activity among the men was football (16.74 %; n = 107), whereas the women prefer different kinds of dance (aerobic 16.45 %; n = 114, Zumba 13.71 %; n = 95 as well as Pilates exercise 4.47 %; n = 31). In terms of frequency of physical activity, as many as 33 % (n = 112) of the men and 28.5 % (n = 115) of the women carry out physical activities irregularly, while 21.5 % (n = 73) of the men and 15.6 % (n = 63) of the women do not do them at all. There was a significant difference ($p < 0.01$) confirming lower intensity of sports activities in the women in comparison to the men. As far as the way of doing physical activity is concerned, both men (68 %; n = 231) and women (53 %; n = 214), with the highest percentage, chose the option "in an organised group", with the significant difference ($p<0.01$) in favour of the men ($\chi2 = 22.3299$). The study is a part of the researched project VEGA 1/0795/15.

**Keywords:** adulthood, physical activity, leisure time.

## 1. Introduction

The World Health Organisation declared 10 May the World Move-For-Health Day. The purpose was to point to an increasing number of chronic diseases caused by a lack of physical activity (Müller et al., 2013; Dobay, Bendíková, 2014). Sports activities, which belong to significant social phenomena, play an important role in terms of disease prevention and health promotion (Kováč, 2000). They are becoming increasingly popular as leisure-time activities due to several objective and subjective reasons related to development of the society (Labudová et al., 2012; Kovács, 2004).

Physical activity in relation to lifestyle and health proves that the health status can affect leisure-time activities as well as common everyday activities that are important in our life (Bendíková, 2014). Even ancient doctors, including the Chinese ones (around 2600 B. C.) and Hippocrates (around 400 B. C.) believed that physical activity is beneficial for human health. However, the opinion that exercise could endanger people's health had been prevalent until the 20th century. J. Morris, whose work helped to change this general belief, was one of the pioneers in this field. He conducted the first precise epidemiological study focused on the relation between

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physical inactivity and the risk of chronic diseases. It was published in 1953 Blair et al. (2011). Since then, there has been more and more evidence that clearly proves health benefits of physical activity. McElroy (2002) states that the dislike for sports and physical activity can be understood as a battle between two contrasting ideologies. One ideology explains that the sedentary lifestyle is caused by an individual's failure to take responsibility for his/her health, while the other ideology claims that the sedentary lifestyle is the result of a larger social, cultural, political and economic structure of the contemporary society (Szőköl, 2015, 2016). According to several studies (Pedersen, 2009; Blair et al., 2011), people who do not do regular physical activity are much more susceptible to diseases and disorders than those who do it regularly. Many centuries ago, Aristotle, a famous Greek philosopher, defined the ideas that are true even today. He defined physical activity as a leisure-time activity that provided space for human cultivation and self-fulfilment. This concept is very close to the contemporary one. The importance of leisure time at the beginning of the 21st century was increased by different documents and activities organised in the last decades of the last century. One of the most significant documents was the Charter for Leisure Education approved by the World Leisure and Recreation Association in December 1993 (Hofbauer, 2004).

The studies focused on physical activity among adult population found that the frequency of physical and sports activities decreases from 26 to 35 years of age. These studies also showed that the factors that influence leisure time in adult population include social status, occupation as well as health and family status (Eurobarometer, 2010).

## 2. Methodology

The aim of our study was to find out what leisure-time physical activities middle-aged adults do in terms of their content, frequency and intensity.

Our group consisted of 742 middle-aged respondents, 403 women and 339 men, who live in southern districts of Slovakia. Table 1 shows their primary characteristics. Selection of the respondents was intentional. They all completed secondary or higher education and they all worked in private or state-owned companies. None of the respondents was partially or totally disabled. They all were married (they had min. 1 child and max. 3 children).

**Table 1.** Group characteristics (n = 742)

| Group | n | Age | Body height /cm | Body weight/kg |
|---|---|---|---|---|
| women | 403 | 37.2 ± 3.04 | 167.9 ± 3.2 | 65.3 ± 6.8 |
| men | 339 | 36.5 ± 4.54 | 179.6 ± 6.3 | 89.1 ± 7.9 |

We conducted this empirical study in 2015 in three primary phases, including distribution and collection of data from the questionnaires, processing and evaluation of qualitative data and their interpretation. We obtained data by studying literary sources from different foreign and Slovak databases and using a standardised questionnaire. We processed the data by means of the frequency analysis (%) and the chi-squared test ($\chi^2$ $p<0.01$, $p<0.05$) as we wanted to assess the significance of different answers between the male and female respondents. We also used the Pearson correlation coefficient (r $p<0.01$, $p<0.05$) to assess the relation between selected determinants of the group, using the Cohen's table. In addition, we used the logical analysis and synthesis methods, induction and deduction as well as comparison.

## 3. Results of the study and discussion

The rise in the standard of living provides more space for diverse leisure-time activities that should include also physical activity. Physical and sports activities should become the part of a lifestyle of the young generation. However, as many authors point out (Belej, 1992; Boržíková, 2006; Brtková, 1999; Chovanová, 2005, 2006, Bendíková, 2011; Müller, Rácz, 2011; Nemček, 2012; Nagy, Müller, 2016), the daily routine of young people does not include sufficient amount of physical activity in regard to contemporary requirements.

At present, it is difficult for adults to do physical activities in their leisure time due to their being busy. In our study group, significantly ($p < 0.01$) more men 56.3 % (n = 191; $\chi^2 = 103.2323$; df-4) and only 31 % (n = 125) of the women do physical activity in their leisure time as active rest, while 7.4 % (n = 25) of the men and 22.8 % (n = 92) of the women do not do and do not care for

physical activity (3.2 %; n = 13 women and 9.1 %; n = 31 men). As many as 14.4 % (n = 58) of the women and only 1.5 % (n = 5) chose the option "rather not", whereas 28.5 % (n = 115) of the women and 25.7 % (n = 87) of the men opted for "rather do" physical activity. The positive result is that 91.1 % (n = 309) of the men try to perform some physical activity in their leisure time. On the contrary, this percentage is lower in the women (62.7 %; n = 253), which may be caused by objective and subjective factors related to position of women in the society (taking care of the family, house chores, etc.).

The structure of the leisure-time activities in the women shows the stability as far as the most and least popular physical activities are concerned. The women are interested especially in different kinds of dance such as aerobic (16.45 %; n = 114), Zumba (13.71 %; n = 95) as well as Pilates exercise (4.47 %; n = 31), back exercises (8.08 %; n = 56) and relaxation physical activities (8.8 %; n = 61) (Figure 1). The most popular physical activities in the women focus on aesthetic perception of movement, which is characteristic from the psychological point of view. Other "active rest" activities were swimming (12.12 %; n = 84) and running (11.11 %; n = 77), which are available thanks to the environment and surroundings. Another popular activity among the women is cycling (13.85 %; n = 96).

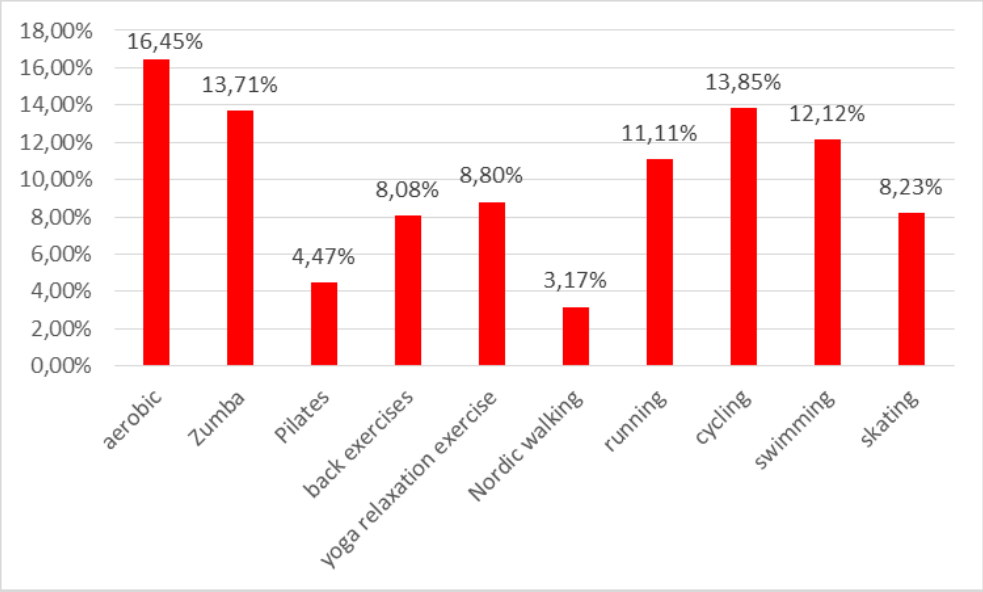


**Fig. 1** Leisure-time physical activities among women (n = 403)

The most popular leisure-time physical activities that the men do are football (16.74 %; n = 107), bodybuilding (15.49 %; n = 99), cycling (15.34 %; n = 98), running (13.93 %; n = 89) and swimming (12.05 %; n = 77). The less popular activities include basketball (6.73 %; n = 43), tennis (5.16 %; n = 33), Nordic walking (5.01 %; n = 32), volleyball (4.85 %; n = 31) and skating (4.69 %; n = 30) (Figure 2).

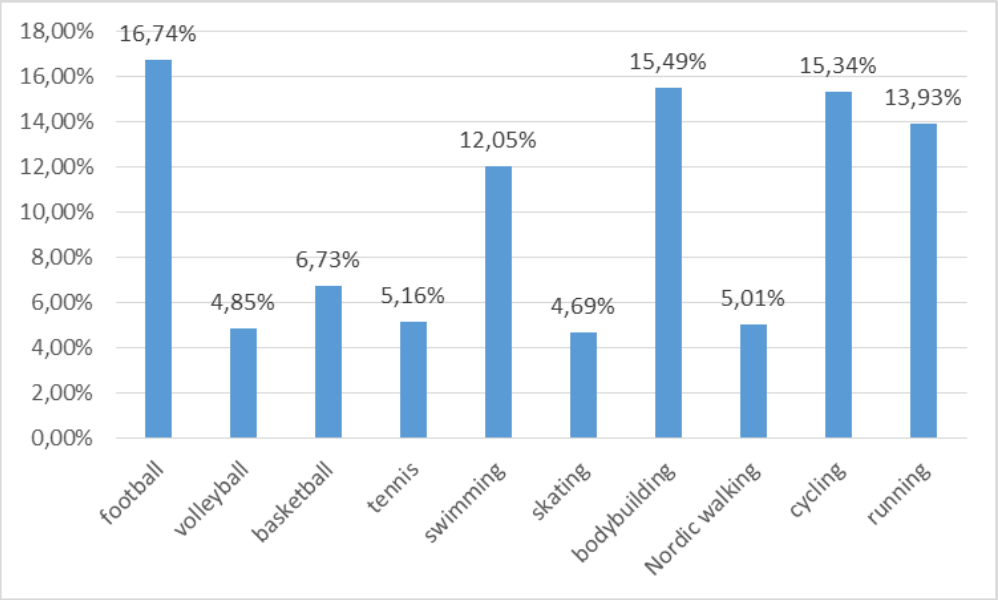


**Fig. 2** Leisure-time activities among men (n = 339)

Our findings confirm the fact that female adolescents and adults prefer individual activities without direct contact that are focused aesthetically ($\chi^2$ = 33.2323; p < 0.01), while the men prefer dynamic and fitness physical activities ($\chi^2$ = 36.3239; p < 0.01).

The frequency of physical activities done by individual respondents was as follows (Figure 3): 33 % (n = 112) of the men and 28.5 % (n = 115) of the women carry out physical activity irregularly and 21.5 % (n = 73) of the men and 15.6 % (n = 63) of the women do not do any physical activity at all. This finding is shocking, considering the contemporary prevalence of lifestyle diseases that have far-reaching effects on people's health in adulthood and old age. In addition, Tóthová (2002) states that a lack of sports activities done by women is caused by insufficient willpower (64 %), taking care of family (50 %), a lack of free time (46 %) and occupational fatigue (36 %).

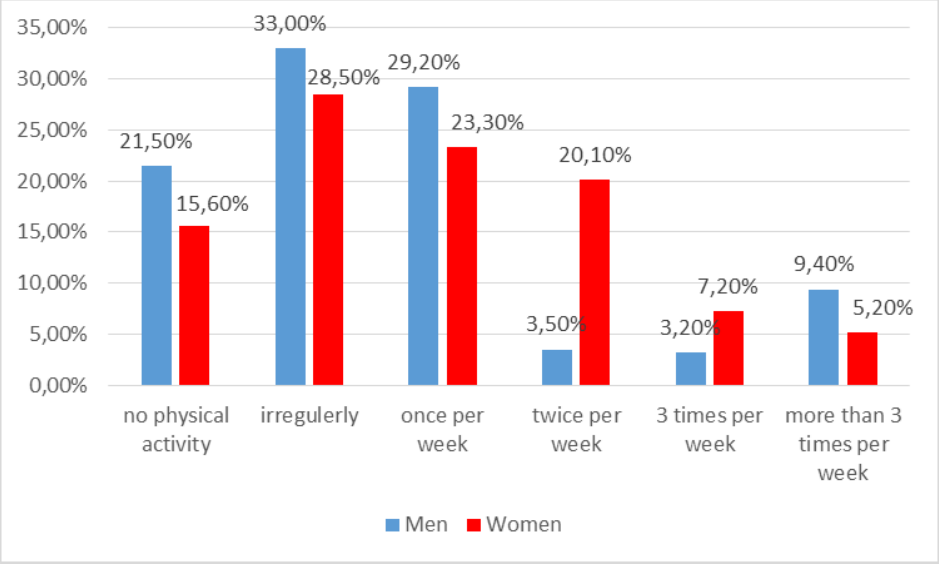


**Fig. 3.** Frequency of physical activity per week (n = 742)

On the contrary, 9.4 % (n = 32) of the men and 5.2 % (n = 21) of the women, with the 4.2 %, difference against the women, carry out physical activities more than three times per week. Furthermore, 29.2 % (n = 99) of the men and 23.3 % (n = 94) of the women (with the 5.9 % difference against the women) do physical activity once per week. Significant number ($\chi^2$ =

57.3878; p < 0.01; df-5) 20.1 % (n = 81) of the women do physical activity regularly twice per week, while only 7.2 % (n = 29) do it three times per week. The men, with the 0.3 % difference, carry out physical activity twice a week (3.5 %; n = 12) and three times per week 3.2 % (n = 11). The findings reached by Dobay, Bendíková (2014) point to the fact that men do physical activities regularly two or three times per week in contrast to women. In this regard, Šimonek (2007) recommends that the adults aged 31-40 do five to seven hours of physical activity per week. What is more, there are other studies that emphasise the importance of 30-minute everyday physical activity in the daily routine of each individual (WHO, 2002).

Intensity and the abovementioned frequency of physical activity are important in terms of human health. Therefore, we were also interested in the intensity of physical activity. Both men (52.2 %; n = 177) and women (49.1 %; n = 198) stated mostly moderate intensity of doing physical activities. What is more, 30.7 % (n = 104) of the men stated high intensity and only 17. 1 % (n = 58) of the women chose low intensity. Low intensity was prevalent in the women 35.2 % (n = 142), while only 15.6 % (n = 63) of them confirmed high intensity. There was a significant difference between the men and the women ($\chi^2$ = 41.309; p < 0.01; df-2) as far as low intensity of physical activity is concerned (Figure 4). The findings reached by Dobay, Bendíková (2014) also confirmed significantly (p < 0.01) lower intensity of physical activities performed by women in comparison to men.

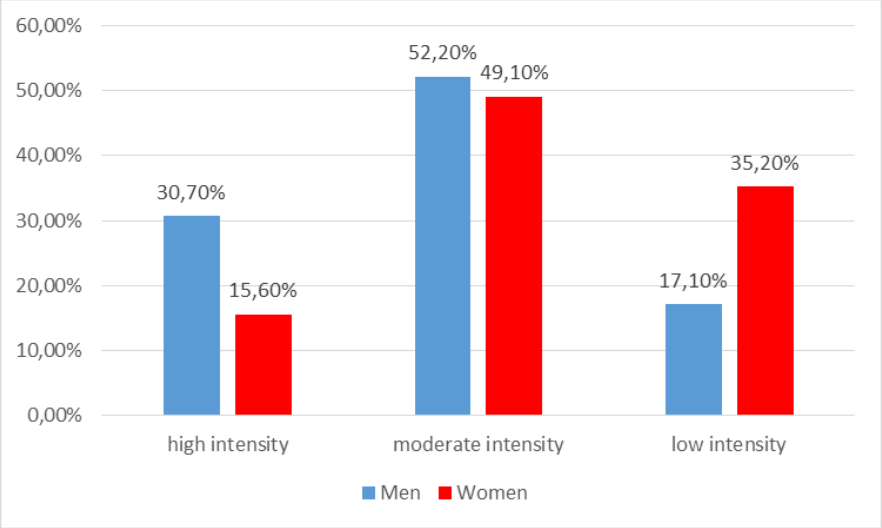


**Fig. 4.** Intensity of physical activity (n = 742)

Concerning the way how the respondents perform physical activities, both men (68 %; n = 231) and women (53 %; n = 214) chose, with the highest percentage, the option "in an organised group". There was a significant difference (p < 0.01) in favour of the men ($\chi$2 = 22.3299; df-3). The option "in an unorganised group" was chosen by 20 % (n = 67) of the men and 25 % of the women (n = 101). The option "on my own" was chosen by 7 % (n = 24) of the men and 9 % (n = 36) of the women, while 5 % (n = 17) of the men and 13 % (n = 52) of the women opted for "I do not care". Considering also developmental psychology, we can confirm that as people get older, they prefer doing physical activity in organised groups. Furthermore, we believe that leisure-time physical activities, especially those which people carry out in groups, contribute to improvement of people's health status as well as social inclusion, human relationships and social communication. It can be said that sports activities done in an organised or unorganised way present an effective tool that has a positive social and economic impact and serves for prevention in terms of health. Preventive measures are always less expensive for the society than the medical treatment itself (Willey et al., 2010; Labudová et al., 2012; Nemček, 2014).

## 4. Conclusion

In terms of types of physical activities, there were significant differences (p<0.01) between the men and the women. Both sexes, with higher percentage in the men, prefer organised physical activities (p<0.01). There was also a difference (p<0.01) in favour of the men as far as the

frequency of physical activity is concerned. It was more regular. The intensity of physical activities is lower in the women than in the men ($p<0.01$).

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# The Investigation of Personal and Social Responsibility Levels in Athlete and Non-Athlete Male and Female Adolescents

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**Abstract**

The purpose of this research was to compare personal and social responsibility levels of athlete and non-athlete students from parents, physical education teachers and other lessons teachers' viewpoints. The sample of this study were 357 students, from all male and female students of middle schools in Rasht city (n=6882) who participated in this research whose responsibility were studied basis of opinions of 357 their parents, 44 physical education teachers and 69 other lessons teachers' viewpoints in home, physical education class and other classes respectively. Research instrument was PSRQ Questionnaire by Li et al (2008). The questionnaires were given to sport management and physical education professors and also psychology professors for evaluating content validity. The reliability of students' responsibility questionnaires were confirmed in home (α=0.72), physical education class (α=0.86) and other classes (α=0.90). Data analysis by using U-Mann Whitney test in the significant level of P≤0.05 indicated that from parents, physical education teachers and other lessons teachers' viewpoints, athlete students had higher personal and social responsibility in home, physical education class and other classes (P≤0.05). According to the opinions of parents and physical education, there weren`t significant differences between female and male students in their responsibility. But, this difference was significant from other lessons teachers' viewpoints (P≤ 0.05).

**Keywords:** responsibility, socio emotional development, physical education.

## 1. Introduction

A landmark experience for any youngster is becoming an adult. Even in the best of circumstances, the road to adulthood is a bumpy one fraught with sudden turns and obstacles. Unfortunately, large amounts of free time give youth an inordinate amount of choices (Martinek et al., 2005; Wright et al., 2008). In other hands, teachers are now having to cope with increasingly more angry, violent adolescents in the classroom; students who lack social and emotional competencies (Weisberg et al., 2003). For this reason, it is argued that school and community programs should promote life skills, such as responsibility, respect, caring, and peaceful conflict resolution (Lickona, 1992; Hellison, 2010; Li et al., 2008; Wright et al., 2010).

Thus, it seems that life skills are very essential for students. One of the most Components and factors of positive life values is personal and social responsibility (Soroush, 2012). Personal and social responsibility includes on personal decision making and be having as a result of being focused on human values centered on caring for others, which entails the promotion of positive

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daily-life environments (Hellison, 1985). Responsibility is effective and important factor for promoting self-development, self-efficacy and self-regulation in adolescents. Basically, adolescence is the most important period of a person's life and promotion responsibility is also essential need in this time (Soroush, 2012).

In other hands, it is widely believed, that physical activity programs can engage youth and promote positive development (Petitpas et al., 2005; Sandford et al., 2006) and responsibility (Khajenouri et al., 2015). Developing character and moral reasoning, for instance, are promoted in some youth sport programs (Miller et al., 1997; Fraser-Thomas, et al., 2005; Filho, 2005; Wright et al., 2010). Also, physical education (PE) programs can provide a suitable learning environment to teach the skills needed for healthy living (McKenzie, Kahan, 2008). For example, the British Columbia Ministry of Education (1995) stated that "students who participate in regular physical education classes enjoy enhanced memory and learning, better concentration, and increased problem-solving abilities. They are willing to take appropriate risks, and have a more positive attitude towards self and others".

In fact, sport programs are successful in fostering positive life skills. Sport environment itself is highly emotional and interactive, providing opportunities for the demonstration of personal and social qualities such as responsibility. Sport participation fosters holistic development as participants are challenged cognitively, emotionally, socially, and physically (Martinek, 2003; Hellison, 2010).

Those who participate in team sports are challenged to take on the responsibility of particular roles and coordinate their efforts with others, so that an overall goal can be achieved. Thus, by its very nature, the sport setting has the potential to reward virtuous actions such as fairness and justice and specially persist in the face of opposition, developing self-control, cooperating with teammates (Shields and Bredemeier, 1995: 174). Also, Studies confirmed the benefits of athletic participation such as promoting emotionality values and building character (Filho, 2005); enhancing work ethics, creativity, self-esteem, confidence, cultural acceptance and overall development (Chen et al., 2010); sociability, extraversion and self-reported well-being (Aries et al., 2004).

Thus, it seems that many of these positive concepts in personal and social domains are made by participating in sport programs, are closely related with definition of personal and social responsibility. As a result, it is necessary to investigate responsibility in athlete and non-athlete adolescents.

In contrast to the benefits of athletic participation, several specific studies for example Wolniak et al study (2001) found that students who participated in intercollegiate athletics did not have greater outcomes in cognitive learning and motivation when compared to non-athlete students. Also, according to some researchers, the time demands of athletic programs force student-athletes to sacrifice attention to academics (Meyer, 1990; Parham, 1993), making it difficult for them to devote time to study or earn good grades (Cantor and Prentice, 1996). But other researchers found more negative consequences for college athletes. For example, Shulman and Bowen (2001) found athletes who played all types of sports to under-perform academically, but the underperformance was more pronounced for athletes who played high-profile sports (i.e., football, basketball and hockey). More negative consequences and psycho-social problems were found to be associated with collegiate athletic participation. Those problems included violence on and off the court (Fields et al., 2007) and lack of social life and experience (Miller, Kerr, 2003).

Therefore, it is important that we explain whether sport participation can actually benefit athletes and athlete students showed high responsibility in PE, and also they had high responsibility for their functions and behaviors in home and other lessons in school?

One of the effective means for evaluation and teaching of social and personal responsibility is TPSR model. Hellison`s (2010) TPSR model represents a shift from thinking about PE as developing solely physical proficiency to focusing equally on the social and emotional development of students (Fletcher, 2009). The TPSR model has been field-tested for more than 30 years (Hellison, 2010). The TPSR model uses physical activity as an instrument to teach life skills and promote responsible behavior (Hellison, Walsh, 2002). The following TPSR studies have met that "gold standard." (Wright, Burton, 2008). Thus, standards and goals of TPSR model are very practical for assessing responsibility levels in athletes and non-athletes. Martins et al. (2015) stated that TPSR model is a reliable evaluation tool in measuring personal and social responsibility levels.

In other hand, it can be said that although research evidence represents the fundamental role of sport in positive psychological, social and emotional components development, but researchers especially in Iran didn't investigate the role of sports and physical activities in increasing responsibility levels of athletes and non-athletes base on standards` TPSR model by PSRQ questionnaire.

This is despite the fact that adolescents make up a large part of the country population and different researches emphasize on other accepts of their behaviors and paying attention to their responsibility levels is important. However, it seems that the considerable importance of physical fitness and sport on growth responsibility levels of athlete and non-athlete students in our country has not been well highlighted. Also, it is important to examine gender differences for athletes and non-athletes.

Therefore, in this research, responsibility levels of female and male athletes and non-athletes were examined (base on questionnaire of TPSR model) to determine that what differences the female and male athletes and non-athletes have in the responsibility levels. Also, a responsible student who is person that has responsibility for all individual, educational and family tasks (Soroush, 2012). Therefore, the study addresses the following research questions from parents, physical education teachers and other lessons teachers' viewpoints:

1. Do student-athletes differ from non-athletes in their personal and social responsibility in home, physical education class and other classes?

2. Do females differ from males in their personal and social responsibility in home, physical education class and other classes?

## 2. Methodology

### Participants

The target population consisted entirely of female and male students among middle schools in city of Rasht in Iran (6882 students includes male=1496, female=2126 approximately). According to the Morgan table and using random cluster sampling method, 400 students (200 girls and 200 boys) were selected as statistical sample from the total population study. Thus, 357 persons (90 %) participated in the study.

### Procedures

According to purpose of this study, an equal number of 100 athletes and 100 non-athletes for each groups (or both sexes) was considered in this research whose responsibility were evaluated based on opinions of 357 their parents, 44 physical education teachers and 69 other lessons teachers' viewpoints in home, physical education class and other classes respectively. Thus, according to the number of students, parents sample was also equal to the number of students. As well as, approximately each of physical education teachers evaluated responsibility of 10 students and each of other lessons teachers evaluated responsibility of 6 students.

Generally, 357 questionnaires from each group separately (the parents, physical education teachers and teachers of other classes) were used for statistical analysis. The scope of student athlete in this study is a student who has the least of regular and constant physical activity in one of the sport fields in sport club in one year and he/she has continued to this constant activity in educational year. Also, non-athlete student is predicated to student who not only doesn`t participate in any of sport fields regularly but also he/she isn`t attendance in physical education class to teacher`s confirmation.

### Instrumentations and data analysis

In this study, three questionnaires on basis of PSRQ questionnaire (personal and social responsibility questionnaire by Li et al (2008)) were used to assess students' levels of responsibility. The questionnaires consists of 17 items which are scored on 6-point Likert scale with ranging from 1 (strongly disagree) to 6 (strongly agree). After translate of standard responsibility questionnaire (PSRQ), and adjust of some question, questionnaires were reviewed by sport management and psychology professors and physical education spacialis for evaluating content validity. Through Cronbach's alpha Method, the reliability of students'responsibility questionnaires were confirmed in home ($\alpha$=0.72), physical education class ($\alpha$=0.86) and other classes ($\alpha$=0.90). According to being non-normal distribution of data, data analyzing by using U-Mann Whitney test

in the significant level of P≤0.05. In order to test the research hypothesis and statistical analysis was used software SPSS (version 17).

### 3. Results

The findings from the descriptive section of the study showed: 182 Male (51 %) and 175 female (49 %) constituted the most and the least of volume of statistical sampling that 194 persons (54/3 %) were athletes and 163 persons (45/7 %) were non-athletes. Also, 50 percent of students-athletes continuously participated in physical activity of sports clubs about 4-2 years. Also, about 60 % of the athletes were members of school athletic teams. The percent of mother (59/9 %) who evaluated responsibility of their childeren were more than father. As well as, the namber of male and female teachers of physical education were equal (n=22) and number of male and female teachers of other classes were similar approximately.

Data analysis by using U-Mann Whitney test indicated that from parents, physical education teachers and other lessons teachers' viewpoints, athlete students showed higher personal and social responsibility levels in home, physical education class and other classes (P≤0.05) in tables 1 ,2, 3.

**Table 1.** The comparison of responsibility levels in athlete and non-athlete students from parents' viewpoints

| responsibility levels | Group | Mean | Standard Deviation | U-Man Whitney tests | |
|---|---|---|---|---|---|
| | | | | calculated-z | Level of Significance |
| Personal responsibility | athlete | 4/90 | 0/76 | -2/808 | 0/005* |
| | non-athlete | 4/69 | 0/77 | | |
| Social responsibility | athlete | 5/08 | 0/68 | -2/232 | 0/026* |
| | non-athlete | 4/91 | 0/74 | | |

* It is significant in level of P ≤ 0/05

**Table 2.** The comparison of responsibility levels in athlete and non-athlete students from physical education teachers' viewpoints

| responsibility levels | Group | Mean | Standard Deviation | U-Man Whitney tests | |
|---|---|---|---|---|---|
| | | | | calculated-z | Level of Significance |
| Personal responsibility | athlete | 4/88 | 0/78 | -14/453 | 0/001* |
| | non-athlete | 2/90 | 0/91 | | |
| Social responsibility | athlete | 5/14 | 0/75 | -10/530 | 0/001* |
| | non-athlete | 3/98 | 1/01 | | |

* It is significant in level of P ≤ 0/05

**Table 3.** The comparison of responsibility levels in athlete and non-athlete students from other lessons teachers' viewpoints

| responsibility levels | Group | Mean | Standard Deviation | U-Man Whitney tests | |
|---|---|---|---|---|---|
| | | | | calculated-z | Level of Significance |
| Personal responsibility | athlete | 4/71 | 0/98 | -6/5738 | 0/001* |
| | non-athlete | 3/87 | 1/22 | | |
| Social responsibility | athlete | 4/86 | 0/87 | -5/572 | 0/001* |
| | non-athlete | 4/27 | 1/02 | | |

* It is significant in level of P ≤ 0/05

Also, according to results of Table 4 and 5 were observed that there are no significant Difference between female and male students in personal and social responsibility levels (P>0/05). Whereas, according to results of Table 6 were observed that there are significant Difference between female and male students in personal and social responsibility levels (P<0/05).

**Table 4.** The comparison of responsibility levels in male and female students from parents' viewpoints

| responsibility levels | Group | Mean | Standard Deviation | U-Man Whitney tests | |
|---|---|---|---|---|---|
| | | | | calculated-z | Level of Significance |
| Personal responsibility | female | 4/82 | 0/77 | -0/373 | 0/709 |
| | male | 4/78 | 0/77 | | |
| Social responsibility | female | 4/97 | 0/72 | -0/933 | 0/351 |
| | male | 5/04 | 0/71 | | |

* It is significant in level of P ≤ 0/05

According to Table 4 and 5 can state that from parents and physical education teachers' viewpoints in home and physical education class respectively, personal responsibility level are more in female students and social responsibility level are more in male students. However this difference was not significant.

**Table 5.** The comparison of responsibility levels in male and female students from physical education teachers' viewpoints

| responsibility levels | Group | Mean | Standard Deviation | U-Man Whitney tests | |
|---|---|---|---|---|---|
| | | | | calculated-z | Level of Significance |
| Personal responsibility | female | 4/05 | 1/29 | -0/735 | 0/462 |
| | male | 3/91 | 1/30 | | |
| Social responsibility | female | 1/01 | 0/81 | -0/284 | 0/777 |
| | male | 4/62 | 1/09 | | |

* It is significant in level of P ≤ 0/05

**Table 6.** The comparison of responsibility levels in athlete and non-athlete students from other lessons teachers' viewpoints

| responsibility levels | Group | Mean | Standard Deviation | U-Man Whitney tests | |
|---|---|---|---|---|---|
| | | | | calculated-z | Level of Significance |
| Personal responsibility | female | 4/51 | 1/20 | -3/139 | 0/002* |
| | male | 4/15 | 1/13 | | |
| Social responsibility | female | 4/77 | 0/98 | -3/623 | 0/001* |
| | male | 4/43 | 0/95 | | |

* It is significant in level of P ≤ 0/05

According to Table 6, results show that from other lessons teachers' viewpoints, personal and social responsibility levels of female students are more than in male students (P<0/05).

## 4. Discussion

Overall, the findings of this study indicated that from parents, physical education teachers and other lessons teachers' viewpoints, there are significance differences between personal and social responsibility levels in athlete and non-athlete students' at home, physical education classes and other classes. In fact, based on the opinions of all three groups, personal and social responsibility levels of athlete students were higher than non-athlete students (P≤0.05). Also, the responsibility levels of athletes are higher than non-athletes. These findings are in agreement with the findings of the Hellison (2010), Khajenouri et al., (2015), Martinek (2003) Shields and Bredemeier (1995) studies. According to findings from these studies, participation in sports activities has an important role in increasing student's responsibility. In fact, physical education and sport programs can promote positive development (Petitpas et al., 2005; Sandford et al., 2006) and foster positive life skills (Hellison, 2010).

Generally, athletes indicated that higher level of individual characteristics and social features (personal and social responsibility) than non-athletes and inactive students. The findings of studies supported that personal responsibility is significantly related social responsibility (Li et al., 2008) and personal responsibility makes social responsibility (Khajenouri et al., 2015; Soroush, 2012). Also, there is significant relation between personal responsibility and altruism (Soroush, 2012).

Generally, continual and regular participation at sports programs can be effective in promotion of their positive individual features such as self-control (Shields, Bredemeier, 1995), self-development (Chen et al., 2010) and self-direction (Li et al., 2008) that are main components of personal responsibility concept, and improvement positive social features such as extroversion (Aries et al., 2004), Positive social relationships, social interactions, and Collaborate with others (Shields, Bredemeier, 1995) that are basic components of social responsibility (Hellison, 1985; Hellisn, Walsh, 2002). Thus, sport is a multi-faceted phenomenon that gradually changes the values and expectations of students. Exercise not only can promote personal adjustment of participating students in sport programs but also can increase their social adjustment.

Finding of current research indicated that athlete students have high responsibility levels in other lessons. Zimmerman, Kitsantas (2005) study supported this finding. They stated that responsibility plays important role in education Development of students. They stated that students, who have high responsibility, were successful in education performance.

More specifically, many positive educational benefits were found to be associated with intercollegiate sport participation. Studies supported that collegiate student-athletes were often more engaged in academic and campus activities than their non-athlete peers (Umbach et al., 2006; Williams et al., 2006).

In other hands, the obtained results in this research aren`t in direction with findings of some researches that stated problems about academic performance of athletes (Meyer, 1990; Parham, 1993; Shulman, Bowen, 2001). Apparently, athletes with a strong athletic identity might tend to neglect other aspects of life in order to fulfill their athlete role, which can increase the potential risk

of social problems (Hudson, 2000). Also, Aries (2004) in his research indicated Students spending 10 or more hours per week in athletic activities had lower entering academic credentials and academic self-assessments than non-athletes, but the academic performance of athletes was not below what would be expected based on their entering profiles. Also, in some researches problems such as violence on and off the court (Fields et al., 2007) and lack of social life and experience (Miller, Kerr, 2003) were found. In regard to these problem, the emphasis on winning is evidenced as more cheating and violations have been reported when recruiting and additional violations of academic fraud concerning student athletes' eligibility (Holman, 2007).

Generally, it can be stated that these problems associated with collegiate athletic participation in professional level that weren't in accordance with sport programs for athlete students in middle schools in this research. In fact, programs that emphasize physical fitness may neglect opportunities to develop students' learning in cognitive, social, and emotional domains (Fletcher, 2009). Overall, it can be stated that advantages of sport participation are more than disadvantages (Chen, 2010).

Other findings of the present study were that from the views of parents and teachers of physical education, there is no significant difference between levels of personal and social responsibility in male and female students. While from the view of teachers of other lessons there is significant difference between responsibility females and males. These findings are in agreement with the findings of Soroush, (2012) and Menzies et al. (2005) studies, they confirmed that isn`t significant relationship between responsibility and gender differences in adolescence. Also, one of the used instruments of Soroush (2012) study was PSRQ questionnaire. She concluded that female significantly showed higher social responsibility than male. But, personal responsibility was higher in males.

In this regard, it is important to note that different studies indicated different conclusions about the role of gender differences on personal and social behaviors of persons such as the responsibilities levels. Basically, relation between responsibility and gender differences in adolescence are not completely clear (Khajenouri et al., 2015; Soroush, 2012).

## 5. Conclusions

In conclusion, based on the presented study, there are basical differences between athletes and non-athletes. The results of this study indicate that that from parents, physical education teachers and other lessons teachers' viewpoints, athlete students presented higher personal and social responsibility in home, physical education class and other classes. According to the opinions of parents and physical education, there weren`t significant differences between female and male students in their responsibility. But, this difference was significant from other lessons teachers' viewpoints. In fact, physical activity programs can contribute to a positive variety of social skills such as responsibility. Physical education (PE) programs can provide a learning environment suitable to teach the skills needed for healthy living (McKenzie, Kahan, 2008).

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# Diagnostics the Response of Freestyle and Greco-Roman Wrestlers' Organisms to Competition and Training Load

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**Abstract**

The aim of a contribution is to diagnose, analyse and compare level of density´s intensity in training load and competition load of freestyle and Greco-Roman wrestling style with using measurements of blood lactate by Biosen C Line Sport. Research complex consisted of six freestyle wrestlers from closer Slovak representation, who participated in the first round of Slovak senior league in Banska Bystrica in 2015 and four Greco-Roman wrestlers from Army sport club Dukla Banska Bystrica. We were identifying level of lactate from capillary blood in the 1st, 4th and 8th minute of resting after competition load of freestyle wrestlers and after training load of Greco-Roman wrestlers. The match lasted 2x3 minutes with 30 seconds break. Arithmetic average of the measured blood lactate of Greco-Roman wrestlers after training load was in the 1st minute of resting – 12,33 mmol/l, in the 4th minute of resting – 13,57 mmol/l and in the 8th minute of resting – 8,65 mmol/l. After the competition load of freestyle wrestlers, the arithmetic average of the blood lactate in the 1st minute of resting was 13,20 mmol/l, in the 4th minute of resting – 11,94 mmol/l and in the 8th minute of resting – 13,65 mmol/l. In comparison to analysed wrestlers, freestyle wrestlers had in the 1st minute of recovery higher values of blood lactate than Greco-Roman wrestlers: of 0,87 mmol/l. In the 4th minute of recovery the Greco-Roman wrestlers had higher values of 1,63 mmol/l and in the 8th minute of recovery, freestyle wrestlers had higher values of 5,00 mmol/l.

**Keywords:** wrestling, competition load, training load, lactate.

## 1. Introduction

Nowadays, trainers of top-level sports are required to have systematically and long-term approach to sportsmen with a goal to improve effectiveness of management processes in training units, micro cycles, mezocycles and also in matches' condition. To regulate training and matches cues, trainers have to know reaction of organism to loading (inside and outside) and to know level of disruption to inside stability of the organism (Laczo, 2010).

We know factors of inside and outside training loads. The outside load consists of: intensity, capacity, coordinating complexity, organization of loading and mentally intensity. In practise, the inside load is expressed by physiological and biochemical values e.g. level of lactate in blood, heart frequency, level of creatine kinase etc. (Štefanovský, 2009).

Adaptation of organism to physically repeated loading improves function of the organs and organs systems because it is able to make better performance and the capacity of organs is getting

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bigger. Noted adaptation is a result of adaptation processes which are taking place on the cell level. The course and content depends on an amount of intensity and frequency of training cues. Invasion of homeostasis activates regulating cells mechanisms which not only minimalize the invasion but also ultra-compensate it (Marček et al., 2007).

It should be necessary for the trainer to know total clinical history of the subject and the values of special diagnostic tests which consist of dominating factors whereas sport training has high demands to work and development of function systems of the organism. Above all, it is about biochemical and physiological processes related to energetic-metabolically systems: high demands of breathing and carrying the oxygen and cardiovascular system (Varnai, 2010).

This conclusion is reinforced by the system of immediate, continuous and stage controls within training and competition load with the intension of gaining objective information about actual phase of subjects' preparedness. In the last 10 years these includes measurement of lactate in blood as often used practise of indirect appraisal of the intensity of training process, degree of regeneration and predominant type of energetic metabolism (Bielik et al., 2006).

The aim of the contribution is to diagnose, analyse and compare level of the density´s intensity in training load and competition load of freestyle wrestlers and Greco-Roman style wrestlers with using the measurements of blood lactate by Biosen C Line Sport.

## 2. Methodology

Research complex consisted of 2 groups of top freestyle and Greco-Roman wrestlers. The first group consisted of four Greco-Roman wrestlers from Military sports centre Banska Bystrica. Closer characteristic is available in the table 1.

**Table 1.** The characteristic of research unit – Greco-Roman wrestlers

| Subject (number) | Age (years) | Competitive weight (kg) | Sports practice (years) | Representation-membership | The most important success |
|---|---|---|---|---|---|
| 1. | 18,61 | 75 | 10 | junior and senior | ECCH **(5.p),** EJCH **(5.p),** JWWCH **(17.p),** |
| 2. | 24,58 | 75 | 16 | senior | ESCH **(12.p),** EH **(17.p),** |
| 3. | 19,62 | 55 | 12 | junior and senior | JWWCH **(3.p),** EJCH **(14.p),** JWWCH **(15.p),** |
| 4. | 24,96 | 66 | 13 | senior | ESWCH **(13.p).** |

**Explanations: ECCH** – *European Cadet Championship,* **EJCH** – *European Junior Championship,* **ESCH** – *European Senior Championship*, **JWWCH** – *Junior World wrestling Championship,* **ESWCH** – *European Senior wrestling Championship,* **EH** – *European games.*

The second group consisted of six wrestlers from closer Slovak representation of freestyle wrestling, who participated in the first round of Slovak senior league in Banska Bystrica in 2015. A closer characteristic is available in table 2.

We were analysing the value of lactate of Greco-Roman wrestlers during the training load. Training load lasted 2 x 3 minutes. We also analysed research complex of freestyle wrestlers after competition load which lasted 2 x 3 minutes. Lactate values from research complexes were collected from little finger's capillaries in the 1st, 4th and 8th minute of resting.

For analysing value of lactate we used automatic system for the lactate and glucose determination – Biosen C Line Sport. By interview, we analysed results' reports, club's classification and the length of sport practise, and the data obtained were noted to non-standardized record sheet of our own concept. By reason of more complex examination of research units we analysed diagnostic of somatometric parameters. We analysed values of statures with bare feet, standing back to the wall (head, back and hose-tops were touching the wall), in the erect stand

with accuracy of 0,5 cm. We analysed body weight, BMI, % of lipid, visceral lipid, muscles and somatotype before realization of measurement, barefoot, in T shirt and shorts with using a personal digital scale TANITA BC 545N. The digital scale is appropriate for sportsmen to evaluate influence of the training to segmental body composition. The digital scale can measure body weight with an accuracy of 0,1 %, BMI, visceral lipid, muscle weight with an accuracy of 0, 1 kg. In our research, as the methods for elaboration and evaluation of factual material we used: case study, descriptive statistics, logical methods and casuistic methods.

**Table 2.** The characteristic of research unit – freestyle wrestlers

| Subject (number) | Age (years) | Competitive weight (kg) | Sports practice (years) | Representation-membership | The most important success |
|---|---|---|---|---|---|
| **1.** | 33,4 | 86 | 22 | senior | SRCH-senior **(5x),** |
| **2.** | 21,2 | 57 | 12 | senior | SRCH-senior **(3x),** |
| **3.** | 18,5 | 74 | 10 | junior and senior | EPCH-2016 **(3.p),** SRCH-senior **(2x),** |
| **4.** | 25,1 | 74 | 16 | senior | EPCH-2016 **(3.p),** SRCH-senior **(1x),** |
| **5.** | 22,8 | 97 | 12 | senior | EJCH-2012 **(5.p),** WJCH-**(20.p),** ECHU23-2016**(7p),** SRCH-senior **(5x),** |
| **6.** | 25,4 | 86 | 13 | senior | SRCH-senior **(4x),** Participant of: ECHU23, ESCH. |

**Explanations:** ***SRCH*** *– Slovak republic Championship,* ***EPCH*** *– European Police Championship,* ***EJCH*** *– European Junior Championship,* ***ESCH*** *– European Senior Championship,* ***WJCH*** *– World Junior Championship,* ***ESCH*** *– European Senior Championship,* ***ECHU23*** *– European Championship u23.*

## 3. Results

An average stature of research unit was 174,80 cm. Body weight was 77,16 kg. An average BMI was of 25,1, average body fat of 11, 89 % and visceral lipid 2 %. An average M' muscle substance was of 64,64 kg.

**Table 3.** Somatometric parameters and the characteristics of sportsmen´s body composition

| Subject (number) | Body height/cm | Body weight/kg | BMI | Body fat/% | Muscle mass/kg | Somatotypes | Visceral fat/% |
|---|---|---|---|---|---|---|---|
| **1.GR** | 183 | 77,6 | 23,4 | 11,8 | 65,1 | 5 | 1 |
| **2.GR** | 176 | 81,6 | 26,3 | 13,8 | 66,8 | 6 | 2,5 |
| **3.GR** | 165 | 59,6 | 21,9 | 9,2 | 51,4 | 5 | 1 |
| **4.GR** | 169 | 72,3 | 25,3 | 11,9 | 60,6 | 5 | 2 |
| **1.FS** | 177 | 86,3 | 26,9 | 13,4 | 71,9 | 6 | 5,5 |
| **2.FS** | 160 | 58,7 | 21,6 | 8,9 | 50,8 | 5 | 1 |
| **3.FS** | 173 | 74,8 | 25 | 13,7 | 61,4 | 5 | 1,5 |
| **4.FS** | 176 | 78,4 | 25,3 | 14,9 | 63,4 | 5 | 2,5 |
| **5.FS** | 184 | 94,8 | 28,6 | 9,5 | 81,6 | 6 | 1 |
| **6.FS** | 185 | 87,5 | 26,7 | 11,8 | 73,4 | 6 | 2 |

**Explanations: GR –** *Greco-Roman wrestlers*, **FS –** *Freestyle wrestlers.*

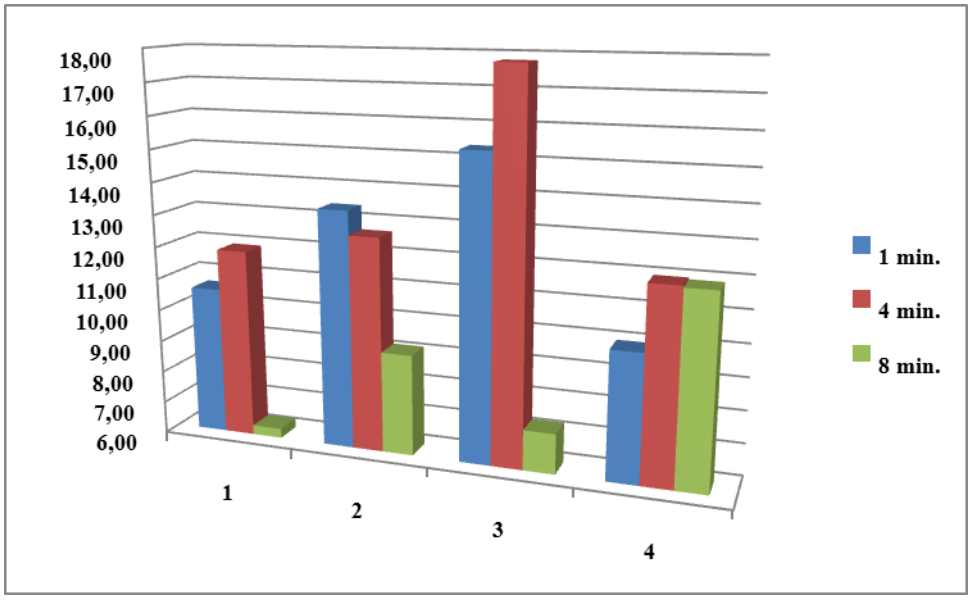


**Fig. 1.** Greco-Roman wrestlers' values of lactate in capillare blood in the minutes of the recovery

Following the results from figure 1 we can see that the highest values of blood lactate after the training load in the 1st minute of resting had subject n. 3 – 15,25 mmol/l and the lowest values had subject n. 4 – 9,96 mmol/l.

In the 4th minute of resting the highest values of blood lactate had again subject n.3 – 17,78 mmol/l and the lowest values had subject n.1 – 11,90 mmol/l.

In the 8th minute of resting the highest values of blood lactate had subject n. 4 - 11,90 mmol/l and the lowest values had again subject n.1 – 6,29 mmol/l. We must observe that only subject 4, with the comparison of 4th and 8th minutes of resting, had no big change of blood lactate.

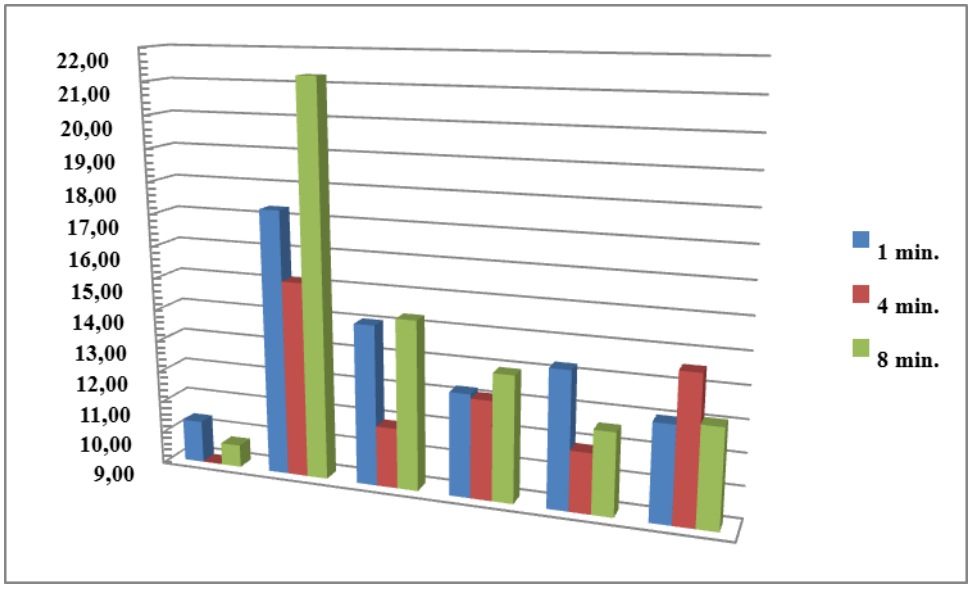


**Fig. 2.** Freestyle wrestlers´ values of capillary blood in the recovery minutes.

On the basis of these results in the figure 2 we can note that the highest values of blood lactate after competition load in all resting minutes had subject n.2 (1st minute – 17,30 mmol/l, 4th minute – 15,14 mmol/l a 8th minute – 21,26 mmol/l). The lowest values had subject n.1 (1st minute – 10,34 mmol/l, 4th minute – 9,02 mmol/l a 8th minute – 9,71 mmol/l). The interesting fact is that in the 8th minute of resting, the highest value of blood lactate had subject n. 2,3 and 4 but mostly subject n. 2 after having the falling character.

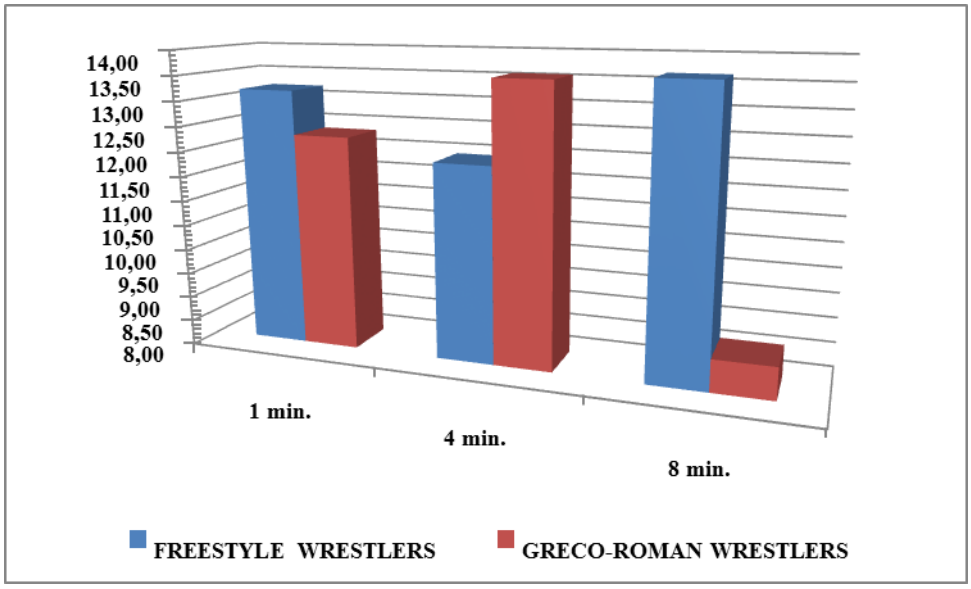


**Fig. 3.** Greco-Roman wrestlers' and freestyle wrestlers´ average values of lactate in capillary blood in the recovery minutes

Greco-Roman wrestlers' arithmetical average of measured blood lactate values after training load which lasted 2 x 3 minutes with 30 seconds break between the rounds was in the 1st minute – 12,33 mmol/l, in the 4th minute of resting – 13,57 mmol/l and in the 8th minute of resting – 8,65 mmol/l (figure 3).

Freestyle wrestlers' arithmetical average of measured blood lactate after competition load which lasted 2 x 3 minutes with 30 seconds break between the rounds was in the 1st minute of resting – 13,20 mmol/l, in the 4th minute of resting – 11,94 mmol/l and in the 8th minute of resting– 13,65 mmol/l (figure 3).

Freestyle wrestlers had in the 1st minute of recovery higher blood lactate values as Greco-Roman wrestlers – of 0, 87 mmol/l. In the 4th minute of recovery, Greco-Roman wrestlers had higher values of 1, 63 mmol/l. In the 8th minute of recovery, freestyle wrestlers had higher values of 5,00 mmol/l. We assume that this difference, in the 8th minute of resting between measured subjects and the fluctuating freestyle wrestlers' values of blood lactate in the resting phases was influenced by the competitive load. The ideal progressive and periodical decrease was achieved by only one subject – subject n.3 from the Greco-Roman unit.

Our position tends to the ideas of Štefanovský et al. (2014), that the huge role has the training ability and also values of VO2 max.

## 4. Discussion

Barbas et al. (2011), in his study analysed values of blood lactate of 12 top men Greco-Roman wrestlers after competition load during one day tournament. The rules in 2011 were different as today. The match used to have three rounds, every round lasted 2 minutes with 30 seconds rest between the rounds. Globally, maximum 6 minutes lasting. The average concentration of blood lactate of top Greco-Roman wrestlers after the match reached over 17 mmol/l. In comparison to our analysed subjects, average values of lactate after the load (1 minute of resting) are markedly different of 4 – 5 mmol/l.

Another study which analysed top men wrestlers from Turkish national team showed average value of lactate after 5 minutes of resting – 12,3 mmol/l (Yoon, 2002).

Cinar (1990) in his post gradual essay discovered that average value of lactate of Turkish and foreign wrestlers after match is 11,59 mmol/l, (n=19). The average post-match value corresponds with the results of our researched wrestlers (after 1st minute of resting).

In the analysis of Savranbasi et al. (1996), of Greco-Roman representatives, the average measured concentration of lactate after training load was 14,9 ± 4 mmol/l.

Filiz (1999) in his study analysed value of lactic acid which accumulates in the blood in the result of maximum density of a body. He analysed 20 wrestlers, which were divided into weight category. The study showed following average values of lactate in the particular weight category:

**48 kg** – 13,2 mmol/l, **52 kg** – 12 mmol/l, **57 kg** – 12,3 mmol/l,
**68 kg** – 9,8 mmol/l, **74 kg** – 13,3 mmol/l, **82 kg** – 10,7 mmol/l,
**90 kg** – 10,7 mmol/l, **100 kg** – 14,6 mmol/l, **130 kg** – 15 mmol/l.

In the study of Karninčić et al. (2009) the average values of lactate of wrestlers from national team were before the match 2,61 mmol/l, after first half-time 8,60 mmol/l, after second halftime 11,82 mmol/l and at the end of the match 12,55 mmol/l. The average value of lactate at the end of the match is approximately equal with the average values of our wrestlers' lactate (after 1st minute of resting).

Bartík et al. (2014) analysed the value of lactate form capillary blood in the 1st, 4th and 8th minute of recovery after training load. The match lasted 2 x 3 minutes with 30 seconds break between the first and second round. The arithmetic average of measured values of wrestlers´ blood lactate was in the 1st minute of resting – 10,77 mmol/l, in the 4th minute of resting – 9,47 mmol/l and in the 8th minute of resting – 7,64 mmol/l. In comparison to this study, our research unit achieved higher values of blood lactate. The difference in the measured resting stages of Greco-Roman wrestlers was: (in the 1st minute of resting – 1,56 mmol/l, in the 4th minute of resting – 4,10 mmol/l and in the 8th minute of resting – 1,01 mmol/l), values of freestyle wrestlers: (in the 1st minute of resting – 2,43 mmol/l, in the 4th minute of resting – 2, 47 mmol/l and in the 8th minute of resting 6,01 mmol/l).

## 5. Conclusion

After training match of Greco-Roman wrestlers, the highest values of blood lactate in the 1st minute of resting had subject n.3 – 15,25 mmol/l, and the lowest values of blood lactate had subject n.4 – 9,96 mmol/l. In the 4th minute of resting, the highest values of blood lactate had again subject n. 3 – 17,78 mmol/l and the lowest values had subject n.1 – 11,90 mmol/l. In the 8th minute of resting the highest values of blood lactate had subject n.4– 11,90 mmol/l and the lowest values had again subject n.1 – 6,29 mmol/l. The highest values of blood lactate of freestyle wrestlers after competition in all minutes of resting had subject n. 2 (1st minute – 17,30 mmol/l, 4th minute – 15,14 mmol/l a 8th minute – 21,26 mmol/l). The lowest values had subject n. 1 (1st minute – 10,34 mmol/l, 4th minute – 9,02 mmol/l a 8th minute – 9,71 mmol/l).

Arithmetic average of Greco-Roman wrestlers' blood lactate values after training match was in the 1st minute of resting – 12,33 mmol/l, in the 4th minute of resting – 13,57 mmol/l and in the 8th minute of resting – 8,65 mmol/l. After competition, the arithmetic average of freewrestlers' blood lactate was in the 1st minute of resting – 13,20 mmol/l, in the 4th minute of resting – 11,94 mmol/l and in the 8th minute of resting – 13,65 mmol/l. When comparing the subjects, freestyle wrestlers had in the 1st minute of recovery higher values of blood lactate than Greco-Roman wrestlers – of 0,87 mmol/l. In the 4th minute of recovery, Greco-Roman wrestlers had higher values of 1, 63 mmol/l, and in the 8th minute of recovery the higher values of 5,00 mmol/l had freestyle wrestlers.

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# Investigation of Participation in Exercise Motives among Various Strata of Society

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**Abstract**

The purpose of this study was to investigate the exercise motives among the persons in different strata of the society. It was also investigated the role of gender and socio-economic status in deciding the exercise motives. Sample consisted of subjects (male and female) in the age category of 18 to 65 years with mean and SD 33.22± 13.45 drawn from different sections of the society i.e. employees and college going students, who performs moderate to vigorous physical exercises. The exercise motivation inventory-2 and Kuppu Swami SES Scale were used in the study. Descriptive statistics and analysis of variance were used to analyze the data. The study revealed that Revitalization, Enjoyment, and Appearance motives were significantly different in different age categories of male whereas ill-health pressure was significantly different in different age categories of female. The study concluded that the exercise motives vary with socioeconomic status in female whereas no such pattern existed in male. Further, appearance, ill-health pressure and weight management were the important considerations in female.

**Keywords:** socio-economic status, exercise motivation.

## 1. Introduction

Physical activity focuses on both practical and theoretical understanding of psychological, sociological, and socio psychological variables involved in sport and physical activity (Marelene, 2013). Fitness means being able to perform physical activity. It also means having the energy and strength to feel as good as possible. Getting more fit, even a little bit, can improve your health (Fitness, Exercise, 2017). In the world, fitness is the central part of wellbeing which is lacking because of too much modernization in the world. An estimated 12.6 million people died as a result of living or working in an unhealthy environment, (WHO, 2017), even in South-Asian Countries alone 3.8 million deaths occurred due to unhealthy environment. The top risks associated with the premature deaths of both men and women are high blood pressure, smoking, high body mass index (BMI), and high blood sugar levels (Davies, 2015).

These risks can be reduced substantially due to physical exercises. But the big question is that what motives people have for exercising. In other words what drag the people towards doing exercise in their daily routine. In this study intensive analysis has been made to investigate specific motives, which drag people for exercise in their everyday schedule. Further, the study will also reveal different motives for exercise among male and female of different socio-economic groups. Socioeconomic status is the social standing or class of an individual or group. It is often measured as a combination of education, income and occupation (American Psychological Association, 2017).

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## 2. Methodology

### Materials and methods

Besides investigating different exercise motives among various sections of the society we also investigated the relationship of gender and socio-economic status with exercise motives. Sample for the study was drawn from different sections of the society such as employees and college going students between ages 18-65 years. Stratified sampling technique was used in this study. Descriptive statistics t test and analysis of variance technique were used to analyze the data. The EMI-2 questionnaire developed by David Markland, 1997 was used to examine individual's participation motives. It consists of 51 items comprising fourteen sub-scales; stress management, revitalization, enjoyment, challenge, social recognition, affiliation, competition, health pressures, ill-health avoidance, positive health, weight management, appearance, strength & endurance and nimbleness. Each of these sub scales was rated on a 6-point Likert scale from 0 (not at all true for me) to 5 (very true for me).

The entire analysis in this research was carried out in order to address the following five research issues:

1. To understand the nature of data obtained on all the 14 sub-scales of exercise motives in male and female.
2. Is there any difference on each sub-scale of exercise motives among females in '21-40' and '>40' age categories?
3. Is there any difference in different subscales of exercise motives among male subjects in their age categories (<20, 21-40, and >40)?
4. Is there any difference in each sub-scale of exercise motives between male and female in '21-40' age category as well as in >40 age category?
5. Is there any difference in exercise motives of subjects belonging to different socio-economic status in male as well as in female categories?

## 3. Results

In this section, the results obtained in the analysis to address the above mentioned research issues have been shown. Table 1 describes the nature of data obtained on each of the 14 subscales of exercise motives in male & female.

**Table 1.** Descriptive statistics of different sub-scales of exercise motives obtained in male

| Sub scale | N | Mean | Std. Error of Mean | SD | Variance | Skewness | Std. Error of Skewness | Kurtosis | Std. Error of Kurtosis |
|---|---|---|---|---|---|---|---|---|---|
| Revitalization | 37 | 3.825 | 0.165 | 1.006 | 1.011 | -1.213 | 0.388 | 1.990 | 0.759 |
| Enjoyment | 37 | 3.591 | 0.193 | 1.174 | 1.379 | -0.978 | 0.388 | 0.280 | 0.759 |
| Challenge | 37 | 3.621 | 0.167 | 1.016 | 1.033 | -0.796 | 0.388 | -0.518 | 0.759 |
| Affiliation | 37 | 3.331 | 0.224 | 1.360 | 1.850 | -1.172 | 0.388 | 0.937 | 0.759 |
| Ill_Health_Pressure | 37 | 4.278 | 0.171 | 1.037 | 1.076 | -2.215 | 0.388 | 5.292 | 0.759 |
| Positive_Health | 37 | 4.496 | 0.163 | 0.990 | 0.981 | -3.219 | 0.388 | 12.133 | 0.759 |
| Weight_Management | 37 | 4.149 | 0.189 | 1.151 | 1.325 | -1.355 | 0.388 | 0.658 | 0.759 |
| Stress Management | 37 | 3.366 | 0.187 | 1.135 | 1.287 | -0.642 | 0.388 | 0.661 | 0.759 |
| Social_Recognition | 37 | 2.588 | 0.167 | 1.016 | 1.032 | -0.246 | 0.388 | 0.124 | 0.759 |
| Competition | 37 | 2.827 | 0.209 | 1.269 | 1.609 | -0.084 | 0.388 | -0.942 | 0.759 |
| Health_Pressure | 37 | 2.041 | 0.261 | 1.586 | 2.516 | 0.530 | 0.388 | -0.886 | 0.759 |
| Appearance | 37 | 4.231 | 0.142 | 0.861 | 0.742 | -0.650 | 0.388 | -1.131 | 0.759 |
| Strength_endurance | 37 | 3.858 | 0.163 | 0.989 | 0.978 | -0.663 | 0.388 | -0.381 | 0.759 |
| Nimbleness | 37 | 4.092 | 0.153 | 0.931 | 0.867 | -1.482 | 0.388 | 3.555 | 0.759 |

Table 1 shows that the skewness value of revitalization, enjoyment, challenge, affiliation, ill-health pressure, positive health, weight management, and nimbleness are more than twice of its standard error (2×.388) and also have negative sign which means that the data of these parameters are negatively skewed. In other words these eight parameters are not the real motives of exercise for

most of the subjects in male category. On the other hand kurtosis values of revitalization, ill-health pressure, positive health, and nimbleness are positive as well as significant because its values are greater than twice of its standard error (2×.759). Thus, the distributions of these four parameters are leptokurtic, which shows that there is a less variation of the scores on these four parameters around their mean. In other words responses of male on these parameters were homogeneous.

**Table 2.** Descriptive statistics of different sub-scales of exercise motives obtained in female

| | N | Mean | Std. Error of Mean | Std. Deviation | Variance | Skewness | Std. Error of Skewness | Kurtosis | Std. Error of Kurtosis |
|---|---|---|---|---|---|---|---|---|---|
| Stress Management | 66 | 3.578 | 0.132 | 1.076 | 1.157 | -0.953 | 0.295 | 1.369 | 0.582 |
| Competition | 66 | 2.893 | 0.147 | 1.194 | 1.425 | -0.564 | 0.295 | 0.083 | 0.582 |
| Health_Pressure | 66 | 1.809 | 0.157 | 1.275 | 1.624 | 0.552 | 0.295 | 0.065 | 0.582 |
| Ill_Health_Pressure | 66 | 3.855 | 0.159 | 1.295 | 1.676 | -1.382 | 0.295 | 1.588 | 0.582 |
| Positive_Health | 66 | 4.289 | 0.109 | 0.889 | 0.790 | -2.122 | 0.295 | 7.153 | 0.582 |
| Appearance | 66 | 3.519 | 0.149 | 1.212 | 1.470 | -0.664 | 0.295 | -0.269 | 0.582 |
| Nimbleness | 66 | 4.030 | 0.125 | 1.019 | 1.038 | -0.695 | 0.295 | -0.755 | 0.582 |
| Revitalization | 66 | 3.437 | 0.132 | 1.073 | 1.150 | -0.422 | 0.295 | -0.283 | 0.582 |
| Enjoyment | 66 | 3.389 | 0.142 | 1.153 | 1.329 | -0.455 | 0.295 | -0.645 | 0.582 |
| Challenge | 66 | 3.249 | 0.138 | 1.124 | 1.263 | -0.497 | 0.295 | -0.178 | 0.582 |
| Social_Recognition | 66 | 2.298 | 0.150 | 1.220 | 1.488 | -0.094 | 0.295 | -0.677 | 0.582 |
| Affiliation | 66 | 3.187 | 0.123 | 0.997 | 0.994 | -0.392 | 0.295 | 0.563 | 0.582 |

Table 2 shows that the skewness for the data on stress management, ill-health pressure, positive health, competition, appearance, and nimbleness are more than twice its standard error (2×.295) and also have negative sign. In other words these six parameters are not the real motives for exercise for most of the subjects in female category. On the other hand kurtosis values of stress management, ill-health pressure, and positive health are positive as well as significant because its values are greater than twice of its standard error (2×.582). Thus, the distribution of these three parameters are leptokurtic, which shows that there is a less variation of the scores on these four parameters around their mean. In other words responses of female towards these three parameters were homogeneous.

In order to compare different subscales of exercise motives in both age groups i.e. 21-40 & <40 in female category, t-test was applied. Except ill-health pressure all remaining sub-scales of exercise motivation were found to be insignificant. Results of the analysis are shown in Table 3.

**Table 3.** *t*-test for the data on ill-health pressure obtained on female in 21-40 yrs & >40 yrs age categories

**Independent Samples Test**

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | |
|---|---|---|---|---|---|---|---|---|
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference |
| Ill - health pressure | Eql. Var. Assu. | 10.332 | 0.003 | -3.18 | 35 | 0.003 | -0.969 | 0.305 |
| | Eql. Var. not Assu. | | | -3.11 | 19.49 | 0.006 | -0.969 | 0.312 |

From Table 3, it can be seen that the average of ill-health pressure scores in both age categories of female differs as the t value (=-3.18) is significant because its *p*-value (=0.03) is less than .05. Further, average ill-health pressure score of the age group A (21-40) is less than that of the group B (>40), and therefore, it may be concluded that the ill-health pressure derives females for exercise more in the age group >40 rather than 20-40. The means plot of the analysis is shown in Figure 1.

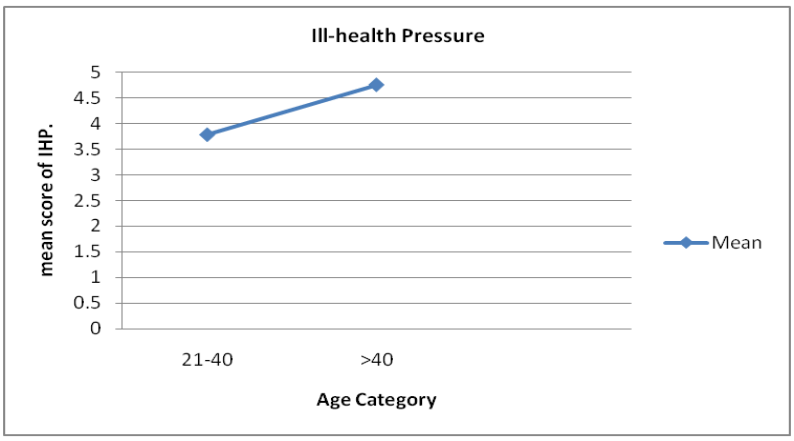


**Fig. 1.** Means plot for the data on ill-health pressure in two different age categories

In order to compare different subscales of exercise motivation in three age groups i.e. <20, 21-40, and >40 in male category, analysis of variance was applied. Out of 14 subscales F values for only three namely appearance, revitalization and enjoyment were found to be significant. The results of the analysis are shown in Table 4.

**Table 4.** One Way ANOVA for the data on different subscales of exercise motives in different age categories of male

| Factors | Variance | SS | df | MS | F | Sig. (p-value) |
|---|---|---|---|---|---|---|
| **Appearance** | Between | 11.874 | 2 | 5.94 | 4.471* | **0.015** |
| | Within Groups | 83.67 | 63 | 1.33 | | |
| | Total | 95.54 | 65 | | | |
| **Revitalization** | Between Groups | 10.78 | 2 | 5.39 | 5.39* | **0.002** |
| | Within Groups | 64 | 63 | 1.02 | | |
| | Total | 74.78 | 65 | | | |
| **Enjoyment** | Between Groups | 9.694 | 2 | 4.85 | 3.981* | **0.024** |
| | Within Groups | 76.71 | 63 | 1.22 | | |
| | Total | 86.4 | 65 | | | |

From Table 4 it can be seen that the average appearance score in all the three age categories differs as the p-value associated with F (=4.471) is .015 which is less than .05. Similarly F-values of revitalization (p<.01) & enjoyment (p<.05) are also significant.

Since F values of all the three parameters were significant the post hoc analysis was applied using Tukey test. The means plot of all the three parameters are shown in Figure 1, 2, and 3.

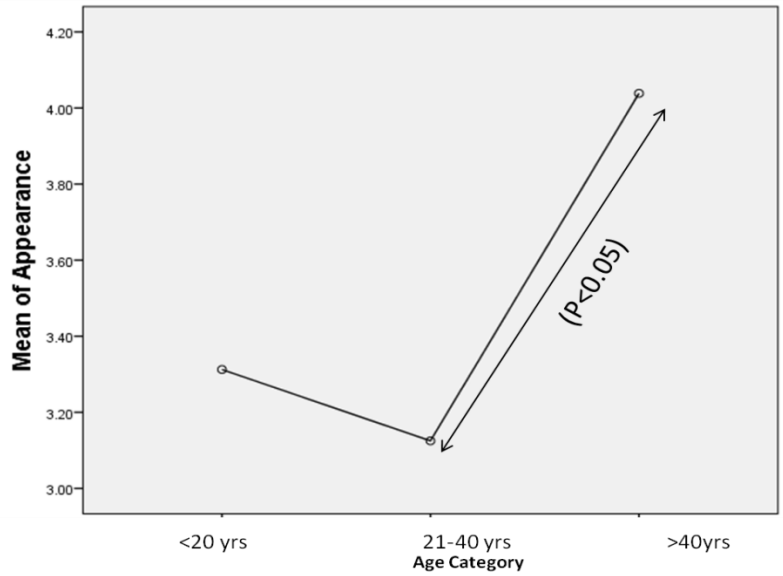


**Fig. 1.** Means plot for the appearance scores in three different age categories of male

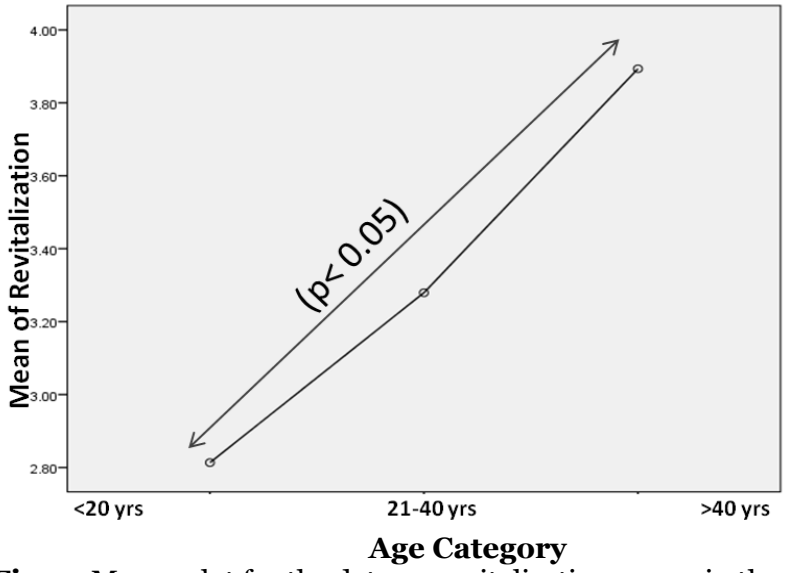


**Fig. 2.** Means plot for the data on revitalization scores in three different age categories of male

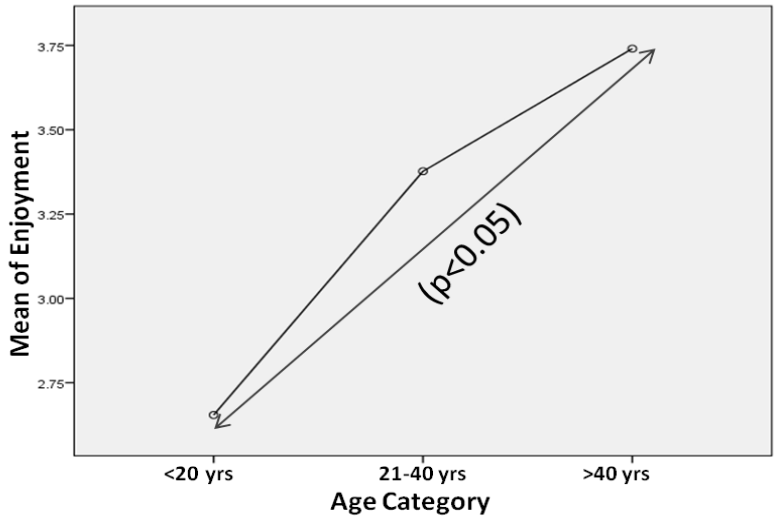


**Fig. 3.** Means plot for the enjoyment scores in three different age categories of male

Figure 1 indicates that the appearance scores of male is significantly higher in more than 40 years age category in comparison to the remaining two age categories i.e <20 years and 21 to 40 years. Figure 2 and 3 indicates that the revitalization and enjoyment scores of male is significantly higher in more than 40 years age category in comparison to <20 years category.

In order to compare different subscales of exercise motivation in male and female in each of the two age categories i.e. 21-40 & >40, t-test was applied. Except appearance in 21-40 years age category and ill-health pressure and weight management in >40 years age category, all remaining sub-scales of exercise motivation were found insignificant. Results of the analysis are shown in Tables 5 and 6.

**Table 5.** t- test for the data on appearance between male and female in 21-40 yrs age category

| | | Levene's Test Equality of Variances | | t-test for Equality of Means | | | | |
|---|---|---|---|---|---|---|---|---|
| | | F | Sig. | t | df | Sig. | MD | SE |
| Appearance | Eql. Var. Assu. | 0.841 | 0.364 | 2.405 | 43 | 0.021 | 0.84 | 0.35 |
| | Eql. Var. not Assu. | | | 2.594 | 41.33 | 0.013 | 0.84 | 0.33 |

In Table 5 it can be seen that *t*-value (=2.405) is significant as its associated *p*-value is .021 which is less than .05. It may be concluded that the average scores of appearance motives in male and female differs. Further, the average scores on appearance of the female is more than that of the male section as shown in Figure 4. In other words female are more concerned for the appearance rather than male in 21-40 age category for doing exercise.

**Table 6.** t-test for data on ill-health pressure and weight management between male and female in >40 age category

| | | Levene's Test Equality of Variances | | t-test for Equality of Means | | | |
|---|---|---|---|---|---|---|---|
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference |
| **Ill-health pressure** | Eql. Var. Assu. | 21.57 | 0.001 | 2.51 | 43 | 0.02 | 0.543 |
| | Eql. Var. not Assu. | | | 2.81 | 34.72 | 0.01 | 0.543 |
| **Weight management** | Eql. Var. Assu. | 27.73 | 0.001 | 2.93 | 43 | 0.01 | 1.134 |
| | Eql. Var. not Assu. | | | 3.19 | 41.02 | 0.01 | 1.134 |

The t-values for ill health pressure and weight management as shown in Table 6 are significant as their p-values are less than .05. Thus it may be concluded that the average scores on ill health pressure as well as weight management differs in male & female. It may be concluded that the female are more concerned for the weight management and ill-health pressure rather than male in >40 age yrs category as shown in Figure 4.

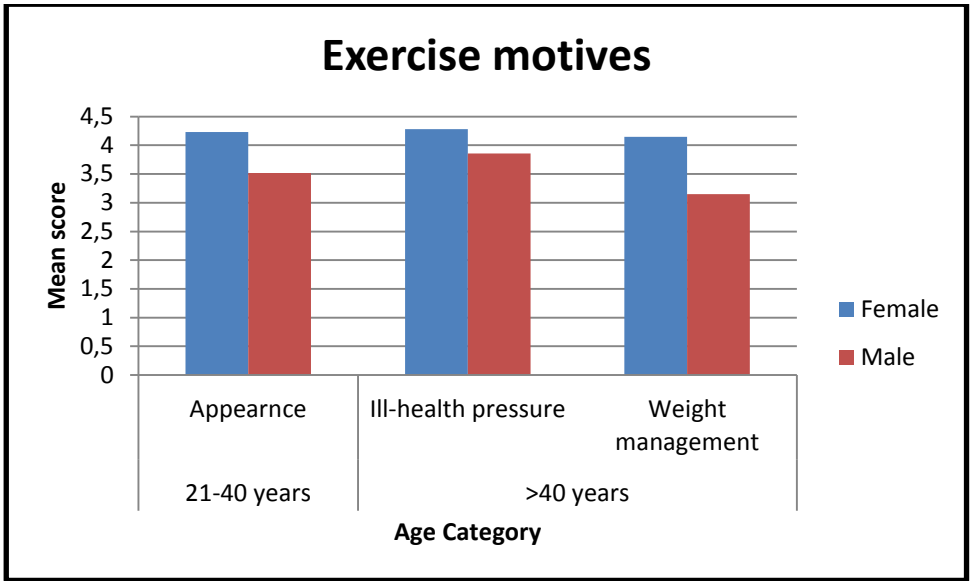


**Fig. 4.** Means plot for the data on appearance, ill-health pressure, and weight management in two different age categories

In order to compare different subscales of exercise motivation if female in all four socio economic classes i.e. upper class, upper middle class, lower middle class, and upper lower class, analysis of variance was applied. The results of the analysis are shown in Table 7.

**Table 7.** One-way ANOVA comparison of exercise motives among socio-economic status in female

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Revitalization | Between Groups | 9.095 | 3 | 3.032 | 3.664 | **0.022** |
| | Within Groups | 27.304 | 33 | 0.827 | | |
| | Total | 36.399 | 36 | | | |
| Enjoyment | Between Groups | 14.28 | 3 | 4.76 | 4.441 | **0.01** |
| | Within Groups | 35.373 | 33 | 1.072 | | |
| | Total | 49.653 | 36 | | | |
| Positive health | Between Groups | 9.952 | 3 | 3.317 | 4.318 | **0.011** |
| | Within Groups | 25.353 | 33 | 0.768 | | |
| | Total | 35.304 | 36 | | | |

Table 7 shows that the average scores of revitalization in all the four socio-economic groups differs significantly as the p-value associated with F is .022 which is less than .05. Similarly F-values of enjoyment and positive health are also significant as their p-values are less than 0.05.

Since F values of all the three parameters i.e. revitalization, enjoyment, & positive health were significant hence post hoc analysis was applied using Tukey test. The means plot of all the three parameters are shown in figure 5, 6 and 7.

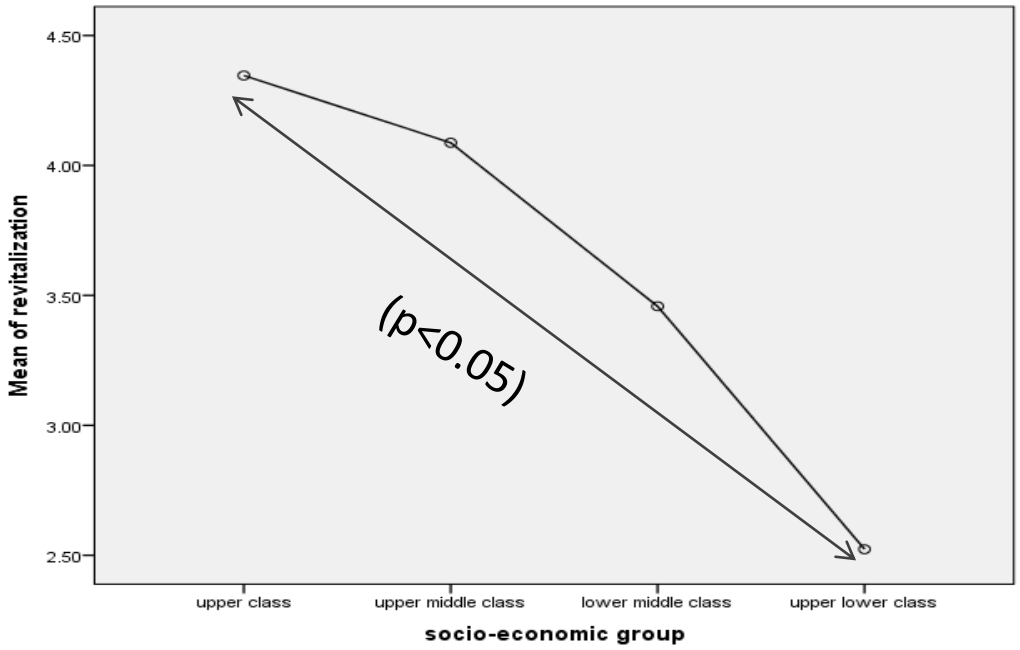


**Fig. 5.** Means plot for the revitalization in different socio-economic status

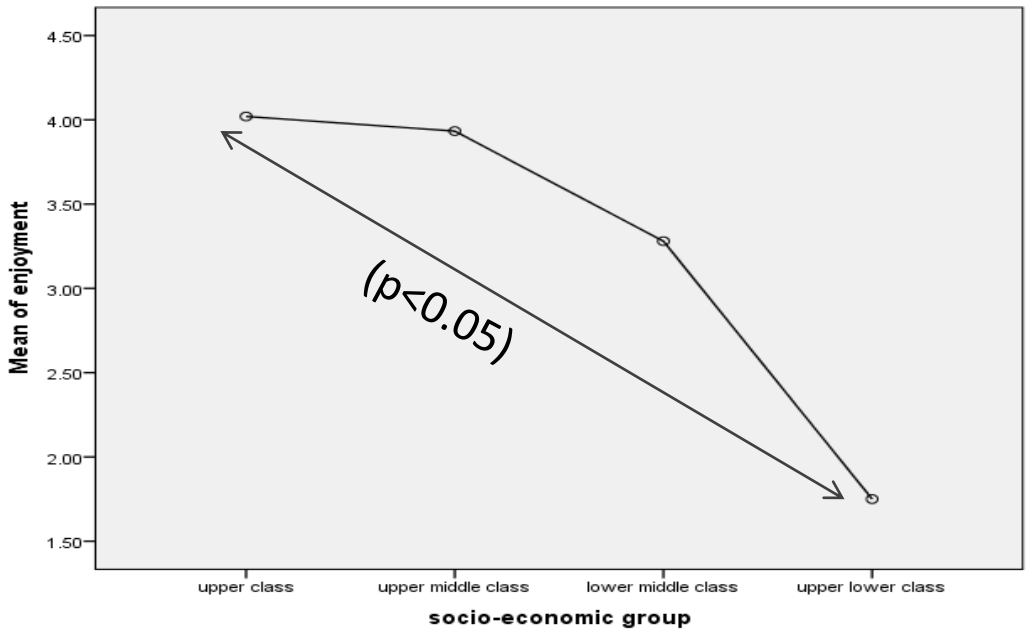


**Fig. 6.** Means plot for the enjoyment in different socio-economic status

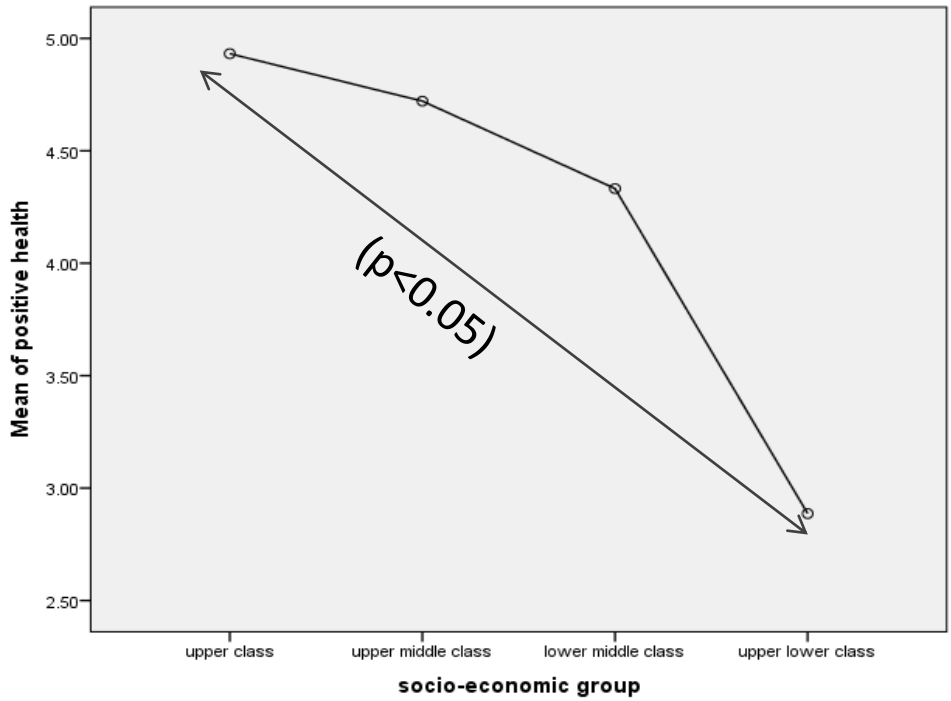


**Fig. 7.** Means plot for the positive health in different socio-economic status

A figure 5 indicates that the average revitalization score is significantly higher in the upper class in comparison to the upper lower class in case of female. Similar trend was observed in case of enjoyment and positive health which can be seen from the Figures 6 and 7.

## 4. Conclusion

Exercise motives differ in different section of the society. Further it also depends upon the gender as well. It is quite natural as the need for exercise differs as per their lifestyle, living standard & job profile.

Out of the fourteen exercise parameters only three parameters revitalization, enjoyment, and appearance were found to have significant concerned for exercising in different age categories of male. Further, male population in the age category more than 40 years had larger concerned of these three parameters for exercising in comparison to other lower age category in men. This can be attributed to the men's tendency to seek out types of activity that provide for opportunities to demonstrate mastery and competence (Kilpatrick et al., 2010) and other fact that individuals especially male, are highly engaged their professional life and might find very less time for their body image. The individuals below 20 years are also engaged in various academic and extracurricular activities, which keep their lifestyle active and less prone to the body image disturbance, and hence slightly motivated for exercise.

The study suggested that women those who are in 21-40 years age category considered appearance as the prime motives for exercising whereas female in age category more than 40 years go for exercise due to their ill-health pressure & weight management, because women have greater concern regarding their body weight than do man. Women's greater concern for weight status seems appropriate on the surface, given that younger women on an average are more likely to be overweight than their male peers (Marcus, 2010). Strong and important motives for participation in physical activity are different across type of activity, age, and gender in adults. Understanding the motives that influence physical activity participation is critical for developing interventions to promote higher levels of involvement (Molanorouzi, 2015).

It was also found that there was no significant difference among the exercise motives among the males in different socio-economic groups. It may be because of the fact that these days management and Socialization emerged to be the most important reasons for exercise for male. The Fitness / Health Management motive for exercise is not surprising because "keep fit" is a naturally reason for exercise. The health motive may reflect an increased focuses in the society on a

healthier lifestyle, and exercise is documented to be a significant factor for a healthier life (Strømme, Høstmark, 2000). The socializing motive may indicate that psychosocial aspect according to meet friends, be a part of a group is an important reason for engagement in physical activity (Ohansen et al., 2005).

Whereas in female section, only three exercise motives namely revitalization, enjoyment, and positive health differs significantly in different socio-economic groups. This may be because socio-economic status is a key factor in determining the quality of life of women, which affects the lives of children and families. Inequality in wealth and quality of life for women exist both locally and globally. Low socio economic status (SES) among women and its correlates, such as poverty, lower education and poor health for children and families, ultimately affect our society as, whole Evidence indicates that SES affects overall well-being and quality of life for women (Women, Socioeconomic Status, 2017). Another reason for differences could be the lower SES. Jeffrey & French (1996) reported that the lower SES was found to be related to the lower energy levels and less concern with weight control. Additional studies have concluded that economic deprivation, including reduced access to healthy food, may contribute to obesity for women (Jeffrey, French, 1996). Among women aged 20-45, Women who live in lower SES neighborhoods have been found to expend more energy, but undertake less moderate physical activity compared to women in higher SES neighborhoods, thus receiving less health-promoting physical exercise (Lee et al., 2007).

## 5. Recommendation

The similar study may be conducted in other strata of the society to have more knowledge about the exercise motives in male and female.

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# Compliance with Hygiene Rules and Frequency of Infectious Diseases Incidents at Sports/Fitness Centers: Comparative Study/Analysis between Recreational Basketball Players and People who Working out at Health Clubs

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**Abstract**

The lack of personal hygiene (Luke, d'Hemecourt, 2007) and decontamination of sports centers (CDC, 2003; Duckro et al., 2005) contribute to the cause and transmission of diseases between the athletes (Collins – O'Connell, 2012) and people that work out in these facilities.

The aim of this study is to investigate the implementation of personal hygiene rules among the amateur basketball players and athletes working out in fitness centers. Moreover, the conditions of hygiene that exist in these specific facilities used by the participants of this study were analyzed. In the end, an analysis between recreational basketball players and the people who work out in health clubs is conducted, in order to examine whether the first are efficiently informed of the hygiene rules compared to the latter.

Survey and quantitative analysis, with data gathered through questionnaires which were distributed and completed by 923 participants. The sample was random and evenly selected among amateur basketball athletes in basketball teams and people working out at fitness centers. The data were analyzed with quantitative methods with statistical package SPSS 22.

The Analysis brought out that recreational athletes tend to not apply personal hygiene rule thoroughly. Low performance on personal hygiene is highly related to the frequency that recreational basketball athletes become ill or infected in their sports halls. People working out at health clubs appear more competent in the application of hygiene rules, their sports spaces tend to be more hygiene friendly and therefore they are less often ill or infected in comparison to recreational basketball athletes.

**Keywords:** skin diseases, infectious diseases, outbreaks, competitive sports, epidemiology.

## 1. Introduction

The environments in which athletes compete or practice and people work out, provide various opportunities for the transmission of infectious organisms (Collins – O'Connell, 2012; Cohen et al., 1992; Smith et al., 2006). The requirements for the transmission of infectious agents are: a source of the agent, an adequate susceptible host, and a mode of transmission for the agent to the host (Siegel et al., 2007; Minooee et al., 2015). Transmission of infectious agents to the host

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can occur through direct or indirect contact, droplets, airborne routes, or percutaneous or mucous membrane exposure (Siegel et al., 2007; Harris, 2011)

In athletes, the most common way to spread infections is through skin contact and respiratory tract, but blood borne, sexually transmitted, and even cardiac infections occur (Harris, 2011).

The athlete's skin is ideally suited for infection (Collins – O'Connell, 2012; Likness, 2011; Cordoro, Ganz, 2005; Lear et al., 2011). The athlete's activities facilitate the entry of microorganisms into the epidermis. The facilitation results in two different processes. Firstly, supersaturation of the stratum corneum (the first layer of protection of the skin) due to sweating and soaked clothes, which allows easy passage of the microorganism via the epidermis. Secondly, most athletes experience abrasions and cuts that allow the entrance of the microorganism through the epidermis (Adams, 2002; Turbeville et al., 2006).

Respiratory tract infections classified as an upper respiratory tract infection or a lower respiratory tract infection. Most upper respiratory infections are caused by virus but in some cases, bacteria may be the primary cause of infection. The micro-organisms enter the respiratory tract by inhalation of droplets and invade the mucosa, resulting in epithelial destruction with redness, edema and exudate. Lower respiratory infections may be viral or bacterial. Organisms enter the distal airway by inhalation, aspiration of gastric content or by hematogenous seeding. The pathogen multiplies in or on the epithelium, causing inflammation, increased mucus secretion, impaired mucociliary function which may lead to airway obstruction (Harris, 2011).

Sporting activities and their venues can put athletes at risk. Skin-to-skin contact, sneeze, cough or talk which is inherent in many sports, encourages the spread of microorganisms among the team (Collins – O'Connell, 2012; Harris, 2011; Cordoro, Ganz, 2005; Lear et al., 2011; Reinberg, 2007). Athletes in both contact and noncontact sports frequently share equipment (Cohen et al., 1992; Likness, 2011) and towels (Lear et al., 2011; Nguyen et al., 2005), allowing the spread of fomites among team members. Many studies have documented the presence of bacteria, viruses (Collins – O'Connell, 2012), fungi, atypical mycobacteria (Cordoro, Ganz, 2005), and parasites on surfaces and especially on playing surfaces (Duckro et al., 2005; Hota et al., 2004).

People who work out at fitness centers also share equipment (Cohen et al., 1992; Likness, 2011) locker rooms (CDC), showers (CDC, 2003) and whirlpools (NFHS, 2011), making transmission much easier. Germs can spread indirectly from surfaces and through the air in the workout facility (Collins – O'Connell, 2012; Harris, 2011). Research indicates that typical gym equipment regularly carries germs such as Staphylococcus, Streptococcus viridans, diptheroids, E. coli and Candida (Goldhammer et al., 2006). The most common contagious fungal infection among people who work out is tinea pedis, or athlete's foot (Likness et al., 2011; Wohlrab et al., 2006). This fungus grows best in dark, moist and warm environments, making sweaty feet, tucked inside running shoes, the perfect targets.

Disease outbreaks in competitive sports and health clubs are not new. Many outbreaks represent a variety of infectious diseases. This study aims to investigate whether the personal hygiene rules are implemented by the amateur basketball athletes and people who work out in fitness clubs and if so, to what extent. Moreover, an effort is made to compare amateur basketball clubs to people who work out in fitness clubs regarding their compliance with the hygiene rules.

## 2. Material and Methods

In frames of research needs, a quantitative analysis was implemented, with data gathered through questionnaires which were distributed and completed by 923 participants. The sample was evenly selected among athletes in basketball teams and athletes in fitness gyms.

The data was analyzed with statistical quantitative methods using IBM SPSS software. For the examination of the research hypothesis the following methods were used: i) Descriptive statistics to examine the behavior and the frequency of symptoms of the athletes ii) Bi-variate correlation to examine correlations between athlete's behavior and symptoms, iii) Chi-square test for independent samples to compare the behavior and frequency of symptoms between the two groups of athletes that participated in the research.

Participant's answered in three different group of questions regarding their personal behavior and environment: i) how often they apply the basic rules of personal hygiene, ii) How often they apply the rules for preventing infectious diseases, iii) How they evaluate the condition of

their sports halls in terms of hygiene. The responders had to choose an answer on a scale 1 to 5 (Likert), where 1 indicated never or poor hygiene and 5 indicated always or very good hygiene.

In a second group of questions, the athletes had to answered about their: i) frequency of illness symptoms such as flu, gastroenteritis etc, ii) frequency of skin symptoms such as rash, fungal, dermatitis etc, iii) frequency of illness shortly after another co-athlete had been ill. The responders had to choose an answer on a scale 1 to 5 (Likert), where 1 indicated very frequent symptoms no symptoms and 5 indicated no symptoms.

The groups of variables which corresponded to the three basic characteristics (frequency of application of hygiene rules and evaluating the hygiene of the sports hall), where combined in order to produce three new variables clustering the responders on a 1 to 3 scale (low frequency, medium and high).

In the second step of analysis all three variables which correspond to the attitude of athletes are tested with bivariate correlation in order to detect significant relationships among them. The basis hypothesis is that each pair of variables is not related to each other. A significance coefficient lower than 0,05 rejects the hypothesis and therefore the relationship between the variables is assumed to be important. A high Pearson coefficient shows a strong relationship between the pair of variables examined.

In the final stage of the analysis, Chi-square test (x2) for nominal or ordinal variables (frequency of symptoms) was used in order to identify significant difference in the behavior between basketball and fitness athletes.

The basic hypothesis is that each variable is not effected by the sports activity of the athlete, basketball or fitness in gyms. This null hypothesis is rejected if significance is lower than 0,05.

## 3. Results

The sample consists of 923 responders, 69,9 % male and 30,1 % female (table 1), 51,1 % of the responders were basketball athletes and 49,9 % were athletes in gyms (table 2).

**Table 1.** Demographics of the responders regarding their sex

| | | Frequency | Percent (%) |
|---|---|---|---|
| **Valid** | **Male** | 645 | 69.9 |
| | **Female** | 278 | 30.1 |
| | **Total** | 923 | 100.0 |

**Table 2.** Athletic activity of the responders

| | | Frequency | Percent (%) |
|---|---|---|---|
| **Valid** | **basket** | 467 | 50.6 |
| | **fitness** | 456 | 49.4 |
| | **Total** | 923 | 100.0 |

According to the results of descriptive statistics (table 3), most of the responders do not follow the rules for their personal hygiene as often as they should. The same is observed regarding the application of rules for the prevention of infectious diseases. Additionally, when asked for the hygiene level of their sports halls, the responses are not always positive.

**Table 3.** Frequencies for behavior of responders regarding hygiene rules, prevention rules and hygiene of sports halls

| | | Sports category | |
|---|---|---|---|
| | | **basket** | **Fitness** |
| **Frequency of applying rules of personal hygiene** | Low | 24.8% | 0.0% |
| | Medium | 65.5% | 53.1% |
| | High | 9.6% | 46.9% |
| **Frequency of applying rules of infectious diseases prevention** | Low | 19.9% | 0.0% |
| | Medium | 79.9% | 91.9% |
| | High | 0.2% | 8.1% |
| **Levels of hygiene of sports hall** | Low | 18.6% | 0.0% |
| | Medium | 80.1% | 19.7% |
| | High | 1.3% | 80.3% |

Bivariate analysis shows significant correlations between all pairs of variables (table 4). More specifically it is shown that when personal hygiene is high, it is less probable for an athlete to get infected by skin or illness symptoms. Contrary, bad hygiene of the sports halls is linked to more frequent symptoms of common illness, skin infections and adhesive illnesses among athletes.

**Table 4.** Pearson correlation for hygiene standards of the athletes and the frequency they were ill or infected during the last year

| | | **How often have you been ill in the last year due to flu, gastroenteritis etc?** | **How often have you had dermal symptoms during your sports activity such as rash, allergy, fungal etc?** | **How often have you been ill shortly after a fellow athlete who you share the same sports hall?** |
|---|---|---|---|---|
| **Applying rules of personal hygiene** | Pearson Correlation | .505** | .452** | .494** |
| | Sig. (2-tailed) | .000 | .000 | .000 |
| **Applying rules of infectious diseases prevention** | Pearson Correlation | .524** | .551** | .571** |
| | Sig. (2-tailed) | .000 | .000 | .000 |
| **Hygiene of sports halls** | Pearson Correlation | .798** | .597** | .812** |
| | Sig. (2-tailed) | .000 | .000 | .000 |

The strongest correlations are detected on the effect of the sports hall's effect on illness and infections symptoms (sports hall hygiene – illness symptoms = 0.798 & sports hall hygiene – infectious diseases between athletes = 0.812).

Coefficients for each pair of variables are strong enough to be considered as important factors in the frequency that an athlete gets ill, or infected:

| | | |
|---|---|---|
| Personal hygiene / | illness symptoms = | 0.525 |
| Infectious diseases prevention / | skin symptoms = | 0.452 |
| Hygiene of sports halls / | Infectious diseases = | 0.494 |
| Personal hygiene / | illness symptoms = | 0.524 |
| Infectious diseases prevention / | skin symptoms = | 0.551 |
| Hygiene of sports halls / | Infectious diseases = | 0.571 |
| Personal hygiene / | illness symptoms = | 0.798 |
| Infectious diseases prevention / | skin symptoms = | 0.597 |
| Hygiene of sports halls / | Infectious diseases = | 0.812 |

In the last step of the analysis the goal was to compare the behavior of two different groups of responders: recreational basketball athletes and people who working out at health clubs. Applying Chi-square test (table 5, 6, 7), the hypothesis of similar behavior between the two groups regarding the variables for personal hygiene rules, prevention for infections rules and environment's hygiene is rejected (Sig.2=0 > 0,05). Therefore, it is assumed that considerable differences exist between the attitudes of the two groups of athletes.

**Table 5.** Chi-Square test for sports group and frequency of applying rules of personal hygiene

**Chi-Square Tests**

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 233.651[a] | 2 | .000 |
| Likelihood Ratio | 288.021 | 2 | .000 |
| Linear-by-Linear Association | 232.742 | 1 | .000 |
| N of Valid Cases | 923 | | |

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 57.31.

**Table 6.** Chi-Square test for sports group and frequency of applying rules of infectious diseases prevention

**Chi-Square Tests**

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 129.664[a] | 2 | .000 |
| Likelihood Ratio | 174.898 | 2 | .000 |
| Linear-by-Linear Association | 128.848 | 1 | .000 |
| N of Valid Cases | 923 | | |

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 18.77.

**Table 7.** Chi-Square test for sports group and levels of hygiene of sports hall

**Chi-Square Tests**

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 609.170[a] | 2 | .000 |
| Likelihood Ratio | 761.486 | 2 | .000 |
| Linear-by-Linear Association | 546.271 | 1 | .000 |
| N of Valid Cases | 923 | | |

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 42.98.

From crosstabulation analysis, it is shown that the differences are very strong between the answers of basketball players and fitness athletes. Basketball players tend to be less cautious with hygiene rules and prevention of infectious diseases (table 8, 9).

**Table 8.** Frequency of answers of the responders from the two groups

| | | Frequency of applying rules of personal hygiene | | |
|---|---|---|---|---|
| | | Low | Medium | High |
| **Sports category** | **basket** | 24.8% | 65.5% | 9.6% |
| | **fitness** | | 53.1% | 46.9% |

**Table 9.** Frequency of answers of the responders from the two groups

| | | Frequency of applying rules of infectious diseases prevention | | |
|---|---|---|---|---|
| | | Low | Medium | High |
| **Sports category** | **basket** | 19.9% | 79.9% | 0.2% |
| | **fitness** | | 91.9% | 8.1% |

Furthermore, the hygiene of sports halls is much higher for fitness athletes than basketball athletes (table 10).

**Table 10.** Frequency of answers of the responders from the two groups

| | | Levels of hygiene of sports hall | | |
|---|---|---|---|---|
| | | Low | Medium | High |
| **Sports category** | **basket** | 18.6% | 80.1% | 1.3% |
| | **Fitness** | | 19.7% | 80.3% |

Chi-square test is used in order to check the relationship between the frequency one gets ill, infected by dermal or other infectious diseases. The original hypothesis states that the sports category is not correlated with the frequency that an athlete gets ill or infected is rejected for all three tested variables (tables 11, 12 and 13).

**Table 11.** Chi-Square test for sports group and frequency of illness

**Chi-Square Tests**

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 673.326[a] | 4 | .000 |
| Likelihood Ratio | 896.234 | 4 | .000 |
| Linear-by-Linear Association | 618.615 | 1 | .000 |
| N of Valid Cases | 923 | | |

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 13.34.

**Table 12.** Chi-Square test for sports group and frequency of dermal infections

**Chi-Square Tests**

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 321.495[a] | 3 | .000 |
| Likelihood Ratio | 384.594 | 3 | .000 |
| Linear-by-Linear Association | 313.903 | 1 | .000 |
| N of Valid Cases | 901 | | |

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 2.98.

**Table 13.** Chi-Square test for sports group and frequency of adhesive illness

**Chi-Square Tests**

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 782.183[a] | 4 | .000 |
| Likelihood Ratio | 1071.007 | 4 | .000 |
| Linear-by-Linear Association | 701.695 | 1 | .000 |
| N of Valid Cases | 923 | | |

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 32.61.

However, the hypothesis is rejected for both cases since (Sig.2=0>0,05). As a result, significant differences are observed between the groups regarding how prone they are to dermal infections and adhesive illness. More specifically basketball athletes who earlier in the analysis were found to be more careless about their hygiene, seem to be more often ill and infected.

By observation of the distribution of answers between the two groups it is observed that:

–The evaluation of the hygiene of the sports hall has significant difference between the two groups of athletes (Table 9)

–Fitness athletes tend to be more consistent and cautious with their personal hygiene and they follow the rules in order to prevent any illness or infection more often than basketball athletes (Tables 5 and 7)

–Basketball athletes tend to be ill or infected more often than the fitness athletes in gyms (Tables 14, 15, 16).

**Table 14.** Frequency of answers of the responders from the two groups

| | | How often have you been ill (flu, cold, gastroenteritis) during the last year? | | | | |
|---|---|---|---|---|---|---|
| | | >3times | 3 times | 2 times | Once | Never |
| **Sports category** | **basket** | 5.8% | 70.0% | 23.8% | 0.4% | |
| | **fitness** | | 1.1% | 24.3% | 57.9% | 16.7% |

**Table 15.** Frequency of answers of the responders from the two groups

| | | How often did you have any dermal symptom (fungal, rash, dermatitis) | | | | |
|---|---|---|---|---|---|---|
| | | >3times | 3 times | 2 times | Once | Never |
| **Sports category** | **basket** | 1.1% | 56.8% | 41.6% | 0.4% | 1.1% |
| | **fitness** | 0.2% | 7.5% | 62.1% | 30.2% | 0.2% |

**Table 16.** Frequency of answers of the responders from the two groups

| | | How many times did you get ill shortly after a co-athlete of yours was also ill? | | | | |
|---|---|---|---|---|---|---|
| | | >3 times | 3 times | 2 times | Once | Never |
| **Sports category** | **basket** | 14.1% | 69.2% | 16.3% | 0.4% | |
| | **fitness** | | | 12.9% | 55.9% | 31.1% |

## 4. Discussion

Sports and exercise provide an excellent setting for the transmission of communicable diseases (Harris, 2011; Likness, 2011). Outbreaks of viral, fungal, and bacterial skin infections are common in athletes (Liknees, 2011; Collins – O'Connell, 2012). The agents most often are

responsible for the reported outbreaks in competitive sports are herpes simplex virus Staphylococcus aureus, enteroviruses, tinea, Streptococcus pyogenes, hepatitis A and B viruses, measles virus, Leptospira species and Neisseria meningitides (Collins – O'Connell, 2012; Harris, 2011; Lear et al., 2011; Luke, d'Hemecourt, 2007). Infectious agents such as Norwalk virus, rickettsia, chlamydia, and pseudomonas are also implicated in outbreaks, even though rarely (Turbeville et al., 2006). Moreover, people who work out in sports centers develop infections that in most cases are common with those of athletes in team sports (Goldhammer et al., 2006).

The transmission of infectious diseases can occur with person to person contact, common source, or vector transmission (Harris, 2011; Likness, 2011; Luke and d'Hemecourt, 2007). The most common mode of transmission is direct person-to-person (primarily skin-to-skin) contact (Sean et al., 2006; Collins – O'Connell, 2012) and through respiratory tract (Harris, 2011). Transmission through common-source exposure is also implicated, although not very common quantitatively. Common sources of exposure include contaminated water or watercoolers, water bottles, and drinking cups, athletic equipment, locker rooms, fencing equipment, soap and towels, whirlpools, swimming pools. In some outbreaks, multiple modes of transmission are reported. Blood-borne and airborne transmission is rarely reported except for measles outbreaks (Sean et al., 2010; Zinder et. al., 2010).

The prevention of infectious diseases among athletes is of great importance. Primary prevention of infectious disease is the ideal goal, and deals with avoiding the development of the disease before infection occurs. Secondary prevention for infection control involves prevention of spread to others. Athletes are often exposed to many different people, travel in various environments locally and internationally for tournaments, and engage in high-risk activities, often in close contact with others (Likness, 2011; Zinder et al., 2010).

Since good hygiene of people participating in sports (Cordoro, Ganz, 2005; Goldhammer et al., 2006; Sean et al., 2006; Zinder et. al., 2010) is of great importance for the prevention of infectious diseases, the current study tried to examine the hygiene conditions that exist in sports halls, the attitude of recreational basketball players as well as people working out in fitness centers regarding personal hygiene issues and the protection measures in order for the possible dangers to be comprehensible.

The study, showed that a great percentage of participants do not follow the rules of personal hygiene as often as they should and that poor personal hygiene is strongly correlated to higher probability for an athlete to have skin infections or illness symptoms. Furthermore, poor hygiene of the sports halls is linked to higher frequency of symptoms of common illness, skin infections and adhesive illnesses among athletes. In a more detailed analysis a serious difference is observed among the two groups when they evaluate the hygiene conditions of their sports hall: amateur basketball athletes report that the hygiene of their sports hall is poor, when people who work out evaluate their fitness hall higher regarding hygiene standards. Therefore, the correlation between the hygiene of the environment and the frequency of dermal or illness symptoms seems to be strong.

Another matter which was examined in this study was the degree in which the responders were informed regarding personal hygiene rules as well as the level of application of these specific rules. The original assumption was that amateur athletes practice in a systematic way and participate in matches and therefore they acquire a better knowledge of the prevention rules compared to people working out at fitness centers. However, the original assumption was precluded.

The analysis for the comparison between the recreational basketball athletes and people who work out, brought out the fact that considerable differences exist both in the attitude of the two groups as well as in the frequency they become ill or infected. The fitness athletes tend to be more consistent and cautious with their personal hygiene and they follow more often the rules in order to prevent any illness or infection compared to basketball athletes. As a result, basketball athletes tend to be ill or infected more often than fitness athletes in gyms.

The results of this research are common with the results of other surveys that poor personal and sports hall hygiene is correlated to higher probability for an athlete to have skin infections or illness symptoms. The authors describe and suggested the sports organization should strongly encourage and educate team members about good overall and hand hygiene, the importance of covering of wounds, and the benefits in terms of infection transmission of limiting sharing of equipment. Good personal hygiene helps reduce colonization of bacteria. Equipment must be handled in a manner to prevent transmission of infectious agents including proper cleaning and

sterilization of reusable equipment. Bacteria and viruses can exist on equipment. Methicillin resistant Staphylococcus aureus (MRSA) has been found on taping gel and whirlpool facilities in training facilities. Other bacteria especially Pseudomonas spp. have also been linked to infection outbreaks from use of whirlpools (CDC, 28).

Periodical surveillance of the frequency of infections within a sports team will allow athletic staff to identify outbreaks quickly and take all necessary measures to contain further transmission and prevent future outbreaks. Appropriate outbreak investigations should identify potential sources of exposure empirically. This procedure will allow prevention methods to be based on real data rather than on expert opinion or suggestion. Furthermore, athletic personnel should be trained properly in the identification of outbreaks and in control measures for specific infectious diseases to prevent further spread of an outbreak (Smith et al., 2006; Jaiosky et al., 2006; So et al., 2004).

## 5. Conclusion

In conclusion, a direct connection is found between the frequency of illness and infection symptoms and the consistency of recreational basketball athletes regarding application of hygiene rules. When the athletes are more careful with their personal hygiene, the less prone they are to illness and infections. Especially in sports such as basketball, the space tends to be less healthy and the athletes more careless regarding their personal hygiene and therefore they have a higher frequency of illness and infections. In addition to that the hygiene conditions of the sports hall are highly related to the frequency that the athletes tend to be ill or infected. Recreational basketball athletes should be informed on a more regular and efficient way and method regarding the need to apply personal hygiene rules, so that the frequency of diseases and infections in athletic halls should be reduced.

Training staff, coaches and athletes should be informed on a more regular and typical way and method regarding the need to apply personal hygiene rules, so that the frequency of diseases and infections in athletic halls should be reduced.

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