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# DIFFERENCES IN THE ANTHROPOMETRIC CHARACTERISTICS AND MOTOR ABILITIES IN STUDENTS FROM DIFFERENT URBAN ENVIRONMENTS

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**Abstract:** Physical education in schools has a major role in the formation of the personality of the child. The only appropriate level of motor abilities enables successful learning of complex motor tasks, abilities acquisition and creating habits. Hence, the main goal of physical education is through interesting structures and exercises to reassure the child, develop his motor abilitiess, to embody a competitive spirit in him, to socialize him, and so on. Generally speaking, for this purpose, students should actively participate in the process of physical education, to understand the value and the importance of the exercise system for their psycho-physical health, physical development and obtaining positive moral qualities of the person. To get the true picture of a child, his current state, standardized tests are performed in predefined conditions. The tests are tools that measure the appropriate characteristics or abilities. There are many types of tests that allow to reflect current motor abilities, morphological characteristics and psycho-physical conditions of a child who is part of the curriculum of physical education and sports. From a technical and organizational point of view, their application is justified and simple, but from a professional point of view, require an appropriate level of knowledge of the emerging phenomenon. The scientists, in the field of sports and physical education in Europe, recognized the need to monitor the physical development and motor abilities of children and youth, and therefore they created a standardized battery of tests recommended by the Council of Europe (Eurofit, 1993). In addition to the basic procedure for assessing physical development, the EROFIT battery contains nine motor tests covering flexibility, velocity, endurance and strength. The survey was conducted on a sample of 109 male students. Respondents are divided according to the criteria age, 14 and 15 years old (8th and 9th grade), from two primary schools from two municipalities in Prishtina. The research was conducted in order to determine the differences in the anthropometric and motor characteristics between the students from the 8th and 9th grade, from two primary schools from both municipalities. In addition to the basic statistical parameters, for determining the univariant differences among the students in the applied variables, the t-test was applied. From the comparison of the applied variables on the two sub samples, statistically significant differences in the anthropometric characteristics and in the motor abilitieswere determined.
**Keywords:** anthropometric characteristics, motor abilities, basic statistic, t-test

## 1. INTRODUCTION

Physical education in schools has a major role in the formation of the personality of the child. Only the appropriate level of motor abilities enables successful learning of complex motor tasks, the adoption of abilities and the creation of habits (Višnjič et al., 2004). Hence, the main goal of physical education is through interesting structures and exercises to reassure the child, develop his motor abilities, embody a competitive spirit in him, socialize him, and so on. Generally speaking, for this purpose, students should actively participate in the process of teaching physical education, to understand the value and importance of the exercise system for their psycho-physical health, physical development and obtaining positive moral qualities of the person (Findak, 1996). Researches and scientific papers in kinesiology are indeed in a large numbers. It is an area that does not become obsolete, but it requires constant control and monitoring of the problem. In order to approach this whole area seriously, scientific research is needed to assess the state of motor abilities, anthropometric characteristics, nutritional status, postural status, to determine

how physically active are the students during the day, to determine with which physical activity they want to be most engaged and to determine how many of the students are engaged in sports outside the physical education classes and sports. According to (Strong et., 2005; Pate et al., 2006), 30 to 60 optimal minutes of physical exercise activity during the day are recommended, which would ensure adequate development of the child.

## 2. METHODS OF WORK

The survey was conducted on a deliberate sample of male students, a total of 109 respondents divided into two sub-samples according to the criterion - age and primary schools. The respondents are students from the Primary School Faik Konica and the Primary School 7th of March, from two different municipalities in Pristina. Each student to fits in the sample of respondents should attend regular physical education classes. The main goal of the research is to determine the differences in the motor abilities between the 8th and 9th grade students from the two primary schools in the municipalities in Pristina.

In the research, a total of 9 variables were used to assess the motor abilities of students (Metikosh et al., 1989), divided into 3 spaces:

1. Tests for estimating flexibility
- Bend with legs aside sitting on the floor (FPRP)
- Deep bend on the bench (FDPK)
- Arm mobility with stick (FIP)

2. Tests for the estimation of the explosive strength
- Long Distance Jump (ESDM)
- High-altitude jump - Sargent's test (ESVM)
- Sprint from standing start at 20 meters (EVS20)

3. Tests for estimating the repetitive strength
- Body lift in 30 seconds (RP30)
- Pushups on the floor (RSP)
- Pull ups from death hang (RZV)

Based on the values obtained from the testing of the respondents, the basic statistical parameters were calculated: arithmetic mean (X), standard deviation (SD), minimum and maximum result (Min and Max), Skewness (Skw), Kurtosis (Kurt) and Kolmogorov-Smirnov method (maxD). By applying the Pearson coefficient of correlation, the correlation between the applied tests was determined. To determine the univariate a difference between the students from both schools in the applied variables, a t-test was applied. Statistical data processing is carried out through the statistical program package "Statistic for Windows 10".

## 3. RESULTS AND DISCUSSION

From the obtained results of the students of the 8th and 9th grade from the Primary school 7th of March (Table 1), we can notice a expressed homogeneity in most of the achieved results (Std Dev are less than 1/3 of the arithmetic mean), except in: Bend with legs aside sitting on the floor (FPRP), Pushups on the floor (RSP), Pull ups from death hang (RZV).

**Table 1:** The basic statistical parameters of the students from 8th and 9th grades from the Primary school 7th of March

| Variable | Valid N | Mean | Min | Max | Std.Dev. | Skew | Kurt | max D | K-S |
|---|---|---|---|---|---|---|---|---|---|
| FPRP | 70 | 36.26 | 10.00 | 60.00 | 9.35 | 0.06 | 0.35 | 0.07 | p > .20 |
| FDPK | 70 | 17.04 | 0.00 | 36.00 | 8.41 | -0.09 | -0.84 | 0.10 | p > .20 |
| FIP | 70 | 80.50 | 49.00 | 97.00 | 10.22 | -1.26 | 1.90 | 0.16 | p < .10 |
| ESDM | 70 | 156.51 | 90.00 | 285.00 | 31.91 | 1.27 | 3.87 | 0.13 | p > .20 |

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|---|---|---|---|---|---|---|---|---|---|
| ESVM | 70 | 33.63 | 22.00 | 47.00 | 6.04 | 0.27 | -0.69 | 0.11 | p > .20 |
| EVS20 | 70 | 4.47 | 3.50 | 7.10 | 0.69 | 1.84 | 4.50 | 0.18 | p < .05 |
| RP30 | 70 | 20.10 | 6.00 | 44.00 | 5.30 | 0.84 | 5.25 | 0.10 | p > .20 |
| RSP | 70 | 14.83 | 0.00 | 50.00 | 11.74 | 1.06 | 0.91 | 0.14 | p < .15 |
| RZV | 70 | 2.46 | 0.00 | 13.00 | 3.04 | 1.58 | 1.91 | 0.27 | p < .01 |

Analyzing the coefficient of curvature of the Gaussian curve (Skewness), one can conclude that of all the applied variables in this study, in five there is a deviation from the normal distribution. In the variables of Arm mobility with stick (FIP) there is asymmetry of the Gaussian curve to the left (smaller values of -1), while in the variables Long Distance Jump (ESDM), Sprint from standing start at 20 meters (EVS20), Pushups on the floor (RSP), Pull ups from death hang (RZV), there is asymmetry to the right (greater than 1).
According to the elongation of the curvature (Kurtosis), we can notice that the variables Long Distance Jump (ESDM), Sprint from standing start at 20 meters (EVS20), Body lift in 30 seconds (RP30), have a high-tailed distribution in the y- axis (values greater than 3), i.e. significant variability, while in all other variables the distribution is distributed light-tailed along the y-axis. This suggests that the sample of respondents is expressed heterogeneous in relation to the obtained results from the applied tests.
The distribution normality of the results was tested with Kolmogorov - Smirnov test (KS), and it can be said that there is a deviation from the normal distribution only in the tests: Sprint from standing start at 20 meters (EVS20) and Pull ups from death hang (RZV), in all nine applied tests.

**Table 2:** Basic statistical parameters of the students from the 8th and 9th grade from the Primary school Faik Konica

| Variable | Valid N | Mean | Min | Max | Std.Dev. | Skew | Kurt | max D | K-S |
|---|---|---|---|---|---|---|---|---|---|
| FPRP | 39 | 37.00 | 18.00 | 53.00 | 8.10 | 0.06 | -0.25 | 0.09 | p > .20 |
| FDPK | 39 | 17.77 | 4.00 | 28.00 | 5.96 | -0.20 | -0.70 | 0.14 | p > .20 |
| FIP | 39 | 85.85 | 51.00 | 98.00 | 10.91 | -1.31 | 1.62 | 0.17 | p > .20 |
| ESDM | 39 | 158.90 | 110.00 | 195.00 | 22.67 | -0.16 | -0.40 | 0.11 | p > .20 |
| ESVM | 39 | 31.79 | 20.00 | 46.00 | 5.56 | 0.46 | 1.36 | 0.17 | p > .20 |
| EVS20 | 39 | 3.70 | 3.00 | 5.00 | 0.37 | 0.98 | 3.01 | 0.09 | p > .20 |
| RP30 | 39 | 21.51 | 15.00 | 37.00 | 4.32 | 1.43 | 3.22 | 0.18 | p < .20 |
| RSP | 39 | 15.13 | 3.00 | 40.00 | 8.64 | 0.68 | 0.29 | 0.12 | p > .20 |
| RZV | 39 | 2.49 | 0.00 | 13.00 | 3.28 | 1.62 | 2.23 | 0.24 | p < .05 |

From the basic statistical parameters of the 8th and 9th grade students from the Primary school Faik Konica (Table 2), we can notice a expressed homogeneity or that the achieved results are grouped around the value of the arithmetic mean in most of the achieved results (Std Dev are less than 1/3 of the arithmetic mean), except in: Pushups on the floor (RSP) and Pull ups from death hang (RZV).

The values of the curve (Skewness) indicate that there is asymmetry to the left in the variable Arm mobility with stick (FIP) (less than -1), while asymmetry to the right (greater than 1) in the variables: Body lift in 30 seconds (RP30) and Pull ups from death hang (RZV). The curvature values of the curve in other tests are symmetrical.

**Table 3:** t - test between students from primary school 7th of March (N = 70) and Faik Konica PS (N = 39)

| | Mean | Mean | t-value | df | p | Valid N | Valid N | Std.Dev. | Std.Dev. | F-ratio | p |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FPRP | 36.26 | 37.00 | -0.42 | 107.00 | 068 | 70 | 39 | 9.35 | 8.10 | 1.33 | 0.34 |
| FDPK | 17.04 | 17.77 | -0.48 | 107.00 | 0.63 | 70 | 39 | 8.41 | 5.96 | 1.99 | 0.02 |
| FIP | 80.50 | 85.85 | -2.56 | 107.00 | 0.01 | 70 | 39 | 10.22 | 10.91 | 1.14 | 0.63 |
| ESDM | 156.51 | 158.90 | -0.41 | 107.00 | 0.68 | 70 | 39 | 31.91 | 22.67 | 1.98 | 0.02 |
| ESVM | 33.63 | 31.79 | 1.57 | 107.00 | 0.12 | 70 | 39 | 6.04 | 5.56 | 1.18 | 0.59 |
| EVS20 | 4.47 | 3.70 | 6.46 | 107.00 | 0.00 | 70 | 39 | 0.69 | 0.37 | 3.52 | 0.00 |
| RP30 | 20.10 | 21.51 | -1.42 | 107.00 | 0.16 | 70 | 39 | 5.30 | 4.32 | 1.50 | 0.17 |
| RSP | 14.83 | 15.13 | -0.14 | 107.00 | 0.89 | 70 | 39 | 11.74 | 8.64 | 1.84 | 0.04 |
| RZV | 2.46 | 2.49 | -0.05 | 107.00 | 0.96 | 70 | 39 | 3.04 | 3.28 | 1.16 | 0.59 |

According to the elongation of the curvature (Kurtosis), it can be determined that there is a considerable variability of the obtained results in Sprint from standing start at 20 meters (EVS20), Body lift in 30 seconds (RP30), i.e. a high-tailed distribution in y - axis (values greater than 3), while in the other results there is a light-tailed distribution along the y-axis. According to this, we can say that the sample of respondents is heterogeneous in relation to the obtained results from the applied tests.

By applying the Kolmogorov-Smirnov test (KS) test, we determine that there is a deviation from the normal distribution only in the variable Pull ups from death hang (RZV), out of all nine applied tests.

Table 3 shows that in 7 out of 21 variables there is a statistically significant difference between the groups of respondents. We will divide the variables into 2 groups, so that we can more clearly discern the differences between the groups of respondents.

From Table 3 it can be noted that in 2 of the total of 9 variables there is a statistically significant difference between the groups of respondents.

According to the t-test (t value – value greater than 1.96), a statistically significant difference exists in the flexibility test Arm mobility with stick (FIP) and the explosive velocity assessment test, Sprint from standing start at 20 meters (EVS20). These two tests serve to assess the motor abilities of the respondents, so we can easily conclude that the group of respondents from the Primary School Faik Konica have better results ie improved motor abilities from the group of respondents from the Primary School 7th of March. Although the results of other tests for the assessment of motor abilities do not show a statistically significant difference, we can still notice that the most of the respondents from the Primary school Faik Konica are better.

## 4. CONCLUSION

For the realization of the purpose and the tasks of the research, a sample of 109 respondents, consisting of 2 sub-samples, was used. The first sub-sample was composed of the students from the 8th and 9th grades of the Primary school 7th of March from the Prishtina peripheral area, while the second sub-sample consisted of the students from 8th and 9th grade from the Primary School Faik Konica from the central area of Prishtina.

In the treated groups, a total of 9 motor tests were applied, for the assessment of the following motor abilities: flexibility, explosive strength and repetitive strength

According to the objectives that were set, the tasks and the hypotheses in the research, the following conclusions are drawn:

The motor abilities for each sub-sample, according to age and the primary school were appropriately assessed.

According to the established motor abilities of the students from the two primary schools, a comparison has been made, which determines better motor abilities of the second group of students (the students of the Primary School Faik Konica) only in 2 of 9 motor tests in: Arm mobility with stick (FIP) and Sprint from standing start at 20 meters (EVS20).

In the remaining 7 motor tests, although no statistically significant difference was found, the respondents from the second group (students from Primary School Faik Konica) achieved significantly better results.

This difference is based on the better organization and the better conditions for the realization of the physical education classes in the school in the central area than in the school in the peripheral municipality of the city.

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