UDC: 572.087.1:796.3.071.2.012.1-055.2-053.6(497.115)
*Original scientific paper*

# RELATIONSHIPS IN SOME ANTHROPOMETRIC PARAMETERS AND MOTOR ABILITIES AMONG VOLLEYBALL, BASKETBALL, HANDBALL PLAYERS AND NON-ATHLETES AGED 13–15 YEARS

**Besim Morina[1], Laureta ABAZI [1], Milazim Kamberi[1], Agim REXHEPI [1], Blerim SULEJMANI**

[1] University of Tetovo, Faculty of Physical Education, Republic of North Macedonia

**Abstract**

This study included 120 female students aged 13–15 years. Among them, 30 were students involved in two volleyball clubs in the cities of Prizren and Theranda, with approximately 1.5 years of training experience; 30 students were members of several basketball clubs in the city of Prizren, with approximately 2.5 years of training experience; 30 students were members of two handball clubs in the city of Prizren, with more than 3.5 years of training experience; and 30 were non-athlete students whose primary physical activity consisted of physical education classes within the school curriculum. The latter group was selected randomly from two schools in the city of Prizren.
The aim of this study is to identify the differences between students who train in sports clubs such as volleyball, basketball, and handball, and students who do not train in any sports club.
Based on the aim of the study, the statistical method used was the T-test (Independent Samples Test).
After processing and analyzing the results, it was possible to confirm differences in both the anthropometric and motor domains. The differences observed between the groups fall within both levels of statistical significance p = .05 and p = .01.
This study provides sufficient data regarding the physical condition and anthropometric and motor characteristics of the sample included in the research, namely the tested entities. Furthermore, this study represents an added value alongside other studies in this field.

Keywords: relationships, anthropometric parameters, motor abilities, athletes, non-athletes.

## Introduction

Being aware that through regular training in sports such as volleyball, basketball, and football, general physical abilities are developed, through this study we aim to closely observe the differences between students engaged in these sports and their peers whose physical activity is limited to twice a week during regular physical education classes.
Volleyball, according to the nature of its movements, belongs to the group of complex polystructural sports. By playing volleyball, all muscle groups of the locomotor system are engaged, while the high intensity and dynamics of the game positively affect the cardiovascular and respiratory systems; in other words, they contribute to the proper formation and development of the body.

## Aim of the research

The main aim of this scientific and professional study is to identify the differences between students who train in various sports clubs such as volleyball, basketball, and handball, and students who do not train in any sports club but whose primary physical activity consists of two physical education classes per week in regular schools.

https://doi.org/10.62792/ut.sport.v13.i27-28.p3392

## Methods

The sample of this research consisted of 120 female participants aged 13–15 years. The sample included:

- **30 volleyball players**, of whom 20 belong to VC "Prizreni" from the city of Prizren and 10 volleyball players from VC "Gjinofci" from the town of Theranda. It should be noted that VC "Prizreni" has been recently established, and the entire sample of volleyball players has an average of about **1.5 years of training experience**.
- **30 young basketball players** from several basketball clubs in the city of Prizren, namely BC "Bashkimi", BC "Ylli 06", BC "Kalaja", and BC "Mega Sport", where the entire sample of basketball players has an average of about **2.5 years of training experience**.
- **30 young handball players** from two handball clubs in the city of Prizren, namely HC "Prizreni" and HC "Click". It is worth emphasizing that both handball clubs included in the measurements have **two years of competitive experience**, and the entire sample of handball players has an average of **more than 3.5 years of training** in this sport.
- **30 students** from two lower secondary schools in the city of Prizren, namely 15 students from each school: SHMU "Gani Saramti" and SHMU "Hysen Rexhepi".

The sample of variables consisted of **6 anthropometric variables** and **7 basic motor variables**. All measurements were carried out according to the guidelines of the **International Biological Program (IBP)**.

For the identification of anthropometric variables, the following anthropometric parameters were applied:

1. **ALARTË** – Body height
2. **APESHA** – Body weight
3. **AGJKRH** – Arm length
4. **APERKA** – Arm circumference
5. **APERKOF** – Thigh circumference
6. **APERKRC** – Calf circumference

For the identification of motor abilities related to dynamic strength, the following motor parameters were applied:

1. **MKVGJA** – Standing long jump
2. **KVLAR** – Standing vertical jump
3. **MHMBGJ** – Medicine ball throw from the chest
4. **MPTHPU** – Deep forward bend while sitting (flexibility)
5. **MTAPDO** – Hand tapping test
6. **MFMDOR** – Maximum hand grip strength (Hand Grip Test)
7. **MVR20M** – 20 m sprint from a high start

## Results and discussion

In Tables **1, 2, 3, 4, 5**, and **6** below, the differences between the results of the respective groups and variables are presented, where the **T-test method (Independent Samples Test)** was applied.

In **Table 1**, the values of differences in the arithmetic means of the variables representing the results achieved by students from volleyball clubs and those achieved by students from basketball clubs are presented. From the results in Table 1, it can be observed that, from the two research domains examined, statistically significant differences were found only in the **motor domain**.

**MKVLAR** with a t-test value **t = 3.593** and significance value **sig = 0.001** indicates a difference at the probability level **p = 0.01**, and as such it is in favor of the group of students from volleyball clubs.

In **Table 2**, the values of differences in the arithmetic means of the variables representing the results achieved by students from volleyball clubs and those achieved by students from handball clubs are presented. Differences between the groups in the **anthropometric domain** were identified in the following variables:

- **APESHA**, with t-test value **t = -2.621** and significance **sig = 0.001**;
- **APEKRA**, with t-test value **t = -3.455** and significance **sig = 0.001**;
- **APEKOF**, with t-test value **t = -4.854** and significance **sig = 0.000**;
- **APEKRC**, with t-test value **t = -3.079** and significance **sig = 0.003**.

All four differences are at the probability level **p = 0.01**, and all are in favor of the group of students from handball clubs. Differences between the groups in the **motor domain** were identified in the variables:

- **MTAPDO**, with t-test value **t = 3.272** and significance **sig = 0.002**, indicating a difference at the probability level **p = 0.01**. Numerically, the value favors the volleyball club students; however, considering that the test task was to be completed in the **shortest possible time**, it can be concluded that the achieved result favors the students from handball clubs.
- **MFDDIN**, with t-test value **t = -2.318** and significance **sig = 0.024**, indicating a difference at the probability level **p = 0.05**, in favor of the students from handball clubs.

In **Table 3**, the values of differences in the arithmetic means of the variables representing the results achieved by students from volleyball clubs and those achieved by students from schools are presented. Differences between the groups in the **anthropometric domain** were identified in the variable:

- **AGJKRH**, with t-test value **t = 2.544** and significance **sig = 0.012**, indicating a difference at the probability level **p = 0.05**, in favor of the volleyball club students.

Differences between the groups in the **motor domain** were identified in the variables:

- **MKVLAR**, with t-test value **t = 2.585** and significance **sig = 0.014**, indicating a difference at the probability level **p = 0.05**, in favor of the volleyball club students.
- **MHMBGJ**, with t-test value **t = 2.969** and significance **sig = 0.005**, indicating a difference at the probability level **p = 0.01**, in favor of the volleyball club students.
- **MVR20M**, with t-test value **t = -4.157** and significance **sig = 0.000**. Numerically, the value favors the school students; however, considering that the test task was to be completed in the shortest possible time, it can be concluded that the achieved result favors the volleyball club students.

In **Table 4**, the values of differences in the arithmetic means of the variables representing the results achieved by students from basketball clubs and those achieved by students from handball clubs are presented. Differences between the groups in the **anthropometric domain** were identified in the variables:

- **ALARTR**, with t-test value **t = -2.158** and significance **sig = 0.035**, indicating a difference at the probability level **p = 0.05**, in favor of the students from handball clubs.
- **APESHA**, with t-test value **t = -3.631** and significance **sig = 0.001**;
- **APEKRA**, with t-test value **t = -4.650** and significance **sig = 0.000**;
- **APEKOF**, with t-test value **t = -3.409** and significance **sig = 0.001**;
- **APEKRC**, with t-test value **t = -3.668** and significance **sig = 0.001**.

The last four differences are at the probability level **p = 0.01**, and all are in favor of the students from handball clubs. Differences between the groups in the **motor domain** were identified in the variables:

- **MKVGJA**, with t-test value **t = -2.270** and significance **sig = 0.028**, indicating a difference at the probability level **p = 0.05**, in favor of the students from handball clubs.
- **MKVLAR**, with t-test value **t = -2.760** and significance **sig = 0.008**, indicating a difference at the probability level **p = 0.01**, in favor of the students from handball clubs.
- **MHMBGJ**, with t-test value **t = -4.047** and significance **sig = 0.000**, indicating a difference at the probability level **p = 0.01**, in favor of the students from handball clubs.
- **MTAPDO**, with t-test value **t = 3.063** and significance **sig = 0.003**, indicating a difference at the probability level **p = 0.01**. Numerically, the value favors basketball club students; however, since the task had to be completed in the shortest possible time, the result favors the students from handball clubs.

In **Table 5**, the values of differences in the arithmetic means of the variables representing the results achieved by students from basketball clubs and those achieved by students from schools are presented. From the results in Table 5, it can be observed that statistically significant differences were found only in the **motor domain**.

- **MPTHTP**, with t-test value **t = 2.604** and significance **sig = 0.012**, indicating a difference at the probability level **p = 0.05**, in favor of the students from basketball clubs.
- **MVR20M**, with t-test value **t = -4.420** and significance **sig = 0.000**. Numerically, the value favors school students; however, considering that the test task had to be completed in the shortest possible time, it can be concluded that the result favors the students from basketball clubs.

In **Table 6**, the values of differences in the arithmetic means of the variables representing the results achieved by students from handball clubs and those achieved by students from schools are presented. Differences between the groups in the **anthropometric domain** were identified in the variables:

- **APESHA**, with t-test value **t = 2.860** and significance **sig = 0.006**;
- **APEKRA**, with t-test value **t = 2.866** and significance **sig = 0.006**;
- **APEKOF**, with t-test value **t = 3.021** and significance **sig = 0.004**.

For these three variables, the differences are at the probability level **p = 0.01**, and all are in favor of the students from handball clubs.

Meanwhile, the variables:

- **AGJKRH**, with t-test value **t = 2.491** and significance **sig = 0.016**;
- **APEKRC**, with t-test value **t = 2.115** and significance **sig = 0.039**,

show differences at the probability level **p = 0.05**, and both are in favor of the students from handball clubs. Differences between the groups in the **motor domain** were identified in the variables:

- **MKVLAR**, with t-test value **t = 1.996** and significance **sig = 0.051**, representing a borderline difference with a tendency toward the probability level **p = 0.05**, in favor of the students from handball clubs.
- **MHMBGJ**, with t-test value **t = 5.662** and significance **sig = 0.000**, and the variable
- **MPTHTP**, with t-test value **t = 3.460** and significance **sig = 0.001**.

For both variables, the differences are at the probability level **p = 0.01**, and both favor the students from handball clubs.

- **MTAPDO**, with t-test value **t = -3.135** and significance **sig = 0.003**, and the variable
- **MPTHTP**, with t-test value **t = -4.623** and significance **sig = 0.000**,

for both variables the differences are at the probability level **p = 0.01**. Numerically, both results favor the group of school students; however, considering that the tasks of the tests were to be completed in the shortest possible time, it can be concluded that both results favor the students from handball clubs.

**Table 1.** T-test between students from volleyball clubs and students from basketball clubs.

| **Group Statistics** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Difference | N | Mean | Std. Deviation | Std. Error Mean | t | df | Sig. (2-tailed) |
| ALARTR | Volleyball c. stud. | 30 | 1591.1000 | 73.61566 | 13.44032 | 1.975 | 58 | .053 |
| | Basketball c. students | 30 | 1554.0000 | 71.89360 | 13.12592 | 1.975 | 57.968 | .053 |
| APESHA | Volleyball c. stud. | 30 | 499.3000 | 83.46428 | 15.23842 | 1.216 | 58 | .229 |
| | NX. K të Basketbollit | 30 | 472.7333 | 85.68383 | 15.64366 | 1.216 | 57.960 | .229 |
| AGJKRH | Volleyball c. stud. | 30 | 1581.8000 | 73.40365 | 13.40161 | .586 | 58 | .560 |
| | Basketball c. students | 30 | 1569.2333 | 91.61263 | 16.72610 | .586 | 55.368 | .560 |
| APEKRA | Volleyball c. stud. | 30 | 240.8667 | 25.13924 | 4.58978 | 1.639 | 58 | .107 |
| | Basketball c. students | 30 | 230.3667 | 24.47727 | 4.46892 | 1.639 | 57.959 | .107 |
| APEKOF | Volleyball c. stud. | 30 | 466.6333 | 49.56325 | 9.04897 | -1.053 | 58 | .297 |
| | NX. K të Basketbollit | 30 | 481.4667 | 59.09182 | 10.78864 | -1.053 | 56.295 | .297 |
| APEKRC | Volleyball c. stud. | 30 | 334.4000 | 30.23996 | 5.52104 | .821 | 58 | .415 |
| | Basketball c. students | 30 | 327.6000 | 33.79920 | 6.17086 | .821 | 57.296 | .415 |
| MKVGJA | Volleyball c. stud. | 30 | 144.9667 | 21.40655 | 3.90828 | 1.925 | 58 | .059 |
| | Basketball c. students | 30 | 135.8333 | 14.72526 | 2.68845 | 1.925 | 51.424 | .060 |
| MKVLAR | Volleyball c. stud. | 30 | 29.3000 | 4.89299 | .89333 | **3.593** | 58 | **.001** |
| | Basketball c. students | 30 | 24.9667 | 4.43717 | .81011 | **3.593** | 57.454 | **.001** |
| MHMBGJ | Volleyball c. stud. | 30 | 366.5000 | 50.22621 | 9.17001 | 1.938 | 58 | .058 |
| | Basketball c. students | 30 | 343.5000 | 41.27598 | 7.53593 | 1.938 | 55.901 | .058 |
| MPTHTP | Volleyball c. stud. | 30 | 198.4000 | 100.87056 | 18.41636 | -.182 | 58 | .856 |
| | Basketball c. students | 30 | 202.4667 | 69.20322 | 12.63472 | -.182 | 51.348 | .856 |
| MTAPDO | Volleyball c. stud. | 30 | 10.7470 | 1.30977 | .23913 | .576 | 58 | .567 |
| | Basketball c. students | 30 | 10.5717 | 1.03054 | .18815 | .576 | 54.958 | .567 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| MFDDIN | Volleyball c. stud. | 30 | 25.7667 | 5.24814 | .95818 | -1.347 | 58 | .183 |
| | Basketball c. students | 30 | 27.4167 | 4.17596 | .76242 | -1.347 | 55.214 | .183 |
| MVR20M | Volleyball c. stud. | 30 | 4.0773 | .32740 | .05978 | -.765 | 58 | .448 |
| | Basketball c. students | 30 | 4.1280 | .15654 | .02858 | -.765 | 41.601 | .449 |

**Table 2.** T-test between students from volleyball clubs and students from handball clubs.

| **Group Statistics** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Difference | N | Mean | Std. Deviation | Std. Error Mean | t | df | Sig. (2-tailed) |
| ALARTR | Volleyball c. stud. | 30 | 1591.1000 | 73.61566 | 13.44032 | -.273 | 58 | .786 |
| | Handball c. stud. | 30 | 1596.5333 | 80.53902 | 14.70435 | -.273 | 57.538 | .786 |
| APESHA | Volleyball c. stud. | 30 | 499.3000 | 83.46428 | 15.23842 | **-2.621** | 58 | **.011** |
| | Handball c. stud | 30 | 565.9000 | 111.38852 | 20.33667 | **-2.621** | 53.760 | **.011** |
| AGJKRH | Volleyball c. stud. | 30 | 1581.8000 | 73.40365 | 13.40161 | -.255 | 58 | .800 |
| | Handball c. stud | 30 | 1587.2667 | 91.61310 | 16.72619 | -.255 | 55.368 | .800 |
| APEKRA | Volleyball c. stud. | 30 | 240.8667 | 25.13924 | 4.58978 | **-3.455** | 58 | **.001** |
| | Handball c. stud | 30 | 272.0667 | 42.59022 | 7.77587 | **-3.455** | 47.020 | **.001** |
| APEKOF | Volleyball c. stud. | 30 | 466.6333 | 49.56325 | 9.04897 | **-4.854** | 58 | **.000** |
| | Handball c. stud | 30 | 530.7333 | 52.67266 | 9.61667 | **-4.854** | 57.787 | **.000** |
| APEKRC | Volleyball c. stud. | 30 | 334.4000 | 30.23996 | 5.52104 | **-3.079** | 58 | **.003** |
| | Handball c. stud | 30 | 362.0667 | 38.82226 | 7.08794 | **-3.079** | 54.722 | **.003** |
| MKVGJA | Volleyball c. stud. | 30 | 144.9667 | 21.40655 | 3.90828 | -.487 | 58 | .628 |
| | Handball c. stud | 30 | 147.9000 | 25.11676 | 4.58567 | -.487 | 56.579 | .628 |
| MKVLAR | Volleyball c. stud. | 30 | 29.3000 | 4.89299 | .89333 | -.020 | 58 | .984 |
| | Handball c. stud | 30 | 29.3333 | 7.44327 | 1.35895 | -.020 | 50.120 | .984 |
| MHMBGJ | Volleyball c. stud. | 30 | 366.5000 | 50.22621 | 9.17001 | -1.515 | 58 | .135 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Handball c. stud | 30 | 383.4000 | 34.81339 | 6.35603 | -1.515 | 51.640 | .136 |
| MPTHTP | Volleyball c. stud. | 30 | 198.4000 | 100.87056 | 18.41636 | -.884 | 58 | .380 |
| | Handball c. stud | 30 | 218.7333 | 75.46451 | 13.77787 | -.884 | 53.719 | .381 |
| MTAPDO | Volleyball c. stud. | 30 | 10.7470 | 1.30977 | .23913 | **3.272** | 58 | **.002** |
| | Handball c. stud | 30 | 9.6573 | 1.26920 | .23172 | **3.272** | 57.943 | **.002** |
| MFDDIN | Volleyball c. stud. | 30 | 25.7667 | 5.24814 | .95818 | **-2.318** | 58 | **.024** |
| | Handball c. stud | 30 | 28.8867 | 5.17832 | .94543 | **-2.318** | 57.990 | **.024** |
| MVR20M | Volleyball c. stud. | 30 | 4.0773 | .32740 | .05978 | .018 | 58 | .986 |
| | Handball c. stud | 30 | 4.0760 | .24869 | .04540 | .018 | 54.106 | .986 |

**Table 3.** T-test between students from volleyball clubs and students from schools.

| **Group Statistics** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Difference | N | Mean | Std. Deviation | Std. Error Mean | t | df | Sig. (2-tailed) |
| ALARTR | Volleyball c. stud. | 30 | 1591.1000 | 73.61566 | 13.44032 | 1.557 | 58 | .125 |
| | Stud. of the schools | 30 | 1563.9667 | 60.75983 | 11.09318 | 1.557 | 55.987 | .125 |
| APESHA | Volleyball c. stud. | 30 | 499.3000 | 83.46428 | 15.23842 | .010 | 58 | .992 |
| | Stud. of the schools | 30 | 499.1000 | 62.94680 | 11.49246 | .010 | 53.926 | .992 |
| AGJKRH | Volleyball c. stud. | 30 | 1581.8000 | 73.40365 | 13.40161 | **2.544** | 58 | **.014** |
| | Stud. of the schools | 30 | 1535.7667 | 66.58243 | 12.15623 | **2.544** | 57.457 | **.014** |
| APEKRA | Volleyball c. stud. | 30 | 240.8667 | 25.13924 | 4.58978 | -.375 | 58 | .709 |
| | Stud. of the schools | 30 | 243.7333 | 33.42819 | 6.10312 | -.375 | 53.853 | .709 |
| APEKOF | Volleyball c. stud. | 30 | 466.6333 | 49.56325 | 9.04897 | -1.220 | 58 | .227 |
| | Stud. of the schools | 30 | 484.7667 | 64.56896 | 11.78863 | -1.220 | 54.367 | .228 |
| APEKRC | Volleyball c. stud. | 30 | 334.4000 | 30.23996 | 5.52104 | -.390 | 58 | .698 |
| | Stud. of the schools | 30 | 338.4000 | 47.42151 | 8.65794 | -.390 | 49.239 | .699 |
| MKVGJA | Volleyball c. stud. | 30 | 144.9667 | 21.40655 | 3.90828 | .791 | 58 | .432 |
| | Stud. of the schools | 30 | 141.1000 | 16.09958 | 2.93937 | .791 | 53.855 | .433 |
| MK | Volleyball c. stud. | 30 | 29.3000 | 4.89299 | .89333 | **2.585** | 58 | **.012** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| VLAR | Stud. of the schools | 30 | 26.1667 | 4.48817 | .81942 | **2.585** | 57.573 | **.012** |
| MHMBGJ | Volleyball c. stud. | 30 | 366.5000 | 50.22621 | 9.17001 | **2.969** | 58 | **.004** |
| | Stud. of the schools | 30 | 334.0000 | 32.73193 | 5.97601 | **2.969** | 49.869 | **.005** |
| MPTHTP | Volleyball c. stud. | 30 | 198.4000 | 100.87056 | 18.41636 | 1.746 | 58 | .086 |
| | Stud. of the schools | 30 | 163.1667 | 45.18703 | 8.24999 | 1.746 | 40.189 | .088 |
| MTAPDO | Volleyball c. stud. | 30 | 10.7470 | 1.30977 | .23913 | .411 | 58 | .683 |
| | Stud. of the schools | 30 | 10.6187 | 1.10041 | .20091 | .411 | 56.325 | .683 |
| MFDDIN | Volleyball c. stud. | 30 | 25.7667 | 5.24814 | .95818 | -1.699 | 58 | .095 |
| | Stud. of the schools | 30 | 27.6233 | 2.87866 | .52557 | -1.699 | 45.002 | .096 |
| MVR20M | Volleyball c. stud. | 30 | 4.0773 | .32740 | .05978 | **-4.157** | 58 | **.000** |
| | Stud. of the schools | 30 | 4.4523 | .37012 | .06757 | **-4.157** | 57.149 | **.000** |

**Table 4.** Independent Samples T-test between basketball club students and handball club students.

| **Group Statistics** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Difference | N | Mean | Std. Deviation | Std. Error Mean | t | df | Sig. (2-tailed) |
| ALARTR | Basketball c. students | 30 | 1554.0000 | 71.89360 | 13.12592 | **-2.158** | 58 | **.035** |
| | Handball c. stud | 30 | 1596.5333 | 80.53902 | 14.70435 | **-2.158** | 57.268 | **.035** |
| APESHA | Basketball c. students | 30 | 472.7333 | 85.68383 | 15.64366 | **-3.631** | 58 | **.001** |
| | Handball c. stud | 30 | 565.9000 | 111.38852 | 20.33667 | **-3.631** | 54.420 | **.001** |
| AGJKRH | Basketball c. students | 30 | 1569.2333 | 91.61263 | 16.72610 | -.762 | 58 | .449 |
| | Handball c. stud | 30 | 1587.2667 | 91.61310 | 16.72619 | -.762 | 58.000 | .449 |
| APEKRA | Basketball c. students | 30 | 230.3667 | 24.47727 | 4.46892 | **-4.650** | 58 | **.000** |
| | Handball c. stud | 30 | 272.0667 | 42.59022 | 7.77587 | **-4.650** | 46.273 | **.000** |
| APEKOF | Basketball c. students | 30 | 481.4667 | 59.09182 | 10.78864 | **-3.409** | 58 | **.001** |
| | Handball c. stud | 30 | 530.7333 | 52.67266 | 9.61667 | **-3.409** | 57.250 | **.001** |
| APEKRC | Basketball c. students | 30 | 327.6000 | 33.79920 | 6.17086 | **-3.668** | 58 | **.001** |
| | Handball c. stud | 30 | 362.0667 | 38.82226 | 7.08794 | **-3.668** | 56.921 | **.001** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| MKV GJA | Basketball c. students | 30 | 135.8333 | 14.72526 | 2.68845 | **-2.270** | 58 | **.027** |
| | Handball c. stud | 30 | 147.9000 | 25.11676 | 4.58567 | **-2.270** | 46.829 | **.028** |
| MKV LAR | Basketball c. students | 30 | 24.9667 | 4.43717 | .81011 | **-2.760** | 58 | **.008** |
| | Handball c. stud | 30 | 29.3333 | 7.44327 | 1.35895 | **-2.760** | 47.300 | **.008** |
| MHM BGJ | Basketball c. students | 30 | 343.5000 | 41.27598 | 7.53593 | **-4.047** | 58 | **.000** |
| | Handball c. stud | 30 | 383.4000 | 34.81339 | 6.35603 | **-4.047** | 56.396 | **.000** |
| MPTH TP | Basketball c. students | 30 | 202.4667 | 69.20322 | 12.63472 | -.870 | 58 | .388 |
| | Handball c. stud | 30 | 218.7333 | 75.46451 | 13.77787 | -.870 | 57.570 | .388 |
| MTAP DO | Basketball c. students | 30 | 10.5717 | 1.03054 | .18815 | **3.063** | 58 | **.003** |
| | Handball c. stud | 30 | 9.6573 | 1.26920 | .23172 | **3.063** | 55.653 | **.003** |
| MFD DIN | Basketball c. students | 30 | 27.4167 | 4.17596 | .76242 | -1.210 | 58 | .231 |
| | Handball c. stud | 30 | 28.8867 | 5.17832 | .94543 | -1.210 | 55.508 | .231 |
| MVR2 0M | Basketball c. students | 30 | 4.1280 | .15654 | .02858 | .969 | 58 | .336 |
| | Handball c. stud | 30 | 4.0760 | .24869 | .04540 | .969 | 48.864 | .337 |

**Table 5.** Independent Samples T-test between basketball club students and school students.

| **Group Statistics** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Difference | N | Mean | Std. Deviation | Std. Error Mean | t | df | Sig. (2-tailed) |
| ALA RTR | Basketball c. students | 30 | 1554.0000 | 71.89360 | 13.12592 | -.580 | 58 | .564 |
| | Stud. of the schools | 30 | 1563.9667 | 60.75983 | 11.09318 | -.580 | 56.432 | .564 |
| APES HA | Basketball c. students | 30 | 472.7333 | 85.68383 | 15.64366 | -1.358 | 58 | .180 |
| | Stud. of the schools | 30 | 499.1000 | 62.94680 | 11.49246 | -1.358 | 53.242 | .180 |
| AGJ KRH | Basketball c. students | 30 | 1569.2333 | 91.61263 | 16.72610 | 1.619 | 58 | .111 |
| | Stud. of the schools | 30 | 1535.7667 | 66.58243 | 12.15623 | 1.619 | 52.953 | .111 |
| APE KRA | Basketball c. students | 30 | 230.3667 | 24.47727 | 4.46892 | -1.767 | 58 | .082 |
| | Stud. of the schools | 30 | 243.7333 | 33.42819 | 6.10312 | -1.767 | 53.154 | .083 |
| APE KOF | Basketball c. students | 30 | 481.4667 | 59.09182 | 10.78864 | -.207 | 58 | .837 |
| | Stud. of the schools | 30 | 484.7667 | 64.56896 | 11.78863 | -.207 | 57.550 | .837 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| APE KRC | Basketball c. students | 30 | 327.6000 | 33.79920 | 6.17086 | -1.016 | 58 | .314 |
| | Stud. of the schools | 30 | 338.4000 | 47.42151 | 8.65794 | -1.016 | 52.420 | .314 |
| MKV GJA | Basketball c. students | 30 | 135.8333 | 14.72526 | 2.68845 | -1.322 | 58 | .191 |
| | Stud. of the schools | 30 | 141.1000 | 16.09958 | 2.93937 | -1.322 | 57.544 | .191 |
| MKV LAR | Basketball c. students | 30 | 24.9667 | 4.43717 | .81011 | -1.041 | 58 | .302 |
| | Stud. of the schools | 30 | 26.1667 | 4.48817 | .81942 | -1.041 | 57.992 | .302 |
| MH MBG J | Basketball c. students | 30 | 343.5000 | 41.27598 | 7.53593 | .988 | 58 | .327 |
| | Stud. of the schools | 30 | 334.0000 | 32.73193 | 5.97601 | .988 | 55.137 | .328 |
| MPT HTP | Basketball c. students | 30 | 202.4667 | 69.20322 | 12.63472 | **2.604** | 58 | **.012** |
| | Stud. of the schools | 30 | 163.1667 | 45.18703 | 8.24999 | **2.604** | 49.925 | **.012** |
| MTA PDO | Basketball c. students | 30 | 10.5717 | 1.03054 | .18815 | -.171 | 58 | .865 |
| | Stud. of the schools | 30 | 10.6187 | 1.10041 | .20091 | -.171 | 57.752 | .865 |
| MFD DIN | Basketball c. students | 30 | 27.4167 | 4.17596 | .76242 | -.223 | 58 | .824 |
| | Stud. of the schools | 30 | 27.6233 | 2.87866 | .52557 | -.223 | 51.484 | .824 |
| MVR 20M | Basketball c. students | 30 | 4.1280 | .15654 | .02858 | **-4.420** | 58 | **.000** |
| | Stud. of the schools | 30 | 4.4523 | .37012 | .06757 | **-4.420** | 39.054 | **.000** |

**Table 6.** Independent Samples T-test between handball club students and school students.

| **Group Statistics** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Difference | N | Mean | Std. Deviation | Std. Error Mean | t | df | Sig. (2-tailed) |
| ALAR TR | Handball c. stud | 30 | 1596.5333 | 80.53902 | 14.70435 | 1.768 | 58 | .082 |
| | Stud. of the schools | 30 | 1563.9667 | 60.75983 | 11.09318 | 1.768 | 53.934 | .083 |
| APESH A | Handball c. stud | 30 | 565.9000 | 111.38852 | 20.33667 | **2.860** | 58 | **.006** |
| | Stud. of the schools | 30 | 499.1000 | 62.94680 | 11.49246 | **2.860** | 45.808 | **.006** |
| AGJK RH | Handball c. stud | 30 | 1587.2667 | 91.61310 | 16.72619 | **2.491** | 58 | **.016** |
| | Stud. of the schools | 30 | 1535.7667 | 66.58243 | 12.15623 | **2.491** | 52.953 | **.016** |
| APEK RA | Handball c. stud | 30 | 272.0667 | 42.59022 | 7.77587 | **2.866** | 58 | **.006** |
| | Stud. of the schools | 30 | 243.7333 | 33.42819 | 6.10312 | **2.866** | 54.901 | **.006** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| APEKOF | Handball c. stud | 30 | 530.7333 | 52.67266 | 9.61667 | **3.021** | 58 | **.004** |
| | Stud. of the schools | 30 | 484.7667 | 64.56896 | 11.78863 | **3.021** | 55.751 | **.004** |
| APEKRC | Handball c. stud | 30 | 362.0667 | 38.82226 | 7.08794 | **2.115** | 58 | **.039** |
| | Stud. of the schools | 30 | 338.4000 | 47.42151 | 8.65794 | **2.115** | 55.824 | **.039** |
| MKVGJA | Handball c. stud | 30 | 147.9000 | 25.11676 | 4.58567 | 1.248 | 58 | .217 |
| | Stud. of the schools | 30 | 141.1000 | 16.09958 | 2.93937 | 1.248 | 49.388 | .218 |
| MKVLAR | Handball c. stud | 30 | 29.3333 | 7.44327 | 1.35895 | **1.996** | 58 | **.051** |
| | Stud. of the schools | 30 | 26.1667 | 4.48817 | .81942 | **1.996** | 47.626 | **.052** |
| MHMBGJ | Handball c. stud | 30 | 383.4000 | 34.81339 | 6.35603 | **5.662** | 58 | **.000** |
| | Stud. of the schools | 30 | 334.0000 | 32.73193 | 5.97601 | **5.662** | 57.781 | **.000** |
| MPTHTP | Handball c. stud | 30 | 218.7333 | 75.46451 | 13.77787 | **3.460** | 58 | **.001** |
| | Stud. of the schools | 30 | 163.1667 | 45.18703 | 8.24999 | **3.460** | 47.427 | **.001** |
| MTAPDO | Handball c. stud | 30 | 9.6573 | 1.26920 | .23172 | **-3.135** | 58 | **.003** |
| | Stud. of the schools | 30 | 10.6187 | 1.10041 | .20091 | **-3.135** | 56.858 | **.003** |
| MFDDIN | Handball c. stud | 30 | 28.8867 | 5.17832 | .94543 | 1.168 | 58 | .248 |
| | Stud. of the schools | 30 | 27.6233 | 2.87866 | .52557 | 1.168 | 45.361 | .249 |
| MVR20M | Handball c. stud | 30 | 4.0760 | .24869 | .04540 | **-4.623** | 58 | **.000** |
| | Stud. of the schools | 30 | 4.4523 | .37012 | .06757 | **-4.623** | 50.751 | **.000** |

**Conclusion and recommendations**

This study examined a total sample of 120 female students aged 13–15 years. The sample consisted of four groups with the following composition: **30 volleyball players**, with an average of approximately 1.5 years of training; **30 basketball players**, who have been practicing basketball for an average of 2.5 years; **30 handball players**, who have been training in this sport for an average of 3.5 years; and **30 school students** from two lower secondary schools in the city of Prizren, who are not active in sports clubs, with their only physical activity being the two regular weekly physical education classes at school.

From the above results using the **Independent Samples T-test**, in the **anthropometric domain**, statistically significant differences in body mass and volume indicators were observed in favor of the handball players. This can be explained by the characteristics of handball, where certain positions require players with higher body mass and volume, which raises the group average, as well as by the longer training experience.

Furthermore, in the **motor domain**, the handball group outperformed the other groups across both levels of statistical significance in the following variables: **MKVLAR** – compared to basketball club students and school students; **MHMBGJ** – compared to basketball club students and school students; **MPTHTP** – compared to school students; **MTAPDO** – compared to all

other three groups; **MKVGJA** – compared to basketball club students; **MFDDIN** – compared to volleyball club students; **MVR20M** – compared to school students.
The results also showed that volleyball club students achieved better results (at **p = 0.01**) in **vertical jump from standstill** compared to basketball club students. Volleyball players also had better results (at **p = 0.05**) in **AGJKRH** and **MKVLAR** compared to school students, and better results (at **p = 0.01**) in **MHMBGJ** and **MVR20M** compared to school students.
Based on these results, it can be stated that the volleyball group is progressing very well; within a training period of 1.5 years, they have begun to show superiority in certain physical abilities compared to non-athletes and maintain a performance level approximately comparable to basketball players, who have longer training experience.

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