

DIFFERENCES IN BMI AND OTHER ANTHROPOMETRIC MEASURES IN 14 AND 15 YEAR OLD BASKETBALL PLAYERS

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(Research note)

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Abstract

The research has been conducted on a sample of 30 basketball players from BC Vardar Skopje in order to determine differences between some anthropometric measures and BMI (Body mass index) of the respondents of 14 and 15 years of age. Based on the results it has been determined that there are statistically significant differences between the two groups of athletes with regard to one variable - BMI (Body mass index) from the applied four variables (height, body weight, BMI and muscle mass percent), thus 14 year old athletes have higher BMI values.

Keywords: *body height, body weight, muscle mass percentage, t-test for small independent samples.*

INTRODUCTION

Although the BMI (Body mass index) is one of the most commonly used indexes in the world, it has certain disadvantages. Namely, although it is stated that it should not be applied to people under 20 and older than 50 years of age, it has been applied to all age categories – children, youth, adults, athletes and to both genders. Moreover, the BMI gives no information about the reason for the body weight - whether it is caused by muscle or fat mass of the body. There are also differences in respect of gender - namely women have a higher percentage of fat than male peers. Therefore, there is a modification today - a percentile distribution of this index for children and adolescents from 2 - 20 years of age, in terms of age and gender. For adults such modification is still missing.

METHODS

This research considered a total of 30 basketball players divided into two groups according to age of 14 and 15 years (15 players of age group). The research is conducted on the basis of regularly implemented standard checkups.

This research has taken into consideration each basketball player's body height, body weight, BMI, percentage of muscle mass.

Basic descriptive indicators will be calculated for determining differences between arithmetic means between two samples with t-test applied for small independent samples.

RESULTS AND DISCUSSIONS

Table 1, presents the basic descriptive indicators for 14-year old respondents. It can be seen from the displayed results that the average height of these athletes was 175.5 cm, average body weight - 67 kg and average BMI 21.9.

Table 2, presents the basic descriptive indicators for 15-year old respondents. The displayed results show that the average height of these athletes is 178 cm, average body weight - 68 kg and average BMI 21.5.

In Table 3, the t-test results were presented for small independent samples, applied to both groups of basketball players, 14 and 15-year old ones.

Based on the obtained results it can be concluded that there are statistically significant differences between the two groups of athletes compared in regards to only one variable - BMI (Body mass index) from the applied four variables (height, body weight, BMI and muscle mass).

The significance of these differences is at the level of $p < 0.04$. On the basis of the notion of T-test, we can conclude that 14 year old have higher values of BMI, which is statistically significant.

The question is why younger basketball players have a greater BMI value? Perhaps the explanation is in the pubertal changes that probably start to happen with 15-year old basketball players. Namely, 15-year old basketball players have increased weight, but also a muscle mass (although these differences

Table 1. Descriptive analysis of height, body weight, BMI, percentage of muscle tissue of 14 years old basketball players

Variables	Mean	Minimum	Maximum	Range	Std.Dev.	Skewness	Kurtosis
HEIGHT	175.5000	151.5000	195.5000	44.00000	10.25044	-.46092	1.613645
WEIGHT	67.4667	50.0000	118.5000	68.50000	15.88740	2.51946	8.222754
BMI	21.9427	16.9200	35.1900	18.27000	4.72592	1.59092	3.531218
MM	52.6340	41.6600	56.7600	15.10000	3.83502	-1.90007	4.266660

Table 2. Descriptive analysis of body height, body weight, BMI, percentage of muscle tissue of 14-year old basketball players

Variables	Mean	Minimum	Maximum	Range	Std.Dev.	Skewness	Kurtosis
HEIGHT	178.0667	161.5000	188.5000	27.00000	8.03312	-.80364	-.47661
WEIGHT	68.3000	48.5000	89.0000	40.50000	12.14172	.33864	-.86688
BMI	21.5280	18.1600	26.0000	7.84000	2.67734	.54283	-1.10823
MM	54.1980	47.1800	58.9300	11.75000	2.77825	-.84354	2.07118

Table 3. T-test for 14 and 15-year old basketball players

Variables	Mean	Mean	t-value	df	Std.Dev.	Std.Dev.	p
	Group 1	Group 2			Group 1	Group 2	
HEIGHT	175.500	178.066	-.7633	28	10.250	8.033	.372
WEIGHT	67.466	68.300	-.161	28	15.887	12.141	.325
BMI	21.942	21.528	.295	28	4.725	2.677	.041
MM	52.634	54.198	-1.279	28	3.835	2.778	.240

are not statistically significant), probably due to the pubertal changes that occur in athletes earlier. However, they have a greater body height, although the differences are not statistically significant. Given that the formula for calculating the BMI value of the square of height is the denominator, it is logical that the resulting value of BMI is lower.

The results of longitude research conducted on NBA basketball players in the period from 1970 to 1993 (McArdle, Katch, & Katch, 2004) provide that despite the increase of average height (about 1%) and weight (by 1.8% or 1.7kg), the BMI is relatively stable during the entire period and is about 24 (i.e. from 23.6 to 24.4).

If we compare the average value of BMI of our basketball players with the average BMI of NBA basketball players, it can be concluded that the differences are evident. Perhaps they are due to the fact that they are professionals (NBA), on one hand, and on the other hand, our basketball players are young, and have not reached full puberty yet and therefore the muscle mass has

not reached its maximum. However, based on the obtained results we can say that basketball players in this study have a high percentage of muscle mass, which corresponds to the level of adult athletes (expressed in percentages). Perhaps the answer to this question lies in the pubertal changes in active athletes (male) that occur earlier.

CONCLUSIONS

Based on results obtained from T - test on small independent samples, applied in two groups of basketball players, 14 and 15-year old basketball players, we can say that there are statistically significant differences between the two groups of athletes in respect of a variable - BMI (Body mass index) from the applied four variables (height, body weight, BMI and muscle mass percent).

The significance of these differences is the level of $p < 0.04$. On the basis of the notion of T-test, we can conclude that 14 year old have higher values of BMI, which is also statistically significant.

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РАЗЛИКИ ВО ОДНОС НА БМИ (BODY MASS INDEX), И НЕКОИ ДРУГИ АНТРОПОМЕТРИСКИ МЕРКИ МЕЃУ 14 ГОДИШНИ И 15 ГОДИШНИ КОШАРКАРИ

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(Испиражувачка белешка)

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Апстракт

Истражувањето е спроведено на примерок од 30 кошаркари на возраст од 14 и 15 години од КК Вардар од Скопје. Целта на истражувањето беше да се утврдат разликите меѓу следните 4 применети варијабли: телесна височина, телесна маса, БМИ (Body Mass Index) и мускулна маса во проценти. Врз основа на добиените резултати од применетиот t-тест, утврдено е дека постојат статистички значајни разлики меѓу двете групи спортисти само во однос на една варијабла – БМИ. Притоа, 14 годишните испитаници во таа варијабла, имаат повисоки вредности.

Клучни зборови: *телесна височина, телесна маса, пропорции на мускулна маса, t-тест за мали независни примероци.*

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