



The Impact of Physical Activity on Body Composition between Play Positions in Handball

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(Received 11 Feb 2020; accepted 24 Feb 2020)

Dear Editor-in-Chief

Keeping one's body in shape is one of the reasons for living and physical activity is one of the most beneficial activities for the human body.

There are many scientific papers (1-4) which prove that physical activity affects the human body. Two of the most detrimental factors affecting human health, are physical inactivity and poor nutrition (fast food, high blood sugar, negative phenomena, etc.) All these aforementioned factors have a negative influence on health, starting with obesity, cardiovascular disease and cancer.

Some studies have also been carried out in terms of morphological, motor, functional and psychological parameters (5). However, certain parameters have been studied less such as intracellular and extracellular water, minerals, proteins, muscle mass and fat mass (6), while not studied at all in the case of handball players with regard to play positions.

The purpose of this study was to examine the impact of physical activity on the aforementioned parameters in relation to handball play positions: goalkeeper, backcourt player, wing and pivot. The function of each position in a handball game is different.

Ninety three players of Kosovo's Elite League in 2018 were enrolled in the study (age 22 ± 5 yr, height 184 ± 8 cm and weight 84 ± 14 kg); backcourt player height (187.16 ± 7.76 cm), wing

(178.47 ± 6.70 cm), pivot (184.81 ± 6.93 cm), goalkeeper (185.08 ± 6.28 cm); backcourt player weight (86.75 ± 10.83 kg) wing (74.52 ± 8.70 kg), pivot (101.73 ± 11.13 kg), goalkeeper (77.75 ± 10.31 kg) prior to the start of the season. All of them were active and in good health.

Before participating in the study, all participants underwent a medical check-up at the Sports Medical Centre in Prishtina, Kosovo. The check-up cleared all participants to take part in the study.

In accordance with the Declaration of Helsinki, the local university Ethics Committee approved the study (Universi College Ethics Committee; Protocol Number: FCP 488/18)

The measurements were made 10 days before the championship started, using the following equipment: body height was measured using a SECA stadiometer (electronic scale) (Seca Instruments Ltd., Hamburg, Germany) with participants standing barefoot, and body composition (intracellular and extracellular water, minerals, proteins, muscle mass and fat mass) was measured by means of bioimpedance, using a Biospace Inbody 720 device (Inbody Co., Leicester, United Kingdom) with participants standing in an upright position and holding two hand electrodes (7). Data were processed with Anova and post-hoc LSD analysis through the SPSS program, version 22, the significance level ($P < 0.05$).

Table 1 presents the average score and the standard deviation; by carrying out Anova analysis, important statistical differences between the groups were identified. Post-hoc LSD analysis has proven that intracellular and extracellular water in backcourt players may be distinguished at the significance level, and in almost all other positions with the exception of the pivot, the difference is less. Equal differences, were found in relation to minerals, proteins and skeletal muscle,

while there are no differences in fat mass, except in the case of the pivot. The goalkeeper was revealed to have the weakest results, but almost all positions were significantly different from the former in terms of the aforementioned parameters.

We can conclude that the positions which have the most loads in the game of handball have better parameters. Participating in physical activity and increasing motor skills, affects the improvement of health parameters.

Table 1: Descriptive data and ANOVA and LSD post-hoc analysis, indicating the mean differences between the players' position

Variable	Mean±SD	F	Sig.	Post hoc test	P	
Intercellular water (l)	33.17±4.33	15.660	.000	Backcourt player	Wing*** Pivot* Goalkeeper***	.000 .010 .000
Extracellular water (l)	19.63±2.71	11.474	.000	Backcourt player	Wing*** Pivot* Goalkeeper*	.000 .026 .010
Proteins (kg)	14.37±1.91	13.049	.000	Backcourt player	Wing*** Pivot* Goalkeeper**	.000 .014 .002
Minerals (kg)	4.92±0.71	18.882	.000	Backcourt player	Wing*** Pivot** Goalkeeper***	.000 .002 .000
Fat mass (kg)	12.44±7.08	22.890	.000	Backcourt player	Wing* Pivot*** Goalkeeper Ns	.035 .000 .555
Fat mass (%)	14.12±6.04	14.028	.000	Backcourt player	Wing NS Pivot*** Goalkeeper NS	.120 .000 .725
Skeletal muscle mass	41.36±5.63	18.310	.000	Backcourt player	Wing*** Pivot* Goalkeeper***	.000 .035 .000

Significant differences between groups 1 - 4; *P<0.05. ** P<0.01. P***P<0.001. Non-significant

Conflict of interest

The authors declare that there is no conflict of interest.

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