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# Relationship Between Anthropometric Characteristics and Player Experience with Speed, Agility and Scoring Statistics of Khorasan Razavi Women's Futsal Team Players in the Iranian Premier League

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**Abstract**— the purpose of this study was to investigate the relationship between anthropometric characteristics and player experience with speed, agility and scoring statistics of Khorasan Razavi women's futsal team players. For this reason, 14 players of Khorasan Razavi women's futsal team were evaluated in the group stage of the Iranian Women's Futsal Premier League 1300-1499. Calendar age, physiological age, height, arm circumference, thigh circumference, leg circumference, chest circumference, shoulder width, waist circumference, hip circumference, waist-to-hip ratio, playing experience, experience playing in the Premier League, playing experience in the national team, scoring statistics, speed (15 m and 25 m) and agility (4.9 test) were measured. Pearson correlation coefficient test and SPSS software version 16 at the level of  $P \leq 0.05$  were used for statistical analysis. Based on the results, experience is probably the most important factor for the success in scoring of women futsal players. As in the present study, as the age, years of playing, playing in

the Premier League and playing in the national team increased, so did the scoring statistics. On the other hand, it seems that the smaller the circumference of the upper and lower limbs, the better the speed and agility performance, which is probably due to the smaller size of the muscle compared to fat and the reduction of fat in these limbs.

**Keywords**— *Futsal, Sports Performance, Anthropometric, Experience, Scoring Statistics*

## I. INTRODUCTION

Futsal is one of the most exciting and popular sports in the world and has a special place among the people in Iran. The Iranian men's national futsal team is the proudest futsal team in Asia and has won most of the Asian Cup. However, the Iranian women's national futsal

team has also established itself as the top power in Asia in recent years and has won the Asian Cup in the last two seasons. Iranian women futsal players have shown that they have a very high potential, and if scientific work is done in this field and special attention is paid, they can take their honors higher than the Asian continent. Therefore, important factors for better athletic performance in futsal should be identified and their development should be planned in the short, medium and long term. Some factors should be considered in the field of sports talent and some in the field of training design.

Futsal is a sport that is played in 20 minutes of useful time, and due to the size of the playing field, a player constantly needs to use fast running in short and medium distances, change the direction and speed of running, shooting, etc. Therefore, speed and agility are two very important factors of physical fitness for a futsal player (1, 2). Alvarez et al. (2008) in a study of Spanish league players showed that the average distance traveled per game is 4313 meters and the average distance traveled per minute of the game is 117.3 meters. Among them, 397 meters of walking, 1762 meters of jogging, 1232 meters of moderate intensity running, 571 meters of high-intensity running and 349 meters of maximum speed running have been reported (3). It has been shown that athletes need to increase their speed and agility to reach the peak of their athletic performance (4). Also, although excellent performance requires improvement in physiological characteristics and fitness factors, it is also related to anthropometric characteristics (5). Identifying important anthropometric characteristics that are related to performance in futsal helps coaches make their plans to bring athletes to the highest level of athletic performance. Although many anthropometric features are used in sports talent identification and help coaches identify elite athletes, some anthropometric features, such as circumference of limbs, can be changed with practice. In fact, body size seems to be a good factor in predicting success in futsal (4).

The purpose of this study was to investigate the relationship between anthropometric

characteristics and player experience with speed, agility and scoring statistics of Khorasan Razavi women's futsal team players.

## I. METHODOLOGY

The method of this research is correlational. Due to the small statistical population, the total number sampling method was used and after the necessary coordination, 14 players of the Khorasan Razavi women's futsal team in the group stage of the Iranian Women's Futsal Premier League 1300-1400 were selected and evaluated as a statistical sample. Calendar age, physiological age (body composition test results), height (body composition test results), arm circumference, hip circumference, leg circumference, chest circumference, shoulder width, waist circumference, hip circumference, waist-to-hip ratio, gaming experience, Experience of playing in the Premier League, experience of playing in the national team, scoring statistics (group stage of the Premier League 1400-1399), speed (in two distances of 15 meters and 25 meters) and agility (4.9 test) were measured. Arm circumference, thigh circumference, leg circumference, chest circumference, shoulder width, waist circumference and hip circumference were also measured using a tape measure. The waist-to-hip ratio was also calculated by dividing the waist by the hip circumference. After collecting the data and for statistical analysis, the data were first described using the mean and standard deviation. Then the data distribution was examined by Kolmogorov-Smirnov test and it was found that the data have a normal distribution and permission to use the parametric correlation coefficient test was obtained. Thus, Pearson correlation coefficient test was used to determine the relationship between variables. SPSS statistical software version 16 was used for statistical analysis. A significance level of  $P \leq 0.05$  was considered. In addition, due to the small sample size for correlational studies, the significance level of  $P \leq 0.09$  was also considered as a near-significant level so that if the correlation was not significant at the level of  $P \leq 0.05$  but at the level of  $P \leq 0.09$  It was significant, it was likely to be significant in

larger sample size and it was recommended to study in larger sample size.

## II. Results

Results related to calendar age, physiological age, height, arm circumference, thigh circumference, leg circumference, chest circumference, shoulder width, waist circumference, hip circumference, waist-to-hip ratio, playing experience, Premier League playing experience, playing experience In the national team, the statistics of goals, speed (in two distances of 15 meters and 25 meters) and agility (4.9 test) are presented in Table 1. Also, the results of Pearson correlation coefficient test are reported in Table 2.

Table1. Mean and standard deviation of the studied variables

| Variables   | mean $\pm$ Standard deviation |
|---|-------------------------------|
| Calendar age (years)                                | 23.14 $\pm$ 5.68              |
| Physiological age (years)                           | 23.31 $\pm$ 5.95              |
| Height (cm)   | 163.28 $\pm$ 5.96             |
| Arm circumference (cm)                              | 26.17 $\pm$ 2.62              |
| Hip circumference (cm)                              | 51.78 $\pm$ 5.12              |
| Leg circumference (cm)                              | 34.39 $\pm$ 2.82              |
| Chest circumference (cm)                            | 82.25 $\pm$ 5.58              |
| Shoulder width (cm)                                 | 42.28 $\pm$ 2.52              |
| Waist circumference (cm)                            | 68.92 $\pm$ 5.38              |
| Hip circumference (cm)                              | 94.96 $\pm$ 7.02              |
| Waist to hip ratio                                  | 0.72 $\pm$ 0.02               |
| Game history (years)                                | 10.85 $\pm$ 4.09              |
| Premier League history (year)                       | 5 $\pm$ 4.5                   |
| National team history (year)                        | 4.42 $\pm$ 4.01               |
| Scoring statistics (number of goals)                | 4.64 $\pm$ 6.45               |
| The first record for sprinting 15 meters (seconds)  | 2.97 $\pm$ 0.12               |
| The second record for sprinting 15 meters (seconds) | 2.93 $\pm$ 0.18               |
| The record for sprinting 25 meters (seconds)        | 4.42 $\pm$ 0.17               |
| 9.4 agility running record (seconds)                | 10.76 $\pm$ 0.58              |

The results showed that the players of the Khorasan Razavi women's futsal team have an average of more than 10 years of playing

experience, about 5 years of playing in the Premier League and more than 4 years of playing in the national team, which according to the average age is 23.14 years. Due to its good age, this team has a high level of game experience. Calendar age was closely and positively correlated with scoring statistics ( $P = 0.09$  and  $r = 0.46$ ). Physiological age was significantly and positively associated with the 25-meter sprint record ( $P = 0.02$  and  $r = 0.60$ ). Height was significantly and negatively with the first record of 15 meters ( $P = 0.031$  and  $r = -0.57$ ) and the record of 25 meters ( $P = 0.047$  and  $r = -0.53$ ) and almost significantly and negatively with the second record of 15 meters. M ( $P = 0.07$  and  $r = -0.49$ ) were related. Arm circumference was significant and positive with a running record of 25 meters ( $P = 0.001$  and  $r = 0.76$ ) and close to significant and positive with a second running record of 15 meters ( $P = 0.51$  and  $r = 0.059$ ) and a running record of agility ( $P = 0.53$  and  $r = 0.058$ ). Thigh circumference was significantly and positively associated with the 25-meter running record ( $P = 0.002$  and  $r = 0.76$ ) and the agility running record ( $P = 0.029$  and  $r = 0.60$ ). Leg circumference was significantly and positively related to the 25-meter sprint record ( $P = 0.08$  and  $r = 0.47$ ). Chest circumference was significantly and positively associated with the 25-meter sprint record ( $P = 0.002$  and  $r = 0.74$ ). Shoulder width was closely and positively correlated with agility running record ( $P = 0.061$  and  $r = 0.53$ ). Waist circumference was significantly and positively related to the 25-meter sprint record ( $P = 0.002$  and  $r = 0.78$ ) and the agility running record ( $P = 0.047$  and  $r = 0.58$ ) and was also significantly and positively related to the second 15-meter sprint record ( $P = 0.09$  and  $r = 0.48$ ). Hip circumference was significantly and positively related to the 25-meter running record ( $P = 0.01$  and  $r = 0.65$ ) and the agility running record ( $P = 0.004$  and  $P = 0.74$ ) and it was also closely and positively related to the 15-meter sprint records in the first test ( $P = 0.07$  and  $r = 0.48$ ) and in the second test ( $P = 0.09$  and  $r = 0.45$ ). Goal statistics positively and significantly was related with playing history ( $P = 0.02$  and  $r = 0.60$ ), playing history in the Premier League ( $P = 0.63$  and  $r = 0.01$ ) and playing history in the national team ( $P = 0.64$  and  $r = 0.01$ ).

Table2. Pearson correlation coefficient test results

| Variables         | The first record of 15 meters sprint | The second record of 15 meters sprint | 25-meter sprint          | 4.9 agility running record | Scoring statistics   |
|-------------------|--------------------------------------|---------------------------------------|--------------------------|----------------------------|----------------------|
| Chronological age | r= 0.20<br>p= 0.47                   | r= 0.03<br>p= 0.91                    | r= 0.42<br>p= 0.12       | r= 0.07<br>p= 0.81         | r= 0.46<br>p= 0.09 * |
| Physiological age | r= 0.26<br>p= 0.35                   | r= 0.11<br>p= 0.68                    | r= 0.60<br>p= 0.02 **    | r= 0.22<br>p= 0.46         | r= 0.41<br>p= 0.14   |
| Height            | r= -0.49<br>p= 0.07 *                | r= -0.57<br>p= 0.03 1 **              | r= -0.53<br>p= 0.04 7 ** | r= -0.025<br>p= 0.93       | r= 0.18<br>p= 0.52   |
| Arm circumference | r= 0.31<br>p= 0.26                   | r= 0.51<br>p= 0.05 9 *                | r= 0.76<br>p= 0.00 1 **  | r= 0.53<br>p= 0.058 *      | r= -0.23<br>p= 0.41  |
| Round thigh       | r= 0.27<br>p= 0.33                   | r= 0.37<br>p= 0.18                    | r= 0.76<br>p= 0.00 2 **  | r= 0.60<br>p= 0.029 **     | r= -0.035<br>p= 0.90 |
| Round leg         | r= -0.025<br>p= 0.93                 | r= 0.16<br>p= 0.56                    | r= 0.47<br>p= 0.08 *     | r= 0.27<br>p= 0.36         | r= 0.05<br>p= 0.84   |
| Around the chest  | r= 0.17<br>p= 0.54                   | r= 0.43<br>p= 0.11                    | r= 0.74<br>p= 0.00 2 **  | r= 0.40<br>p= 0.17         | r= -0.09<br>p= 0.75  |
| Shoulder width    | r= -0.11<br>p= 0.70                  | r= 0.12<br>p= 0.67                    | r= 0.31<br>p= 0.27       | r= 0.53<br>p= 0.061 *      | r= 0.13<br>p= 0.64   |
| Waist             | r=                                   | r=                                    | r=                       | r=                         | r= -                 |

|                        |                      |                       |                         |                        |                       |
|------------------------|----------------------|-----------------------|-------------------------|------------------------|-----------------------|
|                        | r= 0.39<br>p= 0.18   | r= 0.48<br>p= 0.09 *  | r= 0.78<br>p= 0.00 2 ** | r= 0.58<br>p= 0.047 ** | r= 0.16<br>p= 0.59    |
| Hip circumference      | r= 0.48<br>p= 0.07 * | r= 0.45<br>p= 0.09 *  | r= 0.65<br>p= 0.01 **   | r= 0.74<br>p= 0.004 ** | r= -0.17<br>p= 0.55   |
| Waist to hip ratio     | r= -0.30<br>p= 0.31  | r= 0.03<br>p= 0.91    | r= 0.15<br>p= 0.62      | r= -0.31<br>p= 0.31    | r= -0.15<br>p= 0.62   |
| Game history           | r= 0.086<br>p= 0.77  | r= -0.13<br>p= 0.65   | r= 0.15<br>p= 0.60      | r= -0.06<br>p= 0.82    | r= 0.60<br>p= 0.02 ** |
| Premier League history | r= 0.068<br>p= 0.81  | r= -0.04<br>p= 0.89   | r= 0.08<br>p= 0.76      | r= -0.20<br>p= 0.49    | r= 0.63<br>p= 0.01 ** |
| National team history  | r= 0.031<br>p= 0.91  | r= 0.021<br>p= 0.94   | r= 0.037<br>p= 0.89     | r= -0.14<br>p= 0.64    | r= 0.64<br>p= 0.01 ** |
| Scoring statistics     | r= -0.28<br>p= 0.31  | r= -0.47<br>p= 0.08 * | r= -0.13<br>p= 0.64     | r= 0.07<br>p= 0.80     | -                     |

\*\* Significant at the level of  $P \leq 0.05$   
 \* Significant at the level of  $P \leq 0.09$  (close to significant at the level of  $P \leq 0.05$ )

### III. Discussion

Based on the present findings, calendar age was closely significant and positively related to scoring statistics. So that in larger specimens, the results may be significant and with age, the scoring rate may increase. These results, of course, are obtained in a team with favorable age conditions, and such results may not be observed with excessive age. Therefore, experience may be an important factor in scoring statistics when the age is not too high. In this regard, the present results showed that the experience of the game has a significant relationship with the scoring statistics, if the playing history, playing history

in the Premier League and playing history in the national team (all three) had a significant positive relationship with scoring statistics of players. They were all desirable. So that with increasing playing experience, playing experience in the Premier League and playing experience in the national team, the number of goals scored by players increases significantly. Therefore, experience may be an important factor in scoring statistics when the age is not too high. In this regard, the present results showed that the experience of the game has a significant relationship with the scoring statistics. The playing history, playing history in the Premier League and playing history in the national team (all three) had a significant positive relationship with the scoring statistics of the players, the intensity of these relationships were all favorable. So that with increasing playing experience, playing experience in the Premier League and playing experience in the national team, the number of goals scored by players increases significantly.

Physiological age was significantly and positively related to the 25-meter sprint record, which was also favorable. As the physiological age increases, the speed record of 25 meters increases or in fact the speed decreases in this distance. Physiological age is probably an important factor in speed performance at higher distances, and if this age is lower, the athlete can perform better at speeds over distances above 20 meters. But this variable (physiological age) does not seem to be an important factor for speed performance over short distances (such as 15 meters). However, more studies are needed in this area, but it should be noted that such an interpretation is relevant to puberty. Height was significantly and negatively related to the first record of 15 meters and the record of 25 meters and was significantly and negatively related to the second record of 15 meters, the intensity of these relationships was moderate. It seems that with increasing height, the sprint record decreases or, in fact, the speed performance in both distances improves. This correlation is probably due to the effect of longer stride length on better speed performance.

Arm circumference was significantly and positively related to the 25-meter sprint record, and it was also significantly and positively correlated with the second 15-meter sprint record and agility running record, so that with increasing arm circumference, the sprint record also increases. (Speed performance decreases). Also, hip circumference was significantly and positively related to the 25-meter running record and agility running record, so that with increasing hip circumference, speed performance (at a distance of 25 meters) and agility decrease. Chest circumference was significantly and positively related to the 25-meter running record and leg circumference was significantly and positively related to the 25-meter running record. As the chest and leg circumference increase, the speed performance at a distance of 25 meters may decrease. Shoulder width was also closely related to the agility running record. Also, waist circumference was significantly and positively related to the 25-meter sprint record and agility running record, and was closely and positively related to the second 15-meter sprint record. Hip circumference also showed a relationship similar to waist circumference, and in addition, it was closely related to the first record of 15 meters. These findings suggest that performance and agility are likely to decline as these body sizes increase. However, attention should be paid to the body composition of these limbs. Although we measured body composition in another study from the same research project, it is better to study the body composition of different limbs separately in future studies. For example, as increasing arm and hip circumference causes a decrease in speed and agility, it should be noted that increasing the circumference of these limbs with fat can lead to such an effect. But because a kilogram of muscle is less than a kilogram of fat, it is possible that reducing the size of these limbs, if lost or gained by muscle, can lead to improved speed and agility. The results also showed that the scoring statistics were closely and negatively related to the second record of 15 meters running, so that with decreasing the record of 15 meters (increasing speed), the scoring statistics increase. Of course, since this relationship has been close to significant, it is better to examine in the future in a larger sample

size, for example, all the players of the Women's Futsal Premier League.

The nature of the futsal game is such that sprints and short starts are often used. Having the ability to run at high speeds and start allows players to accelerate the game, reach the stray balls earlier than the opponent, or hit the ball earlier than the opponent (2). Research shows that elite futsal players run 5 to 12 percent of their playing time fast during the game and do high-intensity running (speeds above 15 km / h) (3). Therefore, running fast can greatly contribute to the high performance of individual and team futsal. Also, due to the size of the futsal court and the number of players on the court, rarely does a player use fast runs of 20 meters or more. In fact, short-distance sprints, especially in futsal, lead to the physical superiority of the players and the better performance of tactical tasks in group games, as well as the release from the pressure of the opponent. Speed players in futsal in less than a second must decide and perform the desired skill. Because short speed is not only due to the shortening of muscle fibers and the composition of muscle fibers, but also the rapid use of the nervous system and faster reaction can play an important role in this regard. Therefore, the simultaneous use of the nervous-muscular system can improve the ability to perform short runs such as 5 meters and 10 meters and lead to superiority over the opponent. Therefore, in future studies, this issue should also be considered and it is better to measure the neuromuscular characteristics and speeds of decision and reaction of players to achieve better results. Also, futsal, due to its nature, requires a lot of sudden changes of direction and physical deceptions, which require high agility. However, James et al. (2008) showed that there is no significant difference between the agility of selected and unselected players for the Australian national youth soccer team (6), which is probably due to the nature of the game of football; Because football requires less agility than futsal, Dogramaci and Watsford (2011) showed a higher ability to change direction in elite players than in lower level players (7).

#### IV. CONCLUSION

Probably the most important factor for the success of women futsal players is experience. As in the present study, as the age, years of playing, playing in the Premier League and playing in the national team increased, so did the scoring statistics. Also, speed over short distances may play a role in scoring statistics, and the better the speed of the athlete over short distances, the better the performance in this regard, which should be examined in the future in a larger sample size. Be placed so that conclusions can be concluded with more confidence. On the other hand, it seems that the smaller the circumference of the upper and lower limbs, the better the speed and agility performance, which is probably due to the smaller size of the fat than the muscle and the reduction of fat in these limbs. . It is better in future studies to measure the body composition (subcutaneous fat) of these organs to lead to a more accurate interpretation in this regard. Finally, it seems that lower physiological age is an important factor for better speed performance over long distances, but no conclusions can be drawn before conducting additional studies in larger samples. It is suggested that next season, such a study be conducted on all players in the Women's Futsal Premier League.

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