Comparison of Total Burned Calories and Heart Rate at Various Position in Futsal

A A Purnama \(^1\), R D R Hamidie\(^2\)\(^*\) and L Angkawidjaja\(^1\)

\(^1\)Faculty of Sport and Health Education, Universitas Pendidikan Indonesia

\(^2\)Faculty of Human Sciences, Kanazawa University, Ishikawa, 920-1192

*hamidieronald@upi.edu

Abstract. This research aims to know whether there is any comparison of burned calories and heart rate at various positions in futsal. This research used causal comparative method, because this research compares dependent variables with independent variable as a comparison. Samples of this study were 8 people. This study used purposive sampling techniques. The instrument which used in this study was Polar RC3 that can be used to record the burned calories and heart rate. The results obtained were processed with statistical test anova using SPSS Software 21. From the analysis of burned calories, the result was F = 0.348, p = 0.722 > 0.05 then Ho is accepted, meaning that there are no significant proportion of burned calories at various positions in futsal. From the data analysis, the result obtained that heart rate F = 0.541, p = 0.613 > 0.05 then Ho is accepted, meaning that there are no significant heart rate comparisons at various positions in futsal.

1. Introduction

Futsal is a sport that is growing in the world of sports in Indonesia, after the PSSI imposed sanctions by FIFA are also affected in futsal, which is part of the PSSI futsal can grow and thrive afterwards, indoor soccer is a sport that is popular in the community in Indonesia is evident from all walks of life in Indonesia playing futsal in big cities and in the regions [1]. Futsal discovered by Juan Carlos Ceriani who was a football coach who was looking for a solution to the soccer team that he coached can still practice in the rain. Futsal is a sport modification of soccer, there are some differences between futsal and football is 1.) The different types of shoes. 2.) The size of the ball and the field. 3.) The length of time played and number of players. 4.) The rules of the game are different. Sports indoor soccer is a sport that is played by entering the ball into the opponent's goal, in the sport of futsal all the players are in demand for always on the move and rotate in order to open up opposition defenses and create a goal. In futsal there are some positions that commonly used in the game of futsal world that flank, anchor and pivot, the positions of the pick characters that are different, pivot this player is a player who is in the defense line and served for printing goals, flank this player is a utility-type player or a player who always does the movement in order to dismantle the opponent's defense, anchor this player is a player who is in the front line of defense and served as a playmaker in a team [2-4].

Calories are the amount of energy which released a person when doing an activity, the more strenuous activities undertaken so calories in pay will be higher too, heart rate is the reference in use to measure
the intensity of the activity of someone who did physical activity, the higher heart rate then in doing any activity that means high.

2. Method

2.1 Participant
8 players of sport science 2015 futsal team, with the experience of playing futsal for 2 years. Average weight, age, height and body mass index 60.2 kg, 19.5 years, 167.5 cm, 21.5 kg.

2.2 Procedure
Collecting data in this study using polar rc3 instruments to record heart rate and calories from the sample. In this study sample did futsal for 2 x 20 minutes, the sample was divided by the sample except the goalkeeper then played for 2 x 20 minutes without substitutions as well as four other samples [5]. Before the match the sample was fitted with a polar rc3 and made arrangements in advance in accordance with the sample data. After making the last match retrieved data recorded on polar rc3 either manually or automatically through the website and the data processed using spss 2.1.

![Image of research procedure]

**Figure 1.** Research Procedure
3. Result

3.1. Heart Rate
Heart rate the players have been recorded in polar rc3, heart rate recorded heart rate is taken from the playing time and rest periods and time-outs do not count [6]. Here is a table of intensity scale:

| Zona   | Tipe intensitas | Denyut nadi |
|--------|-----------------|-------------|
| 1      | Rendah          | 120 – 150   |
| 2      | Sedang          | 150 – 170   |
| 3      | Tinggi          | 170 – 185   |
| 4      | Maksimal        | 185 <       |

In one game futsal players have an average heart rate of 165.1 bpm and it means the sample plays in moderate intensity [7]. In this study the heart rate of the players classified by their position, the position of the anchor has an average of 156 bpm in one game, the position of the pivot has an average of 167 bpm in one game, while the position of flank has an average heart rate of 169 bpm in one game, of the data that has been obtained showed flank position having the highest average in comparison with other position that is 169 bpm in a match, the anchor position is a position that has the lowest position of heart rate is 156 bpm in every game [8].

3.2 Calories
Calories expended by the players when play has been recorded in polar rc3 paired on the players, the following data is obtained based on the results of research:

a. In the game the player who plays as an anchor issued an average of 194 kcal in a single match.
b. The player who plays as pivot issued an average of 232 kcal in a single match.
c. From research conducted as a flank player who plays have average expend calories by 241 kcal in one game [9].

From the data that has been obtained it can be concluded that the position of the waste calories at most that the position of flank with the average value of calories spent as much as 241 kcal in one game, while the position of the anchor is a position that issued the calories most low with an average of 194 kcal in every game [10-12].

4. Conclusion
This research finds have a differences calorie burned and heart rate in various positions in futsal but statistically not significant differences total calories burned and heart rate at various position in futsal.

References
[1] Arisandi D 2015 Analisis pengunaan kalori atlet bolabasket (studi perbandingan terhadap posisi-posisi pemain bola basket putri pecan olahraga daerah Jawa Barat 2014) (skripsi) Fakultas Pendidikan Olahraga dan Kesehatan Universitas Pendidikan Indonesia
[2] Barbero Alvarez J C, Soto V M, Barbero Alvarez V and Granda Vera J 2008 Match analysis and heart rate of futsal players during competition Journal of sports sciences 26(1) 63-73
[3] Giriwijoyo S and Sidik D Z 2012 Ilmu kesehatan olahraga Bandung: Remaja Rosdakarya
[4] Herman Vic and Engler Lainer (2011) Futsal: Technique, Tactics and Training United Kingdom: Meyer And Meyer Sport
[5] De Oliveira Bueno M J, Caetano F G, Pereira T J C, De Souza N M, Moreira G D, Nakamura F Y and Moura F A 2014 Analysis of the distance covered by Brazilian professional futsal
players during official matches *Sports biomechanics* **13**(3) 230-240

[6] Lakhsana J 2011 *Taktik dan Strategi Futsal Modern* Jakarta: Be Champion

[7] Maulvi M 2016 *Perbedaan indeks kelelahan, \( \text{vo}_{\text{max}} \) berbagai posisi pada pemain futsal (maker, flank, pivot) (skripsi)* Fakultas Pendidikan Olahraga dan Kesehatan Universitas Pendidikan Indonesia.

[8] Mulyana B 2012 *Ilmu Kesehatan Olahraga* Bandung: Rosda

[9] Narti Aulia 2009 *FUTSAL* Bandung: PT Indahjaya Adipratama

[10] Nurhasan and Hasanudin 2013 *Modul Tes dan Pengukuran Keolahragaan*. Bandung: Redpoint

[11] Berdejo-del-Fresno D, Moore R and Laupheimer M W 2015 *VO \(_2\) max Changes in English Futsal Players after a 6-Week Period of Specific Small-Sided Games Training* *American Journal of Sports Science and Medicine* **3**(2) 28-34

[12] Ruyaman Irman 2015 *Perbandingan hasil passing menggunakan kaki bagian dalam (inside) dengan passing menggunakan kaki bagian luar (outside) terhadap ketepatan passing pendek futsal (skripsi)*. Fakultas Pendidikan Olahraga dan Kesehatan Universitas Pendidikan Indonesia.