136 - WATER LOSS - SWEATING RATE OF PROFESSIONAL CARIOCA SOCCER PLAYERS

RAONI VENTAPANE
VINICIUS RIGAUD
CELIO CORDEIRO FILHO
Curso de Educação Física. - Campus Akxe. Universidade Estácio de Sá;
Rio de Janeiro/RJ - Brasil.
raoniventapane@hotmail.com

INTRODUCTION

The development and improvement of physical fitness in sports have been going at great speed because of scientific research that are made on the subject. Among these we can highlight the sports football, which has wide acceptance around the world due to their practice facility (PONTES et al. 2006).

Among the important factors of physical preparation is the control of body weight, this attribute that has been relevant not only in professional practice or high performance athletes, but as well as for the rest of the population, since the body weight control, not high, represents health (and ARAÚJO GOMES, 2004).

Dehydration in football can be linked to several factors such as high ambient temperature, high humidity, hydration pre-game, field position, level of training, competition level, body size, age and other factors (BENVENUTI E SCHNECK NIEHUES, 2009).

Dehydration is linked directly to decreased aerobic capacity, but does not represent significant values in activities or in the production of anaerobic muscle strength (ACSM, 2007).

The decrease in percentage water through sweat in soccer players can vary from 1 liter to 4 liters, depending on weather conditions and the intensity of the match (MAUGHAN et al. 2004 apud SILVA, 2006).

Among the physiological changes due to dehydration, we can found the decrease in plasma volume, increased plasma osmolality, decrease in sodium concentration in plasma, decrease the rate of sweating, increase in body temperature and heart rate increase (MACHADO-MOREIRA, 2006).

According to Reis, Rossi e Azevedo (2009) the sweat rate can be expressed by the difference in body weight before the start of an activity in relation to body weight at the end of the activity, this method recommended by the ACSM, and with the equation for sweat rate (TS) = [(Pi - Pf) x1000] / total time of physical activity. And that when there is an increase in TS, the dehydration process is accelerated due to water loss from sweating, which uses the water coming from the plasma, thus reducing plasma volume leading to performance degradation due to the factors mentioned above.

When there is dehydration, heart rate (HR) is increased, because plasma volume is reduced and consequently there is less ejection from the heart, it is required an increase in HR to support the body's mechanisms to maintain performance (MACHADO-MOREIRA et al. 2006).

According to the American College of Sports Medicine (ACSM, 1996) to activities with more than one hour, people should drink two hours before exercise 500 ml of liquid and thus to promote adequate hydration and to have enough time to excrete excess water intake. Already during the exercise, fluids should be drunk at regular intervals in order to equalize the amount of fluid lost through sweating and fluid intake. These liquids should be drunk at a lower temperature of the environment and the appealing taste, containing carbohydrates and electrolytes, addition of sodium (0.5 to 0.7 gL^1 of water), promoting fluid retention.

The aim of this study was to determine whether there was a decrease in the percentage of body water of athletes divided by function, before and after football games.

METHODOLOGY

The study is a descriptive and quantitative field research. The study was conducted in a professional soccer club in north Rio de Janeiro, which played in the first and second division of the state, and is registered in the Football Federation of Rio de Janeiro (FFERJ). The athletes ages varied from 20 to 34 years old; with mean body weight of 73.1 kg; carrying out activities six times per week. They were divided for the study by five positions: the goalkeeper (G), defender (Z), lateral (L), halfback (M) and attackers (A). This study meets the standards for Human Research. All study participants signed an informed participation consent. For the proposed goal was reached, was measured body weight of athletes before the start of the match and at the final, to calculate the rate of sweating ((TS) = [(Pi - Pf) x1000] / total time of physical activity) . This protocol was applied in five matches at the club's first division and 8 in the second division. The data were treated by means of quantitative procedures of descriptive statistics, mean and standard deviation, and a second step through inferential statistics, paired t test $p < 0.05$. We first performed the analysis of central tendency using means and standard deviation for continuous variables. In the second step of treatment was performed to compare the mean of results in order to verify whether or not they differ significantly. We used the paired Student t test accepting the results of $p < 0.05$ (ie 95% sure to confirm the hypothesis).

DATA ANALYSIS

We evaluated 26 male professional players with average body weight of 75.03 ± 10.10 kg, mean age 23.96 ± 3.83 years and of these only 12 participated in both competitions compared, due to changes during the period between competitions. In the first division athletes were evaluated in five matches while in the second second were 8 matches. From our results we considered only those where athletes stayed during all the playing time in the field.

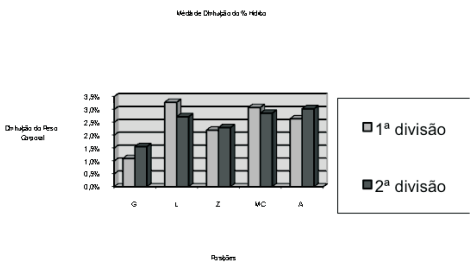

Figure 1: Percentage of water loss divided by position.

The comparison between the mean results of percentage decrease in water first and second division championship in Rio, no significant differences for all groups. In group G, we observed the lowest average rate of decrease in the percentage water in both matches in the first division and in the second, the latter having an average of 1.10 ± 0.92 ± 1.01% and 1.56% respectively. The group L in the first division had levels of dehydration with a mean of 3.28 ± 1.55% and 2.72 ± 0.87% in the second division. This group won the first division the highest average of all groups analyzed in both competitions. In group Z, dehydration accounted for 2.2 ± 1.23% of body weight of athletes in the first division, while the second was that the average level of 2.3 ± 0.74%. Player line group was the one that had the lowest averages in competitions analyzed and less difference between the competitions. The group suffered a MC dehydration in the first division of 3.08 ± 1.30% of body weight on average while in the second division, this decrease in the percentage water was 2.86 ± 0.73% on average. While group A in the first division had a decrease of 2.64 ± 2.25% of body weight through dehydration in the first division while in the second it took the value of 3.03 ± 0.62% being the highest average for this competition.

It is noteworthy that although the averages were within the expected values, there were isolated cases of dehydration where it represented a decrease of 6.55% of body weight of an athlete, suggesting that this athlete was in critical condition from dehydration and exposure to risk thermal shock. The highest average rate of decrease in the percentage water in the first division was the group L with a mean of 3.28 ± 1.55% at the second division the attackers had the highest average percentage decrease in the value of water 3.03 ± 0.62%. These results have no significant differences between them, but it is noteworthy that in the first division L and MC groups had higher values of the group with the highest value of the second division. In the present study might notice that the athletes lost an average of 2.75 ± 1.55% of their body weight in the first division, and 2.60 ± 0.85% in the second division of professional soccer in Rio from 2010 and 2009 respectively.

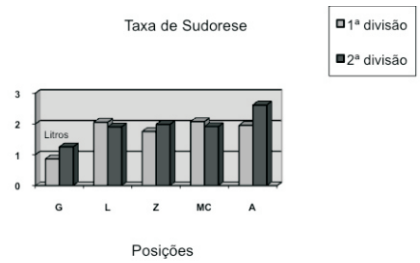

Figure 2: Average sweat rate divided by position

The average amount found by the study of fluids lost through sweat during a soccer match 1.90 ± 1.03 liters in the first division and 2.0 ± 0.66 liters in the second division, converged with the review by Monteiro, Guerra e Barros (2003) which found that fluid loss through sweating is between 1 and 3.5 liters. All groups had average sweat rate converged with the study mentioned above, except the group G in the first division. The average difference between the initial body weight and final body weight was 1.9 ± 1.03 kg in the first division and 2 ± 0.66 kg.

CONCLUSION

The decrease in the percentage levels of water found cause physiological changes that can affect the performance of athletes. The decrease in percentage water differs according to the tactical position of the athletes. In one group no difference in percentage decrease water according to the league played, but these differences are not significant when using the T-Student test. The state of hydration before, during and after matches is significant, thus requiring the intervention of trainers and physiologists. Given that performance in the sport of income differs in detail, it is suggested that trainers should adopt the control of the hydration status of athletes in training and games because it is directly linked to the process of fatigue during a match. It is suggested further research with controlled fluid intake during activity, including differing hydration with water and electrolytes. We also suggest the control of body temperature and ambient temperature control for greater reliability.

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WATER LOSS - SWEATING RATE OF PROFESSIONAL CARIOCA SOCCER PLAYERS

ABSTRACT

The development and improvement of physical fitness have been going at great speed, making the relevant figure of the trainer in football. Sports alternating moments of high intensity and short duration with moments of low intensity and long duration. Depending on their position and function tactic exercised in the field, an athlete may have a loss of up to 3 kg in a soccer match. The physical preparation of athletes is a vastly complex and among the variables to be controlled is the decrease in body weight and levels of dehydration during a soccer match. These variables can be indicators of fatigue, because they cause physiological changes marked. The hypothesis that levels of dehydration in professional athletes of the first and second division championship in Rio are relevant and that levels of dehydration reach values that interfere with the performance of athletes, the study aimed to determine whether there is a decrease in the percentage of body water athletes after the games, athletes by subdividing the position. The study was conducted with 26 professional players from Rio de Janeiro, aged 20 years and 34 years old, subdivided by five positions, the latter being the goalkeeper, defender, side, midfielders and attackers. For the proposed objective was achieved, was measured body weight of athletes before the start of the match and at the end and that's calculated rate of sweating following the formula proposed by the ACSM (1996) (TS) = [(Pi - Pf) x1000] / total time of physical activity. Concluding that the levels of dehydration in the Carioca championship in both the first division and second division are relevant and differ according to the tactical position of the athletes.

KEYWORDS: soccer, dehydration, body weight control.

PERTE DE L'EAU - TAUX DE TRANSPIRATION DES PROFESSIONNELS JOUEURS DE SOCCER PAS DE RIO DE JANEIRO

RÉSUME :

Le développement et l'amélioration de la condition physique qui se passe en grande vitesse, ce qui rend le chiffre correspondant de l'entraîneur physique dans le football. Sports alternant des moments de haute intensité et de courte durée avec des moments de faible intensité et de longue durée. En fonction de leur position et la tactique de la fonction exercée dans le domaine, un athlète peut avoir une perte de 3 kg dans un match de football. La préparation physique des athlètes est extrêmement complexe et parmi les variables à contrôler est la diminution du poids corporel et les niveaux de déshydratation durant un match de football. Ces variables peuvent être des indicateurs de la fatigue, parce qu'ils provoquent d'importants changements physiologiques. L'hypothèse est que les niveaux de la déshydratation chez les athlètes professionnels du championnat de première division et la deuxième à Rio sont pertinents et que les niveaux de déshydratation atteindre des valeurs qui interfèrent avec la performance des athlètes, l'étude visait à déterminer si il ya une diminution du pourcentage d'eau corporelle des athlètes après les Jeux, subdivisé par poste. L'étude a été réalisée avec 26 joueurs professionnels de Rio de Janeiro, avec l'âgée dans le 20 ans et 34 ans, subdivisée en cinq positions, celles-ci étant le gardien, défenseur, défenseur côté, milieu de terrain et les butteur. Pour l'objectif proposé a été atteint, a été mesuré le poids corporel des athlètes avant le début du match et la finale et doit être calculé au taux de transpiration de la formule suivante proposée par l'ACSM (1996) (TS) = [(Pi - Pf) x1000] / temps total de l'activité physique. Concluant que les niveaux de déshydratation dans le championnat Carioca dans la première division et de deuxième divisions sont pertinents et varient en fonction de la position tactique des athlètes.

MOTS-CLÉS: football, déshydratation, contrôle du poids corporel.

PÉRDIDA DE AGUA - TASA DE SUDOR DE JUGADORES DEL FÚTBOL PROFESIONAL CARIOCA

RESUMEN:

El desarrollo y la mejora de la aptitud física han estado yendo a gran velocidad, por lo que la cifra correspondiente del entrenador en el fútbol. Deportes alterna momentos de alta intensidad y corta duración con los momentos de baja intensidad y larga duración. Dependiendo de su posición y la táctica función que ejerce en el campo, un atleta puede experimentar una pérdida de hasta 3 kg en un partido de fútbol. La preparación física de los atletas es extremadamente compleja y entre las variables a controlar es la disminución en el peso corporal y los niveles de deshidratación durante un partido de fútbol. Estas variables pueden ser indicadores de la fatiga, debido a que causan importantes cambios fisiológicos. La hipótesis de que los niveles de deshidratación en atletas profesionales el campeonato de primera división y el segundo en Río son relevantes y que los niveles de deshidratación alcanzan valores que interfieren con el desempeño de los atletas, el objetivo del estudio fue determinar si hay una disminución en el porcentaje de agua corporal los atletas después de los juegos, los atletas subdividido por la posición. El estudio se realizó con 26 jugadores profesionales de Río de Janeiro, con edades entre 20 y 34 años, subdivididos en cinco posiciones, que son el portero, defensa, centrocampistas y los delanteros laterales. Para el objetivo propuesto fue alcanzado, se midió el peso corporal de los atletas antes del inicio del partido y la final y se calculará con la tasa de sudoración siguiente fórmula propuesta por el ACSM (1996) (TS) = [(Pi - Pf) x1000] / tiempo total de actividad física. Concluyendo que los niveles de deshidratación en el campeonato Carioca, tanto en la primera división y segunda división son relevantes y difieren según la posición táctica de los deportistas.

PALABRAS CLAVE: Fútbol. Deshidratación, Control del peso corporal.

PERDA HÍDRICA – TAXA DE SUDORESE DE ATLETAS PROFISSIONAIS DO FUTEBOL CARIOCA

RESUMO

O desenvolvimento e aprimoramento da preparação física vêm acontecendo em grande velocidade, tornando relevante a figura do preparador físico no futebol. Esporte que alterna momentos de alta intensidade e curta duração com momentos de baixa intensidade e longa duração. Dependendo da sua posição e função tática exercida em campo, um atleta pode ter uma perda de até 3 kg em uma partida de futebol. A preparação física de atletas é uma atividade extremamente complexa e dentre as variáveis a serem controlados está a diminuição do peso corporal, e os níveis de desidratação durante uma partida de futebol. Estas variáveis podem ser indicadores de fadiga, pois causam alterações fisiológicas acentuadas. Tendo como hipótese que os níveis de desidratação dos atletas profissionais da primeira e segunda divisão do campeonato carioca são relevantes e que os níveis de desidratação atingem valores que interferem no desempenho dos atletas, o estudo teve como objetivo verificar se há diminuição do percentual hídrico do corpo dos atletas após os jogos, subdividindo os atletas por posição. O estudo foi realizado com 26 jogadores profissionais do Rio de Janeiro, na faixa etária entre 20 anos e 34 anos idade, subdivididos por 5 posições, sendo estas as de goleiro, zagueiro, laterais, meio campistas e atacantes. Para que o objetivo proposto fosse atingido, foi aferido o peso corporal dos atletas antes do inicio da partida e ao final e para que seja calculada a Taxa de sudorese seguindo a formula proposta pela ACSM (1996) (TS) = [(Pi – Pf)x1000] / tempo total de atividade física. Concluindo que os níveis de desidratação no campeonato carioca tanto na primeira divisão quanto na segunda divisão são relevantes e diferem de acordo com a posição tática dos atletas.

PALAVRAS-CHAVE: futebol, desidratação, controle do peso corporal.