105 - TERMORREGULATION DURING EXERCISE: POSSIBLE DIFFERENCES AND PRIVATE NEEDS IN WOMEN(*)

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(*) Research accomplished inside of the ethical norms foreseen in the Resolution no.. 196, of October 10, 1996, of National Council of Health.

Introduction

The study of the perspiration is not new subject, about the year of 1600 the duct of the sweat gland was described, although the existence of the sweat gland was not accepted until approximately 1800 (Shibasaki, 2006). During the practice of physical exercises the perspiration begins a dehydration process that can provoke harmful physiologic disturbances to the organism and fall in the sporting acting, as well as increasing the risks associated to the effort and to the heat (Moreira, 2006). The disturbances provoked by the body termorregulation are known and it doesn't seem there to be differences when we compared men and women, as well as the termorregulation in atmosphere cold or hot (Armstrong, 2005), however a comparison of those disturbances among the groups becomes inevitable, tends in view the inherent hormonal events the woman, mainly in what he/she concerns the phases of the menstrual cycle. In case some difference is detected, it will be necessary to determine the composition of a solution of specific replacement for each group, as well as determining a specific strategy of rehidration.

Previous studies didn't show differences in the synthesis of proteins, collagen (Miller, 2005) or in the muscular (Jonge, 2000) contractility in different phases of the menstrual cycle. An initial hypothesis would be to smallest production of heat in absolute values due to smaller amount of corporal mass, however a relative production of heat without significant difference when compared the results between men and women. If the initial hypothesis is true, we will have a normal distribution of the relationship of the corporal weight(PC) and of the loss of corporal weight(PPC) in men and women.

It is waited with the study to verify the hydration needs in young women and case has a need peculiar of hydration during the effort, to serve as base of information for determination of a strategy of replacement of fluids.

Methods

Sample

Seven men and seven women healthy university students participated in this study. The men had their averages (+ I deviate standard) of age, initial (PCI) corporal weight and VO2máx respectively equal to 20,5 + 3,5 years, 66,4 + 7,6 kg and 42 + 5,8 ml / min -1. The women had their averages (+ I deviate standard) of age, initial (PCI) corporal weight and VO2máx respectively equal to 19,2 + 1,7 years, 52,6 + 5,8 kg and 30,7 + 2,3 ml / min -1. All were informed of possible risks and discomforts before they sign the consent term. This study is in accordance with the ethical norms of the Declaration of Helsinque 1975, revised in 1983. The members of the sample were physically assets, they practiced exercises at least three times a week.

Experimental design

The two groups, men and women in normohidration state, accomplished a series of exercises in an athletics track during one hour in an intensity of effort moderated to induce a hipertermia process and dehydration. During the series of exercises the two groups were moisturized with 300ml of water to each 15 min.

Body weigh and VO2máx

PC was measured with digital scale accurately of centigrams. PC was obtained with the individuals in swimsuit and dry to increase the precision of the measure. PPC was determined by the difference of PCI and of PC at the end of the series of exercises (PCF). VO2máx was determined by a track (test of Jogging of 2400m) test through the formula application.

Calculations

The formula used to calculate VO2máx was the following:

VO^2 máx = (2400m x 60 x 0,2) + 3,5 / time (sec) = VO^2 in ml 1 / (kg.min)

Statistical analysis

The Welch Two Sample t-test was used for comparison among independent averages. In this in case the test is of the type H0: μ 1 = μ 2. The mean level admitted was P < 0,05. In case the value-p it is very small should accept the alternative hypothesis H1: There is difference among the groups. Another form of analyzing if there is difference among the averages is to observe the 0 is out of the certain trust (IC) interval of 95%. The relationship analysis between PC and PPC was made through the dispersal graph.

Results

Initially PPC was analyzed in the two groups for us to determine the normality of the distribution.

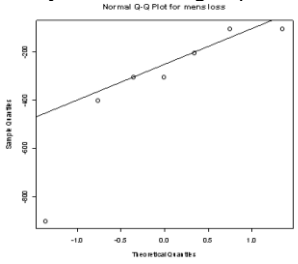

Figure 1

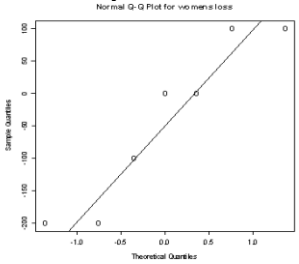

Figure 2

After establishing the normality of distribution of the sample, the effect of the series of exercises was observed in the individuals' corporal mass. The figure 3 display the distribution of initial PC of the two groups in box plot. The figure 4 display the difference of PPC among the groups after the session of exercises. With a value p=0 ,03381 the hypothesis of equality is rejected among PPC of the groups. We can observe certain IC: -547,4... -23,9. The difference among the groups is quite clear.

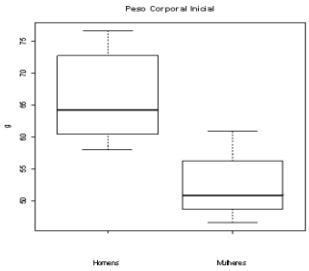

Figure 3

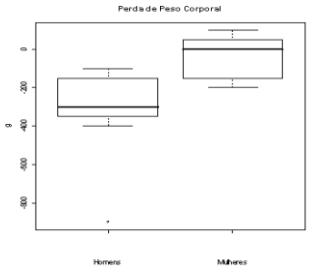

Figure 4

It was also made the analysis of the relationship between PC and PPC. There was not a linear relationship for these varied. The figure 5 display the relationship in men, with medium PPC 328,5g and standard deviation 275,1. The figure 6 display the relationship in women, with medium PPC 42,8 and standard deviation 127,2. The result shows that PC doesn't influence directly in tax of the individual's perspiration.

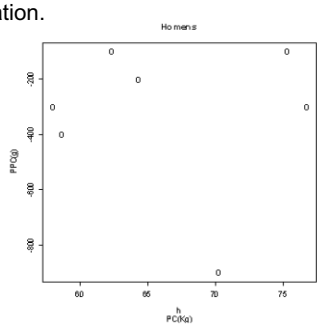

Figure 5

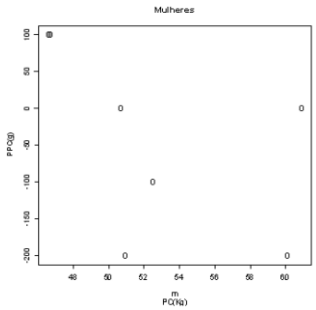

Figure 6

Discussion

As larger the dehydration, smaller the capacity of redistribution of the blood flow for the periphery, smaller the sensibility hipotalâmica for the perspiration and smaller the capacity aerobics for a die heart debit(Armstrong, 1997). The reduction of the heart debit during physical exercises in function of the perspiration is very illustrious in the literature. The competition between outlying sanguine flow and muscular sanguine flow in some cases can be decisive factor of the muscular fatigue. Other factors as the cardiovascular flotation and the fall in the medium blood pressure(Alonso, 1998) were also already well studied.

The physiologic behavior of the dehydration still was not told considering the sex difference. Seemingly there are no differences. In a study with rugby players, the tax of medium perspiration was of 8,0 ± 3,7mL / me, varying from 3,3 to 12,5mL / min, representing a significant ($p < 0,05$) reduction in the final weight and the % of liquid loss in relation to PC was of 1,5 ± 0,7% (Perrela, 2005). That study showed proportional differences in PPC if compared the other studies where men accomplished exercise during 100-120min and they had a medium PPC of 4% (Alonso, 1997).

Modifications in the hydration appear among 30-50 minutes of exercise and they become usually significant after a hour of exercise (Alonso, 1998). Along the exercise they happen modification in the sanguine concentration of some hormones, among them the insulin and the glucagon, that suffer a decrease and an increment, respectively (Roy, 2000). The same study demonstrated that the dehydration process doesn't provoke damage in the oxidation of carbohydrate or fat. Although the mentioned study has been accomplished in men, according to the procedures, it doesn't seem there to be reasons to believe that the organic reactions would be different in women.

Another factor that should be taken into account is the composition of the replacement solutions. The capacity of reabsorption of electrolytes in the perspiration can determine if there is adult need of replacement of salts in women. A study done by Kenney, 2002 speech on the dietary ingestion of reference, that is a group of nutritional guidelines proposed from necessity dear average, recommended dietary ingestion, appropriate ingestion and tolerable superior limit of ingestion. The daily needs of ingestion of water are larger than 3,7L / day for men and 2,7L / for women, depending on the activity accomplished along the day, however there was not distinction in the needs of sodium and potassium (Kenney, 2002).

Studies on the thermoregulatory responses were made and they described in details the physiologic effects of the dehydration, with emphasis in the thermal and circulatory effects during the exercise (Armstrong, 1997), but they were also studies addressed to masculine groups. As for the effects on the heart frequency, it seems there to be a difference in the absolute values when we compared results obtained in studies pilot when we compared men and women. These results when analyzed show that in relative values those differences are minimum, probably for known behaviors that differentiate the feminine and masculine cardiovascular behavior, owed mainly to you differentiate anatomical of size of the heart and vases in general.

An exact neurological road responsible for the perspiration is not totally known (Shibasaki, 2006). There are no indications that the feminine answer mechanism is different from the masculine. Acetylcholine is the primary neurotransmitter released from cholinergic sudomotor nerves and binds to muscarinic receptors on the eccrine sweat gland, although sweating can also occur via exogenous administration of á-â adrenergic agonists(Shibasaki, 2006).

Volumes around 600ml induce an emptying of 30ml/min (Perrela, 2005), men seem to have larger capacity to support great amounts of liquids in the stomach than women. On the other hand the women seem to be more attentive the rehidration need.

Conclusion

We know that exist differences between men and women in practice of the physical exercise, mainly in what concerns the high acting. It is observed in the results that there was a great difference in the dehydration tax among the groups. We didn't observe relationship between initial PC and the perspiration tax, what discards the individuals' possibility with larger PC perspire more in relative values, however we observed a larger PPC among the men, what suggests that individuals with larger muscular mass produce more heat and they need larger dissipation. logical conclusion. After the analysis of the obtained information it was ended that no there is a special necessity in the hydration of a group or other, the essential cares stay in the athlete's hydration as the climatic adaptation, adaptation to a strategy of replacement of liquids and the formulation of a replacement drink the closest possible of the individual need.

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TERMORREGULATION DURING EXERCISE: POSSIBLE DIFFERENCES AND PRIVATE NEEDS IN WOMEN(*)

ABSTRACT

(*) Research accomplished inside of the ethical norms foreseen in the Resolution no.. 196, of October 10, 1996, of National Council of Health.

The termorregulatory answer to the physical exercise promotes organic modifications that can be harmful the health and to the sporting acting. This study has the objective of lifting some subjects about the possible specific needs of water and electrolytes replacement in women. In a session of exercises, seven men and seven women had his/her corporal weight measured before and after the activity and their compared results. The maximum consumption of O2 (VO2máx) in men and women was 42mlO2/Kg/min (+ 5,8) and 30,7mlO2 / Kg / min (+ 2,3), respectively. The loss of weight corporal (PPC) average for men and women was 328,5g and 42,8g with standard deviation of 275,1 and 127,2, respectively. The difference among medium PPC was of 232,3 and it was out of the certain trust interval. The relationship between corporal weight and PPC didn't show influence in the individuals tax perspiration. The main observed difference was smallest PPC in women after the accomplishment of the exercises.

KEY WORDS: Exercises, dehydration, sex difference.

TERMORREGULATION PENDANT EXERCICE: DIFFÉRENCES POSSIBLES ET SOLDAT NEEDS DANS LES FEMMES(*)

RÉSUMÉ

(*) Les recherches ont accompli dans les normes éthiques prévues dans la Résolution no.. 196, du 10 octobre 1996, de Conseil National de Santé.

Les termorregulatory répondent à l'exercice physique encourage des modifications organiques qui peuvent être malfaisant la santé et à l'intérimaire de sport. Cette étude a l'objectif de soulever des sujets au sujet des besoins spécifiques possibles d'eau et remplacement des électrolytes dans les femmes. Dans une session d'exercices, sept hommes et sept femmes avaient son poids corporel a mesuré auparavant et après l'activité et leurs résultats comparés. La consommation maximale d'O2 (VO2máx) dans les hommes et les femmes était 42mlO2/Kg/min (+ 5,8) et 30,7mlO2 / Kg / min (+ 2,3), respectivement. La perte de poids la moyenne corporelle (PPC) pour les hommes et les femmes était 328,5g et 42,8g avec déviation standard de 275,1 et 127,2, respectivement. La différence parmi PPC moyen était de 232,3 et c'était hors du certain intervalle de la confiance. Le rapport entre poids du caporal et PPC n'a pas affiché influence dans les individus taxez la transpiration. Le principal a observé la différence était plus petit PPC dans les femmes après la réalisation des exercices. MOTS CLEF: Exercices, déshydratation, différence du sexe.

TERMORREGULATION DURANTE EL EJERCICIO: LAS DIFERENCIAS POSIBLES Y LAS NECESIDAD CONFIDENCIALES EN MUJERES(*)

RESUMEN

(*) La investigación accomplish dentro de las normas éticas previstas en la solución no.... 196, de 10 de octubre de 1996, de Asamblea Nacional de la salud.

La respuesta de termorregulatory para el ejercicio físico asciende las modificaciones orgánicas que pueden ser perjudiciales la salud y al desempeño deportivo. Este estudio tiene el objetivo de levantar algunos temas sobre las necesidad específicas posibles de agua y reemplazo de electrólitos en mujeres. En una sesión de los ejercicios, los siete hombres y siete mujeres tenían su / que su cabo peso midió antes y después de la actividad y sus resultados comparados. El consumo máximo de O2 (VO2máx) en hombres y mujeres era 42mlO2 / kg / minutos (+ 5,8) y 30,7 mlO2 / kg / minutos (+ 2,3), respectively. La pérdida de cabo de peso (PPC) corriente para los hombres y mujeres era 328,5 g y 42,8 g con la desviación típica de 275,1 y 127,2, respectively. La diferencia entre PPC mediano era de 232,3 y estaba fuera del cierto intervalo de confianza. La relación entre el cabo peso y PPC no mostró transpiración de impuesto a influencias en las personas individuales. La diferencia observada principal era PPC más baja en mujeres después del logro de los ejercicios. PALABRAS CLAVE: los ejercicios, la deshidratación, la diferencia de relaciones sexuales

TERMORREGULAÇÃO DURANTE O EXERCÍCIO: POSSÍVEIS DIFERENÇAS E NECESSIDADES PARTICULARES EM MULHERES(*)

RESUMO

(*) Pesquisa realizada dentro das normas éticas previstas na Resolução Nº. 196, de 10 de outubro de 1996, do Conselho Nacional de Saúde. A resposta termorregulatória ao exercício físico promove modificações orgânicas que podem ser prejudiciais a saúde e ao desempenho esportivo. Este estudo tem o objetivo de levantar algumas questões sobre as possíveis necessidades específicas de reposição hidrosalina em mulheres. Em uma sessão de exercícios, sete homens e sete mulheres tiveram seu peso corporal medido antes e depois da atividade e seus resultados comparados. O consumo máximo de O_2 ($VO_{2máx}$) em homens e mulheres foi 42mlO_2/Kg/min ($\pm$ 5,8) e 30,7mlO_2/Kg/min ($\pm$ 2,3), respectivamente. A perda de peso corporal (PPC) média para homens e mulheres foi 328,5g e 42,8g com desvio padrão de 275,1 e 127,2, respectivamente. A diferença entre as PPC médias foi de 232,3 e ficou fora do intervalo de confiança determinado. A relação entre peso corporal e PPC não mostrou influência na taxa de sudorese dos indivíduos. A principal diferença observada foi a menor PPC em mulheres após a realização dos exercícios.

PALAVRAS CHAVE: Exercício, desidratação, diferença entre sexos.