24 - ACUTE EFFECT OF A WATER AEROBICS SESSION ON BLOOD PRESSURE IN NORMAL TENSION AND HYPERTENSIVE WOMEN.

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INTRODUCTION

Physical exercise promotes organic adaptations to meet the metabolic demands and to restore homeostasis, since it implies the increase in energy consumption and consequent physiological changes (BRUM et al., 2004).

Among these changes, it is noteworthy that the hypotension effect is the result of mechanisms related to hemodynamic, mood and neural factors. (AMORIM et al, 2009). After exercise, blood pressure levels can reach values below those recorded at rest prior to exercise, resulting in what is called post-exercise hypotension (PEH) (FOSS; KETEYIAN, 2000).

The PEH can be considered as an important strategy for controlling blood pressure (BP) in both normal tension and hypertensive individuals, especially after aerobic exercise (ANNUCIAÇÃO; POLITO, 2011). This hypotension effect has been observed even after a single session of exercise, and observed that its magnitude and duration depend on the type, duration and intensity of exercise (CUNHA et al., 2006).

One type of exercise is much sought after water aerobics, which promotes various physiological changes as a result of hydrostatic pressure (REIS; LIMA, 2009). This pressure increases with depth and density of the liquid providing, the practitioner of aquatic exercise, reduction of edema, blood pressure and possibly heart rate (HR) (AEA, 2008).

Thus, the aquatic exercise, specially aerobics, have been suggested as a means of prevention and non-pharmacological treatment for hypertension. (AMORIM et al, 2009).

The objective of this study was to compare the acute effect of a water aerobics session on blood pressure in young adult women, active, normal tension and hypertensive.

METHODOLOGY

Subjects

The study included 20 women - 10 normal tension and 10 hypertensive women - aged between 40 and 60 years, practicing aerobics water to at least six consecutive months. Before performing the procedures the volunteers were informed about the procedures and benefits of the study, answered a questionnaire (anamnesis) and signed a consent form.

The procedures used in the study were previously approved by the Ethics and Research in Humans of the Faculdade de Saúde, Ciências Humanas e Tecnológicas do Piauí - NOVAFAPI, according to the regulations of Resolution 196/96 of the Health National Council on research involving humans, CAAE No. 0218.0.043.000-10.

Procedures

For the sample characterization was carried out anthropometric measurements: body mass index, abdomen hip ratio index and fat percentage (3 folds), following the protocol of Pollock.

The volunteers were divided into five groups (2 normal tension and 2 hypertensive). Each group underwent a session of water aerobics 50mim with characteristic aerobic. The intensity of the class was controlled by the HR in the water through the Polar frequency counter (FS1, Finland), calculated using the formula Kruel (1994) considering the intensity of 75% HR max.

To perform the water aerobics session and measure the blood pressure, participants were instructed not to perform any exercise 24 hours before, eat at least 2 hours before the session, not to ingest alcohol, caffeine and chocolate.

The BP measurement was performed by the digital monitor (MIcrolife BP 3BTO-A, Switzerland) at 5min rest out of the pool (5'rest), after sitting still in the pool (post), and 15 (r15), 30 (r30), 45 (R45) and 60 minutes (r60) after the session.

Statistical Analysis

To compare the behavior of BP among hypertensive and normal tension was used for repeated measures ANOVA, considering $p<0.05$ as significance level. In all analysis we used SPSS 15.0 for Windows.

RESULTS

The characterization of the sample (Table 1) found differences in anthropometric characteristics of participants with more pronounced values of BMI, IAHR and % F, in addition to SBP and DBP at rest, for the group of hypertensive.

Table 1. Characterization of the sample.

	Normal Tension (n=10)				Hypertension (n=10)			
	Min	Max	Média	± DP	Min	Max	Média	± DP
Age (years)	40	52	46,5	4,40	44	60	52,8	5,15
BMI (kg.m2(-1))	19,68	28	22,92	2,73	21,48	30,63	25,24	3,34
IAHR (cm)	0,79	0,96	0,88	0,05	0,88	1,01	0,94	0,04
%F	15,81	28,74	21,92	3,85	22,13	33,74	26,29	3,29
SBP rest (mmHg)	104	119	110	5,66	125	164	133	11,8
DBP rest (mmHg)	70	86	72	4,48	70	91	75	6,09

BMI: Body mass index; IAHR: Index abdomen hip ratio, % F: Percentage of fat; rep
SBP: systolic blood pressure at rest, rep DBP: diastolic blood pressure at rest.

It was found that there was a greater increase in SBP during the water aerobics session in the group of normal tension as well as a greater moment in PEH r15 and r30. Since at times the r45 and r60 PEH became more evident in the hypertensive group (Table 2).

Table 2. Delta variation in systolic blood pressure (SBP in mmHg).

		5'rest	post	r15	r30	r45	r60
NT	média	110,4	11,9	-0,9	-4,4	-5,7	-7,4
	± DP	5,66	5,74	5,80	8,46	7,67	6,54
HT	média	133,3	7,3	-0,5	-4,1	-6,1	-10,6
	± DP	11,89	2,95	7,01	9,26	10,71	10,84

NT: Normal tension; HT: Hypertension

The DBP behavior during and after the water aerobics session showed differences when comparing the two groups. The normal tension showed a decrease in DBP during all times while a hypertensive increases until 15 minutes after the session, when it was found the hypotension effect. At 60 minutes post-exercise group received a higher PEH in hypertensive than normal tension (Table 3).

Table 3. Delta variation in diastolic blood pressure (DBP in mmHg).

		5'rest	post	r15	r30	r45	r60
NT	média	72,4	0	-2,5	-2,5	-2,7	-3,1
	± DP	4,88	2,26	3,31	4,81	4,32	3,48
HT	média	75	3,8	0,7	-0,9	-1,9	-3,5
	± DP	6,09	5,47	2,67	3,90	2,92	3,57

NT: Normal tension; HT: Hypertension

About the values of MAP there is an increased in PEH to 60 minutes post-exercise in hypertensive participants, although this effect is only seen after 30 minutes of rest. It is also seen a smaller increase in MAP during the water gymnastics session in normal tension participants (Table 4).

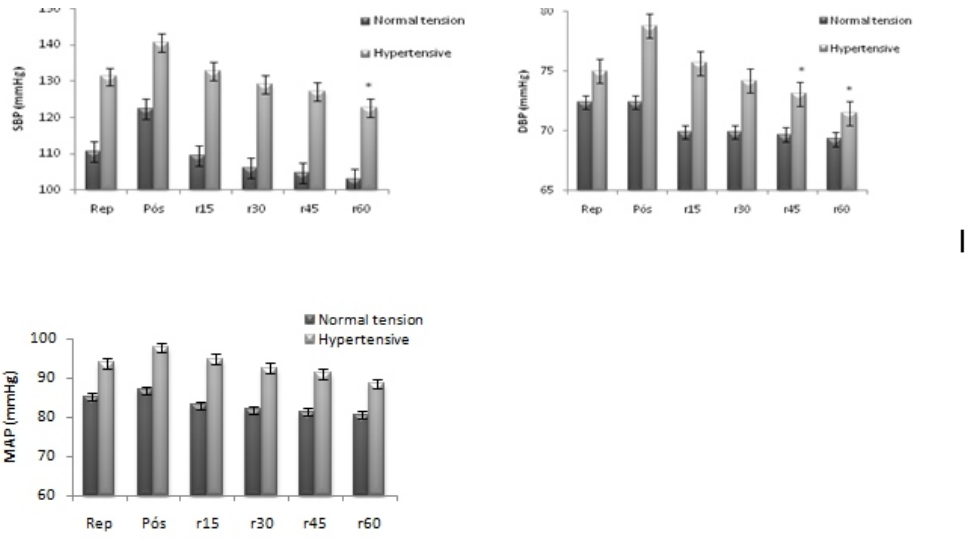
Table 4. Delta variation in mean arterial pressure (PAM in mmHg)

		5'rest	post	r15	r30	r45	r60
NT	média	85,07	3,97	-1,97	-3,13	-3,7	-4,53
	± DP	4,67	2,85	3,62	4,69	4,57	3,26
HT	média	94,43	5,0	0,3	-1,97	-3,3	-5,87
	± DP	6,59	4,35	3,86	5,24	4,95	5,35

NT: Normal tension; HT: Hypertension

The hypotension effect of water aerobics can be seen in Figure 1, where you can see a decrease in SBP, DBP and MAP in relation to resting values, especially in hypertensive participants.

Figure 1. Response of SBP, DBP and MAP at rest, immediately after the session (post) and post-session recovery (15, 30, 45, 60 min).



*p<0,05 in relation to rest

DISCUSSION

You can identify a decrease in blood pressure in response to a water aerobics sessions in normal tension and hypertensive women, physically active, witch corroborates with the studies of Amorim et al (2009) who observed a reduction in blood pressure with significant reproducibility and small variability when the water aerobics sessions at 60-80% of heart.

According to Foss and Keteyian (2000), during exercise, the systolic pressure increases due to the increase in cardiac output and vascular resistance in the tissues. Since the mean arterial pressure is increased only moderately, while the diastolic pressure has little or no modification. The results of this study are consistent with the literature, with an average elevation of 10.67

mmHg SBP immediately after the end of the year, compared with their levels at rest. The variations of MAP and DAP for the same period were 3.95 and 0.6 mmHg, respectively, confirming the data found in literature.

After physical activity, blood pressure levels tend to return to pre-exercise values within a few minutes, as observed in this study 15 minutes after exercise (118.7 + 14.49). However, in some situations, the pressures can reach even lower rates than those observed before exercise in this study it can be seen from 30 minutes post-exercise, a fact called post-exercise hypotension (FOSS; KETEYIAN, 2000).

By studying the effects of gymnastics on the blood pressure in healthy women, overweight or obese, Borges (2007) found a reduction in SBP and MBP in the experimental group. The decrease in SBP and MBP can also be observed in this study, although the sample is composed of women with BMI and% F in the presence of normal and hypertensive group.

CONCLUSION

The results of this study allowed the observation of high values of systolic, diastolic and mean during exercise. There was also a reduction in blood pressure levels (SBP, DBP and MBP) when comparing the values before and after a few minutes of water aerobics class, and that these values continued to decline during the period of 60 minutes after the activity.

Through this research it was confirmed, therefore, the importance of practice-oriented, systematic and continuous physical activity, especially in the aquatic environment, both in normal tension and hypertensive, given the benefits with respect to the decrease in blood pressure levels.

On the other hand, we suggest further investigations on the many variables involved in the performance of physical activity such as age, gender, intensity and duration of lessons for better management of physical exercises, including aerobics.

KEYWORDS: Blood Pressure, Hypertension, Water Activities

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ACUTE EFFECT OF A WATER AEROBICS SESSION ON BLOOD PRESSURE IN NORMAL TENSION AND HYPERTENSIVE WOMEN.

SUMMARY

Physical training causes significant changes influencing the cardiovascular system, emphasizing the post-exercise hypotension (PEH), which effect on blood pressure levels reach values lower than before exercise. Therefore, aquatic physical activities, especially gymnastics, are suggested for prevention and non pharmacological treatment of hypertension. This study aimed to identify the responses of blood pressure in adult women, normal tension and hypertensive physically active after a session of aerobics. The research was descriptive cross-sectional quantitative held with 20 women between 40 and 60 years, normal tension (n = 10) and hypertensive (n = 10). The blood pressures were measured 5 minutes before entering the pool, right after the end of the lesson (in water) and after 15, 30, 45 and 60 minutes from the end of this. Data were analyzed using SPSS 15.0 (for Windows), with analysis of systolic, diastolic and mean by ANOVA for repeated measures followed by post-hoc Tukey (significance level of $p < 0.05$). The results show an increase of SBP, DBP and MBP home until immediately after the activity, starting moments after its reduction to the exercise period of 60 minutes, becoming more evident in hypertensive HPE. Through this research it was confirmed, therefore, the importance of practice-oriented, systematic and continuous physical activity, especially in the aquatic environment, both in normal tension and hypertensive, given the benefits with respect to the decrease in blood pressure levels.

KEYWORDS: Blood Pressure, Hypertension, Water Activities.

L'EFFET AIGU D'UNE SEANCE D' HYDROGYMNASTIQUE SUR LA PRESSION ARTERIELLE CHEZ LES FEMMES NORMOTENSEURS ET HYPERTENSEURS

RÉSUMÉ

L'Entraînement physique provoque des importants changements qu'influent le système cardiovasculaire, en soulignant l'hypotension après-exercice (HPE), effet dans lequel les niveaux de tension artérielle atteignent des valeurs inférieurs qui avant l'exercice. Donc, les activités physiques aquatiques, spécialement l'hydrogymnastique, ce sont suggérées pour la prevention et traitement non phamacologique de l'hypertension artérielle. Cet étude a eu l'objectif d'identifier les réponses

de la pression artérielle chez les femmes adultes normotenseurs et hipertenseurs physiquement actives après une séance d'hydrogymnastique. La recherche a été de coupe transversel quantitative et décritive avec 20 femmes entre 40 et 60 ans; normotenseur (n =10) et hypertenseur (n=10). Les pressions artérielles ont été realisées 5 minutes avant de l'entreé dans la piscine, ensuite après le terminus de la séance (au-dedans de l'eau) et après 15, 30, 45 et 60 minutes. Les données ont été analisées par le programme SPSS 15.0 (pour Windows), avec l'analise des pressions systolique, diastolique et la moyenne par l'ANOVA pour les mesures répétées, suivie du Post-hoc Tukey (niveau de signification de $p<0,05$). Les résultats montrent elevation de PAS, PAD et PAM du repos jusqu'à immédiatement après l'activité, en commençant sa redution quelques instants après l'exercice jusqu'à 60 minutes, il a montré l'HPE dans les femmes hypertenseurs. À travers de cette recherche, elle a montré l'importance de la pratique orienté, systematique et continue d'une activité physique, principalement en moyen aquatique, tant par individus normotenseurs comme hypertenseurs, puisque les avantages obtenus par relation à la diminuition des niveaux de tension artérielle.

MOTS-CLES: Pression Artérielle - Hypertension – Activité Aquatique

EFECTO AGUDO DE UMA SESIÓN DE HIDROGIMNASIA SOBRE LA PRESIÓN ARTERIAL EM MUJERES NORMOTENSOS Y HIPERTENSOS

RESUMEN

El entrenamiento físico provoca importantes alteraciones que influéncian el sistema cardiovascular, resaltándose la hipotensión post-ejercicio (HPE), efecto en el cual los niveles presóricos alcanzan valores más pequeños que antes del ejercicio. Por lo tanto, las actividades físicas acuáticas, especialmente la hidrogimnasia, son sugeridas para prevención y tratamiento no farmacológico de hipertensión arterial. El presente estudio visó identificar las respuestas de la presión arterial de mujeres adultas, normotensas e hipertensas, físicamente activas después de una sesión de hidrogimnasia. La investigación fue de corte transversal cuantitativa descriptiva realizada con 20 mujeres entre 40 y 60 años, normotensas (n = 10) e hipertensas (n = 10). Las presiones arteriales fueron contrastadas 5 minutos antes de la entrada en la piscina, tras el término de la clase (dentro del agua) y después de 15, 30, 45 y 60 minutos del fin de esta. Los datos fueron analizados por el programa SPSS 15.0 (sea Windows), con análisis de las presiones sistólica, diastólica y media por la ANOVA para medidas repetidas, seguida del Post-hoc Tukey (nivel de significación de $p<0,05$). Los resultados demuestran elevación de PAS, PAD y PAM del reposo hasta inmediatamente después de la actividad, iniciando su reducción algunos instantes después del ejercicio hasta el periodo de 60minutos, quedando más evidente la HPE en las hipertensas. A través de esta investigación se confirmó, por lo tanto, la importancia de la práctica orientada, sistemática y continua de una actividad física, principalmente en medio acuático, tanto por individuos normotensos cuanto hipertensos, teniendo en cuenta los beneficios obtenidos con relación a la disminución de los niveles presóricos.

PALABRAS CLAVE: Presión arterial, hipertensión, Actividades Acuáticas

EFEITO AGUDO DE UMA SESSÃO DE HIDROGINÁSTICA SOBRE A PRESSÃO ARTERIAL EM MULHERES NORMOTENSAS E HIPERTENSAS

RESUMO

O treinamento físico provoca importantes alterações que influenciam o sistema cardiovascular, ressaltando-se a hipotensão pós-exercício (HPE), efeito no qual os níveis pressóricos atingem valores menores que antes do exercício. Portanto, as atividades físicas aquáticas, especialmente a hidroginástica, são sugeridas para prevenção e tratamento não farmacológico de hipertensão arterial. O presente estudo visou identificar as respostas da pressão arterial de mulheres adultas, normotensas e hipertensas, fisicamente ativas após uma sessão de hidroginástica. A pesquisa foi de corte transversal quantitativa descritiva realizada com 20 mulheres entre 40 e 60 anos, normotensas (n = 10) e hipertensas (n = 10). As pressões arteriais foram aferidas 5 minutos antes da entrada na piscina, logo após o término da aula (dentro da água) e após 15, 30, 45 e 60 minutos do fim desta. Os dados foram analisados pelo programa SPSS 15.0 (for Windows), com análise das pressões sistólica, diastólica e média pela ANOVA para medidas repetidas, seguida do Post-hoc Tukey (nível de significância de $p<0,05$). Os resultados demonstram elevação de PAS, PAD e PAM do repouso até imediatamente após a atividade, iniciando sua redução alguns instantes após o exercício até o período de 60minutos, ficando mais evidente a HPE nas hipertensas. Através desta pesquisa confirmou-se, portanto, a importância da prática orientada, sistemática e contínua de uma atividade física, principalmente em meio aquático, tanto por indivíduos normotensos quanto hipertensos, haja vista os benefícios obtidos com relação à diminuição dos níveis pressóricos.

PALAVRAS-CHAVES: Pressão Arterial, Hipertensão, Atividade Aquática