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ORIGINAL ARTICLE

Effect of a physical activity programme in the aquatic environment on haemodynamic constants in pregnant women[☆]

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KEYWORDS

Exercise;
Pregnancy;
Immersion;
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Abstract

Objective: To evaluate the effect of a physical activity programme in the aquatic environment with immersion up to the neck, of six weeks duration, on haemodynamic constants in pregnant women.

Methods: A six-week physical activity programme in the aquatic environment was carried out with a total of 46 pregnant women, who were distributed into an experimental group (n = 18), which participated in the programme, and a control group (n = 28), which followed routine care. In both groups different haemodynamic measurements were evaluated before and after the programme.

Results: At the beginning of the programme the mean systolic blood pressure was similar between groups, but diastolic blood pressure was slightly higher in the experimental group. When the measurements at the last session were compared, arterial pressures (systolic, diastolic and mean) were significantly higher in the control group ($p < .050$). Similarly, the initial plasma volume values did not differ between groups, but after the intervention, the control group women showed a higher mean ($p < .010$). The fraction of sodium excretion (FENa) increased significantly in the experimental group, after the programme, with a mean three times higher ($p < .050$). Aldosterone plasma levels did not show significant differences between the groups in the different measurements.

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PALABRAS CLAVE

Ejercicio;
Embarazo;
Inmersión;
Hemodinámica

Conclusion: A programme of swimming and immersion exercises in pregnant women contributes to hydrosaline balance, preventing an excessive increase in usual plasma volume during pregnancy and in the activity of the renin-aldosterone axis.

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Efecto de un programa de actividad física en el medio acuático sobre las constantes hemodinámicas en mujeres embarazadas

Resumen

Objetivo: Evaluar el efecto de un programa de actividad física en el medio acuático con inmersión hasta el cuello, de seis semanas de duración, sobre las constantes hemodinámicas en mujeres gestantes.

Método: Se llevó a cabo un programa de actividad física en el medio acuático, de seis semanas de duración a un total de 46 mujeres embarazadas, que fueron distribuidas en grupo experimental que participó en el programa (n = 18) y grupo control (n = 28) que desarrolló los cuidados habituales. En los dos grupos se valoraron diferentes medidas hemodinámicas antes y después del programa.

Resultados: Al inicio del programa el promedio de presión arterial sistólica era similar en ambos grupos pero la presión arterial diastólica era ligeramente mayor en el grupo experimental. Cuando se contrastan las medidas en la última sesión, resultan significativamente mayores las presiones arteriales (sistólica, diastólica y media), en el grupo control ($p < 0,050$). De forma similar, los valores iniciales de volumen plasmático no diferían en ambos grupos, pero tras la intervención las mujeres del grupo control evidencian un mayor promedio ($p < 0,010$). La fracción de excreción de sodio (FENa) aumenta significativamente en el grupo experimental, tras la realización del programa, cuyo promedio se triplica ($p < 0,050$). Los niveles plasmáticos de aldosterona no muestran diferencias significativas entre ambos grupos en las distintas mediciones.

Conclusión: Un programa de ejercicios de natación e inmersión, en mujeres gestantes, contribuye al equilibrio hidrosalino, previniendo el aumento excesivo de volumen plasmático habitual en el embarazo, y en la actividad del eje renina-aldosterona.

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What is known?

The effect of immersion in water on hydrosaline balance is well known, however more specific studies are necessary in pregnant women to help elucidate the precise circulatory and neuroendocrine mechanisms involved.

What do we contribute?

The positive outcomes on various haemodynamic variables of a physical activity programme immersed to the neck in an aquatic environment specifically designed for pregnant women.

Introduction

There is sufficient scientific evidence to show that regular, moderate, physical exercise in healthy pregnant women, with normal pregnancies not only holds no risk to the health

of mother or foetus, but is beneficial throughout pregnancy, during labour and the postpartum period.^{1,2} Sport and physical exercise in general benefits the cardiovascular system, blood circulation and tones the musculoskeletal system.³

Studies show that moderate sport suitable to the specific pregnancy can be undertaken without risk to maternal or foetal health. Furthermore, other recent studies indicate the effect of regular physical exercise in preventing excessive weight gain during pregnancy, helping to control blood pressure and preventing hypertension and gestational diabetes. Therefore, exercise is beneficial for both mother and foetus, and prevents the risk of excess weight and, as a consequence, helps to prevent complications in labour.⁴⁻⁶

The profound changes in the body during pregnancy include cardiovascular changes with increased cardiovascular system capacity, as a result of vasodilatation of the peripheral vascular system and increased venous circulation and increased circulating volume, which at the end of pregnancy is elevated around 30–60%. Similarly, water and salt retention occurs due to the intensive activity of the renin-angiotensin-aldosterone system.⁷⁻¹⁰ Several vasodilatory factors have been identified such as progesterone, increased glomerular filtration rate and natriuretic agents such as atrial natriuretic peptide (ANP).^{11,12}

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