Postural evaluation, pain and fitness of hydrogymnastics practitioners*

Avaliação postural, dor e aptidão física de praticantes de hidroginástica

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ABSTRACT

BACKGROUND AND OBJECTIVES: Hydrogymnastics may be practiced by people of different ages because it provides low impact, being an alternative to improve quality of life and health of people unable to practice impact activities. This study aimed at analyzing the effects of 12 weeks of hydrogymnastics on subjective pain perception and their influence on daily life activities, in addition to evaluating posture and fitness of hydrogymnastics practitioners.

METHOD: Participated in this study 20 females aged from 30 to 50 years who went through a baseline evaluation to measure flexibility and localized muscle resistance. Anthropometric measures were body mass, height, waist and hip circumference to estimate body mass index (BMI) and waist / hip ratio (WHR). In addition, they have answered two questionnaires to evaluate pain. Twelve weeks after the pre-test, final evaluation was performed.

RESULTS: There has been statistical difference in waist circumference and WHR, in addition to decreased subjective pain sensation on face and left foot. Pain started to interfere less with general activities, mood and sleep. With regard to posture, there has been no change between the beginning and the end of the study.

CONCLUSION: Hydrogymnastics for 12 weeks was effective to improve some fitness items and to decrease pain; however it has not changed posture of females practicing such modality.

Keywords: Fitness, Pain, Posture.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A hidroginástica pode ser praticada por indivíduos de diversas faixas etárias, pois proporciona baixo impacto, sendo uma alternativa para melhorar a qualidade de vida e a saúde de indivíduos que estão impossibilitados de realizar atividades de impacto. Desse modo, o objetivo deste estudo foi analisar os efeitos de 12 semanas de prática de hidroginástica sobre a percepção subjetiva da dor e sua influência nas atividades da vida diária, verificar a postura e a aptidão física de praticantes de hidroginástica.

MÉTODO: Participaram da pesquisa 20 mulheres, com idade entre 30 e 50 anos. As mesmas passaram por uma avaliação inicial para mensurar a flexibilidade e resistência muscular localizada. Também foram feitas mensurações antropométricas, como massa corporal, estatura, circunferência da cintura e do quadril, para estimar o índice de massa corpórea (IMC) e a relação cintura quadril (RCQ). Além disso, responderam dois questionários para avaliar a dor. Após 12 semanas do pré-teste, realizou-se a avaliação final.

RESULTADOS: Encontrou-se diferença estatística significativa na circunferência da cintura e na RCQ, houve diminuição da sensação subjetiva da dor nos locais face e pé esquerdo. As dores passaram a interferir menos na realização de atividades gerais, no humor e no sono. Em relação à postura, não houve modificações entre o início e o final do estudo.

CONCLUSÃO: A hidroginástica, num período de 12 semanas, foi eficaz na melhoria de alguns itens da aptidão física e na diminuição da dor, porém, não em relação à postura de mulheres que já praticam essa modalidade.

Descritores: Aptidão física, Dor, Postura.

INTRODUCTION

Pain is complex and subjective¹. Reason for numerous problems, pain may become the major focus of attention of individuals, limiting their daily activities and affecting their and their families' quality of life (QL). Factors such as depression, physical and functional incapacity, social withdrawal, family dynamics changes and economic unbalance, direct and limit people's decisions and behaviors².

Another problem affecting general population is poor posture, which is the lack of relationship among the several body parts, leading to increased overload of body supporting structures, which

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Submitted in June 15, 2012.

Accepted for publication in February 28, 2013.

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may also result in pain³. In this context, an increasing number of evidences are starting to show that physical activity provides better QL⁴ an even promotes analgesia⁵.

Hydrogymnastics is a physical exercise modality which promotes global physical fitness improvement, and may contribute to improve QL. For being an activity performed in water, it may be practiced by different age groups⁶.

This study aimed at evaluating the effects of 12 weeks of hydrogymnastics on subjective pain perception and its influence on daily life activities, posture and skills.

METHOD

This was an exploratory and quantitative research. Case study was used as research strategy.

Sample was made up of 23 females practitioners of hydrogymnastics, students of the Sports Association of the Federal University of Santa Maria (ADUFMS).

Inclusion criteria were: a) age between 30 and 50 years; b) be hydrogymnastics practitioner for at least three uninterrupted months, with minimum frequency of twice a week and signing the Free and Informed Consent Term (FICT). Exclusion criteria were: a) practicing physical activity different from hydrogymnastics; b) miss more than 12 of a total of 24 lessons.

The following pieces of equipment were used to collect physical fitness data: digital scale of the brand Acqua, metric tapes, Wells bench and mats. The following tools were used to evaluate pain: McGill Pain Questionnaire and Wisconsin Pain Inventory, both adapted. To evaluate posture, an evaluation card based on the observation of the subject standing up in the frontal and lateral plane was used.

Sample subjects went through a baseline evaluation (pre-test), where the following tests were applied: "Sit and Reach"⁷ to measure posterior legs, hips and lumbar spine flexibility, and "Abdominal 1 minute", to quantify localized muscle resistance. Anthropometric data were also collected, such as body mass and height to estimate body mass index (BMI), waist and hip circumference to estimate waist-hip relationship (WHR).

In addition, participants have answered two pain evaluation questionnaires.

In the McGill Pain Questionnaire, participants have marked on a table body sites where they felt pain and the level of perceived pain. Pain level is represented by a scale from zero (no pain) to

10 (unbearable pain). For spatial pain location, the questionnaire has human body sketches, one in anterior plane and the other in posterior plane⁸.

In Wisconsin Pain Inventory, participants have circled a number which would describe how pain interfered with the following aspects of their lives: general activity, mood, walking ability, work, relationship with other people, sleep, enjoy life. Numbers are on a scale from zero (no interference) to 10 (total interference)⁸.

Another procedure was postural evaluation through observation, using as reference point a posture grid, or "posturógrafo", placed behind de person. Subjects were evaluated in swimsuits and with bare feet, in frontal planes with anterior, posterior views and sagittal with profile view.

After baseline evaluation, subjects constituting the sample of this research have normally participated in hydrogymnastics lessons.

Twelve weeks after pre-test, final evaluation was performed (post-test), where all initial tests were repeated. Only participants who had not missed more than 12 lessons were evaluated. Due to excessive absences, three females had to be excluded from the study and the post-test was applied to 20 students.

Data were collected by trained students, participants of the Center of Studies on Physical Education Measurements and Evaluation (NEMAEF) CEDF/UFSM.

Student's t test was used for pre and post-test data analysis, with the statistical package SPSS 8.0 for Windows and considering statistically significant $p < 0.05$.

This study was approved by the Research Ethics Committee, Federal University of Santa Maria (opinion 23081.008796/2009-38).

RESULTS

Pre and post-test mean and standard deviation of age, body mass, height, body mass index (BMI), waist circumference, hip circumference, WHR, flexibility and abdominal are shown in table 1.

As it can be seen, only waist circumference and WHR variables had statistically significant differences ($p < 0.05$).

For postural evaluation, cervical, dorsal and lumbar spine regions were observed to check whether they had normal alignment, rectification, inversion or hyperlordosis in cervical and lumbar regions, or even hyperkyphosis in dorsal region. We have also observed whether individuals had or not scoliosis, which was observed in 100% of cases. There has been no change between baseline and final evaluations. Table 2 shows the percentage of the sample with -

Table 1 – Descriptive values of physical fitness variables.

	Pre-Test	Post-Test	p value %
Age (years)	42.45 ± 6.09	42.45 ± 6.09	-
Body mass (kg)	66.75 ± 8.99	66.63 ± 9.03	0.472
Height (m)	1.61 ± 0.05	1.61 ± 0.05	-
BMI (kg/m ²)	25.70 ± 3.66	25.65 ± 3.65	0.460
Waist circumference (cm)	81.82 ± 8.97	83.83 ± 9.64	0.001*
Hip circumference (cm)	101.81 ± 6.69	101.70 ± 7.39	0.722
WHR	0.80 ± 0.06	0.82 ± 0.07	0.004*
Flexibility (cm)	26.75 ± 7.90	28.18 ± 7.80	0.076
Abdominal (repetitions)	12.25 ± 9.39	13.75 ± 8.27	0.143

BMI = body mass index; WHR = waist-hip relationship.

*Significant differences for $p < 0.05$.

McGill Pain questionnaire has shown major sites affected by moderate to unbearable pain. According to data, lumbar region was most often mentioned, present in 35% of questionnaires, followed by neck, left shoulder, right shoulder, left foot and face. Pre and post-test values are better seen in table 3, where it is possible to observe that only left foot and face had 10% decrease in the percentage of the sample referring pain in those regions.

According to the protocol, Wisconsin's Pain Inventory was able to detect whether pain interfered or not with the following aspects of the lives of hydrogymnastics practitioners: general activity, mood, walking ability, work, relationship with other people, sleep and enjoy life. According to pre-test data, it could be observed that 65% of the sample have reported that pain interferes with general activities, 55% reported interfering with mood and sleep, and 50% with work and walking ability.

Table 2 – Pre-test and post-test percentage values of postural evaluation.

	Pre-Test / Post-Test				
	Normal	Hyperlordosis	Hyperkyphosis	Rectification	Inversion
Cervical spine	100 / 100	0 / 0	-	0 / 0	0 / 0
Dorsal spine	50 / 50	-	15 / 15	35 / 35	0 / 0
Lumbar spine	10 / 10	90 / 90	-	0 / 0	0 / 0

Table 3 – Distribution of sample frequency according to pain location.

Presence of Pain	Absolute Frequency	Relative Frequency (%)
	Pre / Post	Pre / Post
Lumbar spine	7 / 8	35 / 40
Neck	5 / 7	25 / 35
Left shoulder	5 / 5	25 / 25
Right shoulder	4 / 4	20 / 20
Left foot	4 / 2	20 / 10
Face	3 / 1	15 / 5

Comparing final with baseline data, it is possible to observe that there has been 5% decrease in reports that pain interferes with general activities, 10% decrease with regard to mood and 20% with regard to sleep. The item work had no change with regard to pre-test. In walking ability, there has been 10% increase, showing the interference of pain with this aspect (Graph 1).

Graph 1 – Percentage of sample referring pain during daily activities.

DISCUSSION

After analyzing physical fitness tests results (localized muscle resistance, flexibility, body mass index and WHR), statistically significant differences between pre and post-test were found only in waist circumference and WHR. These differences point to a result which is different from what has been observed by a study evaluating the effects of hydrogymnastics on physical fitness of the elderly. After three months of practice, subjects have presented improvements in all evaluated physical fitness components (upper and lower limbs strength and resistance, flexibility, localized muscle resistance)⁹.

This difference may be explained by the fact that the elderly participating in the experiment did not practice any regular physical exercise whereas the subjects of our research were already hydro

gymnastics practitioners for more than three months¹⁰. This fact may be explained because, in fact, strength gains, for example, presented during the first weeks of training by otherwise sedentary individuals, occur as a function of neural factors¹¹.

In a different study with the elderly¹⁰ results were similar to our study. Authors have also observed significant decreases in waist perimeter after sometime training with hydrogymnastics.

With regard to postural evaluation, it was possible to detect that most incident deviation of the participants of this study were scoliosis, followed by hyperlordosis, present in 100% and 90% of the sample, respectively.

Observing data, there has been no change in posture in any evaluated region; final percentages were equal to baseline percentages. The reason might have been that no specific work was proposed to treat such deviations.

In studies involving specific groups, such as Olympic fight fighters¹² or classic ballerinas¹³, one of the most incident postural deviations was lumbar spine hyperlordosis, as it was seen in this study.

A study evaluating 12 sedentary female university students, aiming at observing possible postural changes as a consequence of 16 weeks of against resistance training, has observed postural improvement only in head/neck, heels and abdomen. They have also not obtained significant responses for lumbar and dorsal regions, similarly to our study¹⁴.

According to McGill Pain protocol, major moderate to severe pain sites were detected in hydrogymnastics practitioners. Lumbar spine was most often mentioned, being present in 35% of the sample, followed by neck, left shoulder, right shoulder, left foot and face. In the post-test, these percentages had 10% decrease for left foot and face.

Still with regard to pain evaluation according to answers to the

Wisconsin's Pain Inventory, it was observed that pain interferes with general activities for 65% of the sample, with mood and sleep for 55%, with work and walking ability for 50% of the students. In the post-test there has been decrease of these percentages in the items general activities, mood and sleep, of 5%, 10% and 20%, respectively, as compared to baseline evaluation. These results are in line with other studies carried out on this subject, because such studies have also had the lumbar region as the major pain site, being also mentioned neck and shoulders, and resulting in limitations to perform daily activities¹⁰.

Among the limitations of this study, one may mention lack of control and planning of hydrogymnastics lessons, because they were ministered by different teachers, each one in his/her own way. Participants' diet has also not been controlled, which may have affected the final results of this study.

CONCLUSION

Hydrogymnastics for 12 weeks has improved waist circumference and WHR, however there have been no significant changes in flexibility, body mass index, and localized muscle resistance, possible due to the relatively short training time and because nutritional follow up was not performed. There has been pain decrease in sites such as face and left foot, which has interfered less with general daily activities, mood and sleep.

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