167 - PHYSICAL EXERCISE PROGRAM AND ITS EFFECTS ON CARDIORESPIRATORY CONDUCTION AND ON PSYCHOLOGICALSYMPTOMS ON PERIMENOPAUSAL WOMEN

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INTRODUCTION

The word *perimenopause* may include the period that precedes immediately menopause (when endocrine, biological and clinical symptoms start) and the first following year (Torpy, 2003). Mental, distress and physical symptoms during perimenopause are different for each culture. Added to this; endocrine changes and social context also may be considered (Guthrie, Dennerstein & Dudley, 1999; Boswort, Bastian, Kuchibhatla, 2001). According to Utian (2005), women frequently face with life changes during perimenopause. Studies of menopausal symptoms are problematic, because it's difficult to identify when a women is in perimenopause. A woman at perimenopause may deal with several transformations; hormonal changes, loss in her reproductive capacity and aging. These entire modifications act in diverse ways and the woman can present several clinical manifestations as, for example, psychological complains.

Epidemiological studies evaluating a big number of women in perimenopause were taken in the last decades, in several countries. These studies don't confirm the idea of the existence of some mental disease specifically associated to climacteric or even a raise in its incidence and remaining of psychiatry problems during this period. However, they suggest that women in perimenopause report a raise in anxiety and distress symptoms. Changes in sleeping habits such as frequent insomnia are the most common psychic symptom (Usandizaga & De La Fuente, 1998). Also may appear irritability, abrupt changes in behavior, anxiety, concentration difficulties for intellectual tasks, memory loses and sadness. The serious distresses appear in rare occasions and always above scenery of a neurotic or psychotic personality; however they are frequent on light distress. There is no doubt according to Usandizaga & De La Fuente (1998), the hormonal alteration and the neurotransmitters contribute to those situations, however it must not be forgotten the possibility of a transitional neurosis in patients who live the menopause as the expression of a period in what several conditionings are produced: loss in reproductive capacity, decrease in physical attractiveness, leaving home by the children (named "empty nest syndrome"). A study by Dennerstein & Burrows (1978), showed that, from 75% of the women who report perimeopausal symptoms, 33%passed through distress symptoms. The World Health Organization (WHO, 1996) reported that there was a psychiatric death raising 1 or 2 years before menstruation stops. It's known that the aging process, excluding any pathological condition, presents physiological and psychological changes, with reduction in aerobic and anaerobic capacities, reduction in motor efficiency and mechanic performance, reduction in postural reflexes, tendency to self - steam loss. Considering the morfofunctional and psychological alterations innate from female metabolic processes, at the pre and perimenopausal periods, and that the deleterious effects from sedentary on women are imminent at this phase, its is convenient to establish a special physical exercises program, which present preventive, educative and curative factors, aiming a physical condition raise, respecting the interaction of the cognitive aspects and physical and psychological capacities from each individual. Recent investigations have shown that women at menopause phase and that exercise regularly demonstrate better resistances face to menopausal signs comparatively to the sedentary ones (Lange - Collet, 2002). The present work had the aim to evaluate the responses of cardiorespiratory condition, and of the psychological symptoms characteristic of the hormonal transition in perimenopausal women, after an aerobic and strength exercise program.

METHODOLOGY

It was about a study group, where 25 women from 47 to 53 years old, sedentary, healthy, with an intact uterus, non smokers, with no cardiac diseases, diabetes or hypertension, who showed symptoms and were clinically considered in perimenopause, and who didn't use hormonal replacement therapy at least 6 months before the training start where analyzed. The sample selection was made in an intentional way, where all of them were volunteers and signed a conscience term, to participate in one of the groups. All the individuals where patients from gynecologists, in the city of Santa Maria/RS Brazil. Women were orientated to do not change their diet. There were two study groups: Group C: women in perimenopause, with no physical training (control group) n (10); Group E: women in perimenopause, with a 20 - week - physical training of aerobic and strength exercises (experimental group) n (14);

Menopause symptoms questionnaire: it was adopted the "international versions of the menopause rating scale (MRS)" version in Portuguese (Heinemann, Potthoff and Schneider, 2003).

Laboratorial examinations: all the examinations were made at the same laboratory: serum dosage of TC and fractions HDL, LDL, and triglycerides and glucose - the collection was made with the sample in a 12 fasting, **- hormonal dosage -** TSH, T4, LH, FSH, E2 and the collect was also made with a 12 hours fasting.

Aerobic potency (VO_2max): the tests were made at the Exercise Physiology Laboratory at CEFD/UFSM- RS/BR. The used protocol was "MADER". The criteria to interrupt the maximum test were recommended by ACSM (2003). The VO2max was measured in a direct way "brief to brief" during the resting, exercise and recovering phases. To the gases analysis a closed circuit analyzer mark and model Vmax 229 was used. To the VO_2max test a treadmill mark/model Imbramed ATL 10.200 was used. It was registered the resting cardiac frequency. It was also checked immediately after the aerobic potency test interruption and in each minute the recovering phase after ending the VO_2max test. Arterial pressure: it was checked at the resting moment and during the recovering phase after finished the VO_2max test.

Physical exercises training program: the physical exercises program lasted 20 weeks: strength exercises and aerobic ones performed on the treadmill. The frequency to the program was three times a week.

Aerobic training program: the training was performed on the treadmill, with a intensity from 65% to 75% of maximum heart rate obtained on the VO2max test "Mader protocol". On the four first weeks a 25 minute adaptation period, increasing to 30 minutes on the third and fourth weeks, and after, 35 minutes until the end of the program.

Strength training with weight lifting: Part 1: warming up with stretching exercises. Part 2: the exercises series was composed by 12 exercises to different muscle groups: on the 5 first sessions, it was prescribed a minimum weight charge, aiming an adaptation. It was attributed a weight charge compatible for 20 repetitions in one exercise series, after 4 weeks, it was increased to 2 series of 20 repetitions with a break of 11 minute between them. The weight charges were increased according to

the capacity of each woman. Part 3: relaxing exercises.

Statistical treatment: the variables were represented through means and standard deviations. For the comparative study between group E and C, whether on the pretest or the posttest, it was used the Kruskal Wallis Test. For the symptoms analysis it were used the frequency charts as well as the same analysis criteria used above. The significance level accepted was 5%.

RESULTS AND DISCUSSION

Chart 1 - cardiorespiratory condition on pretest (means+-DS) Kruskal-Wallis Test. p<0.05

Grupo	N	VO_2max (ml/Kg/min)	FCr (bpm)	FCm (bpm)	RQ	Tempo (min)	Pam (mm Hg)
GE	14	27,00 ± 4,93	75 ± 11	174 ± 13	1,04 ± 0,05	15 ± 2	113,16 ± 7,3
GC	10	25,84 ± 4,24	78 ± 15	168 ± 12	1,05 ± 0,03	15 ± 4	121,04 ± 9,7
		p= 0,906	p= 0,729	p= 0,177	p= 0,953	p= 0,812	p= 0,497

On VO_2max, FCr, FCm, exercise period, Pam (mm Hg) and RQ variables, groups didn't show statistically significant differences before start training. The low VO_2max level presented b both groups, GE (27.60±4.93 ml/kg/min) and GC (25.84±4.24 ml/kg/min) shows that women own a low physical condition level according to the American College of Sports Medicine's (ACSM) (2003) criteria, even that quantitatively VO_2max on GE is a little higher than GC. The FCr presents normal values as well as the FCm, for the studied age group. As an observation, the RQ value indicates that the main energetic subtracts used are carbohydrates.

Chart 2 - VO2max, FCR (bpm), RQ, time (min) and Pam (mm Hg) on posttest (means +- DS). Kruskal- Wallis. p< 0.05 and p < 0.01.

Grupos	N	VO_2max (ml/Kg/min)	FCr (bpm)	FCm (bpm)	RQ	Tempo (min)	Pam (mm Hg)
GE	14	30,32 ± 3,89	68 ± 7	174 ± 16	0,94 ± 0,06	17 ± 2	113,78 ± 7,6
GC	10	25,84 ± 4,39	82 ± 14	176 ± 8	1,05 ± 0,04	14 ± 2	126,35 ± 8,4
		p= 0,024	p= 0,019	p= 0,557	p= 0,0002	p= 0,059	p= 0,545

In posttest there are statistically significant differences on mean values of VO_2max (ml/kg/min) and FCr. GE presents superior VO2max means (30.32±3.89 ml/kg/min) if compared to GC (25.73±4.54), p=0.024, and lower means of FCr (bpm), (68±7) from GE versus 82±74 from GC), p=0.019. On the other hand, on the variable time of exercise, it doesn't exist a statistically significant difference, however GE remained more time exercising (17 min) than GC (14 min), p= 0.059. The RQ shows a statistically significant difference (p<0.001) superior to the other variables and identify to GE a important improvement on the cardiorespiratory condition, fact that fits in with the values of the other variables of the cardiorespiratory condition. The RQ value was one of the most significant values of physical condition improvement from the GE women. When the means difference of pre and posttest in group GE were compared, the RQ value reported statistically significant difference (p=0.012), changed from 1.05 to 0.94, what didn't occurred in group GC (p=0.878). Despite the value (0.94) does not represent the utilization of fat as energetic substrate during physical exercise, GE shows a tendency of an improvement on the capacity of the energetic substrate during exercise. The decrease on the RQ value was a positive mark on the training, because, according to Poehlman (2002) the perimenopause phase is associated to a reduction in fat oxidation and a increase in retention capacity of carbohydrates, such as the RQ increases when women step into the postmenopause phase.

When means's differences from GE and GC were analyzed, it was concluded that statistically significant differences occurred on VO2max (ml/kg/min), occurring a increase of 12% in GE. These results accord with Drinkwater (2000), who concluded that women may present substantial improvements on VO2max with aerobic training, because when they low initial values they may increase their VO2max from 10% until 40% with cardiorrespiratory endurance training. This study's results indicate that perimenopause is not a factor that interferes on women's capacity to respond to physical training and, thus they can increase their VO2max and decrease FCr, they also indicate that only after a 20 - week training, women that are not sedentary anymore (GE), got to VO2max values equal to younger sedentary women. Considering that 20 weeks is a short training period, VO2max values supposedly increase more with continuality. Increases in VO2max and decreases in FCr in GE may also be attributed strength exercises that intend to improve peripheral circulation, according to the words of Wilmore and Costil (2001). An explanation to reduction in Maximum cardiac debit and VO2max with aging is that it provokes peripheral vascular resistance increase and, in words of Fleck and Kraemer (1999), strength exercises training provokes this reduction, which agrees with the opinion from Negrão e Barreto (2005), who say that strength exercises develop cardiorrespiratory adaptations promoting on the cardiovascular system a volumetric overcharge, in other words, promoting a blood flux increase. Vincent et al. (2002), suggest that the peripheral adaptations induced by strength exercises training are the main responsible mechanisms by the VO2max increase.

The "international version of the menopause rating scale" (Heinemann, Potthoff et al., 2003), evaluate the symptoms in 5 level of intensity (none - 0, light - 1, moderated, severe - 3 and very severe - 4). It weren't found significant differences in pretest of any of the symptoms. However there is statistically significant difference p<0.05 in S1 p=0.034 and S2 p=0.043 between groups in posttest. In the longitudinal study statistically significant difference S2 p=0.029 in GE is observed as an effect of training (chart 3). In symptom anxiety, women from GE show reduction of frequency on the moderated level of 22% and a increase of 30% on level none. However, GC show an increase of 10% in light level and reduction of 10% in level moderated. In symptom physical and mental tiredness there is reduction on level moderated from pre to posttest in GE of 21%, stepping into level light. Women from GC show reduction of 10% in level none, and reductions occurred in moderated and severe levels, and increased in very severe level.

Chart 3 - Distress condition (S1), Irritability (S2), Anxiety (S3) and mental and physical tiredness (S4) on pre and posttest (means±DS).

	Pretest GE (n14)	Pretest GC (n10)	P	Posttest GE (n14)	Posttest GC (n10)	p
S1	1± 1,03	1,2 ± 1,2	0,758	0,42 ± 0,7	1,04± 1,3	0,039#
S2	1,3 ± 1,2	1,5± 1,1	0,659	0,5± 0,75*	1,5± 1,2*	0,043#
S3	1,07 ± 1	1,4 ± 1,3	0,625	0,5 ± 0,9	1,2± 1,13	0,112
S4	1,3 ± 1,4	1,7± 1,3	0,488	1,07 ± 1,1	1,8± 1,4	0,186

Pretest - posttest, Wilcoxon Test p<0,05. # among groups pretest - pretest/ posttest - posttest, Kruskal-Wallis Test p<0,05.

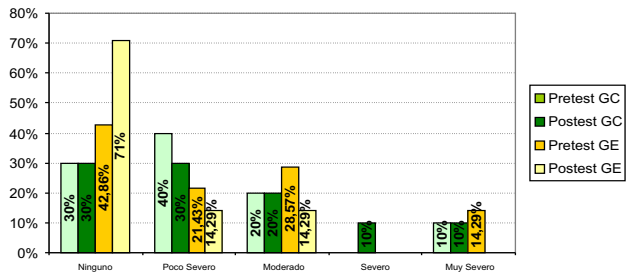

Chart 1 -Frequency concerning symptom 1-distress condition(humor changes, tears, lack of will), in groups GE and GC.

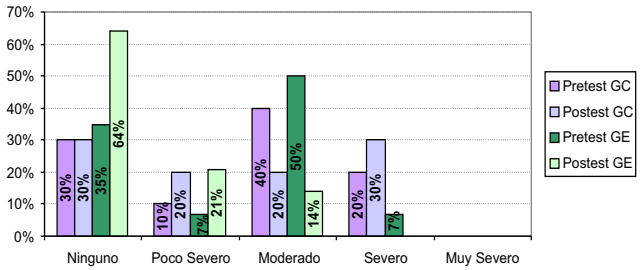

Chart 2- Frequency concerning symptom 2 - irritability (feeling tense, aggressive, and nervous) in groups GC and GE.

The 24 studied women presented, in general, a light level of distress, irritability, anxiety and physical and mental tiredness. Through graphic representation, it can be noticed that after training, the number of women in GE that didn't reported to suffer distress symptoms (42% to 71%) (Graphic 1) has increased, and at the same time the light and moderated levels appear with a noticeable decrease in the same group. The most significant of the results of psychological symptoms, is that GE presents a representative improvement on the symptom irritability (Graphic 2). Sending more than 60% of the women to level none on the posttest, what suggests the benefic effect of the training; GC presents a percentage stabilization of women who show level none, 30%.

Some longitudinal studies don't indicate a association between menopause and "distress, anxiety and irritability symptoms" (Pearlstein, Rosen et al., 1997), fitting in with the achievements of this study in which women from both groups show very elevated levels of intensity, however on the irritability symptom 50% of the women from GE and 40% from GC, showed the moderated level. In contrast, a Canadian study shows high levels of distress, irritability and anxiety among menopausal women during 3 years of observation; the high levels of distress fond on 51% of the women relate to fragility in health and not with menopause (Kaufer, Gilbert et al., 1994). According to Elevasky and McAuley (2005), the studies of psychological effects of exercise in perimenopausal women have been widely referred. Most physically active women present less nervousness and menopause symptoms. The positive effects from physical exercises in menopause result in reduction on distress, irritability and anxiety levels (Slaven and Lee, 1997; Ivarson et al., 1998; Scheneider, 2002). The mechanisms that highlight such effects aren't so clear and furthermore, there are no many investigations that wide the fact that physical exercise impacts on quality of life on women going through this period.

In relation to S4, it weren't found studies that link physical exercises and cognition in perimenopausal women. In words of Sherwin (1996), according to clinical literacy, the levels of estrogens are related to the cognitive function aspects. In words of Sheperd (2001), menopause, on its own, doesn't interfere the cognitive function. During a "hot flush", blood tension on hippocampus decreases and, possibly, harms memory and cognition. Even if psychic symptoms are common during perimenopause and all climacteric, Utian (2005), say that its is not sufficiently justified to associate menopause to psychic symptoms and that it can be better associated to social and personal circumstances (Dennerstein, 2000).

CONCLUSIONS: according to the goals and results obtained in this study, after 20 weeks of the aerobic and strength exercises program, the following conclusions were taken: 20weeks of training is time enough to proportionate increases on VO2max, decreases on FCr and statistically significant decreases on RQ; training is a possible therapy to assist psychological symptoms control on perimenopause.

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PHYSICAL EXERCISE PROGRAM AND ITS EFFECTS ON CARDIORESPIRATORY CONDUCTION AND ON PSYCHOLOGICALSYMPTOMS ON PERIMENOPAUSAL WOMEN

ABSTRACT

The aim of this study was to evaluate the responses of the cardiorespiratory condition and of the psychological symptoms in women on the perimenopausal phase, after making a 20 week training, with strength and aerobic (on a treadmill) exercises. The frequency was of 3 times a week. Two groups were tested: group GC (n10) women in perimenopause phase, with no training; group GE (n14) women in perimenopause phase, with training. Any of the groups made hormonal therapy during the study. Some statistically significant difference was noticed on VO2max ml/kg/min and on resting cardiac frequency (FCr) between groups GC and GE on the post-test. There was a statistically significant reduction in RQ in group GE. It was observed a statistically significant reduction in group GE on the symptom distress, irritability and anxiety. It was concluded that 20 weeks of training with exercises is time enough to promote raisings on VO2max, reductions on FCr and changes on QR; it is a possibility of therapy to help on the control of psychological symptoms during perimenopause. Key - words: perimenopause, physical exercises, cardiorespiratory condition, psychological symptoms.

PROGRAMME D'EXERCICE PHYSIQUE ET LEURS EFFETS DANS LA CONDITION CARDIORESPIRATOIRE ET DANS LES SYMPTOMES PSYCHOLOGIQUES CHEZ LES FEMMES A LA PERIMENOPAUSE

RESUMEE

Le cible de cet étude a été d'évaluer les réponses des conditions cardiorespiratoires et des symptômes psychologiques chez les femmes à la phase de periménopause après une série d'exercices au cours de 20 semaines, composée d'exercices de musculation et des exercices aerobiques. La routine du programme a été de 3 fois par semaine. Deux groupes ont été sous test: Groupe GC (n10) avec des femmes dans la phase de periménopause, sans la pratique des exercices physiques; Groupe GE (n14) avec des femmes dans la phase de periménopause qui ont realisé la pratique dês exercices physiques. Aucun dês groupes a utilisé d'hormone pendant l'étude. On a observe des differences statiquement significative au VO2 max ml/kg/min et dans la fréquence cardiaque de repôs (FCr) entre les groupes GC et CE dans le pos-test. Il y a eu la réduction du valeur du RQ statiquement significative dans le groupe GE. On a observé une réduction statiquement significative dans le groupe GE dans les symptômes des problèmes depressif, irritabilité et anxiété. On a eu comme conclusion que 20 semaines de pratique d'exercices suffisent pour obtenir l'élevation du VO2 max, réduction dans la FCr et changement dans le QR; c'est une possibilite de thérapie à fin d'aider le controle des symptômes psychologiques au cours de la période de periménopause.

Mots Clés-Periménopause, exercices physiques, condition cardiorespiratoire, symptômes psychologiques.

PROGRAMA DE EJERCICIOS FÍSICOS Y SUS EFECTOS EN LA CONDICIÓN CARDIORRESPIRATORIA Y EN LOS SINTOMAS PSICOLÓGICOS DE MUJERES EN LA PERIMENOPAUSIA

RESUMEN

El objetivo del presente estudio fue evaluar las respuestas de la condición cardiorrespiratoria y de los síntomas psicológicos de mujeres en la perimenopausia, tras la realización de un entrenamiento de 20 semanas, con ejercicios de musculación y ejercicio aeróbico, realizado en tapiz rodante. La frecuencia al programa fue de 3 veces por semana. Fueron testados dos grupos: Grupo GC (n10) mujeres en la perimenopausia, sin entrenamiento con ejercicios físicos; Grupo GE (n15); mujeres en la perimenopausia, que realizaron el entrenamiento con ejercicios físicos. Ningún de los grupos hizo uso de terapia hormonal durante el estudio. Se observó diferencia estadísticamente significativa en el VO2max ml/Kg/min y en la frecuencia cardiaca de reposo (FCR) entre los grupos en el postest. Hubo reducción del valor del QR estadísticamente significativa en el GE. Se observó reducción estadísticamente significativa en el GE en el síntoma problemas en el estado de ánimo depresivo, irritabilidad y ansiedad. Se concluyó que 20 semanas del entrenamiento con ejercicios, es tiempo suficiente para promocionar aumentos del VO2max, reducciones en la FCr y cambios en el QR y es una posibilidad de terapia para auxiliar en el control de los sintomas psicológicos de mujeres en la fase de perimenopausia.

Palabras Clave: Perimenopausia, ejercicios físicos, condición cardiorrespiratoria, síntomas psicológicos.

PROGRAMA DE EXERCÍCIOS FÍSICOS E SEUS EFEITOS NA CONDIÇÃO CARDIORRESPIRATÓRIA E NOS SINTOMAS PSICOLÓGICOS DE MULHERES NA PERIMENOPAUSA

RESUMO

O objetivo do presente estudo foi avaliar as respostas da condição cardiorrespiratória e dos sintomas psicológicos de mulheres na fase de perimenopausa, após a realização de um treinamento de 20 semanas, com exercícios de musculação e exercício aeróbico realizado em esteira rolante. A freqüência no programa foi de 3 vezes por semana. Foram testados dois grupos: Grupo GC (n10) mulheres na fase de perimenopausa, sem treinamento com exercícios físicos; Grupo GE (n14); mulheres na fase de perimenopausa, que realizaram treinamento com exercícios físicos. Nenhum dos grupos fez uso de terapia hormonal durante o estudo. Observou-se diferença estatísticamente significativa no VO2max ml/Kg/min e na freqüência cardíaca de repouso (FCr) entre os grupos GC e CE no pós-test. Ocorreu redução do valor do RQ estatísticamente significativa no Grupo GE. Observou-se redução estatísticamente significativa no Grupo GE no sintoma problemas no estado de ânimo depressivo, irritabilidade e ansiedade. Concluiu-se que 20 semanas de treinamento com exercícios, é tempo suficiente para promover aumentos do VO2max, reduções na FCr e trocas no QR; é uma possibilidade de terapia para auxiliar no controle dos sintomas psicológicos durante a fase de