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; Bosworth, 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 which 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 perimenoausal 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 morofunctional and psychological alterations innate from female metabolic processes, aerobic and anaerobic capacities 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 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_max): the tests were made at Exercise Physiology Laboratory at CEF/UFSC - 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 VO2max 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 VO2max test. Arterial pressure: it was checked at the resting moment and during the recovering phase after finished the VO2max 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 first four 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 was used the frequency charts as well as the same analysis criteria used above. The significance level accepted was 5%.

### RESULTS AND DISCUSSION

<table>
<thead>
<tr>
<th>Grupo</th>
<th>N</th>
<th>VO2max (ml/kg/min)</th>
<th>FCr (bpm)</th>
<th>FCm (bpm)</th>
<th>RQ</th>
<th>Tempo (min)</th>
<th>Pam (mm Hg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GE</td>
<td>14</td>
<td>27,00 ± 4,93</td>
<td>75 ± 11</td>
<td>174 ± 13</td>
<td>1,04 ± 0,05</td>
<td>15 ± 2</td>
<td>113,16 ± 7,3</td>
</tr>
<tr>
<td>GC</td>
<td>10</td>
<td>25,84 ± 4,24</td>
<td>78 ± 15</td>
<td>168 ± 12</td>
<td>1,05 ± 0,03</td>
<td>15 ± 4</td>
<td>121,04 ± 9,7</td>
</tr>
</tbody>
</table>

p=0,906  p= 0,729  p= 0,177  p= 0,953  p= 0,012  p= 0,497

On VO2max, FCr, FCm, exercise period, Pam (mm Hg) and RQ variables, groups didn't show statistically significant differences before start training. The low VO2max level presented by both groups, GE (27.60±4.93 ml/kg/min) and GC (25.94±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 VO2max 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 substrates used are carbohydrates.

<table>
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</thead>
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<tr>
<td>GE</td>
<td>14</td>
<td>30,32 ± 3,89</td>
<td>68 ± 7</td>
<td>174 ± 16</td>
<td>0,94 ± 0,06</td>
<td>17 ± 2</td>
<td>113,76 ± 7,6</td>
</tr>
<tr>
<td>GC</td>
<td>10</td>
<td>25,84 ± 4,39</td>
<td>82 ± 14</td>
<td>176 ± 8</td>
<td>1,05 ± 0,04</td>
<td>14 ± 2</td>
<td>126,35 ± 8,4</td>
</tr>
</tbody>
</table>

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 VO2max (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 cardiorespiratory 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 continuity. 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 was 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.
In conclusion, according to the goals and results obtained in this study, after 20 weeks of the aerobic and strength exercises program, the following conclusions were made: 20 weeks of training is time enough to proportionate increases on VO2max, associated to social and personal circumstances (Dennerstein, 2000). 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 a percentage stabilization of women who show level none, 30%.

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 Shepard (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).

REFERENCES


DRINKWATER BL. Mulheres no Esporte. VIII Volume de A Enciclopédia de Medicina do Esporte. Ed Guanabara Koogan (RJ); 2000.


HEINEMANN LAJ, POTTHOFF P, SCHEINEIDER HPG. International versions of the Menopause Rating Scale (MRS).
O objetivo do presente estudo foi avaliar as respostas da condição cardiorespiratória e dos sintomas psicológicos de mulheres na perimenopausa, tras la realización de un entrenamento de 20 semanas, con exercícios de musculación y exercicio 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 perimenopausa, sin entrenamento con exercícios físicos; Grupo GE (n15): mujeres en la perimenopausa, que realizaron el entrenamiento con exercícios físicos. Ningún de los grupos hizo uso da terapia hormonal durante o estudo. Se observou diferenza estatisticamente significativa no VO2max ml/Kg/min e na frecuencia cardiaca de reposo (FCr) entre os grupos GC e GE no pos-test. Hubo redución do valor do QR estatisticamente significativo en GE. Se observou redución estadisticamente significativa en el GE en el síntoma problemas en el estado de ánimo depressivo, irritabilidad e ansiedade. Se concluíu que 20 semanas do entrenamento con exercícios, é tempo suficiente para promocionar aumentos do VO2max, redución en la FCr e trocas no QR; é una posibilidad de terapia para auxiliar en el control de los sintomas psicológicos de mujeres en la fase de perimenopausia.

Palavras Chave: Perimenopausia, exercícios físicos, condição cardiorespiratória, sintomas psicológicos.

RESUMEN
El objetivo del presente estudio fue evaluar las respuestas de la condición cardiorespiratoria y de los síntomas psicológicos de mujeres en la perimenopausa, 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 perimenopausa, sin entrenamiento con ejercicios físicos; Grupo GE (n14): mujeres en la perimenopausa, 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 cardíaca de reposo (FCr) entre los grupos GC y GE en el post-test. Hubo reducción del valor del QR estadísticamente significativo 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 de entrenamiento con ejercicios, es tiempo suficiente para promover aumentos del VO2max, reducciones en la FCr y trocas en el QR; es una posibilidad de terapia para auxiliar en el control de los síntomas psicológicos durante a fase de menopausia.

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