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Health-related physical fitness in elderly women assisted by the Family Health Support Center of Canindé, CE, Brazil

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Abstract

The regular practice of guided physical activity has been considered a therapeutic tool of excellence in promoting the health of the elderly; however, the evaluation of its potential in public support services for family health are still scarce and deserve a more representative approach. The aim of this study was to assess health-related physical fitness in elderly women followed up by the Family Health Support Center in Canindé, Ceará. The level of physical activity, the ability to perform daily activities, blood pressure, resting heart rate, body composition, aerobic fitness, strength, and flexibility of upper and lower limbs of elderly users of the physical activity program were evaluated. The results showed that 60.87% of the elderly are active and that 89.25% are independent in performing their daily tasks, characterizing a better functional capacity resulting from the regular practice of physical activity. They had normal pressure and chronotropic averages, as well as adequate muscle mass, however they were classified as obese and at a high risk of developing metabolic complications. The elderly women demonstrated a good average muscular strength of upper (18.15±5.25) and lower (11.06±2.85) limbs. However, they demonstrated a low aerobic fitness (375.5±66.52) and low flexibility of upper (-6.33±9.3) and lower (-1.93±7.66) limbs, suggesting an assessment of the structure of the physical activity program and expansion of health education strategies. In conclusion, active elderly women with good functional capacity and muscle strength were evaluated, although with a high weight index, a high risk for metabolic complications, and low aerobic fitness and flexibility scores.

Keywords: Aging, physical activity, health.

INTRODUCTION

Aging is a natural and individual process during the course of human life, which reflects the relationships established from the diverse experiences faced throughout life. In this context, the individual may develop pathological aging, characterized by the presence of chronic-degenerative diseases or healthy aging, established by a healthy lifestyle and access to quality healthcare services[1].

According to the Ministry of Health, the number of elderly people in the world grows daily, both in developed and developing countries. In this context, the expectation is that the number of elderly people in the world, in 2050, will be greater than the number of children, a phenomenon that has never been observed before[2].

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In Brazil, this situation is becoming a reality for everyone. According to data from IBGE[3], mortality and fertility rates are decreasing while life prospects are rising, characterizing an increasingly aging population. From this angle, projections made in 2013 indicated that the elderly in 2060 will represent 33.7% of the population, prevailing over the number of children that will be equivalent to 13.0% of the national population[4]. In the northeast region, the state of Ceará ranks second in the number of people over 60 years old[3].

This reality leads us to believe that there has been a significant improvement in the quality of life of the elderly, both globally and locally, possibly due to the change in the population's lifestyle. This lifestyle, when healthy, involves regular and guided physical exercise, capable of expanding the sense of productivity, participation, and performance of activities of daily living and family roles, and, consequently, their levels of physical, mental, and social health. Therefore, the offer of physical activity programs in public health support services can positively infer health-related physical fitness and, consequently, the quality of life of the elderly population[5].

According to the American College of Sports Medicine[6], health-related physical fitness is defined as a synchronicity of measurable particularities influenced by habit, or even by the lack of habit of a person exercising, comprised of the sum of five components: cardiorespiratory fitness, composition strength, muscle strength, muscle endurance, and flexibility.

Some studies have pointed out relevant implications of health-related physical fitness in the elderly. In the trial by Vila *et al.*[7], it was found that a group of elderly women practicing physical exercise had better levels of aerobic resistance, physical mobility, and flexibility of lower limbs compared with a group of sedentary elderly women. Ueno *et al.*[8], suggest that the practice of frequent and systematic physical activity improves the functional performance of the elderly, pointing out the physical activities of a generalized approach as promoters of strength, agility, and dynamic balance. Da Silva Rojo *et al.*[9], demonstrated that physical exercise improved physical fitness and cognitive functioning in the elderly.

Although the scientific community has already been investigating health-related physical fitness in elderly people who practice physical activities, the assessment of these activities in public family health support services is still scarce and deserves a more representative approach. Such low representativeness can be justified by the quantitative, yet small, number of Physical Education professionals included in the Family Health Strategy program that exists in Brazil, associated with the low adhesion of its users to the physical activity programs offered in the communities.

Therefore, this study aimed to assess health-related physical fitness in elderly women monitored by the Family Health Support Center in the municipality of Canindé, Ceará.

METHODOLOGY

This study is characterized as a field study carried out at the Family Health Support Center (FHSC), in the urban area of the municipality of Canindé, Ceará, and occurred between June and October 2016 using the support of the quantitative approaches, whose analyses took place through the use of bibliographic research related to the theme in question.

The sample consisted of elderly women accompanied by the Physical Activity Program proposed by the FHSC of Canindé. This study was comprised of elderly women, aged 60 years or over[10], who regularly participated in the FHSC Physical Activity Program in Canindé, Ceará for a minimum of three months. This minimum time was established in order to assess this elderly woman's attendance and adherence to the physical activity program.

This Physical Activity Program is aimed at users of the FHSC in Canindé, however it receives the community openly. It is mostly composed of elderly women with low socioeconomic status. It has a Physical Education professional, who guides body practices, with a predominance of resistance exercises and stretching, twice a week, held in the parish hall of the Alto Guaramiranga church.

The data were collected in three stages. In the first stage, some personal information was obtained from a form previously structured in order to characterize the sample regarding age, gender, education, and health status.

In order to identify the level of physical activity of the elderly women who participated in the study, the International Physical Activity Questionnaire - IPAQ[11] and research questionnaires on the activities of daily living were applied, using the Katz index[12] and instrumental activities of daily living, through the Lawton scale[13].

The second stage consisted of assessing blood pressure and resting heart rate and anthropometric assessment. The anthropometric assessment was performed by calculating the Body Mass Index (BMI) and the Waist Circumference (WC) and the Left Calf Circumference (LCC). Both are anthropometric indicators often used to monitor and accompany obesity and the risk of developing serious adverse health conditions.

The third stage (assessment of physical fitness) consisted of a cardiorespiratory assessment, muscle strength assessments of upper and lower limbs, and a flexibility evaluation. The assessment of cardiorespiratory fitness was performed using the six-minute walk test, analyzed according to the reference equations proposed by Enright and Sherrill[14] and described by Britto; De Sousa[15]. The elbow flexion test was performed to assess the strength of the upper limbs and the sit and stand test for the lower limbs, considering the reference values proposed by Rikli and Jones[16], and described by Morrow *et al.*[17]. In the evaluation of flexibility, the chair sit and reach test for lower limbs, and the back-scratch test for upper limbs were used, following the guidelines described by Baldi[18].

The first and second stages took place in August and the third stage took place in September and October 2016. All data were collected by the same evaluator-researcher, on days other than the Physical Activity Program and at predetermined times, according to the availability of each elderly woman.

The results were initially tabulated in a database established in an Excel spreadsheet and then analyzed in the SPSS version 2.0

program, expressed as mean and standard deviation from the mean. The level of significance was set at $p<0.05$.

This study followed the norms that regulate research on human beings, of the National Health Council - Ministry of Health, Resolution No. 510/2016 and was approved by CEP/IFCE under opinion No. 432.503/2013.

RESULTS

Sample characterization

This is a study carried out with 46 women, regularly participating in the physical activity program developed at the Family Health Support Center, aged between 60 and 85 years (70.9±6.7).

This study identified a sample consisting of four single women (8.7%), twenty-two married women (47.8%), one divorced (2.17%), and nineteen widows (40.30%). Regarding education, four elderly women did not study (8.7%), thirty-six did not complete elementary school (78.2%), three completed elementary school (6.52%), one did not complete high school (2.17%), one completed high school (2.17%), and one completed higher education (2.17%). This characterizes a group with little education, since 86.9% of these elderly women did not finish elementary school or have not studied.

Another point observed was the health situation of these women, in which thirty-two were hypertensive (68%), ten were diabetic (21.1%), seven had osteoporosis (14.8%), three had arthrosis (6.3%), one had arthritis (2.1%), two had labyrinthitis (4.2%), one had bursitis (2.1%), four had high cholesterol (8.5%), and two had generalized pain (4.2%).

Assessment of activities of daily living

The evaluation of the level of physical activity of the elderly (Table 1), showed that 28 (60.87%) were at a sufficiently active level (active and very active), characterizing elderly women who meet the basic recommendations regarding frequency, intensity, or duration in the usual practices of physical activity. The remaining 18 (39.13%) were classified as irregularly active (A and B), representing elderly women who perform physical activities, but insufficiently in relation to the recommendations of the World Health Organization.

Table 1 – Classification of the level of physical activity of the elderly women based on the International Physical Activity Questionnaire - IPAQ.

Classification of the level of physical activity of elderly women based on the International Physical Activity Questionnaire - IPAQ		
Physical activity level	**N**	**%**
Very active	1	2.17
Active	27	58.7
Irregularly active A	14	30.43
Irregularly active B	4	8.7
Total	46	100

The degree of independence of the elderly women in relation to basic activities of daily living (eating, dressing, getting prepared, showering, getting up from the chair, controlling urination and evacuation) was analyzed using the Katz Index (Figure 1), showing that 89.2% of the elderly women evaluated were independent in performing daily activities, except for urination and evacuation control, in which five elderly women (10.8%) suspected themselves of being dependent in this activity, needing help from family members and caregivers.

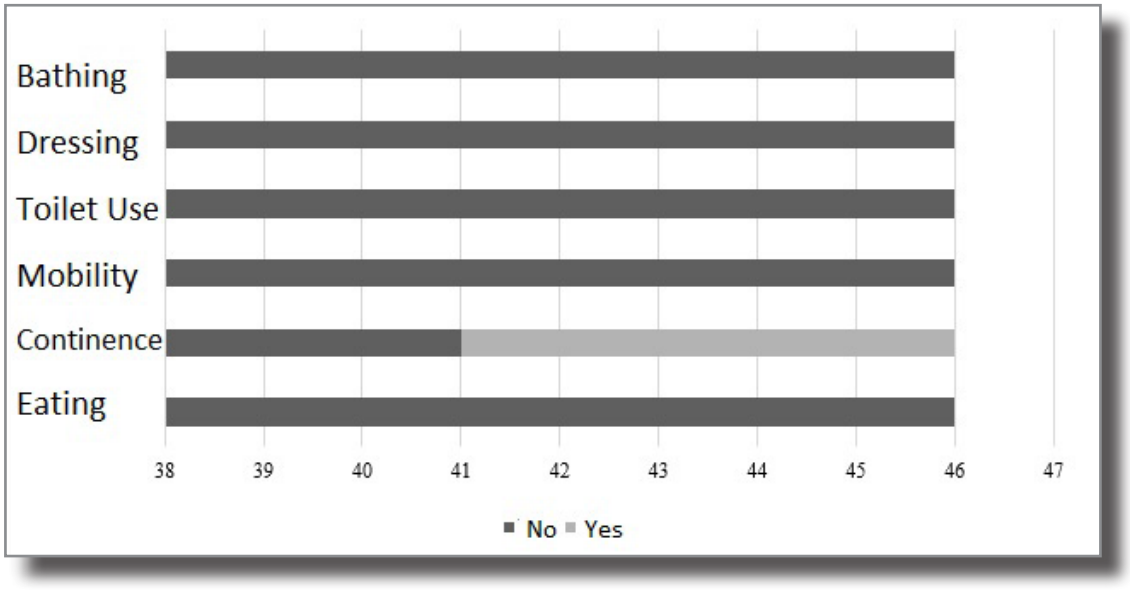

Figure 1 – Performance of elderly women in carrying out the Basic Activities of Daily Living - Katz Index.

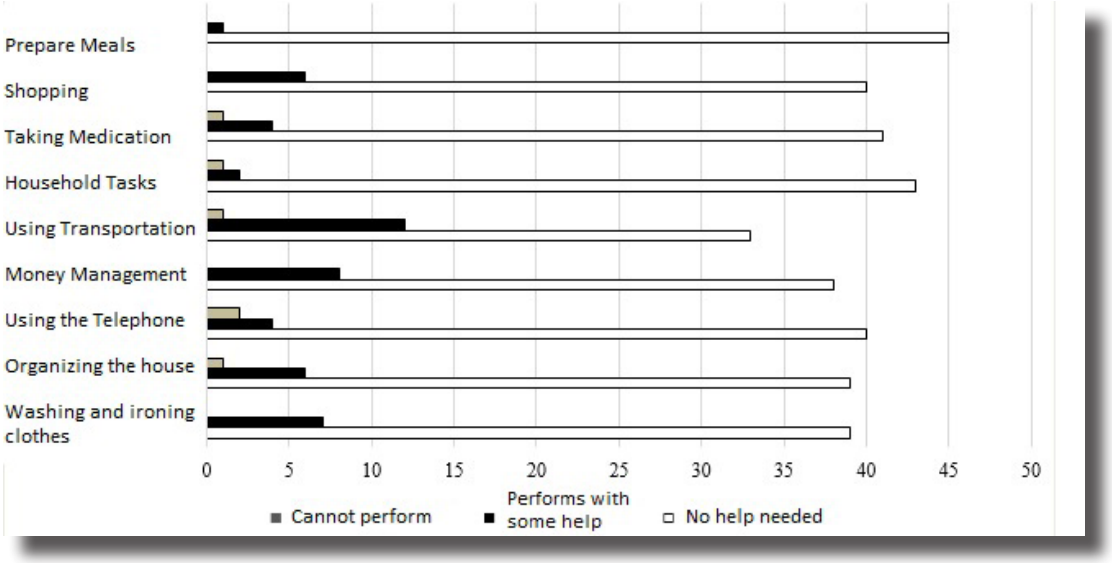

Figure 2 – Performance of elderly women in carrying out instrumental activities of daily living - Lawton scale.

Physiological and anthropometric assessment

In the physiological parameters, systolic and diastolic blood pressure and resting heart rate were evaluated. As for the morphofunctional parameters, the body mass index, the waist circumference, and the left calf circumference were measured (Table 2).

Tabela 2 – Physiological and morphofunctional characterization of elderly women who practice physical activity in the FHSC of Canindé - CE.

Physiological and morphofunctional characterization of elderly women who practice physical activity in the FHSC of Canindé - CE.		
Physiological parameter	**M**	**DP**
SBP (mmHg)	135.65	13.1
DBP (mmHg)	77.17	16
RHR (bpm)	68.6	12.7
Morphofunctional parameter		
BMI (kg/m2)	27.78	4.1
CC (cm)	95.6	11
LCC (cm)	34.3	3.2

Caption: SBP= systolic blood pressure; DBP= diastolic blood pressure; HRR= resting heart rate; BMI= body mass index; WC= waist circumference; LCC= left calf circumference; M= mean; SD= standard deviation.

The evaluation of systolic blood pressure showed a mean of 135.65 (±13.1) mmHg and diastolic blood pressure of 77.17 (±16) mmHg. The resting heart rate averaged 68.6±12.7 bpm (Table 2).

In the morphofunctional evaluation of the elderly women, an average body mass index of 27.78 (±4.1) kg/m2 was identified, classifying them as obese. The average waist circumference was 95.6 (±11) cm, characterizing this group above the normal range and indicating, through this parameter, a high risk of metabolic complications in these women. Regarding the left calf circumference, the mean measurement identified was 34.3 (±3.2) cm, indicating an adequate value for muscle mass in these elderly women (Table 2).

Physical fitness assessment

The average of the cardiorespiratory fitness of the elderly women was identified by the total amount of meters covered during the 6-minute walk test. It can be seen that none of the elderly women evaluated, even when analyzed by age groups, reached normal aerobic fitness values (Table 3).

Table 3 – Classification of the level of health-related physical fitness in elderly women who practice physical activity in FHSC de Canindé - CE.

Parameters	60-64		65-69		70-74	
	M	SD	M	SD	M	SD
Cardiorespiratory fitness	393.32	36.55	355.43	83.20	365.11	93.74
Muscle strength						
Upper limbs	17.72	4.24	18.55	5.12	20.25	6.77
Lower limbs	10.9	2.02	11.11	3.14	11.91	4.23
Flexibility						
Upper limbs	-2.75	5.55	-10.5	11.24	-5.75	10.13
Lower members	0.18	5.05	0.77	6.24	-3.58	8.5

Parameters	75-79		80-84		Total	
	M	SD	M	SD	M	SD
Cardiorespiratory fitness	381.67	53.47	386.8	19.21	375.56	66.52
Muscle strength						
Upper limbs	17.88	4.93	13.8	0.83	18.15	5.25
Lower limbs	10.88	1.83	9.6	0.89	11.06	2.85
Flexibility						
Upper limbs	-8.5	9.57	-3.8	9.73	-6.33	9.3
Lower limbs	-2.33	7.61	-6.8	11.69	-1.93	7.66

Legend: M= Mean; SD= Standard Deviation.

It was observed that the group of elderly women aged 60 to 64 years covered greater distances during the test (393.32±36.55) in relation to the group of elderly women between 80 and 84 years (386.8±19.21). However, it was not possible to demonstrate a linear relationship, nor to establish statistically significant differences in the aerobic fitness of these elderly women with advancing age (Table 3).

The elderly women had good average muscle strength in both upper limbs (18.15±5.25) and lower limbs (11.06±2.85); however, as seen in the cardiorespiratory fitness tests, there was no statistically significant difference with advancing age (Table 3).

The assessment of upper limb flexibility showed negative values in all means, regardless of age, although two groups (60-64, 80-84) are classified within the normal values proposed by Rikli and Jones16. In contrast, a reduction in lower limb flexibility was identified with advancing age. In this assessment, only the first two groups (60-64, 65-69) showed positive results in the test (Table 3).

DISCUSSION

The characterization of the elderly women evaluated in this study showed a predominance of married or widowed women, with a low education, and arterial hypertension, diabetes and osteoporosis as the most affected diseases. This reality reflects an elderly (Canindeense - from Canindé) population arising from difficult access to education in the Central Backlands of Ceará, whether due to the low family income, cultural or even religious aspects still present in this region of the country (limiting women to domestic activities), which determine the space that women should occupy in society[19]. This situation limits the performance of some activities within the group, leading the elderly to depend on a family member or external caregiver, to perform cognitive tasks such as reading, for example.

Arterial hypertension is one of the main health problems in our country, usually associated with some risk factors such as advanced age, low education, and overweight[20]. The prevalence of diabetes has increased over the years, and is related to urbanization, the aging of the population, sedentary lifestyles, and the increase in obesity rates21. Osteoporosis is relatively common in elderly women due to decreased estrogen production. In addition, it is associated with family history, alcohol consumption, diets low in calcium, and a lack of exercise[22]. Thus, we can suggest that the chronic diseases identified in some elderly women in our sample, may be related to the lifestyle and/or family history of these women.

Thus, the importance of the practice of physical exercises as a preventive and therapeutic tool for this population stands out, and in particular, the importance of these women maintaining their physical activities by regularly attending the physical activity program proposed by FHSC in this municipality, with a view to improve blood pressure, glycemic, and osteogenic control.

Most of the elderly women evaluated in this study were classified as having an active/very active physical activity level, with none classified as sedentary. This result may be related to the physical performance acquired by the regular practice of physical activity in the FHSC, associated with other various

physical activities performed daily. From the questionnaires, it can be seen that this group practices other activities such as walking, water aerobics, and dancing on the weekends, and that most of them also perform domestic activities normally, as they live alone or with family members.

In the study by Araujo *et al.*[23], elderly people enrolled in the Care Center for the Elderly and with an average age of 70.3 years, were also classified as sufficiently active (70%), indicating that the co-living groups are contributing positively to a good health condition of this population stratum in this parameter, as well as highlighting the importance of these community support services.

The elderly women claimed to be independent in performing the basic activities of daily living, except for the control of urination and evacuation, indicated as dependent in five elderly women. The independence in performing physiological activities, pointed out by most elderly women, may be related to the high level of physical activity in these women, since the regular practice of physical activity promotes the improvement of functional capacity9. In turn, the difficulty in controlling urination and evacuation may be associated with individual aspects of aging, which deserve a more in-depth analysis of their relationships. Along these lines, some studies indicate that one of the main basic activities in which the elderly person is dependent is precisely the control of urination and evacuation[24,25,26,27].

The problem of fecal incontinence is often associated with health problems such as diabetes and chronic diarrhea, in which it negatively alters the individual's body[25]. As for urinary incontinence, which mainly affects people with advanced age and especially women in old age, it may be related to some pharmacological therapy or signs resulting from some associated disease[2].

Similarly, independence in performing instrumental activities of daily living was demonstrated in most of the sample, mainly in preparing meals, performing household chores and taking medication. Similarly, it is worth mentioning that we are evaluating a sample composed exclusively of women, where, despite their age, reported during the application of the questionnaire that they still take care of the house, children, and husband, and that the instrumental activities evaluated in this study have always been part of their daily life. Even with the decrease in functional capacity due to advanced age, they consider these activities as obligations for every housewife.

A study carried out by Kagawa and Corrente[27] identified a greater dependence on housework among the activities of daily living evaluated, with 33.98% of the sample composed of elderly men, which fosters the gender relations discussed in the previous paragraph. A probable relationship may be perceived between these results and the gender differences created in our society, especially in the interior of the Brazilian states, in which individuals still associate the performance of domestic tasks only with the female sex.

However, almost 30% of the elderly women found it difficult to travel to distant places using some transport, a need that may be related to the health situation in which this elderly woman finds herself, feeling insecure outside the home and far from family care. This possibility could lead an elderly woman to request the help of someone to carry out the activity. In addition, the need for reading signs and directions, as well as perceiving access in certain places, can be intimidating due to their limited education (a characteristic mentioned previously).

The physiological assessment of the elderly women showed diastolic blood pressure and resting heart rate within the normal range.

Systolic blood pressure, on the other hand, was classified, according to the Brazilian Society of Cardiology[20], as borderline, close to a hypertensive condition; something relatively common to identify as age advances. This result highlights the positive effects of physical activity on the lives of these elderly women in relation to blood pressure control and the maintenance of resting heart rate, as well as the importance of this community support service.

The anthropometric evaluation showed a high average in the body mass index of the elderly, classifying them as obese, a global health problem that affects numerous people and is generally associated with hypercaloric diets and sedentary lifestyle. We evaluated a group of elderly women classified as having an active/ very active physical activity level, which leads us to consider that this obesity, now discussed, may be related to poor eating habits caused by little knowledge about healthy eating practices, situated in a sample with low education, associated with low income, which creates a disadvantageous context of expanding healthy food choices.

The evaluation of waist circumference characterized elderly women was above the normal range, indicating through this parameter, a high risk of metabolic complications. The left calf circumference, a parameter that is considered a very important tool to understand whether the elderly has greater risks of falls, has decreased strength, and a greater functional dependence[28], in turn, characterized these participants as having an adequate composition of muscle mass, a result that fits with and may be associated with the functional independence in the activities of daily living discussed above. Despite this, given the results found in body composition and waist circumference, it is suggested that the physical activity program deserves to be revisited with a view to improving a weight reduction strategy.

Along these lines, Almeida and Silva[29], point out a combined training protocol involving strength, balance, aerobic resistance, and flexibility exercises, which was applied with active elderly people for two months, resulting in a significant reduction in body fat and an increase in lean muscle mass. Buonani *et al.*[30] investigated menopausal women, who accumulated 150 minutes or more of weekly physical activity at moderate-vigorous intensity, observing an improved body composition (lower percentage of total body fat, body mass index, and a higher percentage of lean muscle mass.) compared to those of less than 150 minutes. These studies bring the reflection that strategies such as combined training, or changes in the volume and intensity of the physical activity program proposed by the FHSC of Canindé, can be well accepted by the elderly and promote significant and healthy changes in the body composition of these women.

This group of elderly women had low cardiorespiratory fitness, even though they were considered physically active. Low aerobic fitness is a common condition of the aging process; however it can be improved with the practice of physical exercises. This result denotes that the activities currently developed by the group of elderly women have not promoted the aerobic challenge necessary to expand this physical capacity. Thus, the need to reevaluate the structure of the FHSC training program in Canindé is reiterated, in order to improve the aerobic capacity of these elderly women, in addition to the weight reduction mentioned above.

Fostering this discussion, Silva[31], charted, for eight months, the physical activity program developed in the same FHSC as our study (Canindé, Ceará), recognizing the

predominance of resistance exercises and flexibility, confirming the need to include aerobic exercises in planning the training programs.

The good performance of the muscular strength of these elderly women may be associated with their dominion in the execution of basic activities and instrumental activities of daily living, identified by the Katz index and the Lawton scale, in addition to presenting a response, as exposed by Silva[31], of a body developed in this physical activity program, which benefits localized muscle strength and endurance.

A deficiency in upper limb flexibility was identified, with negative values in all means, regardless of age, and a reduction in lower limb flexibility with advancing age. Although these are active elderly women, the decrease in flexibility with advancing age is common and was expected, since during the aging process there is usually less synovial fluid production in the joints and a reduction in the elasticity of periarticular tissues[32].

However, these declines can be reversed with the regular practice of stretching and/or of a wide range physical exercise. In this context, Silva and Guedes[33], noticed a significant gain in flexibility for the elderly who underwent a guided gymnastics program for 3 months. The authors concluded that the implementation of stretching sessions provides relevant benefits such as an increase in the articular range of the elderly.

The low flexibility characterized in our sample, may be related to a lower request for movements of wider amplitude and/or to an unsatisfactory practice of stretching exercises. This insufficient practice of stretching exercises or body practices with wide ranges, can contribute to the functional deficiency and make these elderly women dependent in carrying out their daily activities. Thus, it is suggested that flexibility training is something regular and planned in the physical exercise program of these elderly women. Such exercises performed continuously can guarantee the maintenance of the functional independence of these women.

CONCLUSION

It was identified that the group of elderly women evaluated in this study, has an active level of physical activity, possibly due to physical activities in the FHSC, in addition to other activities performed concurrently, such as walking, water aerobics, and dancing. In addition, these elderly women were shown to be independent in performing basic and instrumental activities of daily living, characterizing an improved functional capacity resulting from regular physical activity.

Regular practice of guided physical activity is acting positively in the blood pressure and chronotropic control of these elderly women, but it is not enough to reduce the state of obesity and the risk of developing metabolic complications. The elderly women have the muscular strength of upper and lower limbs classified within the normal range; however, a low aerobic fitness, negative upper limb and lower limbs flexibility progressively reduced with advancing age. Along these lines, a review of the structure of the physical activity program capable of developing all the components of physical fitness and the development of multiprofessional strategies that can favor a change in the lifestyle of

these elderly women, such as lectures with themes of nutritional education, for example, is suggested.

Among the limitations of this study are the absence of the evaluation of specific weight parameters, such as the evaluation of the percentage of body fat and the investigation of male participation in the cohabitation groups, not performed in this study due to the low adherence of this gender to the physical activity program.

Studies that promote the assessment of physical fitness in the elderly accompanied by other FHSC's from different regions of the country, can provide a greater understanding of the work developed by the Physical Education professionals, not only consolidating the work of this health professional, but mainly improving the service offered to the community.

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