Effects of an intervention program of physical activity and nutrition orientation on the physical activity level of physically active women aged 50 to 72 years old

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ABSTRACT

The promotion of a physically active lifestyle in elderly people has been used as a strategy to promote improvement in health standards and quality of life. The objective of this study was to evaluate the effects of an intervention program on the physical activity (PA) and nutritional level of physically active women aged from 50 to 72 years old. The sample was composed of sixty-four women participating in a regular exercise program in a senior center. Subjects were assigned conveniently to one of four intervention groups: A) nutritional (n = 17); B) nutritional + physical activity (n = 17); C) physical activity (n = 13); D) control (n = 15). Physical activity level was assessed by the International Physical Activity Questionnaire (IPAQ). The intervention program was conducted for twelve weeks, once a week, 5 to 10 minutes after the exercise sessions. Nutritional intervention was based on "talks" about health nutrition, and the physical activity intervention was based on the Agita São Paulo program message, encouraging everyone to take at least thirty minutes of any PA, at moderate intensity, mostly days of the week, besides the gym classes. The results showed a significant ($p < 0.05$) increase on frequency (time/week) of moderate activities in groups A, B and C (32.4%; 49.6%; 47.9% respectively) after 12 weeks of program, when compared to the control group. Women in the physical activity intervention group presented significant increase (123.2%) in duration (min/week) of moderate PA and walk (150.9%) and also in the walking frequency (97.6%) when compared to baseline. The intervention program produced significant increases in the physical activity level even in women already physically active.

Key words: Intervention program. Physical activity level. Elderly people physically active.

INTRODUCTION

Since the decade of 50, an expressive growth of the elderly population has been observed in the developing countries. In Brazil, according to demographic forecasts, a growth of 16 times on the number of the elderly population is estimated from 1950 to 2020[1].

On the other hand, a decrease on the involvement in moderate-intense physical and daily activities is observed with aging, leading to a decrease on the physical capacity[2-4]. Such fact has been associated with the increase on the risk of non-transmissible chronic diseases such as hypertension, type 2 diabetes mellitus, heart diseases, cerebral vascular accident, osteoarthritis, respiratory disorders and postural deviations[5-7].

It is suggested that the morbidity-mortality associated to chronic diseases could be reduced with prevention, including lifestyle changes especially with regard to diet and physical activity[8]. Paffenbarger *et al.*[9] demonstrated that the regular practice of physical activities reduces the mortality risk due to heart diseases among other causes and hence increasing longevity. Therefore, physical activity has been widely employed as strategy to improve the quality of life of the elderly population by decreasing the harmful effects caused by alterations followed by aging, also improving the social contact, reducing psychological problems.

Some studies that had as main objectives to increase the physical activity level by means of technical orientations to change health behaviors showed to be effective[10-12]. With this purpose, the Physical Activity Promotion Program called as Agita São Paulo arose for the population of the State of São Paulo with the objective of increasing the level of knowledge on the benefits of an active lifestyle and the physical activity level not only for adults and school boys and girls, but also for adults older than 60 years of age. The program uses messages that inform about the benefits of an active lifestyle, how much physical activity should be performed in order to obtain these benefits and the orientations about how to overcome the main barriers to achieve active lifestyle[13,14]. On the other hand, some evidences demonstrated positive relation between physical activity and diet. However, Wilcox *et al.*[15] verified no voluntary changes on diet with changes on the physical activity level. Therefore, the objective of this study was to evaluate the effects of a physical activity level increment program using the strategies of the Agita São Paulo program and nutritional orientation on the physical activity level of women with ages ranging from 50 to 72 years physically active.

METHODS

The present work was approved by the Ethics Committee of the Celafiscs for researches involving human beings and the participants signed the Free and Informed Consent Term.

From the 104 elderly women initially selected for the study, only 62 fulfilled all intervention phases. At the end of the study the other 42 were excluded because they did not fulfill 75% of frequency in gym and intervention sessions or because they did not fulfill all evaluation questionnaires or due to dropouts.

All statistical analyses performed in this study included the 62 women who fulfilled all intervention phases.

To do so, the 62 women from the final sample presented ages ranging from 50 and 72 years (mean: 61.9 ± 6.7 years) and participated in a regular localized exercise practice twice a week with duration of fifty minutes each session with average practice time of 4.71 ± 3.74 years, offered by the Senior Center of the São Cae-

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tano do Sul city hall. From the six physical exercise groups of that center, the four groups in which the session schedules were the most apart from each other were included, in other words, the groups performing sessions earlier and later in order to avoid contact between groups, once the orientations were given at the end of the sessions. Thus, the final total group was assigned conveniently according to day and schedule of the physical activity group: group A (n = 17) received nutritional orientation; group B (n = 17) received nutritional orientation plus physical activity orientation; group C (n = 13) received physical activity orientation only; and group D (n = 15) received no orientation at all. All groups remained participating regularly in physical activity sessions offered by the Senior Center always oriented by a physical education teacher.

Furthermore, the inclusion criteria established that the women could not be involved with weight reducing diets and present at least 75% of frequency in the physical activity and intervention sessions.

The nutritional and/or physical activity orientations were conducted once a week with duration of 5-10 minutes shortly after the physical activity session. The nutritional orientations for groups A and B were based on a nutrition handbook for the old-aged developed by the Department of Nutrition of the Public Health School – USP and consisted of observations on several topics involving healthy nourishment, aging and nutritional requirements; functions of energetic, constructor and regulatory foods; meaning of a healthy nourishment (emphasizing the food pyramid); useful advices on adequate nourishment: food source of the main nutrients (proteins, carbohydrates, fats, vitamins, minerals and fibers), fat benefits, fibers and salt and health; differences between "diet" and "light"; how to control body weight and the relation between free radicals and aging[16]. These nutritional orientations were performed due to the interrelation between healthy behaviors[18] reported in literature, for example, how a healthy nourishment influences the physical activity level.

The orientations on physical activity performed with groups B and C were based on the message from the Agita São Paulo program and consisted of stimulating the performance of physical activities, especially those of moderate intensity in addition to the physical activity sessions, especially walks for at least thirty minutes a day performed continuously, in other words, being performed in 3 sessions of 10 minutes or 2 sessions of 15 minutes most days of the week, for at least 5 times. During orientation sessions, information with regard to benefits of the regular practice of physical exercises, the importance of the stretching before walk and hydration and with regard to the strategies to overcome barriers for the practice of physical activities were also emphasized. Furthermore, informative material (folders, food pyramids, posters, projections) were distributed also based on the same references. The objective of these orientations was to verify whether the knowledge and stimulus themselves would result in voluntary changes on the physical activity level.

The data collection was performed before and after the intervention period by the same appraisers and took place at the São Caetano do Sul Senior Center facilities (SP).

In order to identify the physical activity level according to leisure-time daily physical activities, the short-form self-applicable International Physical Activity Questionnaire (IPAQ) version 8 was used, validated in Brazil by the Study Center of the São Caetano do Sul Physical Fitness Laboratory – Celafiscs[17]. The questionnaire was composed of nine questions with regard to frequency (times/week) and duration (minutes/session) of physical activities performed at different intensities: intense, moderate and walk standard. For the analysis of data, the moderate intensity and walk standard were used, once most women (98%) did not perform high-intensity physical activity.

The statistical analysis used included the analysis of covariance "Ancova" in order to correct possible initial differences (pre) or eventual differences between groups and to determine pre and post intervention differences between groups twelve weeks after and the delta percentile (Δ%) in order to verify differences between groups at the same period and between the different periods in each group. The significance level adopted was $p < 0.05$. The software SPSS version 10.0 (1999) was used for the analysis of data.

RESULTS

The adherence degree of the 104 women to the program was of 56.6% for Nutrition group (A); 60.7% for Nutrition and PA group (B); 59.7% for Physical Activity group (C), and 62.5% for control group (D), summing up 59.6% of overall adherence. Thus, the number of participants of each group included: group A (n = 17) received nutritional orientation; group B (n = 17) received nutritional orientation plus physical activity orientation; group C (n = 16) received physical orientation only; group D (n = 14) did not receive any type of orientation.

No significant differences were observed between groups before the intervention period. After twelve weeks of intervention, the group that received nutritional orientation and the group that received nutritional and physical activity orientation presented significant increase on the frequency of moderate activities practice of 32.4% and 49.6%, respectively, after the intervention period and in relation to the control group (table 1). Moreover, the physical activity group also presented significant increase (47.9%) on the frequency of moderate activities after the intervention period and in relation to the control group. On the other hand, the control group demonstrated no significant change on the frequency of moderate activities after the intervention period; otherwise, a non-statistically significant reduction of 15.6% was observed. With regard to the duration of the moderate physical activities, the nutrition orientation and nutrition plus physical activity groups demonstrated no significant alterations after the 12-week period; however, a significant increase of 123.2% was observed for the physical activity group in relation to the control group. On the other hand, the control group presented significant reduction (–14.7%) on the duration of moderate physical activities.

TABLE 1
Values of average (x), standard deviation (s) and percentile delta (Δ%) of frequency and duration of moderate activities after 12 weeks of nutritional and physical activity orientation of women older than 50 years of age

Variables		Nutrition (n = 17)		Nutrition and PA (n = 17)		Physical activity (n = 13)		Control (n = 15)	
		Pre	Post	Pre	Post	Pre	Post	Pre	Post
Frequency	x	3.3	4.2*[a]	3.4	5.0*[a]	3.4	5.0*[a]	3.4	2.9
(times/week)	s	1.6	1.8	1.5	1.7	1.6	1.6	1.3	0.8
	Δ%		32.4		49.6		47.9		–15.6
Duration	x	106.5	123.5	95.6	120.0	86.2	192.3*	72.7	62.0*
(min/week)	s	120.3	120.9	80.0	82.2	66.7	162.3	57.4	16.6
	Δ%		16.0		25.5		123.2		–14.7

* p 0.05 – pre and post intervention period.
[a] $p < 0.05$ – in relation to control group.

In the case of the walk standard (table 2), the nutrition and nutrition plus physical activity groups demonstrated no significant alterations with regard to frequency and duration. However, the physical activity group demonstrated increase of 97.6% on frequency and of 150.9% on the walk duration after the intervention period. However, the frequency increase was not significant in relation to the control group, which also presented increase of 49% on the walk frequency.

These data suggest that the three types of intervention conducted once a week during 12 weeks were effective in increasing the frequency of moderate activities of women from this sample

in relation to the pre period and the physical activities intervention was effective in increasing significantly the duration of moderate activities in 123.2% in relation to the control group after the intervention period. However, no significant differences were observed between intervention and control groups with regard to walk frequency and duration after the intervention period.

TABLE 2
Values of average (x), standard deviation (s) and percentile delta (Δ%) of frequency and duration of walk standard after 12 weeks of nutritional and physical activity orientation of women older than 50 years of age

Variables		Nutrition (n = 17)		Nutrition and PA (n = 17)		Physical activity (n = 13)		Control (n = 15)	
		Pre	Post	Pre	Post	Pre	Post	Pre	Post
Frequency	x	3.6	3.2	5.0	4.6	2.9	5.8*	3.7	5.5*
(times/week)	s	2.0	2.5	2.0	2.4	1.8	1.8	2.0	1.8
	Δ%		–11.4		–8.2		97.6		49.0
Duration	x	47.1	34.7	52.4	47.4	40.8	102.3*	63.3	61.7
(min/week)	s	120.3	24.5	67.8	56.3	22.5	102.3	39.8	35.5
	Δ%		–26.2		–9.6		150.9		–2.6

* $p < 0.05$ – pre and post intervention period.

DISCUSSION

The results found in this study provide strong evidences that a 12-week intervention program aimed at nutritional or physical activity orientation or both promoted an increase on the frequency and duration of moderate physical activities. Moreover, a significant increase on the duration of moderate activities and on frequency and duration of walk occurred in the group that only received physical activity orientation after the intervention period; however, this increase was not significant in relation to the control group.

Only a few intervention studies on the food and physical activity behavior change have been conducted in populations older than 50 years of age. These results demonstrated the importance of simple but clear orientations on the increase of the physical activity level of women who already performed physical activities.

The first work that used the behavior change techniques on physical activity in Brazil was performed at our Research Center, occasion when we could also demonstrate an increase on the voluntary physical activity practice of women after 12 weeks of a physical exercises program enriched with food habits and voluntary physical activity change techniques in 113 women with ages ranging from 30 to 50 years[11].

Our results also corroborate data found in the San Diego Medicare Preventive Health Project (HAS) in which elderly subjects experienced increase on the physical activity level after eight educational sessions aimed at healthy behaviors including the practice of physical exercises performed once a week by a trained counselor during 8 weeks[10]. On the other hand, Guillet *et al.*[12] demonstrated increase on the frequency and duration of physical activities of a group of obese women with ages between 60 and 70 years who participated in health and education sessions and also obtained improvements on the neuromotor variables studied.

Many studies have verified whether physically active individuals had a healthier diet and some of them found positive relations[18], while others found no relation at all[5,19-21]. The present study has verified that the group that received specific orientations on healthy nourishment presented voluntary increase on the frequency of moderate activities.

A diagnostic evaluation study of an inactiveness habit change program in the State of São Paulo called as Agita São Paulo Program by which our Research Center was the technical responsible, evaluated the physical activity level of 2,000 individuals older than 50 years of age in the metropolitan region and in the inland of the State of São Paulo. In the most populous cities, less than 23% of those who had previous knowledge about the new physical activity paradigm practiced physical activity according to the new recommendations, and in the smaller towns, only 14% of them practiced physical activities according to these recommendations. These data confirm that the adequate knowledge level does not necessarily result in a regular involvement with physical activity according to the new paradigms. The authors concluded that the physical activity promotion should emphasize not only the increment on the knowledge level but also on the strategies to overcome barriers, thus facilitating the adoption of an active lifestyle[22].

These data corroborate data found in the present study that searched not only for the increment on the knowledge level but also emphasized the best strategies to overcome barriers and to stimulate the physical activity practice during intervention sessions, what resulted in increment on the physical activity level.

Young *et al.*[23] verified in 2,668 individuals with ages ranging from 50 to 65 years that the adherence rate to an one-year exercise program was lower among those who were initially sedentary (39.5%) than among active ones (71.6%); however, this rate increased in household low-intensity programs, demonstrating the importance of stimulating small behavior changes that may be incorporated in the daily life with regard to the adherence on a more active lifestyle, what may be demonstrated in the present study.

Dallosso *et al.*[24] demonstrated that walking is the most common physical activity among elderly individuals. Similarly, studies conducted at our Research Center with women older than 50 years of age who performed calisthenic physical exercises during 50 minutes verified that the number of steps, the distance traveled and the energetic expenditure were respectively 28.5%, 43.23% and 43.2% higher in walk performed as transport means to sessions than the values observed during the physical exercise session itself, what demonstrated that the walk between the residence and the physical exercise session site may be an effective mean to obtain health benefits as the physical exercise session itself[25]. The present study, also aimed to emphasize the importance of walk, especially performed at leisure time along with the intervention in order to obtain a significant increase on the duration and frequency of walk in the group that received physical activity orientation.

The present work presented some limitations among which we could mention:

a) Samples conveniently assigned were used, in other words, the groups were selected so that the schedules and days of physical activity sessions were the most apart as possible in order to avoid contact between groups; however, no control on the access to information given to each group was performed and these information might have reached the control group by means of the participants from the intervention group;

b) The sample used is small and specific, being composed of a group of physically active elderly women who have attended physical exercises sessions for a considerably period of time, what may not reflect the reality of the average elderly individual;

c) It is also known that questionnaires applied to measure the physical activity level present some limitations; on the other hand, the questionnaire used in the present study was validated in a sample from the Brazilian population;

d) The fact that the individuals knew that they were participating in a research to evaluate the increment on their physical exercise practice may itself have influenced the results found.

Finally, it is worth emphasizing that the intervention program was a 12-week short-term program. Thus, further behavior changes might have been reached with a long-term program.

CONCLUSION

One concludes that a nutritional and physical activity intervention program promoted significant increase on the physical activity level, frequency and duration of moderate physical activity and walks

even among previously physically active elderly women. Thus, strategies for the promotion of an active lifestyle as those proposed by the Agita São Paulo Program may be used as a mean to encourage the performance of physical activities among elderly individuals, being currently considered as a model strategy according to the World Health Organization[26], for health promotion by means of the practice of physical activities. More long-term intervention researches are suggested with the objective of evaluating the change on the physical activity level and on the food habits in a sample representative of the elderly population in order to investigate if these changes remain after the end of the program.

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