Impact of a physical activity program on the quality of life of the elderly

Impacto de um programa de atividade física na qualidade de vida de idosos

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ABSTRACT
The elderly population has been increasing considerably over the last few years and the importance of the physical and mental well-being of this population must be noticed. The study aimed to analyze the quality of life of elderly participants in the Municipality Project called “Idade Viva”. Toward this purpose, 41 individuals of both genders aged from 60 and 78 years old were assessed. Participants were divided into two groups: Group of Elderly Practitioners of Physical Activities of the “Idade Viva” Project (G1), Group of Elderly Non-practitioners of Physical Activities of the “Idade Viva” Project (G2). The physical (PCS) and mental (MCS) parameters of quality of life were assessed using the "12 - Item Short-Form Health Survey (version 1) - (SF-12 v1)“, the level of moderate to vigorous physical activity (MVPA) by the “International Physical Activity Questionnaire (IPAQ-short version). Data collection took place in the morning at the Project location. Anthropometric data were collected: body mass, height and abdominal perimeter (AP). The Shapiro-Wilk normality test and the independent T test were used for intergroup analysis. There were no significant differences regarding PCS (G1= 43.4; G2= 48.0) and MCS (G1= 47.4; G2=50.4), as well as for weekly MVPA minutes (G1= 296.0; G2= 180.0). G1 had a higher prevalence of active individuals (82%) compared to G2 (58%). It can be concluded that physical activity programs for elderly people can increase the level of habitual physical activity and contribute to attenuate the parameters of the Metabolic Syndrome.

Keywords: physical activity, elderly, quality of life.

INTRODUCTION
It is consensual that the number of elderly people has been increasing in the Brazilian and world population, due to the improvement in their health condition, access to information...
and preventive aspects (OLIVEIRA, 2019). Estimates show that the population growth of this audience in Brazil will double from 2020 to 2050, going from 13.76% to 29.75%, respectively (IBGE, 2017).

The increase in the elderly population in Brazil is a result of changes in the prevalence of mortality and fertility, as well as lifestyle habits, in acknowledgment to the demographic transition, which took place five decades ago. (MARINHO; PASSOS; FRANCE, 2016). Likely to the reduction in birth rates, there is a greater life expectancy of the population, which is also due to the advances of the Unified Health System (SUS), concomitantly with a better economic plan (NOGUEIRA et al., 2008). Furthermore, according to Taylor and Johnson (2015), the number of elderly people in 2050 will be greater than the number of children.

Considering the complications of the aging process, such as sarcopenia, it is not uncommon for the individual to experience worsening in their quality of life. (LANDI et al., 2012). However, it is worth pointing out that regular physical activity, especially strength exercises, can attenuate the reduction in muscle mass (LIMA et al., 2012). Thus, the practice of physical activity, regardless of age, improves quality of life, and enables functional independence, varying in different stages of life (ASSUMPÇÃO; MORAIS; FONTOURA, 2002).

With the increase in life expectancy including different age groups, it is remarked that more strategies are implemented to encourage adherence to physical activity practices, which is a determining factor for a healthy life. (LOPES et al., 2015).

Considering that regular physical activity improves the control of metabolic disorders (Systemic Arterial Hypertension and Type 2 Diabetes Mellitus) (FRANCISCO et al., 2018), it is recommended at least 30 minutes of moderate to vigorous physical activity per day (MVPA) accumulating at least 150 minutes a week to gain health benefits. (HASKELL et al., 2007).

Despite the knowledge that the increase in habitual physical activity is an important guider in healthy aging, supervised and group physical activities provide benefits, especially the inclusion of the elderly (RIBEIRO; FERRETTI; DE SÁ, 2017).

It is acknowledged that even with the increased adherence to physical activities, most elderly people continue with many hours of sedentary behavior (ALVES et al., 2010). Therefore, this study aimed to investigate the impact of a physical activity program on quality of life indicators for elderly people living in the city of Ariquemes-RO.
2 METHODOLOGY

2.1 STUDY DESIGN

This is a cross-sectional study. Data collection took place at the “Idade Viva” Community Center, a project from the City Hall that serves the elderly population, developing programs for medical care, food, handicrafts, dance, weight training and hydro gymnastics. For this research, volunteers aged within 60 to 78 years old were admitted.

The study consisted of 41 volunteers of both genders, divided into 2 groups: participants in the physical activities promoted inside the project (G1) and non-participants in the project's physical activities (G2). The metabolic equivalent (MET) was the reference parameter to infer the minimally moderate intensity of activities performed in the center (Table 1) (AINSWORTH et al., 2000; FARINATTI, 2003).

As inclusion criteria for G1 it was considered: participating in activities for at least 3 months and a minimum weekly frequency of 3 times. The exclusion of participants from both groups occurred when the volunteers did not have an age group within the proposal, amputations, when they were physically or psychologically dependent on another person, as well as when they had any other dysfunction that affected their participation in the proposed activities.

To collect the basic data, body mass was measured using a Techiline Digital scale, Model: Tec-Silver, and height with an anthropometric Sanny Medical, Starrett Sn-4010, 2m. From such data, the Body Mass Index (BMI) was calculated. Abdominal perimetry (AP) was obtained with a Coats Ba 1010 measuring tape.

The diagnosis of quality of life indicators was performed by the Short-Form Health Survey (version 1) - (SF-12 v1), validated for the Brazilian population by Silveira et al., (2013). The SF-12 v1 consists of objective questions, distributed into 8 spheres, namely: physical aspects, pain, functional capacity, general health, mental health, vitality, as well as social and emotional aspects. It is noteworthy that the SF-12v1 covers the physical (PCS) and mental (MCS) health domains.

To measure the level of habitual physical activity, the International Physical Activity Questionnaire (IPAQ-short version) was used, an instrument validated for the Brazilian population (MATSUDO et al., 2001). The questionnaire consists of 4 topics, which result in 8 questions about physical activity. A volunteer who accumulates 150 minutes of MVPA per week is classified as physically active.

The volunteers were evaluated on the parameters of the Metabolic Syndrome: diagnosis of diabetes mellitus, treatment for hypertriglyceridemia and hypercholesterolemia (high LDL)
and hypocholesterolemia low HDL-c, as well as diagnosis and treatment of arterial hypertension. Along with these parameters, blood pressure was considered indispensable, which added to the other two, there would be the configuration for metabolic syndrome, according to the criteria of the International Diabetes Federation (IDF) (ALBERTI et al., 2006).

The study was approved by the Human Research Ethics Committee of the Faculdade de Educação e Meio Ambiente (FAEMA) (evaluation number 2.959.507) and the Informed Consent Term (TCLE) was subsequently signed. The procedures carried out followed following the Declaration of Helsinki and as determined by Resolution nº 196/96 of the National Health Council of the Ministry of Health (NHC/MH). Thus, the collection took place in the morning and happened in a private room, consisting only of the evaluator and the evaluated person, keeping the right to privacy of the answers.

For data analysis, descriptive statistics of the sample (mean, standard deviation and percentage) was performed. The Shapiro-Wilk normality test was used. Considering that the variables age, body mass, height, BMI, abdominal perimetry, PCS, MCS and MVPA presented normal behavior, the independent t test was applied to observe the significance between practitioners and non-practitioners of physical activities promoted in the project. The significance adopted in the tests was p<0.05. All data were analyzed using the SPSS statistics 20 software.

<table>
<thead>
<tr>
<th>Activities</th>
<th>Intensity</th>
<th>METs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dance</td>
<td>Moderate</td>
<td>3,0</td>
</tr>
<tr>
<td>Hydro gymnastics</td>
<td>Moderate</td>
<td>4</td>
</tr>
<tr>
<td>Exercises in Health Centers</td>
<td>Moderate</td>
<td>5,5</td>
</tr>
<tr>
<td>General gymnastics</td>
<td>Moderate</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 1. Intensities in metabolic equivalents (METs) of the activities offered at Centro de Convivência Idade Viva.


3 RESULTS

The profile of the participants in terms of age prevailed among the elderly aged from 60 to 78 years old, with approximately 54% of the individuals interviewed being regular practitioners of the project's physical activities (G1). Despite the mean age of both groups being similar, higher mean age was found in G1 compared to G2 (Table 2). Active individuals
participated in the proposed activities 3 to 4 times a week, with approximately 1 hour-long duration.

In addition, Table 2 shows important anthropometric data in relation to cardiovascular risk, with no significant differences between the studied groups.

Table 2. Basic and anthropometric data

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>G1 (22)</td>
<td>67,54</td>
<td>5,88</td>
</tr>
<tr>
<td></td>
<td>G2 (19)</td>
<td>66,68</td>
<td>4,02</td>
</tr>
<tr>
<td>BW (kg)</td>
<td>G1 (22)</td>
<td>67,68</td>
<td>12,16</td>
</tr>
<tr>
<td></td>
<td>G2 (19)</td>
<td>77,79</td>
<td>12,95</td>
</tr>
<tr>
<td>Height (m)</td>
<td>G1 (22)</td>
<td>1,58</td>
<td>1,10</td>
</tr>
<tr>
<td></td>
<td>G2 (19)</td>
<td>1,66</td>
<td>1,17</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>G1 (22)</td>
<td>26,66</td>
<td>5,13</td>
</tr>
<tr>
<td></td>
<td>G2 (19)</td>
<td>26,34</td>
<td>7,68</td>
</tr>
<tr>
<td>A.P (cm)</td>
<td>G1 (22)</td>
<td>91,18</td>
<td>11,37</td>
</tr>
<tr>
<td></td>
<td>G2 (19)</td>
<td>97,15</td>
<td>12,51</td>
</tr>
</tbody>
</table>

Source: Data Research. G1= Regular PE participating group, G2= Regular PE non-participating group. BMI= Body Mass Index. A.P= Abdominal Perimetry. BW= Body weight; m= meters; cm = centimeters Kg = kilogram; Kg/m²= kilogram per square meter.

Regarding the quality of life parameters, no significant differences were found in any domain, neither physical nor mental, as well as no difference within the MVPA (Table 3). However, the MVPA level was, on average, more than 100 minutes higher in G1.

When analyzing the individual range of 150 minutes of MVPA of the two groups by the IPAQ, it was observed that in G1, 18 elderly people reached this recommendation, while in G2, only 11 elderly people reached it.

Table 3. Questionnaire Item Short-Form Health Survey - (SF-12).

<table>
<thead>
<tr>
<th>Data</th>
<th>Number of People</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCS</td>
<td>G1 (22)</td>
<td>43,41</td>
<td>10,55</td>
<td>.198</td>
</tr>
<tr>
<td></td>
<td>G2 (19)</td>
<td>48,00</td>
<td>6,88</td>
<td></td>
</tr>
<tr>
<td>MCS</td>
<td>G1 (22)</td>
<td>47,45</td>
<td>10,04</td>
<td>.594</td>
</tr>
</tbody>
</table>
Regarding Metabolic Syndrome, it was found to be present in 7 elderly individuals in group G1 and 13 elderly individuals in group G2, according to the IDF criteria. In addition to the higher prevalence of Metabolic Syndrome, most of the risk criteria were more prevalent in individuals who did not show adherence to the physical activities of the ‘Idade Viva’ project, as shown in Table 4.

Table 4. Prevalence of parameters and diagnosis of metabolic syndrome by group.

<table>
<thead>
<tr>
<th>Complications</th>
<th>G1 (22)</th>
<th>G2 (19)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment for Dyslipidemia</td>
<td>11 (50%)</td>
<td>12 (63%)</td>
</tr>
<tr>
<td>Arterial hypertension</td>
<td>11 (50%)</td>
<td>16 (84%)</td>
</tr>
<tr>
<td>Diagnosis of Diabetes Mellitus</td>
<td>6 (27%)</td>
<td>6 (32%)</td>
</tr>
<tr>
<td>Abdominal Perimetry (PA)</td>
<td>17 (77%)</td>
<td>16 (84%)</td>
</tr>
<tr>
<td>Diagnóstico de Síndrome Metabólica*</td>
<td>7 (32%)</td>
<td>13 (68%)</td>
</tr>
</tbody>
</table>

*Prevalence of Metabolic Syndrome according to the criteria of the International Diabetes Federation (IDF) (ALBERTI et al., 2006). G1= Group participating in regular physical activity, G2= Group not participating in regular physical activity, AP= Abdominal perimetry, cm= centimeters, M= male, F= female.

4 DISCUSSION

The main finding of this study suggests that the adherence of the elderly population to an activity program, which substantially increased the level of physical activity, can improve the health parameters related to the Metabolic Syndrome, including extrapolating the weekly recommendations of 150 minutes of MVPA.

Considering the average age of the participating groups, G1 predominates as the oldest and most participative group, curiously older individuals showed greater affinity in participating in the proposed exercises compared to non-practitioners of the project's exercises (G2). In a divergent way, the work of Peixoto et al., (2018) with the elderly, presents an inverse
relationship between the increase in age and the reduction in habitual physical activity, which was evaluated by the same tool, the IPAQ.

As for the Body Mass Index (BMI), both groups, G1 and G2, presented a eutrophic situation (BRASIL, 2011). In particular, one should consider the possible increase in muscle mass resulting from strength activities, which can overestimate the BMI, not showing the difference between lean and fat mass in this audience. Despite the simplicity of the BMI analysis and its little distinction, we can consider its importance as an anthropometric monitoring tool for the elderly, as it is easy to access and apply. Thus, although G1 did not show differences in BMI compared to G2, we can assume that regular MVPA may have helped to maintain muscle mass, avoiding more severe effects of sarcopenia. (SANTOS, 2005).

Regarding AP, there was no significant difference between the groups, with values above the references defined by the International Diabetes Federation (IDF) of 90 and 80 centimeters for males and females, respectively. Additionally, more than half of those evaluated in both groups exceeded the reference values, a relatively common and dangerous sign in elderly people of both sexes (SILVEIRA et al., 2018). In a study with physical exercise intervention in the elderly, for a period of 3 months, no significant differences were found between abdominal perimetry before and after the intervention, showing that not only physical activity has an impact on this parameter (HORTENCIO et al., 2018). It is worth emphasizing that, in addition to regular physical activity, variables such as socioeconomic conditions, use of medication, and especially food, have significant impacts on this analysis (PORTO et al., 2019).

No significant differences were found between quality of life parameters, both physical and mental, as well as the level of MVPA for both groups. Although there was no difference, both exceeded the reference of 150 minutes per week of MVPA.

In a study carried out with elderly people in Belo Horizonte (MG), using the same tool (SF-12), it was found that physical activity was correlated with an improvement in the physical component of the questionnaire. It is noteworthy that the scores of both PCS (42.8) and MCS (45.1) of the cited work were similar to ours, regardless of the groups in this study (CAMELO; GIATTI; BARRETO, 2016). In addition, a study carried out in the Rio Grande do Sul, designed for the entire population of the state and with approximately 7,300 elderly people, using the SF-12, found consistent evidence on the relationship between performing activities in general, including physical activity, and improvement of quality of life (TREVISAN et al., 2017). It is necessary to emphasize that the elderly analyzed by the aforementioned research achieved values, both for the PCS and for the MCS, above 60 points, indicating a substantially higher score compared to the present study.
However, a study carried out in Palmas (TO), also with elderly people aged 67 (±7.19) years old, using the IPAQ and the SF-36 (expanded version of the SF-12), could not find the relationship of Level of Physical Activity with quality of life, as more than 66% of the elderly participants were insufficiently active and all domains of the instrument had scores greater than 58 points (BAPTISTA; OLIVEIRA; NETO, 2018).

Although not expressing in this work, the importance of regular physical activity in the quality of life is well established in the literature, especially concerning the maintenance of functional independence, as well as improvements in cardiovascular risk parameters (DE ARAÚJO ALENCAR et al., 2010; MIRANDA; SOARES; SILVA, 2016).

In this sense, it is worth considering that regional and cultural aspects can significantly impact the individual's quality of life. Additionally, interpersonal relationships, access to material goods, loneliness, education, and healthy eating, for example, should also be highlighted (VECCHIA et al., 2005). Therefore, in addition to regular physical activity, we can alarm other variables that should be highlighted to achieve a better quality of life in this attendance, which may have impacted the low scores in this study.

Regarding Metabolic Syndrome, a considerably higher prevalence was found in group G2 compared to group G1, according to the IDF criteria. It is well defined that healthy habits, reaching 150 minutes of MVPA per week and dietary changes have a great positive impact on the parameters of the Metabolic Syndrome, and it has already been suggested that they are even greater than pharmacological interventions (SHERLING; PERUMAREDDI; HENNEKENS, 2017).

When analyzing individually the level of MVPA of the elderly in each group, it is observed that in G1 82% of the elderly reached the established value, while only 58% reached in G2. It is important to point out that in this study both groups, on average, demonstrated the reach of the weekly recommendations, however, G1 presented more than 100 minutes of MVPA concerning G2, also presenting better results in most parameters of the Metabolic Syndrome. Our data corroborate the study by Calixto (et al., 2017), which, despite the difference in diagnosis, performed using the National Cholesterol Education (NCEP) criteria, also presented a high prevalence of Metabolic Syndrome, and this diagnosis was closely associated with a sedentary lifestyle.

Although we consider other precautions about the presence of Metabolic Syndrome, such as nutrition, it is possible to associate that the increase in the level of habitual physical activity, carried out by the G1 group, has been decisive for the improvement of the parameters of the Metabolic Syndrome (GUIMARÃES and CIOLAC 2004). However, we must interpret
the results with caution, as despite this evidence, other factors related to Metabolic Syndrome were not analyzed.

5 CONCLUSION

It was notorious that, regardless of the adherence to the exercises proposed by the “Idade Viva” Project, there was no difference between the participating and non-participating individuals in terms of quality of life, both in the physical and mental domains. The high level of physical activity exhibited by both groups, it seems, was not a remarkable parameter for quality of life, as well as for abdominal perimetry. However, these results suggest that adherence to an activity program can be an effective strategy for attenuating the parameters of the metabolic syndrome and its diagnosis in the population investigated. Finally, more studies should be carried out with this population. The development of intervention studies with greater control over the exercises performed and the nutritional variables of this population is suggested.
REFERENCES


