PHYSICAL ACTIVITY AND FUNCTIONAL FITNESS IN ELDERLY LIVING IN NURSING HOMES OR USING DAY CARE CENTERS: AN EXPLORATORY STUDY

ATIVIDADE FÍSICA E APTIDÃO FUNCIONAL EM PESSOAS IDOSAS QUE VIVEM EM LARES E EM UTENTES DE CENTRO DE DIA: UM ESTUDO EXPLORATÓRIO

ACTIVIDAD FISICA Y APTITUD FUNCIONAL EN PERSONAS MAYORES QUE VIVEN EN RESIDENCIAS DE ANCIANOS O CENTRO DE DÍA: UN ESTUDIO EXPLORATORIO

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ABSTRACT

Introduction. The loss of physical function, health problems, limited support from families and few financial resources, leads to institutionalization. Currently, one of the problems associated with institutionalization is the higher sedentary behavior and consequent loss of autonomy. Therefore, the main purpose of this study was to examine physical activity (PA) levels and functional fitness of older adults living in nursing homes or using day care center.

Method. Thirty-two older adults (85.5 ± 5.7 years) from both genders (women=24; men=8) participated in this study; 14 nursing home residents and 18-day care center users. Physical activity data were collected through accelerometry. Functional fitness was evaluated with physical fitness field tests.

Results: The participants of this study have extremely low levels of functional fitness and PA and high levels of sedentary behavior. In nursing home residents (NH), the mean time in sedentary behavior and moderate PA was 9h48min/day and 2.2 min/day, respectively. In the same group, the mean time spent in light PA was 77.5 min/day. In day care center (DCC) users the mean time in sedentary behavior and moderate

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PA was 7h48min/day and 1.6 min/day, respectively. Older adults attending DCC showed better results than nursing home residents in the chair sit-and-reach test (DCC= -12.4±15.7 cm, NH= -22.3±4.1 cm, p=0.037), 6 min walking test (DCC= 270±73.9 min, NH= 167.7±84.4 min, p<0.001) sedentary time (DCC= 7.48±0.2 hours, NH= 9.48±0.94 hours, p<0.01) and average PA (DCC= 82.6±18 counts/min, NH= 58.5±30.5 counts/min, p=0.03). The performance in other tests (30-s chair stand; back scratch; arm curl; 8 foot up-and-go) of functional fitness was not statistically different.
Conclusions: Functional fitness and PA levels are very low both in older adults living in nursing homes or in those that are users of DCC. Intervention programs are needed for these groups to reverse the decrease of physical fitness and PA, and promoting health and functional status.

Key words: physical activity; functional fitness; older adults

RESUMO

Introdução. A perda da função física, problemas de saúde, apoio limitado das famílias e poucos recursos financeiros levam à institucionalização. Atualmente, um dos problemas associados à institucionalização é o maior comportamento sedentário e consequente perda de autonomia. Portanto, o principal objetivo deste estudo foi examinar os níveis de atividade física (PA) e aptidão funcional de idosos que vivem em lares de idosos ou em creches.
Método. Trinta e dois idosos (85,5 ± 5,7 anos) de ambos os sexos (mulheres = 24; homens = 8) participaram deste estudo; 14 residentes em casas de saúde e usuários de centros de cuidados de 18 dias. Dados de atividade física foram recolhidos por meio de acelerometria. A aptidão funcional foi avaliada com testes de aptidão física.
Resultados: Os participantes deste estudo apresentam níveis extremamente baixos de aptidão funcional e AF e altos níveis de comportamento sedentário. Nos residentes de asilos (NH), o tempo médio em comportamento sedentário e PA moderado foi de 9h48min / dia e 2,2min / dia, respetivamente. No mesmo grupo, o tempo médio gasto em PA leve foi de 77,5 min / dia. Nos usuários de creche (DCC), o tempo médio em comportamento sedentário e PA moderado foi de 7h48min / dia e

1,6min / dia, respetivamente. Os idosos que compareceram ao DCC apresentaram melhores resultados do que os residentes do asilo na cadeira teste de sentar e alcançar (DCC = -12,4 ± 15,7 cm, NH = -22,3 ± 4,1 cm, p = 0,037), teste de caminhada de 6 min (DCC = 270 ± 73,9 min, NH = 167,7 ± 84,4 min, p <0,001) tempo sedentário (DCC = 7,48 ± 0,2 horas, NH = 9,48 ± 0,94 horas, p <0,01) e PA médio (DCC = 82,6 ± 18 contagens / min, NH = 58,5 30,5 contagens / min, p = 0,03). O desempenho em outros testes (suporte para cadeira de 30 segundos; arranhão para as costas; braçadeira para os braços; com 8 pés para cima e para baixo) de aptidão funcional não foi estatisticamente diferente.
Conclusões: A aptidão funcional e os níveis de AF são muito baixos, tanto em idosos que vivem em lares de idosos como naqueles que são usuários de CDC. Programas de intervenção são necessários para que esses grupos possam reverter a diminuição da aptidão física e da AF e promover a saúde e o status funcional.

Palavras-chave: atividade física; aptidão funcional; idosos

RESUMEN

Introducción. La pérdida de la función física, los problemas de salud, el apoyo limitado de las familias y unos pocos recursos financieros conducen a la institucionalización. Actualmente, uno de los problemas asociados con la institucionalización es el mayor comportamiento sedentario y la consecuente pérdida de autonomía. Por lo tanto, el objetivo principal de este estudio fue examinar los niveles de actividad física (AP) y la aptitud funcional de los adultos mayores que viven en hogares de ancianos o que usan guarderías.
Método. Treinta y dos adultos mayores (85.5 ± 5.7 años) de ambos sexos (mujeres = 24; hombres = 8) participaron en este estudio; 14 residentes de hogares de ancianos y usuarios de centros de cuidado de 18 días. Los datos de la actividad física se recolectaron a través de la acelerometría. La aptitud funcional se evaluó con pruebas de campo de aptitud física.
Resultados: Los participantes de este estudio tienen niveles extremadamente bajos de aptitud funcional y PA y altos niveles de comportamien-

to sedentario. En residentes de hogares de ancianos (NH), el tiempo promedio en el comportamiento sedentario y el PA moderado fue de 9h48min / día y 2.2min / día, respectivamente. En el mismo grupo, el tiempo medio transcurrido en PA ligero fue de 77,5 min / día. En los usuarios de centros de atención diurna (DCC), el tiempo promedio en el comportamiento sedentario y el PA moderado fue de 7h48min / día y 1.6min / día, respectivamente. Los adultos mayores que asistieron a DCC mostraron mejores resultados que los residentes de hogares de ancianos en la prueba de silla y alcance (DCC = -12.4 ± 15.7 cm, NH = -22.3 ± 4.1 cm, p = 0.037), prueba de caminata de 6 minutos (DCC = 270 ± 73.9 min, NH = 167.7 ± 84.4 min, p <0.001) tiempo sedentario (DCC = 7.48 ± 0.2 horas, NH = 9.48 ± 0.94 horas, p <0.01) y PA promedio (DCC = 82.6 ± 18 cuentas / min, NH = 58.5 ± 30.5 cuentas / min, p = 0.03). El rendimiento en otras pruebas (soporte para silla de 30 s; rasguño en la parte posterior, rizo en el brazo, 8 pies para arriba y para arriba) de la condición física funcional no fue estadísticamente diferente.

Conclusiones: la aptitud funcional y los niveles de AP son muy bajos tanto en adultos mayores que viven en hogares de ancianos como en aquellos que usan DCC. Los programas de intervención son necesarios para estos grupos para revertir la disminución de la aptitud física y la AP, y promover la salud y el estado funcional.

Palabras clave: actividad física; aptitud funcional; adultos mayores

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INTRODUCTION

Population with 60 years or over has growing in the last years. According to the World Health Organization (WHO), persons with 60 years or over has increased in most regions and countries (World Health Organization, 2015). In 2015 the number of older persons has reached 901 million worldwide. Forecasts for 2030 is that there will be an increase to 1.4 billion people over 60 years old. This value, in 2050, could reach nearly 2.1 billion older adults (World Health Organization, 2015).

Aging is associated with loss of functional and cognitive abilities. The loss of these abilities may lead to dependence. The decrease in PA and physical fitness have been proposed as predictors for loss of the capacities that allow to perform activities of daily living (Rikli and Jones, 2013; Vermeulen et al., 2011). Consequently, there is a decrease in quality of life and an increase in dependence. The impossibility of performing tasks of daily living, the decrease of health status, old age, female gender is pointed as factors that may motivate the institutionalization (Luppa et al., 2011; Pita-ferna et al., 2010). Often, the loss of physical functions, health problems, limited support from families and few financial resources, leads to institutionalization (Sullivan and Asselin, 2013).

The physical, functional and cognitive decline can be attenuated or reversed with the practice of PA. Several studies showed that regular PA improves the optimization of the locomotor and cardiorespiratory systems (Paterson & Warburton, 2010) and reduces the risk of heart disease, type II diabetes, colon and breast cancer (Spirduso et al., 2005), general morbidity, mortality and prevalence of chronic diseases associated with aging (Dias & Couceiro, 2017; Paterson and Jones, 2007). Paterson (2010) demonstrated that the better the functional fitness of older adults, the better their cardio-respiratory capacity. Although PA is associated with improvements in functional fitness and quality of life, its potential has not been fully explored as the percentage of older adults who complies with the daily recommendations of PA is very low (Baptista et al., 2012).

Unfortunately, few studies have studied the reality of nursing home (NH) residents and day care center (DCC) users regarding PA and functional fitness. Thus, most studies look at PA and functional fitness of older adults living in the community. The available studies with institutional-

ized older adults shown that they are less physical active (Król-Zielinska, Kusy, Zielinski & Osinski, 2011), less fit and more sedentary than the older adults living in the community (Simão & Pereira, 2015; Tomas-Carus et al. 2014). In Portugal, we found one study that examined the PA of institutionalized older adults (Lobo et al., 2008), and two studies that examined their functional fitness (Lobo et al., 2008; Pereira et al., 2016). In Portugal, 16.5% of the population is over 65 and 10% are institutionalized (Instituto Nacional de Estatística, 2004), and more research is needed to develop possible preventive measures. Therefore, the main purpose of this study was to examine PA levels and functional fitness of older adults living in NH or using DCC services.

MATERIAL AND METHODS

STUDY DESIGN AND PARTICIPANTS

The volunteers for this cross-sectional were older adults from two institutions in the region of Évora (Portugal), one NH residence and on older adults DCC. Thirty-two older adults were included according to the inclusion criteria: living in a NH residence or DCC, age of 65 years or more and being able to walking without the assistance of another person.
Table 1 shows the general characteristics of the participants. Old and very old people constituted the sample and in general they had low educational levels. All participants or their legal representatives were informed about the objectives of the study and gave their informed consent prior to participation. The study was approved by the University of Évora ethics committee and conducted in accordance with the Declaration of Helsinki.

Table 1 – Descriptive characteristics of the participants

	DC (n=18)	min-max	NH (n=14)	min-max
Age (years)	84.6 (5.2)	72-93	86.7 (6.3)	78-98
Education (years)	0.9 (1.6)	0-4	3.9 (1.4)	0-6
Height (cm)	153.7 (8.3)	142-175	153 (4.8)	147-153
Weight (kg)	68.1 (10.9)	52.7-104.4	65.2 (10.9)	51-85.9
Gender (% Women)	66.7%	-	78.6%	-

Note. DC, day care center users; NH, nursing home residents. *p<0.01 for comparison between groups

PROCEDURES

A trained kinesiologist collected physical fitness and PA data. Physical fitness evaluation was performed in two sessions (one session per day). Afterwards, the participants and NH personnel were instructed on the proper use of the accelerometer. For all participants, the institution personnel were responsible for attaching the accelerometer in the correct place at morning and for removing it at the end of the day. In some cases, the institutions were not able to guarantee this procedure, and therefore it was not possible to collect accelerometer data.

PHYSICAL ACTIVITY

Habitual PA was accessed by accelerometry (model GT1M; ActiGraph, For Walton Beach, FL). The GT1M (3.8 x 3.7 x 1.8cm; 27g) measures the acceleration of normal human movements, ignoring high frequency vibrations associated with mechanical equipment. All the data was downloaded using ActiGraph software and stored in a database computer. ActiGraph accelerometer measurements are frequent in PA research with older adults and have been shown to be valid and reliable for quantifying PA in adults (Silva, Mota, Esliger, & Welk, 2010).
It was asked that NH participants use the accelerometer during day hours for 7 consecutive days, except during water activities. Day care participants use the accelerometer during all days of the week for 5 consecutive days (they did not wear de accelerometer at the weekend because they did not visit the institution in that period).

The device was securely attached on the right hip, near the iliac crest. The accelerometers were activated on the first day at 6:30 a.m. and data were record in 60-s epochs. The accelerometer activation and data download were performed using the software Actilife Lifestyle (Version 3.2). Processing was done with the program MAHUffe (http://www.mrc-epid.cam.ac.uk/research/resources/materials-transfer disclaimer/physical-activity-downloads/) from the original downloaded files from the accelerometer. We included the results from participants with at least 3 valid days and a minimum wear time of 8 hours per day. Periods of

at least 60 consecutive min of zero intensity counts were considered nonwear time.
Physical activity variables evaluated by accelerometry included minutes per day spent in different intensities of activity, mean time (minutes per day) of total PA (light, moderate, and vigorous), average PA (counts per minute), and number of steps per day. The time spent at different levels of PA was calculated using the following criteria: sedentary: < 100 counts per min; light: 100-2019 counts per min; moderate: 2,020-5,998 counts per min; vigorous: > 5,999 counts per min (Baptista et al., 2012).

PHYSICAL FITNESS

The participant's height (m) was measured without shoes in a stadiometer and the weight (kg) was measured with a digital scale (Tanita MC-780 MA Bio Lógica Tecnologia Médica SL). The body mass index (BMI) was calculated from weight in kilograms divided by height in meters squared. Waist circumference was measured to the nearest 0.1 cm at the level of uppermost lateral border of the iliac crest. Cutt-offs for a high risk of metabolic risk were established at ≥102 cm in men and ≥88 cm in women (Obesity & Initiative, 2000).
Physical fitness regarding lower and upper body strength, lower and upper body flexibility, agility and dynamic balance, was evaluated using the Senior Fitness Test Battery (Rikli & Jones, 1999) respectively using the tests: 30-s chair stand (rep), arm curl (rep); chair sit-and-reach (cm), back scratch (cm), 6 minute walk (m) and 8 foot up-and-go (sec). We use the normative values for Portuguese older adults provided by Marques el al. (2014) for evaluating individual scores, considering that those falling bellow the 25th percentiles were bellow the normal range (Rikli and Jones,1999).
Balance was assessed with the Functional Reach Test (Duncan, Weiner, Chandler, & Strudenski, 1990) and the Berg Balance Scale (Berg, Maki, Williams, Holliday, & Wood-Dauphinee, 1992). The Functional Reach Test considers the difference (in cm) between the participants arm length and maximal forward reach, while maintaining a fixed base of support. Every participant performed the test 3 times and the best score was used for data analysis. In the current study, we use the 15.2 cm as

the cut point for a higher risk of falls (Duncan et al., 1992). The Berg Balance Scale is composed of 14 tasks, and measures the person's ability to maintain balance either statically or while performing various functional movements. Each item is scored on a scale from 0 (unable to do the task) to 4 (independent task completion). The best score on the test is 56 points and according to the original article a score of < 45 point indicates individuals may be at greater risk of falling (Berg et al., 1992).

DATA ANALYSIS

Much of the data were normally distributed, however some data were not normally distributed as confirmed by the Shapiro-Wilk test. Accordingly, the non-parametric Mann-Whitney test or the Independent sample t-test was used where appropriate to compare the descriptive participants' characteristics, PA and physical fitness between the DCC and the NH. Descriptive analysis (mean and standard deviation) was used for all variables. Analyses were conducted with the statistical software PASW Statistical for Windows (Version 22.0; IBM SPSS Inc.). For all statistical tests, significance was set at $p < 0.05$.

RESULTS

Results for habitual PA and sedentary behaviour evaluated by accelerometry are shown in table 2. Data from 7 participants of the DCC group and 5 from the NH group were not collected because they did not use the accelerometer for a sufficient amount of time or the institution did not provide the necessary daily basis support for the use of the accelerometer. Thirteen and 9 subjects had eligible data in the DCC group and in the NH, respectively.

The time that participants engaged in PA was almost entirely performed at light intensity. Vigorous intensity PA was absent in both groups. We found that the DC group in comparison with the NH group spent less time in moderate PA ($p=0.009$) and in sedentary time ($p<0.001$) and has more PA counts/min ($p=0.030$).

Table 2 –Physical activity and sedentary behavior of the participants

	DC (n=13)	NH (n=9)
Sedentary behavior (min/day)	449.1 (18.3)	569.1 (56.4)*
Total PA (min/day)	86.8 (19.4)	79.6 (30.2)
Light PA (min/day)	85.1 (19.6)	77.5 (30.2)
Moderate PA (min/day)	1.6 (0.9)	2.2 (0.4)*
Steps per day (number)	952.2 (284.7)	834.8 (293.5)
Average PA (counts/min)	82.6 (18.0)	58.5 (30.5)*

Note. DC, Day Care Centers; NH, Nursing Home Residents; PA, physical activity. *p<0.05

Table 3 presents the results for the physical fitness tests. The DC group had better results than the NH group in the Chair sit-and-reach test (p=0.015) and in the 6 min walk test (p=0.005). In the NH group a high percentage of participants were in risk of associated health problems, falling, or having functional difficulties, considering the cut-off values proposed in the literature.

Table 3 – Physical fitness of the participants

			High risk or <P25[e]			High risk or <P25[e]
	DC	n	n (%)	**NH**	n	n (%)
30-s chair stand (rep)	7.0 (3.9)	18	9 (50%)	4.6 (4.6)	14	8 (57.1%)
Chair sit-and-reach (cm)	-10.9 (15.4)	18	4 (22.2%)	-22.3 (4.1)*	13	8 (61.5%)
Back scratch (cm)	-36.4 (14.6)	18	8 (44.4%)	-25.6 (23.7)	12	3 (25%)
Arm curl (rep)	10.2 (4.6)	18	7 (38.9%)	9.1 (4.2)	14	6 (42.9%)
(a) 8 foot up-and-go (s)	16.7 (9.8)	18	10 (55.6%)	15.3 (9.2)	13	5 (38.5%)
6 minute walk (m)	270 (73.9)	12	2 (16.7%)	167.7 (84.4)*	11	7 (63.6%)
BBS[a] (points)	44.4 (7.9)	18	5 (27.8%)	42.8 (8.9)	11	6 (54.5%)
FRT[b] (cm)	22.7 (9.2)	18	1 (5.6%)	19.9 (5.7)	13	2 (15.4%)
BMI[c] (kg/m^2) Overweight (%) Obese (%)	28.8 (3.2)	18	 9 (50%) 7 (38.9%)	27.9 (3.9)	10	 3 (30%) 4 (40%)
Waist circunference[d] (cm)	101.0 (8.2)	18	12 (67.7%)	100.8 (8.6)	11	10 (90.9%)
Hand Grip (kg)	19.5 (4.8)	18	-	16.3 (4.0)	14	-

Note. DC, Day Care Centers; NH, Nursing Home Residents. BBS, Berg Balance Scale. FRT, Functional Reach Test. BMI, Body Mass Index.

*p<0.05 for comparison between groups aScore of < 45 indicates individuals may be at greater risk of falling (Berg et al., 1992) b15.2 cm was the cut point for a higher risk of falls (Duncan et al., 1992) cOverweight (≥ 25 kg/m2 and < 30 kg/m2) and obese (≥ 30 kg/m2) (World Health Organization, 2000).

dCutt-offs for a high risk of metabolic syndrome were ≥102 cm in men and ≥88 cm in women (Obesity & Initiative, 2000).

eScores on the Senior Fitness Tests bellow the 25th percentiles (<P25) were interpreted as bellow the normal range (Marques et al., 2014)

DISCUSSION

This study is one of the first surveys that assess PA by accelerometry in NH residents and DCC users and evaluate their physical fitness. It was found that the levels of PA and physical fitness were very low and that sedentary behavior was high among both groups.

Participants that attend DCC spent only ~1.6 min per day in moderate PA. The rest of the ~1.4 hour of daily PA was performed at a light intensity. The average number of steps per day (~952) was also very low in the DCC and NH residents even showed lower values (~834.8). In comparison with the DCC group, NH residents showed better results in moderate PA, worse results in average PA, and spent more time in sedentary behavior. Although there are significant differences between groups in moderate PA, in both cases the results revealed patterns of PA very distant from the health recommendations of accumulating at least 30 min of moderate to vigorous PA (World Health Assembly 2004) or 10,000 steps per day (Tudor-Locke & Bassett, 2004).

There are a limited number of studies that measured PA in institutionalized older adults or DCC users and most of them have reported PA by questionnaire (Król-Zielinska et al., 2011; Pereira et al., 2016; Tomas-carus et al., 2014). A previous study about PA behavior which was also conducted with Portuguese institutionalized older adults (Lobo, Santos, Carvalho, & Mota, 2008), reported better results than ours. The authors divided the sample into tertiles according to min of moderate PA, reporting mean values between 0.6-0.7 min, 4.3-4.7 min and 25.6-27.9 min for each of those tertiles, thus showing that about one-third of the participants have reasonable levels of PA.

We have also found two studies (Pereira et al., 2016; Tomas-carus et al., 2014) that reported results for PA behavior as measured by the International Questionnaire of Physical Activity (Craig et al., 2003). Tomas-carus et al. (2014) showed good results of PA in institutionalized older adults. The authors reported an average of 83 min per day of moderate PA in a group of 187 participants. Regarding sedentary behavior, Tomas-carus et al. (2014) reported that participants spent 2841 minutes per week seated, which is clearly less than the 3983 min per week of sedentary time found in NH residents in the current study.

Pereira et al. (2016) showed that older adults that living in the com-

munity are more active than institutionalized older adults. This study reported that among 186 participants, 37.1% of the institutionalized older adults were moderately active. These results are somewhat striking and eventually could be related with study methodology, since the answers were self-reported by the participants. Results of PA obtained through questionnaires may be overestimated, compared to objective methods. Thus, the use of more objective methods like accelerometer allows for more accurate results. We have not found studies that have assessed the PA of older adults who attend the DCC.

Physical fitness components are very relevant for functional mobility and performance of everyday activities (Rikli & Jones, 1999). The results showed that the participants' physical fitness was low, and that a great number was in risk of associated health problems, falling, or of having functional impairments. The NH residents had significant worse results than the DCC users in chair sit-and-reach test and 6-minute walk. Previous studies have reported better findings in functional fitness of institutionalized participants than our study. Pereira at al. (2016) reported better results than our study in lower and upper body strength, upper and lower body flexibility, agility and dynamic balance, and aerobic endurance. Pereira et al. (2016) also compared the functional fitness of institutionalized older adults with older adults living in the community, concluding that people living in the community have better physical condition. Furtado et al. (2015) observed the functional fitness of women living in the community and institutionalized women. The results obtained were similar to the results of Pereira et al. (2016), with women living in the community showing better functional fitness (Furtado, Sousa, Simão, Pereira, & Vilaça-Alves, 2015).

Balance is a central physical fitness component with repercussions in functional status and affecting significantly the risk of falling. In the current study we have evaluate three tests – Berg Balance Scale, Functional Reach Test and 8 Foot Up-and-Go Test – that have been associated with the occurrence of falls among the older adults. Overall, the tests showed a high-risk profile of our participants. Our study has not found significant differences in balance between NH residents and DCC, and there were no significant statistical differences on the proportion of fallers and non-fallers between those two groups. Although there were no significant differences between groups in the balance tests scores, ac-

cording to the cut-off risk values for the berg balance scale test, more than 50% of the institutionalized older adults were are in risk of falling.
Body composition was also study in the current study. Body mass index and waist circumference measures showed that there were a substantial number of people at a high health risk. For NH residents and the DCC, average body mass index was above the cutt-off level for being overweight and for being obese. Considering the total sample (28 participants), 82% of participants were overweight or obese. It is also impressive that regarding waist circumference, more than 90% of the NH residents were above the cut-offs for a high risk of metabolic syndrome. This results are in line with those by Marmeleira, Ferreira e Raimundo (2017), which reported that almost two thirds of the institutionalized participants were overweight or obese and that the majority of participants were at a high health risk if one considers the waist circumference values. On the other hand, institutionalized elderly participants of the study of Barbosa et al. (2015), had an average BMI (22,59 kg/m2 and 24,32 kg/m2 for men and women, respectively) below the cut-off level (<25kg/m2) for being overweight.
The present study strengthens the idea that NH residents and DCC users have marked low levels of PA and physical fitness, highlighting the importance of implementing adequate health promotion strategies. Nursing homes should provide continuous, individually adjusted and supported PA, for the improvement and maintenance of the residents' physical functions (Frändin & Helbostad, 2016). Exercise programs should be incorporated in the institutions for the older adults, even if it is not possible to include all components or achieves less than the traditional recommended volumes (intensity, duration, and frequency) of PA (Garber et al., 2011). For inactive people, it would be beneficial to start with interspersing short bouts of PA and standing between periods of sedentary activity (Garber et al., 2011).
This study has some limitations that should be noted. It was limited in sample size because both groups have few participants. Also, the supervision of the use of the accelerometer was carry out by NH personnel, and it was not possible to guarantee that participants wear the accelerometer immediately after awakening and remove it just before going to sleep. Finally, there was a discrepancy in the number of participants with valid PA data and with physical fitness data, which weakened the

robustness of the results.

CONCLUSION

Our findings indicate that NH residents and DCC users, have low levels of PA, spent a high proportion of the day in sedentary behavior and have low physical fitness. Day care centers users have better results in sedentary behavior, average PA and functional fitness. Due to their reduced PA levels and physical fitness, a high proportion of NH residents have an increased risk of associated health problems, functional impairment and of falling. The results highlight the importance of institutions for the older adults implement health promotion strategies targeting PA and physical fitness of their residents. This could have positive consequences for the older adults' health status and functional capacity and for fall prevention.

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