
FUNCTIONAL CAPACITY AND LEVEL OF PHYSICAL ACTIVITY IN CENTENARIANS OF FLORIANÓPOLIS, BRAZIL

FUNCTIONAL CAPACITY AND LEVEL OF PHYSICAL ACTIVITY IN CENTENARIANS OF FLORIANÓPOLIS, BRAZIL

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RESUMO

O objetivo deste estudo foi comparar o nível de atividade física com a capacidade funcional de centenários do município de Florianópolis, Brasil. Utilizou-se o pedômetro para a mensurar o nível de atividade física e a Escala de Katz para a capacidade funcional. Participaram 23 idosos (101,7 ± 2,0 anos). Verificou-se a média de 641,23 (DP=655,83) passos/dia entre os idosos. Apesar de os idosos independentes (n=15) terem apresentado maior média de número de passos/dia (813,53; DP=715,97) em relação aos idosos dependentes (n=8) (318,15; DP=378,98), não houve diferença estatisticamente significativa (U= 33,000; p= 0,087). Conclui-se que o nível de atividade física de centenários dependentes e independentes não diferem estatisticamente. Apesar disso, a análise descritiva mostra que o número de passos foi maior nos centenários independentes, sugerindo que os mesmos podem ter um estilo de vida mais ativo.

Palavras-chave: Atividades cotidianas. Centenário. Idoso. Atividade motora.

ABSTRACT

This study aimed to compare the level of physical activity and functional capacity of centenarians from Florianópolis, Brazil. To measure the level of physical activity and functional capacity, pedometer and the Katz scale, respectively, were used. Study participants were 23 centenarians (101.7 ± 2.0 years). The results shown an average of 641.23 (SD = 655.83) steps/day among subjects was observed. Although independent centenarians (n = 15) presented higher average number of steps/day (813.53, SD = 715.97) compared to dependent ones (n = 8) (318.15, SD = 378, 98), no statistically significant difference was observed (U = 33.000, p = 0.087). Conclusions: the level of physical activity of dependent and independent centenarians did not differ statistically. Nevertheless, descriptive analysis shows that the number of steps was higher in independent centenarians, suggesting that they may have a more active lifestyle.

Keywords: Activities of daily living. Centenarian. Aged. Motor activity.

Introduction

The growth of the centenarian population worldwide is evident, and in 2010, there were about 290 thousand people aged one hundred years or more, and by 2050, there will be about 3 million¹. Brazil followed this trend, and in 2010 totaled about 25,000 centenarians². In the context of this global panorama of rapid population aging and life extension, one of the challenges is disease prevention and health promotion, and one of the most important health indicators is the functional capacity³.

Epidemiological studies have found that in people aged over 80, factors associated with worse functional capacity are related to being female, low educational level and old age⁴⁻⁶. Another important factor refers to social ties as inability guards in aging⁶.

Similarly, there is a concomitant relationship between advancing age and decrease in level of activity^{7,8} and population-based studies with elderly Brazilians corroborate this information, reporting that the constant practice of physical activity is little relevant in this population⁸. A prospective study of Asian centenarians found that the increase in hours of leisure physical activity contributed to increased longevity⁹. However, it is observed that is

not common to use objective measure, such as the use of the pedometer to assess the level of physical activity.

The assessment of the level of physical activity through pedometers is widely accepted by researchers, because there is evidence of the relationship between the low number of steps /day and the time spent in sedentary behavior¹⁰. More than this, pedometers can reflect the variability of behaviors of physical activity in older people, and are therefore more sensitive¹¹. Another factor that justifies the use of the pedometer is the fact that walking is considered one of the most physical activities practiced by centenarians^{12,13}.

In the perspective of analyzing the functional capacity, Ozaki et al.¹⁴ assessed Japanese centenarians and found that the maintenance of this capacity and autonomy are significantly influenced by the regular practice of physical exercises, concluding that health practices play an important role in preserving the capacity of performing activities of the daily living, even after reaching the age of 100 years¹⁴.

Studies that have also evaluated the functional capacity of centenarians¹⁵⁻¹⁸ show the importance of maintaining this capacity for compression of morbidity in this stage of life, but remains in the literature gap in the assessment of the level of physical activity objectively, which shows the relevance of this study. Thus, the aim of this study was to compare the level of physical activity and functional capacity of centenarians in the municipality of Florianopolis, SC.

Methods

Study Characterization

This is an epidemiological cross-sectional and comparative study¹⁹. This research conducted a survey of the number of centenarians based on the 2010 census², where of the 48 centenarians living in Florianopolis, SC, 23 participated in the study, as shown in Figure 1.

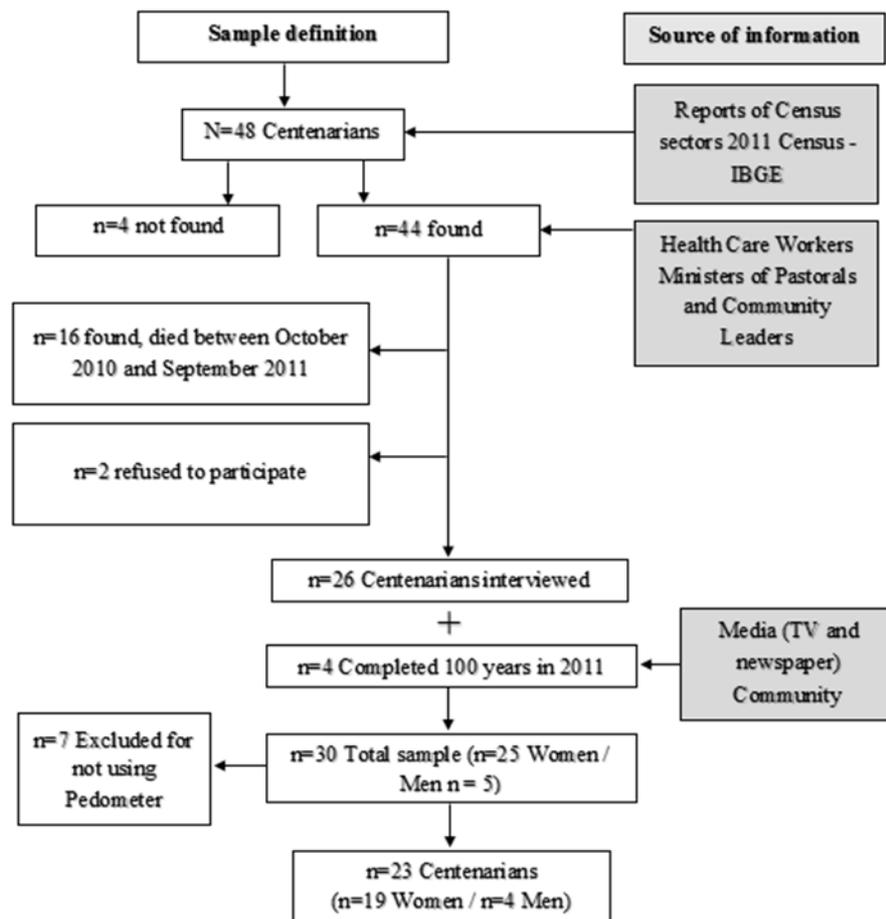


Figure 1. Representative scheme of the selection process of study participants.

Fonte: Os autores

The inclusion criteria were: age of 100 years or more considering the 2011 period; living in Florianópolis for five years or more and use of the pedometer for at least five days a week.

Thus, 23 centenarians with average age of 101.7 ± 2.0 years were selected for this study, 19 women with mean age of 101.9 ± 2.1 years, and four men with mean age of 100.7 ± 0.9 years, living in Florianópolis, SC, Brazil, in 2011.

Instruments

The Multidimensional Protocol for the Assessment of Centenarians and Caregivers was used, prepared by the Laboratory of Gerontology (LAGER) of the Health and Sports Science Center (CEFID), State University of Santa Catarina (UDESC)²⁰. From this protocol, questions relating to sociodemographic data were applied in the form of interview.

The Katz Scale was used to assess the functional capacity of centenarians with regard to activities of the daily living (ADLs) and the level of dependence. This instrument was developed by Katz et al.²¹ and validated to Brazil by Lino et al.²² and ranks the elderly as independent or dependent on the performance of six functions (bathing, dressing, toileting, transferring, continence and feeding)^{21,22}. For the inferential analysis, centenarians were grouped into two groups: "independent", in which individuals were independent in all functions and "dependent", in which they were dependent on one or more functions.

For the objective assessment of the level of physical activity, Power Walker™ pedometer Model PW-610/611 was used. This instrument is a uniaxial movement sensor that records movement of steps in response to acceleration of the body in the vertical axis and measures the number of steps/day over a seven-day period¹¹.

Data Collection

Initially, telephone or personal contact was performed with caregiver and/or centenarian in order to perform the invitation to the research participation. Data collection was performed by previously trained Physical Education professionals and took place in two phases. After participants signed the Informed Consent Form, the first phase included interview with the Multidimensional Assessment Protocol and the Katz scale and the pedometer was configured and delivered with orientation of use for seven days, removing it only to shower and sleep. In the second phase, after seven days, data were collected and the pedometer was removed.

Data Processing

The variables of this study were analyzed using the Statistical Package for Social Sciences (SPSS) - version 20.0. Initially, data were analyzed using descriptive statistics (mean, standard deviation, median and frequency analysis). For normal data was performed Shapiro-Wilk test. In inferential statistics, the Mann-Whitney U test was used, adopting significance level of 5%.

Ethical Aspects

The study was approved by the Ethics Research Committee involving Human Beings of the State University of Santa Catarina, protocol No. 149/2010 and was conducted within standards required by Resolution No. 466/12 of the National Health Council of Brazil.

Results

Table 1 shows the socio-demographic and anthropometric characteristics of the sample for men and women centenarians.

Table 1. Socio-demographic and anthropometric characteristics for men and women centenarians (n= 23)

Socio-demographic characteristics	Men (n=4)	Women (n=19)	Overall (n=23)
Age mean (SD)	100,75 (0,95)	101,91 (2,17)	101,74 (2,05)
Height mean (SD)	1,59 (0,05)	1,43 (0,07)	1,46 (0,09)
Weight mean (SD)	60,95 (14,20)	52,66 (11,88)	54,10 (12,38)
BMI mean (SD)	23,68 (3,83)	25,59 (5,24)	25,26 (5,00)
Schooling			
No Education / Illiterate	00	05	05
Incomplete elementary school /1 to 4 years	01	05	06
Complete elementary school /5 to 8 years	02	05	07
Incomplete High School	01	03	04
Complete High School	00	00	00
Higher Education	00	01	01
Marital status			
Single	01	00	01
Married	01	00	01
Widowed	03	18	21

Source: Authors.

It was observed that most centenarians were women and widows. In addition, half of subjects reported four years or less of schooling, indicating low educational level.

Regarding the level of physical activity, it was found by means of the pedometer, mean of 641.23 ± 655.83 steps / day, with a wide variation in the mean number of steps / day (22.14 to 2441.57). With regard to functional capacity, it was found that 15 centenarians (65.21%) were classified as independent in all functions and 8 (34.79%) as dependent on at least one function through the Katz scale. Among the dependents, 7 are female and a male. Among independents, there were 12 women and three men. Among the tasks that were most significant to characterize centenarians as dependent, transferring ($n = 5$) was the most cited, followed by bathing ($n = 3$), sphincter control ($n = 3$), use of toilet ($n = 3$), feeding ($n = 2$) and dressing ($n = 2$).

When comparing the level of physical activity in individuals classified as independent and dependent by the Katz scale, there was no significant difference ($U = 33.000$, $p = 0.087$) in the number of steps between groups, as Table 2. Nevertheless, it is noteworthy that independent centenarians showed greater number of steps / day in relation to dependent centenarians.

Table 2. Comparison between dependent and independent centenarians in relation to the level of physical activity.

Katz Scale	Frequency (%)	Average number of steps/day (SD)	<i>U</i>	<i>p</i>
Independent	15 (65.21)	813.53 (715.97)	33.000	0.087
Dependent	08 (34.79)	318.15 (378.98)		

SD = Standard Deviation; *U* = Mann-Whitney U test; *p* = level of significance.
Source: Authors.

Discussion

In this study, it was observed that, although independent centenarians to perform activities of daily life do not present a significantly higher number of steps compared to the dependent elderly, the descriptive analysis revealed that independent elderly have an average number of steps / greatest day than dependent elderly (813.53 and 318.15, respectively).

According to the World Health Organization, the number of centenarians in the world increased from 90 to 292 thousand between 1990 and 2010²³. Despite this growth, studies involving this population segment are specific and have reduced sample size^{18,24,25}, similar to this study. However, it is noteworthy that even with a small sample, it is an important epidemiological study to understand the level of physical activity and functional capacity of centenarians and compare these variables.

Another relevant aspect is the low educational level, and similar studies have also described this feature in their sample^{18,26}. Biolchi et al.¹⁸ explain the fact because in the early twentieth century, when these centenarians were born, access to the public school system was limited¹⁸. Mazo (1998) reports that the lack of family encouragement related to family educational model of that time and differences related to social roles of individuals may have contributed to this result.

Regarding the functional capacity of the evaluated centenarians, we found that of the 23 study participants, 15 are independent for activities of daily life, showing that despite his advanced age, had capacity for self-care and independence, which is a key feature for survival

in extreme longevity²⁷.

Study with 16 individuals aged 95 years or more of Porto Alegre, RS, used the Katz scale to assess functional capacity and found that 56.3% of individuals had preserved ability to perform activities of the daily living, being considered independent. The authoress found that this level of independence is due to the fact that individuals performed occupational and leisure activities, as they did not practice regular physical activity²⁸.

A longitudinal study carried out by Yi and Vaulpe²⁹, between 1998 and 2002 in China on health and longevity of 8,170 Chinese elderly aged 80-105 years found that 48.6% of men and 38.5 % of women living in rural areas were able to perform ADLs and in urban areas, this proportion was 39.2% for men and 27.8% for women²⁹. The authors reported greater loss of functional capacity and physical performance in women and this gender difference was accentuated with advancing age. In addition, Wong et al.²⁵ found that in a sample of 6 healthy centenarians individuals, all were considered independent according to the Katz scale.

The aforementioned studies corroborate the results of this study, because most individuals were considered independent. However, we must be careful when using these studies as a reference. First, the studies of Wong et al.²⁵, Yi and Vaulpe²⁹ were performed with an oriental population and cultural differences involved when comparing with the findings of this study should be considered^{25,29}. In addition, methodological differences must also be considered, and these samples cannot be used as a way to generalize the centenarian population as bedridden centenarians are usually excluded from some studies, which may overestimate their functional capacity.

In this study, the level of physical activity was expressed by the number of steps, verifying an average of 641.23 (SD = 655.83) steps/day among centenarians. High standard deviation was observed in this variable, which reinforces the idea that one of the characteristics of the aging process is the heterogeneity among individuals³⁰. Tudor-Locke et al.¹¹, in a review on established values for the use of pedometer, found a wide variation of results (2000-9000 steps / day). However, one should take into account that the review involved studies with samples that ranged from 50 to 94 years old and no studies were found with the reference values for the centenarian population.

Comparing dependent and independent centenarians, it was observed that despite the higher average number of steps/day shown by the independent group, no significant statistical difference was found, which can be attributed to heterogeneity and small number of participants. Nevertheless, the descriptive analysis of this study suggests that higher levels of physical activity in centenarians can provide independence for activities of daily living, an idea that is consistent with the literature, which shows the relationship of an active lifestyle with maintaining physical feature³¹.

Conclusion

It was concluded in this study that the level of physical activity of dependent and independent centenarians living in Florianópolis, SC did not differ statistically. Nevertheless, descriptive analysis shows that the number of steps was higher in independent centenarians, suggesting that they may have a more active lifestyle.

The information from this study can subsidize interventions for future actions aimed at active lifestyle among centenarians such as the implementation of public policies aimed at promoting the health of this age group through physical activity in order to maintain independent living and autonomy of these individuals.

It is suggested studies investigating assessment of functional capacity and level of physical activity, with longitudinal follow-ups in order to check the decline in functional capacity according to the level of physical activity.

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