



Depressive symptoms and perspectives of life, according to the level of physical activity of centenarians

Sintomas depressivos e perspectivas de vida, mediante o nível de atividade física de centenários

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ABSTRACT

This study aims to describe depressive symptoms and future life perspectives in centenarians according to physical activity level. A quantitative descriptive study was conducted on 20 centenarians with preserved cognition, living in Santa Catarina. The Geriatric Depression Scale (GDS-15) was applied to the older adults to evaluate depressive symptoms, with open questions regarding future life perspectives. A pedometer was used to determine the level of physical activity. The data were analyzed using descriptive statistics. Wide variability was observed in step count and the overall mean number of depressive symptoms was low (4.3 ± 3.02). Most participants attributed their perspective of how long they want to live to spirituality, some want to live only while they are in good health, and others do not want to live anymore. In conclusion, physical activity does not influence the perception of older adults of how many years they want to live, but affects the suspicion of depression.

Keywords: Centenarians. Depression. Motor activity. Perception.

RESUMO

Este estudo tem como objetivo descrever os sintomas depressivos e as perspectivas futuras de vida em centenários mediante o nível de atividade física. Estudo quantitativo descritivo realizado com 20 centenários com cognição preservada, residentes em Santa Catarina. Aplicou-se aos idosos a Escala de Depressão Geriátrica (GDS-15) a fim de que se verifiquem os sintomas depressivos, com perguntas abertas quanto às perspectivas futuras de vida e o pedômetro para analisar o nível de atividade física. Os dados foram explorados por meio de estatística descritiva. Foi encontrada grande variabilidade na contagem de passos e o número médio geral de sintomas depressivos foi baixo ($4,3 \pm 3,02$). A maioria atribuiu sua perspectiva de quantos anos quer viver a espiritualidade, alguns querem viver somente com saúde e outros não querem mais viver. Conclui-se que a atividade física não influencia os idosos na percepção de quantos anos querem viver, mas afeta a suspeita de depressão.

Palavras-chave: Atividade motora. Centenários. Depressão. Percepção.

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INTRODUCTION

The world population is aging; thus, it is becoming increasingly more common to find people who are older than 80, 90 and even 100 years¹. The 2010 demographic census conducted by the Institute of Geography and Statistics recorded 24,236 centenarians in Brazil².

In view of the marked increase in the number of long-lived older adults, especially centenarians, it is necessary to better understand biological and behavioral characteristics and the lifestyle of these individuals^{3,4}. These variables include depressive symptoms, future life perspectives, and the level of physical activity (PA).

According to the World Health Organization¹, more than 15% of the elderly population has depression. In an epidemiological study involving centenarians from Japan, France, Switzerland, Denmark and Sweden, Herr et al.⁴⁹ found a prevalence of depression of 12.5% among older adults of these countries. Depression is characterized by moodiness, emptiness or irritability, accompanied by somatic and cognitive changes that significantly affect the individual's psychosocial functioning¹⁰. Studies indicate that the main risk factors for depression in older adults are cognitive impairment^{11,7,12}, disabilities^{13,14}, comorbidities¹⁵, frailty^{9,16}, and the advancing age itself¹⁷. These factors affect the satisfaction with life in which the preservation of the individual's autonomy

for performing activities of daily living is considered an important function (HAO et al., 2019). It is also interesting to note that one in every four Portuguese and German centenarians are longing for death¹⁸.

The death wish of centenarians is often related to their reflections about the end of life and their future life perspectives. In one study, English centenarians were asked about these aspects and their answers indicated that they do not want to think about death, accept that this process is inevitable, and are even longing for it¹⁹. Another study showed that the perspectives of Hong Kong centenarians are based on short-term goals and many of them reported that living to the next day is the only thing they wish for²⁰.

The feelings of death may be fostered by depressed mood, a condition called neuroticism²¹ that may arise after the older adult is afflicted by major disabilities, which are strongly associated with depression²². Physical disabilities and depression can be attenuated by regular PA, which is highly effective in maintaining the older adult's independence²³. In addition, physical exercises exert antidepressive effects in older adults, particularly aerobic activities²⁴. Furthermore, PA favors social interaction²⁵ and has a positive effect on body image, in addition to reducing physiological stress responses and stimulating brain alterations such as the increased secretion of serotonin and endorphin, with several benefits for older adults²⁶.

Physical activity and leisure of centenarians are often restricted to the home environment^{27,28}. Streit et al.²⁹ found a low average step count among centenarians from Florianópolis. The low level of PA in centenarians is a characteristic of the oldest-old. Within this context, interventions designed to maintain the mobility of these older adults may have benefits³⁰, improving future life perspectives and depressive symptoms.

Therefore, the aim of this study was to describe depressive symptoms and future life perspectives in centenarians according to PA level. The hypothesis of the study is that “more active” centenarians will have fewer depressive symptoms and, consequently, a positive perception of life.

METHODOLOGY

STUDY DESIGN AND ETHICAL CONSIDERATIONS

This is a quantitative descriptive study³¹ that is part of the project “SC100: Multidimensional Study of Centenarian from Santa Catarina” (Project SC100) conducted by the Laboratory of Gerontology (LAGER), Center for Health and Sport Sciences (CEFID), Santa Catarina State University (UDESC). The project was approved by the Ethics Committee on Research Involving Humans of UDESC (No. 1.468.034/2014) under CAAE 21417713.9.0000.0118, according to Resolution 466/2012 of the National

Health Council. All participants signed the free informed consent form.

STUDY SAMPLE

Twenty centenarians whose age was confirmed by an official document participated in the study, including those who would turn 100 in the respective year of data collection. Centenarians from the mesoregions of Grande Florianópolis, microregion of Joinville, Vale do Itajaí and Sul Catarinense de Santa Catarina with preserved cognition evaluated by the Mini-Mental State Examination (MEEM; Portuguese version developed by Bertolucci et al.³² and cut-off proposed by Brucki et al.³³ based on educational level), who answered all questions of the study and used a pedometer for 7 days for assessing PA level, were included. The study location was the centenarian’s home or the geriatric institution if the older adult was institutionalized.

INSTRUMENTS AND DATA COLLECTION

The instruments used for data collection are part of the Multidimensional Assessment Protocol for Centenarians (PAMIC in the Portuguese acronym)³⁴ and were applied by trained researchers following the guidelines of the Interviewer Manual: Application and Analysis of the Multidimensional Assessment Protocol for Centenarians³⁵. The data were collected during two meetings in the homes of the

centenarians and/or of the primary/family caregiver.

PAMIC questions of the following blocks were applied: Block 1 – Identification of the Older Adult (name, date and place of birth, age, sex, proof of age document, address, duration of residence, and telephone contact); Block 2 – Auditory Assessment to identify the ear the older adult hears best with and to position the researcher for the interview; Block 4 – Sociodemographic Data (sex, marital status, education, religious beliefs); Block 7 – Health Conditions (health situation; diseases); Block 12 – Mood and Depression, which involve questions of the Brazilian version of the Geriatric Depression Scale (GDS-15) using a cut-off value >6 for suspicion of depression as proposed by Almeida and Almeida³⁶; Block 13 – Perceptions and Expectations of the Older Adult in which the following questions were applied to describe the future life perspectives of centenarians: “How many years do you want to live?” (Question 1), “What do you usually worry about?” (Question 2), and “Do you worry about how you will die?” (Question 3). Thematic content analysis was used to analyze the answers to these questions³⁷. These questions were applied by interview, which was recorded.

Block 16 of the PAMIC (Kinanthropometric and Physical Assessment) was also used to record information about pedometer programming (body weight and stride amplitude of the centenarian). The older adults used a Power

Walker™ PW-610/611 pedometer for 7 consecutive days during a typical/normal week to record the daily number of steps. The use of the pedometer was explained to the older adults, who also received an explanatory leaflet. The PA level of the participants was classified into tertiles (33.3% per group) according to the mean number of steps per day: 1st tertile < 443 steps = less active; 2nd tertile 444 to 1,327 steps = regularly active; 3rd tertile $> 1,328$ steps = more active.

DATA ANALYSIS

The data were entered into the Excel program and analyzed with the IBM SPSS 20.0 software using descriptive statistics (mean, standard deviation, and simple frequency). The names of the centenarians were replaced with “participant” followed by an Arabic number and letter (M or F) indicating the sex in order to ensure confidentiality.

RESULTS AND DISCUSSION

This study evaluated 20 centenarians (101.05 ± 2.06 years) with preserved cognition (MEEM 23.3 ± 2.69), who participated voluntarily in the study (non-probability sampling). There were 10 women (101 ± 1.49 years) and 10 men (101.1 ± 2.6 years). The number of steps/day taken by the centenarians over one week varied widely (15 to 8,256 steps per day).

Regarding depressive symptoms on a scale from 0 to 15, the answer with the largest score was 10 symptoms and the overall mean among the centenarians was 4.3 (SD = 3.02) symptoms. This number is slightly lower than that found among Jewish centenarians living in Europe (4.67 ± 4.01)¹⁴. Most participants were widowed (65%), as also reported for Greek³⁸, American^{39,5}, Portuguese⁹, and Chinese centenarians⁴⁰.

A finding that called attention was that only 10% of the centenarians reported poor health, showing good health perception of this population as indicated in the literature^{7,8}. The predominant diseases in these older adults were hypertension (55%), eye disease (55%), and hearing problems (65%), similar to the findings of other studies on centenarians^{39,9,41,42}. It should be noted that none of the

centenarians had a diagnosis of diabetes (the question considered the report of a health professional) and only one had depression, considering that almost all centenarians had some type of disease³⁹. Table 1 shows the sociodemographic profile, mean number of depressive symptoms, mean number of steps/day, and health conditions of the centenarians participating in this study.

Although only one of the older adults reported depression diagnosed by a physician as can be seen in Table 1, five participants with a suspicion of depression according to the Geriatric Depression Scale³⁶ were identified. This finding agrees with the literature since the diagnosis of depression is difficult and the disease often remains undiagnosed in centenarians due to the lack of access¹⁷.

Table 1. Sociodemographic profile, mean number of depressive symptoms, mean step count, and health conditions of the centenarians participating in the study (n=20)

Characteristic	Mean (SD)	Range
Age (years)	101.05 (2.06)	99 – 106
MEEM	23.3 (2.69)	20 - 28
Mean number of steps/day	14,99.83 (1,992.03)	15 – 8,256
Mean number of depressive symptoms	4.3 (3.02)	0 – 10
Sociodemographic		
	n	%
Sex		
Male	10	50
Female	10	50
Marital status		
Widowed	13	65
Married or with partner	6	30
Single	1	5
Education		
Yes	12	60
No	8	40
Primary caregiver		
Child/Grandchild	10	50
Spouse/Partner	2	10
Other	8	40
Religion		
Catholic	12	60
Evangelical	6	30
Spiritist	2	10
Health conditions		
Good/Very good	6	30
Regular	12	60
Poor/Very poor	2	10
Type of disease*		
Cardiovascular	6	30
SAH	11	55
Stroke	2	10
Spine or back	3	15
Arthritis	5	25
Arthrosis	5	25
Osteoporosis	7	35
Diabetes	0	0
Constipation	6	30
Depression	1	5
Bronchitis or asthma	6	30
Emphysema	1	5
Dyslipidemias	3	15
Eye disease	11	55
Hearing problems	13	65
Cancer	6	30
Urinary incontinence	4	20
Gastritis	2	10

Legend: SD = standard deviation; n = absolute frequency; % = relative frequency; MEEM = Mini-Mental State Examination; SAH = systemic arterial hypertension. *Multiple response option.

Source: The authors.

Five of the 20 centenarians had a suspicion of depression, similar to the study of Ribeiro et al.⁹ in which one of three centenarians had a suspicion. Among the four older adults with a suspicion of depression, two belonged to the less active group and two to the regularly active group. None of the older adults in the more active

group had a suspicion of depression. Thus, centenarians of this study with a higher PA level were less likely to have depression, corroborating the findings of Silveira et al.⁴³. Chart 1 shows the number of depressive symptoms, presence or absence of a suspicion of depression, and PA level of each centenarian.

Chart 1. Number of depressive symptoms (GDS-15), suspicion of depression, and physical activity level of the centenarians studied (n=20)

Identification	Age	Number of depressive symptoms (GDS-15)	Suspicion of depression*	Physical activity level
Participant 1 - M	100	10	Yes	Regularly active
Participant 2 - M	100	9	Yes	Regularly active
Participant 3 - F	99	8	Yes	Less active
Participant 4 - F	102	8	Yes	Regularly active
Participant 5 - F	103	7	Yes	Regularly active
Participant 6 - M	106	6	Yes	Less active
Participant 7 - F	99	6	Yes	Regularly active
Participant 8 - F	101	5	No	Less active
Participant 9 - F	103	4	No	Regularly active
Participant 10 - M	100	4	No	More active
Participant 11 - M	100	4	No	Less active
Participant 12 - F	101	4	No	More active
Participant 13 - F	100	4	No	More active
Participant 14 - M	100	2	No	More active
Participant 15 - M	100	1	No	Less active
Participant 16 - F	102	1	No	More active
Participant 17 - F	100	1	No	Regularly active
Participant 18 - M	106	1	No	Regularly active
Participant 19 - M	100	1	No	More active
Participant 20 - M	99	0	No	Regularly active

M = male; F = female. *Suspicion of depression according to the cut-off (>6) of the Geriatric Depression Scale (GDS-15).

Source: The authors.

Regarding the future life perspectives of the centenarians, among the answers to Question 1, there was a predominance of replies placing divinity (God) in their perspective of how many years they will live (n=12); in addition, all participants reported having a religion.

According to Barreto Grangeiro et al.⁴⁴, elderly people tend to have faith in the figure of God and also in the church, with this being seen as a positive factor by centenarians. Chart 2 shows the detailed answers and profile of the respondents.

Chart 2. Future life perspectives according to the physical activity level of centenarians (n=20)

Identification	Age	PA level	Future life perspectives			
			I don't want to live anymore	I want to live more	God knows	Did not answer
Participant 16 - F	102	More active	Yes		Yes	
Participant 12 - F	101	More active			Yes	
Participant 10 - M	100	More active	Yes	Yes		
Participant 19 - M	100	More active			Yes	
Participant 13 - F	100	More active		Yes	Yes	
Participant 18 - M	106	Regularly active	Yes	Yes		
Participant 5 - F	103	Regularly active			Yes	
Participant 9 - F	103	Regularly active			Yes	
Participant 1 - M	100	Regularly active				Yes
Participant 17 - F	100	Regularly active		Yes	Yes	
Participant 20 - M	99	Regularly active		Yes		
Participant 6 - M	106	Less active		Yes		
Participant 8 - F	101	Less active	Yes		Yes	
Participant 11 - M	100	Less active			Yes	
Participant 15 - M	100	Less active			Yes	
Participant 3 - F	99	Less active				Yes
Participant 2 - M	100	Regularly active	Yes			
Participant 7 - F	99	Regularly active			Yes	
Participant 14 - M	100	More active			Yes	
Participant 4 - F	102	Regularly active			Yes	
	Total		5	6	13	2

PA = physical activity; M = male; F = female.
Source: The authors.

As can also be seen in Chart 2, five centenarians no longer wanted to live, others wanted to live longer (n=6), a minority preferred not to answer (n=2), and some placed their hope in divinity (n=13). Some participants provided more than one answer. This variation between responses is similar to that found in European studies^{45,18}, which emphasize that centenarians are experts in dealing with the end of life, but discussing this issue is still viewed with fear by others depending on factors such as culture and beliefs. In addition, culture and religiosity are known to be intimately related⁴⁶.

Two centenarians, 'Participant 10 – M' (100) and 'Participant 18 – M' (106), reported that they want to live longer but in good health. When asked how many years they wanted to live, these older adults answered that "if healthy, many years. But if I'm not healthy, I do not want to live anymore". The same was reported in the study by Fleming et al.¹⁹ in which part of the sample reported that they were not worried about death itself, but were more concerned about the process of dying. The subjects stated that they prefer dying comfortably rather than facing hospital treatment.

With respect to centenarians who expressed the desire to die (n=4), such as 'Participant 10 – M' (100), 'Participant 18 – M' (106), 'Participant 16 – F' (102),

'Participant 8 – F' (101) and 'Participant 2 – M' (100), interestingly, none of them had a wish for death itself but this desire was linked to another answer such as divinity or ill health. When asked the same question, one-fourth of German and Portuguese centenarians wished for death¹⁸. English centenarians reported that they are ready to die, only waiting to be "called"¹⁹.

Regarding Question 2 (What do you usually worry about?), nine centenarians answered "I don't worry about anything". Six older adults, mostly women, answered "I worry about the health of children and grandchildren". According to Ferrigno⁴⁷, women tend to be more concerned about the family, i.e., culturally they assume roles as caregivers and are also more courageous. On the other hand, men are concerned about health because they perceive a greater weakness of the body. This fact is consistent with the answers of 'Participant 2 – M' (100) and 'Participant 18 – M' (106): the first reported "I worry about everything" and the second was worried about "Pain he feels".

On the other hand, there are older adults who are worried about financial issues and the country's situation: 'Participant 5 – F' (103), "financial concerns" and 'Participant 10 – M' (100), "worried about the current situation of the country". Furthermore, in older adults, the

body shows signs of the years lived, a fact that can lead to significant losses which may favor isolation and/or loneliness⁴⁸. This situation was reported by 'Participant 9 – F' (102): "I'm afraid of being alone".

With respect to other questions related to the concerns of centenarians, the predominant answers were related to divinity. Regarding Question 3, when asked "Do you worry about how you will die?", the answers were also related to divinity. Five centenarians answered "No, God knows, when God wants to take me": 'Participant 16 – F' (102), 'Participant 12 – F' (101), 'Participant 19 – M' (100), 'Participant 11 – M' (100), and 'Participant 15 – M' (100).

Four older adults answered "No, because death is a sure thing": 'Participant 18 – M' (106), 'Participant 1 – M' (100), 'Participant 13 – F' (100), and 'Participant 8 – F' (101). This understanding is generally common in centenarians, as they are dealing with the end of life. Sometimes, there is a need for support, protection and dialogue about inheritance and funeral, which are central needs of centenarians who are in the finitude of life⁴⁵. Wong et al.²⁰ emphasize that centenarians tend to have positive attitudes towards life.

Three centenarians, 'Participant 20 – M' (99), 'Participant 15 – M' (100) and 'Participant 17 – F' (100). answered "No, I want to die suddenly, a sudden death".

According to Fleming et al.¹⁹, centenarians are more worried about the process of dying than about death itself. Another answer that called attention was that of 'Participant 6 – M' (106), who stated that "Yes, everyone is afraid of the way they will die and not death", revealing that this theme is part of the daily thoughts of this elderly person.

CONCLUSION

The present results revealed wide variability in step count and a low overall mean number of depressive symptoms. A finding that calls attention in this study is that, although only one centenary reported depression, a suspicion of depression was detected by the instrument used, highlighting the difficulty in diagnosing this population. The older adults may suffer from depression without being properly treated. The recommendation is that families and the public sector pay more attention to the mental health of these individuals in order to reverse this situation since demographic changes including an increase in the number of centenarians are evident and services must provide the necessary assistance.

This found that the level of physical activity of the centenarians does not influence the prospects for future life, but demonstrates that these are mostly related to spirituality, thus demonstrating the importance of this aspect in the lives of the elderly, with and without suspicion. depression and with different levels of

physical activity. Further studies are recommended, focusing on future perspectives, depression and physical activity with a greater number of centenarians, in order to better understand the possible relationships between these variables.

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