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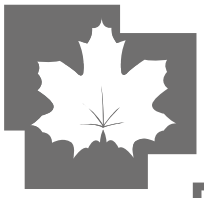

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The National Health Survey and the health of older adults in Brazil

National health surveys are useful tools for identifying the health needs of a population, and allow a greater understanding of the health-disease process. The information generated by these surveys is of relevance to the academic field, as it provides knowledge about the occurrence of diseases, health problems and health behaviors at a populational level, contributing to the planning and management of social and health policies.

The Brazilian experience of national health surveys began with a comprehensive and systematic approach, through the inclusion of a health module in the National Household Sample Survey (or PNAD), the first edition of which was implemented in 1998, with subsequent editions every five years. From 2013 onwards, as the result of a joint strategy of the Ministry of Health, the Oswaldo Cruz Foundation and the IBGE, PNAD Health was replaced by the National Health Survey (or PNS), which became one of the most important tools in the Brazilian health surveillance program, producing primary data on the health conditions of the country's population. Data from the last edition of the PNS, carried out between August 2019 and March 2020, are already partially available on the website of the Brazilian Institute of Geography[1]. The microdata of the survey comprise information on 23,144 people aged 60 years and over, who answered the complete survey questionnaire, while information about the living, housing and health conditions of another 20,410 people in this age group was reported by a respondent in the home.

Some important methodological characteristics of the last edition of the PNS are worth noting. It is a household-based survey, whose sample consists of residents residing in permanent private households throughout Brazil[2]. Considering the particular characteristics of the older population, this study does not include residents of Long Term Care Facilities for Older Adults, a limitation which should be discussed in studies that use such data sources.

The research sampling plan consists of a three-stage cluster approach. The first stage corresponds to the selection of a primary sampling unit, the second to the selection of households and the third to the selection of the resident aged 15 years or over who is to respond to the complete survey questionnaire[2].

The questionnaire is formed of three parts. The first consists of the characteristics of the household, answered by the head of household, and is composed of questions about housing conditions, sanitation and registration of the household in the Family Health Strategy. The second contains information about all the residents in the household, in relation to level of education, income, occupation, physical or intellectual disability, health plan coverage, access to and use of health services, health of residents aged 60 years and over and of children under the age of 2[2].

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This health information can be provided by a respondent who is responsible for the household, who provides the answers about the other residents. The first and second part of the questionnaire, which consist of modules A to L, makes available data from 279,382 people, of whom 15.6% (43,554) are aged over 60 years.

Module K of the questionnaire is an important source of information for the area of geriatrics and gerontology, containing 62 questions about the health of individuals aged 60 years and over. The first part of this module has 36 questions about the presence of limitations or incapacities in the performance of activities of daily living. Also included in this module are questions on the use of health services, use of medications, diagnosis and treatment of cataracts, immunization against influenza, occurrence of falls and fractures, and associated treatments[3].

The third part of the questionnaire, corresponding to modules M to Y, is answered only by residents aged 15 years or over, who are selected by simple random sampling from eligible members of the household. The total number of residents selected in the survey was 90,846 and of these, 25.5% (23,144) were aged 60 years or over at the time of the interview. This section contains questions in relation to work and social support, perception of health status, accidents, chronic diseases, women's health, prenatal care, paternity and prenatal care of partner, violence, oral health, communicable diseases, sexual activity and medical and health care[1,2].

Given the plethora of current data produced by the PNS available in the area of geriatrics and gerontology, researchers can choose to conduct studies based on the household sample or the sample of selected respondents. The first has information about all older adults living in the households selected for the sample. The second contains information about the sample of older adults selected as respondents to the third part of the questionnaire.

In the sample composed of all older adults living in the selected households, the sample is larger, although the information available for this group is limited. In the sample of selected respondents, there is a smaller sample size, but a greater amount of information is available. Both options consist of excellently sized samples that are representative of the population residing in permanent private households in Brazil, and it is up to the researcher to select the best option for the topic of interest.

Due to the use of complex samples, special care must be given to the analysis of data from the PNS and other studies that use this type of sampling design, which should not be carried out in a conventional manner, as though the observations were taken from simple casual sampling. In complex samples, the probabilities of participant selection are different in each of the sampling stages[4].

As a result, during data analysis, different weights should be assigned to each of the study participants. These weights consist of the inverse product of the selection probabilities of these participants at all stages of the sampling plan. The design effect, caused by the use of clusters in the drawing stage, must also be considered. Thus, the analysis of PNS data must be performed using statistical packages that contain modules for complex samples. Most software packages used in the area of health have modules for this type of analysis, such as the Complex sample module of the Statistical Package for the Social Sciences (SPSS), the Survey data (svy) of STATA, and the Survey library of the R software package[5].

Thus, there is a concrete possibility of the production of new scientific evidence when using data made available in public repositories, from studies developed with methodological rigor on a nationwide basis. The PNS is a valuable source of current information about the health conditions of the older Brazilian population, which can and should be better explored in studies in the area of geriatrics and gerontology.

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Cross-cultural adaptation of the original version of the Older Adults Socio-familial Evaluation Scale to the Brazilian context

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Abstract

Objective: To cross-culturally translate and adapt the Spanish Older Adults Socio-familial Evaluation Scale (*Gijón Scale*) to the Brazilian context. *Methods*: A methodological procedure of cross-cultural adaptation with translation (Spanish-Portuguese), back-translation (Portuguese-Spanish), evaluation of semantic, idiomatic, experimental, and conceptual equivalences, and pretest of the Brazilian version in a sample of 30 older adults. For the concordance analysis, proportionality and the Kappa Cohen-Fleiss index (κ) were measured. In addition, internal consistency was confirmed by Cronbach's alpha. *Results:* Translations (T1 and T2), back-translations (RT1 and RT2), and evaluations of the synthesis version (T12) were carried out by a Committee of Experts, and a neutral judge ensured the evaluative essence of the original version of the scale in T12. The evaluation of the 34 components of T12 showed semantic (100%) and idiomatic (94%) adequacy, and adequacy greater than 70% for experimental and conceptual equivalences. There was almost perfect concordance among the experts of the Committee: semantics (κ=0.95), idiomatic (κ=0.97), experimental (κ=0.98), and conceptual (κ=0.99). The T12 pretest resulted in substantial reliability of the instrument with a Cronbach's alpha of 0.77. *Conclusion:* The present study ensures the cross-cultural adaptation of the Socio-familial Evaluation Scale to the context of the older person living in Brazil. The equivalence evaluation resulted in almost perfect concordance among experts. The target audience did not report difficulties in understanding the assertions of the scale. The instrument

Keywords: Validation Study. Risk. Health of the Elderly. Social Vulnerability.

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proved to be reliable considering the Cronbach's alpha obtained. After validating the scale, an ongoing study, a reliable instrument will be made available for tracking the socio-familial situation of older adults in the Brazilian context.

INTRODUCTION

Recent agreement points to the need for interdisciplinary actions based on the interaction between specific knowledge from different sciences to optimize care for the older person[1–3]. Characteristics such as family environment[4], gender, and ethnicity should be considered in the evaluation of the health-disease process as the imbalance between these factors may result in health inequities or inequalities experienced by the individual during life[5]. Including psychosocial factors in health evaluation favors more comprehensive interventions[6,7], planning actions that can be preventive, rehabilitative, or therapeutic[8] and impact the population's health conditions and the investments made by the healthcare system[9].

However, the association of other dimensions related to the global care is still a point of interest of the academic community[9–11]. The theme related to cognitive and functional aspects stands out among investigations, especially studies aiming to ensure the adequacy of instruments to track the profile of the older population living in Brazil[12]. This direction points to the hierarchization of care, focusing on cognitive and physical functional evaluation and being the starting point of the Brazilian healthcare model[13]. The integrated care capable of covering the triad formed by the individual, social, and programmatic aspects of the life of this population[14–16] focuses on possible situations of social vulnerability resulting from the aging process[17,18].

The conditions and quality of life of older adults are related to their social context and affect their social and economic structure[4,19]. Therefore, the multidimensionality of care, from the initial evaluation to the follow-up of the individual, encourages their protagonism and their network of relationships and social support[20]. These specific dimensions can be evaluated with the support of different instruments that meet the development and validation criteria for use in Brazil[12,21,22]. However, evaluating social aspects in human aging still presents a reductionist approach[12,20] with fragmented and disconnected actions among care providers. Furthermore, it is noteworthy that the indicators from the evaluation of the social aspects enable to structure public policies and more efficient and comprehensive actions to meet the demands of the older population[9].

Establishing a relationship between the environmental and socioeconomic factors ensures the expansion of interventions on the level of social and family cohesion as well as other individual factors that may be associated with morbidity and mortality in this population[7,20]. However, for this measure, it is necessary to use an instrument covering different social dimensions[14,15].

In an evaluation of the social context of older adults' lives, these dimensions are related to environmental adjustment, personal adaptation, subjective welfare, and their social interactions[15]. It is possible to measure these dimensions using the Older Adults Socio-familial Evaluation Scale (OA-SFES), also known as *Gijón's scale*[15]. In its internal organization, it assesses the socio-familial situation of the interviewee on an individual basis and points out the social situation in three different sectors[14–16].

Originally built and validated in Spain, it is used as a gerontological, multidimensional tool for social screening purposes with substantial reliability and good trustworthiness[15]. In Portugal, the scale underwent a validation study comprising gerontological tracking protocols[14]. In Peru, it was adequate without the validation criteria and is part of the protocol "*Valoración Clínica del Jovens Mayor*"[16]. The scale also investigates older adults in other Spanish-speaking countries without the validation process[23–25].

Even without being subjected to the methodological rigor to adapt and validate evaluation instruments, the scale is used in Brazil to evaluate services in the Integrated Comprehensive Care project (ICC)[26]. The use of the scale by social workers from

the ICC multidisciplinary team enabled the detection of cultural and language gaps, which motivated interest in the development of this research, which consists of cross-cultural adaptation (CCA) and subsequent validation.

Thus, it is urgent to expand the list of evaluative instruments to the context of older adults living in Brazil[12,21,22]. The present work aims to cross-culturally translate and adapt the Older Adults Socio-familial Evaluation Scale to the context of the older population living in Brazil. It is worth noting that the translation and the CCA represent the initial stages of the scale validation and give attributes and dimensions appropriate to the instrument variables[27]. Furthermore, adapting and validating the OA-SFES to the Brazilian context will raise new health indicators and establish a relation between living conditions and the health-disease process of older adults[14,15].

METHOD

The Older Adults Socio-familial Evaluation Scale (OA-SFES) evaluates the socio-familial situation of older people from a multidimensional perspective. Validation studies conducted in Spain and Portugal report that the scale can be self-administered or preferably conducted by a social worker professional[14,15].

Among its inner characteristics, the scale is organized into five domains to measure different aspects of the older person's life: I- Family situation; II- Economic situation; III- Housing situation; IV- Social relations; V- Social support network[14,15]. Each domain comprises five assertions with values from one to five. The interviewer selects only one assertion per domain. The sum of the values assigned to each assertion results in the global score organized into three distinct intervals: adequate social situation (5 to 9 points), social risk (10 to 14 points), or social problem (above 15 points)[15]. The present study presents the cross-cultural adaptation (CCA) of the OA-SFES to the context of older adults living in Brazil.

Methodological studies intend to obtain, organize, and analyze data and enable the development, validation, or evaluation of research instruments and techniques[27–29]. The CCA comprises this type of study, measures the accuracy of the results, and reduces the risk of distortions of information and interpretations when handling the scale[27].

To use the original version, prior authorization of the validation study was obtained from the main author. Moreover, he approved the cross-culturally adapted version[27].

As listed in Figure 1, different steps were taken to adequately adapt the scale considering countries with cultural and/or language differences[27].

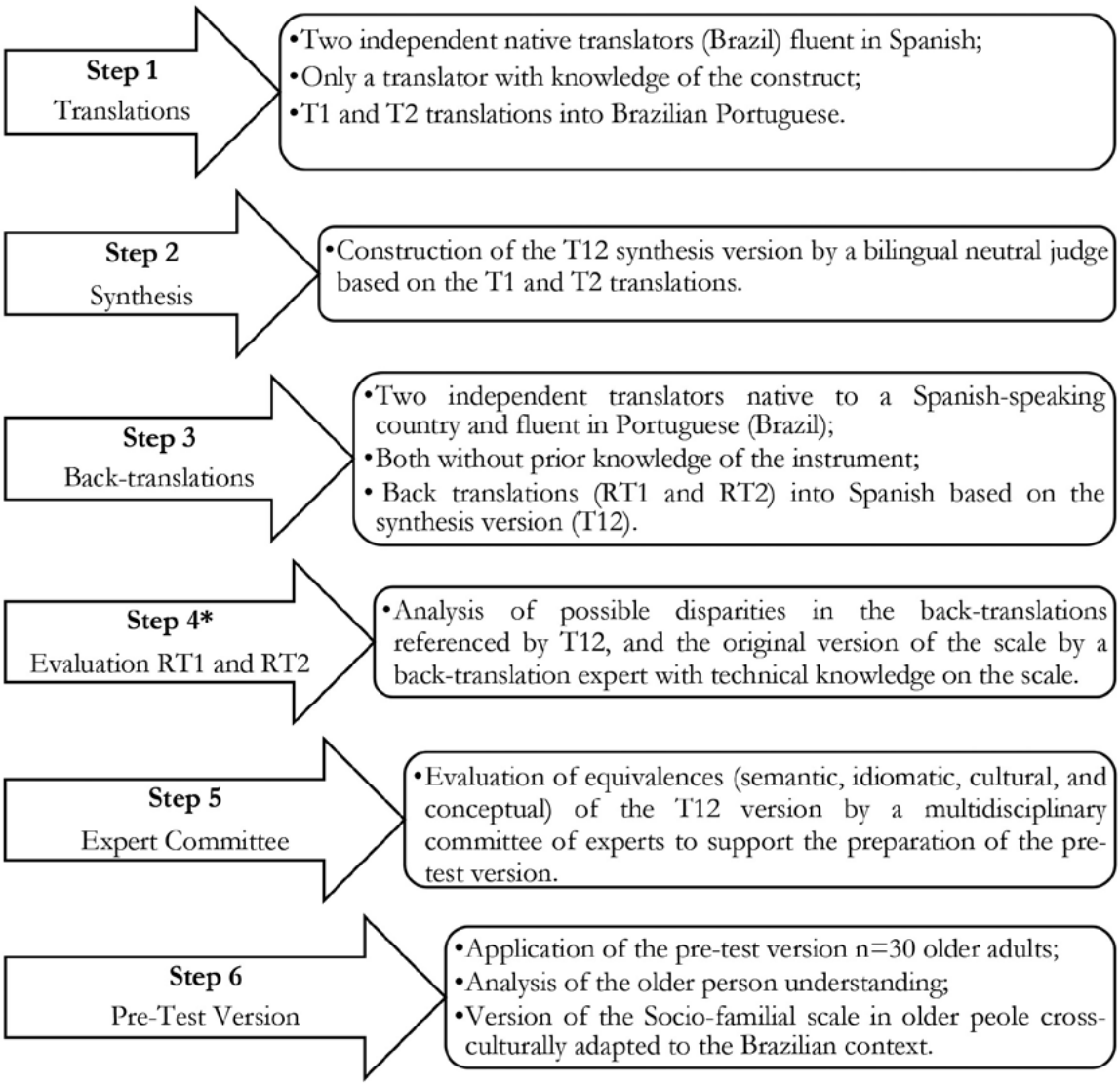

Figure 1. Steps for Cross-Cultural Adaptation of the Older Adults Socio-familial Evaluation Scale.

Source: Beaton et al. (2002), amended by the author; *Step proposed by the research team.

According to the method[27] adopted in the present study the five steps for the CCA were completed, and one extra step was added. The 34 components of the scale underwent CCA in each step: scale title (1 item); domains (5 items); assertions (25 items); score (3 items).

Data were analyzed with the support of the SPSS version 23. The Cronbach's alpha coefficient[29,30] was adopted to verify the homogeneity and dimensions of the scale items in the pretest version.

Step 1 - Translation

Two Brazilian translators proficient in the Spanish language participated in the first step. The translations took place independently, resulting in versions T1 and T2. Each component of the scale was translated, and the translators' comments were transcribed.

The interpreter responsible for T1 was previously informed about the research and the object of the

study. The interpreter of the T2 version translated it without knowing the scale, keeping the focus on the language, preventing ambiguous effects on the original instrument that the first translator might not have identified[27].

Step 2 - Synthesis

In the second step, the synthesis version called T12 was created. Finally, a neutral judge proficient in the Spanish language analyzed the level of concordance according to the following criteria:

- Total concordance: identical translations;
- Partial concordance: changes of up to two words in the translated sentence;
- Difference between translations: situations of ambiguity, conceptual and/or cultural conflicts between translations.

The result of this analysis enabled the neutral judge to select the translation of greater idiomatic and cultural consistency or propose changes in the instrument's adequacy to the context of the older person living in Brazil. To finalize version T12, the neutral judge took one of the following actions: suggested a new translation; chose T1; chose T2; maintained T1 and T2 (when identical); merged T1 and T2.

Step 3 - Back-Translation

T12 underwent back-translation in the third stage. Two bilingual interpreters native of a Spanish-speaking country and living in Brazil for over 10 years participated. Back-translations were carried out blindly and independently without knowledge of the scale and its internal organization. Thus, two versions (RT1 and RT2) back-translated to the Spanish language were obtained[27].

Step 4 - Evaluation of back-translations

The fourth step was included, although not foreseen in the original methodology, to guarantee the semantic equivalence in T12, evaluating its validity, inconsistencies, and conceptual errors. An expert with substantial knowledge on the scale in its original version evaluated RT1 and RT2.

Said evaluation determined the adequacy or inadequacy of the back-translations using T12 and the scale in its original version as references. When conceptual and/or grammatical disparities were found in any back-translation, the evaluator selected the most appropriate version considering the main object of the construct.

Step 5 - Expert Committee

Step 5 was carried out by the Expert Committee comprising eight professionals from different areas: methodologist, linguist, psychologist, social worker, physician, and nurse. They conducted the assessments supported by the "Evaluative Compilation", a document with the versions produced in the previous steps and a theoretical review related to each component of the scale. This evaluation gave rise to the version submitted to the pretest.

Experts evaluated the T12 version in search of semantic, idiomatic, cultural, and conceptual equivalences of the 34 components of the scale, assigning the following scores: (1) - extreme adequacy without the need for any change, (0) - adequacy with the need for change, and (-1) - inadequacy. A proportion equal to or greater than 80%[31] is expected for adequate concordance among experts. To assess the T12 concordance, the Cohen-Fleiss Kappa coefficient was adopted (κ)[29] considering the following levels: non-existent (<0), mild (0–0.2), moderate (0.21–0.4), strong (0.41–0.60), very strong (0.61–0.80), almost perfect (0.81–0.99), and perfect (1)[32].

Step 6 - Pretest

The objective of the pretest was to analyze the respondents' understanding of the instrument and possible difficulties with the interviewer's application of the OA-SFES.

At this step, three instruments were used: the pretest version (T12), a form to analyze the interviewee's understanding of the scale, and a questionnaire to collect sociodemographic data.

The pretest was applied to a group of 30 older adults[27] and comprised a non-probabilistic and judgmental sample.

Adults aged 60 years or older, of both sexes, who were in outpatient care or in the inpatient unit of Hospital São Julião de Campo Grande (MS) during data collection (October to November 2017) were included.

The present study meets the standards for research with human beings described in Resolutions No. 466/2012 and No. 510/2016 and was evaluated and approved by the Human Research Ethics Committee of Universidade Federal de Mato Grosso do Sul (UFMS), registered under Opinion N. 58735616.8.0000.0021. The use of the Older Adults Socio-familial Evaluation Scale (Spanish version) was authorized by the first author of the validation study via email.

The older adults were included in the list of respondents after they read and signed the Informed Consent Form (ICF). The interviews were conducted in such a way to ensure the confidentiality of the responses not interfering with care.

RESULTS

Translations and Synthesis Version

First, the Older Adults Socio-familial Evaluation Scale (Spanish version) was translated into Brazilian Portuguese by two independent translators, resulting in two versions (T1 and T2). The comparison between the 34 translated components showed 53% of total concordance among the translators, 29.4% of partial concordance, and 17.6% of difference between the translations.

Then, the neutral judge evaluated T1 and T2 and altered or pointed out the most appropriate translation for each component, which resulted in the synthesis (T12). This version was organized based on language, evaluative context of the scale, and reality of the Brazilian older population. Chart 1 reports the actions of the neutral judge regarding each translated component, striving for a version with better equivalence to the Portuguese spoken in Brazil.

Chart 1. Description of the actions of the neutral judge in the evaluation of the translations to develop the T12 version (n=34). Campo Grande, MS, 2017.

Description	=			T1	T2
Name of the Scale	1 item	-	-	-	-
5 - 9 points	1 item	-	-	-	-
10 - 14 points	1 item	-	-	-	-
Over 15 points	1 item	-	-	-	-
Domain title	5 items	-	-	-	-
Assertions Domain A	-	A.2; A.3	A.1; A.5	-	A.4
Assertions Domain B	B.4	B.3	B.2; B.5	B.1	-
Assertions Domain C	-	-	C.1; C.2; C.3; C.4	C.5	-
Assertions Domain D	D.1; D.2; D.3;D.4	-	-	-	D.5
Assertions Domain E	-	-	D.1; D.2; D.3; D.5	E.4	-
Total	14 items	3 items	12 items	3 items	2 items

(=) Identical translations; () Combination of the two translations; () The neutral judge's suggestion to change the translations; (T1) Choice of translation T1; (T2) Choice of translation T2.

Fourteen items (41%) were found to be identical components and they were kept. The divergent translations were handled in two ways by the neutral judge. T1 and T2 were combined for 3 (8.9%) components. T1 was chosen for another 3 (8.9%) items, and T2 for 2 items (5.9%). In these cases, the chosen version adequately represented the language aspects guided by the evaluative context of the scale. The neutral judge suggested adjustments in 12 (35.3%) translated components.

Back-translations

The back-translations allowed the comparison between the original instrument and version T12. Considering the 34 components back-translated in RT1 and RT2, there was 58.8% of total concordance among the interpreters, 32.4% of partial concordance, and only 3 (8.8%) components showed differences in the back-translations. Therefore, T12 complies with the evaluative essence proposed compared to the content of the original version of the scale.

Evaluation of Back-Translations

The expert evaluated RT1 and RT2 based on the T12 version and the original scale in the Spanish version. Chart 2 shows the expert's evaluation of the back-translations. When conceptual and/or grammatical disparities were found in any component of the back-translations or synthesis, the most appropriate version was selected considering the main objective of the construct. In identical back-translations, the expert concluded that 70.6% of them met the objectives of the construct. However, with conflicting back-translations, RT2 was chosen most of the time (17.6%) compared to RT1 (8.8%).

Note that the expert indicated assertion A.2 (Domain A) of version T12 as the version with greater equivalence when compared to RT1, RT2, and the original version.

Once this step was completed, the discussion with the neutral judge was resumed for the conclusion of T12 and the finalization of the Evaluative Compilation for submission to the Expert Committee.

Chart 2. Evaluation of back-translations regarding the T12 and the original version of the Older Adults Socio-familial Evaluation Scale (n=34). Campo Grande, MS, 2017.

Description	RT1	RT2	Evaluation
Name of the scale	A	A	RT1 and RT2
Score range: 5 – 9 points	A	A	RT1 and RT2
Score range: 10 – 14 points	A	A	RT1 and RT2
Score range: Over 15 points	A	A	RT1 and RT2
Domain A	A	A	RT1 and RT2
Assertion A.1	A	A	RT2
Assertion A.2	A	A	T12
Assertion A.3	I	A	RT2
Assertion A.4	I	A	RT2
Assertion A.5	A	A	RT2
Domain B	A	A	RT1 and RT2
Assertion A.1	A	A	RT1 and RT2
Assertion B.2	A	A	RT1 and RT2
Assertion B.3	A	A	RT1 and RT2
Assertion B.4	A	A	RT1 and RT2
Assertion B.5	A	A	RT1 and RT2

to be continued

Continuation of Chart 2

Description	RT1	RT2	Evaluation
Domain C	A	A	RT1 and RT2
Assertion C.1	A	A	RT1
Assertion C.2	A	A	RT1
Assertion C.3	A	A	RT1 and RT2
Assertion C.4	A	A	RT1 and RT2
Assertion C.5	A	A	RT1 and RT2
Domain D	A	A	RT1 and RT2
Assertion D.1	A	A	RT1 and RT2
Assertion D.2	A	A	RT1 and RT2
Assertion D.3	A	A	RT1 and RT2
Assertion D.4	A	A	RT2
Assertion D.5	A	A	RT1 and RT2
Domain E	A	A	RT1 and RT2
Assertion E.5	A	A	RT1 and RT2
Assertion E.2	A	A	RT1
Assertion E.3	A	A	RT1 and RT2
Assertion E.4	A	A	RT2
Assertion E.5	A	A	RT1 and RT2

A=Adequate; I=Inadequate; T12=Synthesis; RT1=Back-translation 1; RT2=Back-translation 2.

Expert Committee

The Expert Committee suggested not using metaphors, colloquial languages, or ambiguous nouns and verbs as a guideline to analyze the T1, T2, T12, RT1, and RT2 versions to optimize the understanding of the scale components. The Committee suggested changes or replacements based on the study of each component based on the Evaluative Compilation.

The concordance ratio among experts in the evaluation of the adequacy of the components of the version to be submitted for pretest was higher than 80% in both semantic (100%) and idiomatic (94%) equivalence. In turn, the experimental and conceptual equivalences showed concordance ratios of 71% and 73%, respectively. Finally, to guarantee the experimental and conceptual equivalence, the synthesis version was re-evaluated by the committee members to consolidate the version submitted to the pretest. The kappa indices associated with this version show near-perfect concordance[32] between the semantic (κ=0.95), idiomatic (κ=0.97), experimental (κ=0.98), and conceptual (κ=0 .99) evaluations.

Pretest

The respondents' answers were objective and clear during the use of the T12 version in the pretest. The average time for applying the scale was 7 minutes.

To evaluate the understanding of the older adults regarding the instrument, every assertion of the scale was read by the interviewer. Then, the respondent was asked to interpret the item and confirm or deny a clear understanding of the component presented. All participants reported total comprehension, not reporting difficulties in understanding the scale's assertions.

Among the 30 older Brazilians participating in the pretest, 60% (18) declared less than 3 years of education or never attended school.

The socio-familial evaluation with the instrument indicated that 66.7% of older adults had an adequate or acceptable social situation.

The total Cronbach coefficient for the results of the application of the pretest version indicates substantial internal consistency. Adopting as a reference the 0.61-0.80 range for substantial internal consistency[29,30], the exclusion of any of the domains does not impact the interpretation of the total reliability of the scale, which presented a total alpha value of 0.77 (Table 1).

After completing all steps of the CCA process, the Older Adults Socio-familial Evaluation Scale adapted to the Brazilian context was unanimously analyzed and approved by the Expert Committee and by the main author of the Spanish version. Thus, it was not necessary to carry out a review and a new pretest.

The Brazilian version of OA-SFES (Chart 3) supports the survey for validating and measuring the psychometric properties of the instrument that are in progress.

The Brazilian version of the OA-SFES (Chart 3) supports the ongoing investigation to validate and measure its psychometric properties.

Table 1. Standard deviation, average, and Cronbach's alpha in case of exclusion of any evaluative domain (n=30). Campo Grande, MS, 2017.

Evaluative Domains	Standard Deviation	Scale average if the item is excluded	Cronbach's alpha if the item is excluded
Domain A [1]	1.2	7.57	0.77
Domain B [2]	0.8	6.40	0.82
Domain C [3]	0.9	8.33	0.70
Domain D [4]	1.1	8.00	0.66
Domain E [5]	0.8	8.50	0.65
Scale total	1.21	**9.7**	0.77

[1] Family Situation; [2] Economic Situation; [3] Housing Situation; [4] Social Relations; [5] Social Support Network.

Chart 3. Older Adults Socio-familial Evaluation Scale (Brazilian version) in the pretest version. Campo Grande (MS), 2018.

Component		Description
Domain A		Family Situation
Assertion A.1		Lives with the family without physical or psychological dependence
Assertion A.2		Lives only with spouse of about the same age without physical or psychological dependence
Assertion A.3		Lives with family (and/or spouse) and has some degree of physical or psychological dependence
Assertion A.4		Lives alone and has child(ren) who live nearby
Assertion A.5		Lives alone and has no child(ren) or child(ren) reside(s) far away
Domain B		Economic Situation
Assertion B.1		Individual income above 2.4 times the minimum wage
Assertion B.2		Individual income from 1.3 to 2.4 times the minimum wage
Assertion B.3		Individual income from 1 to 1.3 times the minimum wage
Assertion B.4		Individual income from BPC/LOAS
Assertion B.5		No individual income or income less than 1 minimum wage
Domain C		Housing Situation
Assertion C.1		Adequate housing for the older person's needs (basic sanitation, water supply, electricity supply, and accessibility)
Assertion C.2		House with architectural barriers (stairs, steps, narrow doors, etc.)
Assertion C.3		Housing with poor hygiene, humidity (mold and fungi), inadequate ventilation and lighting
Assertion C.4		Housing without telephone and/or elevator (in case of a two-story house or apartment)
Assertion C.5		Inadequate housing (declared to be destroyed, shacks, tenements, etc.) and/or lack of basic infrastructure (water supply, electricity supply, sewage, or septic tank) or living on the streets
Domain D		Social Relations
Assertion D.1		Social relationship with support network (family, neighbors, work, friends, community, etc.)
Assertion D.2		Social relationship only with family and neighbors
Assertion D.3		Social relationship only with family or only with neighbors
Assertion D.4		Does not leave the house, but receives visits
Assertion D.5		Does not leave the house nor receive visits nor have any social relationships with the support network
Domain E		Social Support Network
Assertion E.1		Receives social support from family or neighbors
Assertion E.2		Receives volunteer service at home from the public and/or private network
Assertion E.3		Has no social support network, but is able to stay home and perform self-care
Assertion E.4		Needs to join the LTCF due to a situation of social vulnerability
Assertion E.5		Needs permanent care in the LTCF for basic and instrumental activities of daily living

Global Score		
From 5-9 points		Adequate or acceptable social situation
From 10-14 points		There is social risk
Over 15 points		There is a social problem

Note: Use the blank field to mark the alternative corresponding to the social context reported by the person interviewed.

DISCUSSION

It is important to emphasize that the adequate availability of this instrument will contribute to the planning of public policies and actions with the older population in Brazil in their different social contexts. The expanded view on different dimensions enables the organization and mobilization of the older person's social network, preventing frailty or worsening their health condition[12,13].

The interpreters discussed the technical and linguistic aspects of T1 and T2 to perform the translations. In possession of these translations, the neutral judge built the synthesis (T12) that referenced the next steps. The composition of T12 met language aspects guided by the evaluative context of each component of the scale and was subsequently back-translated (RT1 and RT2). The RT1, RT2, and T12 versions were evaluated by an expert with technical knowledge on the scale in the Spanish version. The evaluation indicated that T12 consistently corresponds to the evaluative proposal of the Older Adults Socio-familial Evaluation Scale (Spain).

Based on the concordance ratio between experts regarding the experimental and conceptual criteria[28], the reevaluation of the scale components resulted in an adequate pretest version to assess the interviewer's understanding and handling, as well as the respondent's understanding. With an almost perfect concordance rate among experts, the evaluation of semantic, idiomatic, experimental, and conceptual equivalences reflected positively on the results arising from the application of the pretest version.

The assertions making up the scale in the pretest version (T12) were read individually to each one of the 30 participants, who unanimously declared good understanding.

By measuring its domains, the global internal consistency of the Brazilian pretest version had a Cronbach's alpha of 0.77, higher than those obtained for the Portuguese (0.41)[14] and Spanish (0.45)[15] versions which denote reasonable internal consistency[30].

With a more discriminative than descriptive purpose, the evaluative domains of the OA-SFES measure different aspects, which can reduce homogeneity[29]. To assess the socio-familial condition of the older adult, the scale considers, on the one hand, the family situation, social relationships, and social support and, on the other hand, the economic situation and housing conditions. Thus, the social evaluation encompasses different dimensions comprising different variables so that it would not be relevant to renounce any evaluative dimension, even if it impacts the result of internal consistency.

Another point to be emphasized is related to the applicability of the scale. Some instruments have been used to assess the social aspects in individuals of different age groups. However, when compared to the internal and operational structure of OA-SFES, they do not encompass the social function in its entirety and present a high degree of complexity for handling[14]. In the validation studies carried out in Spain[15] and Portugal[14], the participant filled the scale. For the use of the OA-SFES in Brazil, it is suggested that the scale be applied by an interviewer so as not to reduce the instrument's reliability.

The education profile of the older population in Brazil reinforces the suggestion of adopting the application of the scale in the modality *face to face*. Studies show that 50.2% of the population living in Brazil aged over 60 years attended school for up to 4 years, and 30.7% had less than one year of education[33]. Low education was also observed among respondents in the present research. Therefore, the self-completion adopted in Brazil could compromise the results of the evaluations.

The cross-cultural adaptation of the instrument to the Brazilian context is essential for the other steps involved in validating the OA-SFES. In its validated version, this scale will enable screening the socio-familial situation of older adults living in Brazil in a more effective and contextualized way regarding the individual's biopsychosocial aspects[34].

CONCLUSION

The Older Adults Socio-familial Evaluation Scale (Spain) was translated and cross-culturally adapted to the Brazilian context. The evaluations of semantic, idiomatic, cultural, and conceptual equivalences carried out by the members of the Expert Committee

had a positive outcome, resulting in the pretest version of the Older Adults Socio-familial Evaluation Scale (Brazilian version). Furthermore, the pretest version showed good internal consistency with reproducible data. The validation study of this instrument is ongoing based on this pretest version.

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Meanings of "being happy in old age" and perceived quality of life according to Brazilian older adults

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Abstract

Objective: Identifyting associations between meanings of "being happy in old age" and perceived quality of life in a sample of community-dwelling older adults. *Methods:* Data were drawn from the baseline (BL; 2008-2009) and follow up (FW; 2016-2017) records of the Fibra Campinas, a population-based study on frailty in old age. Two hundred and eleven individuals with an average age of 81.0±4.3 at follow-up, answered to an open question on happiness in old age at baseline and to the CASP-19 at follow-up. BL records were submitted to content analysis; those of FW to measures of frequency, position and dispersion, and both to logistic regression analyzes. *Results*: The content analysis generated four themes: health and functionality (the most mentioned), psychological well-being, interpersonal relationships and material resources. The most cited categories were self-development and family relationships. High scores in CASP-19 prevailed and were more likely among participants who did not mention material resources (OR=2.44; 95%CI: 1.20-4.43), nor health and functionality (OR=2.03; 95%CI: 1.22-4.22), and among those who cited interpersonal relationships (OR=1.92; 95%CI: 1.08-3.41) at BL. High scores in the factor Self-Realization/Pleasure were more likely among those aged 80-84 (OR=1.93; 95%CI: 1.01-3.68) and among those who did not mention health and functionality (OR=1.98; 95%CI: 1,00-1.98) at BL. *Conclusion:* Happiness in old age and quality of life related to psychological needs of control, autonomy, self-realization and pleasure are related constructs, whose evaluation captures experiences that exceed material and health conditions, predominant in classic measures of quality of life.

Keywords: Happiness. Healthy Aging. Longevity. Quality of Life.

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INTRODUCTION

Happiness is a multidimensional construct, identified with objective conditions such as health, independence, material resources, family support and social relationships, as wll as with subjective conditions such as life satisfaction, sense of purpose, sense of autonomy, and spirituality. Among the components of happiness most cited by older people are family relationships, social relationships and social support, and self-fulfillment, self-acceptance, feeling good about oneself, adapting to current conditions and satisfaction with life. In the same way as the objective-subjective dichotomy, the concepts of hedonism (search for pleasure and avoidance of suffering) and eudaimonism (search for personal excellence) explain older people's conceptions of happiness in old age[1-10]. As have been shown by research with similar objectives subjective and eudaimonic elements prevail over objective and hedonic elements in the older person's assessment of happiness in old age[1,11,12]. For women, happiness is mainly to enjoy being with the family, maintaining affectionate relationships and participating in social activities[13]. As reported by Diener's review studies[10,13], men more than women cite the maintenance of capacities that allow them to maintain independence and autonomy and have the resources to meet their needs. The importance given to subjective and eudaimonic elements tends to remain and act as a protective resource, in the face of the decline associated with the aging process[14].

Cross-cultural research has discussed the issue of the universality of meanings of happiness and concluded that there are cross-cultural differences regarding the priorities of older people in terms of happiness, but not regarding the essence of the concept or aspirations[11,12,15]. For example, old people interviewed in Taiwan (China) indicated as sources of happiness: gratification of the need for respect, harmony in interpersonal relationships, fulfillment at work, taking life with ease, and deriving pleasure from living with others. Other themes cited by them are identical to those found in Western samples: material resources, self-fulfillment, pleasure and positive affect, and health[16]. A Korean study identified self-fulfillment, belonging, mission, social recognition, enjoyment, material success, and parenting as sources of happiness[17]. Latino seniors living in the US valued harmonious social relationships, family unity, and faith/religion, physical health, self-esteem, open communication with family and friends, and financial security[18]. In Palestine, aged people highlighted: sense of well-being, good physical and mental health, positive feelings, independence, purpose in life, contentment, and financial security[19]. An exception was observed in a sample of aged Chinese people who experienced periods of hunger in childhood and who presented quantity and quality of food as the main sources of happiness in old age, suggesting that certain types of experiences that test the limits of human dignity can cause changes in vital priorities[20].

Happiness, quality of life, positive mental health, satisfaction with life, and psychological well-being are related terms or part of the same conceptual universe that can be defined as of the conditions that allow a life or old age worth living. The decision to use one or the other of these terms depends on the theoretical traditions to which investigations or interventions are affiliated, not on differences in the meaning of the terms or the methodologies used to investigate them. Thus, in Psychology, happiness and psychological well-being predominate; in Social Sciences, the most commontermes are life satisfaction and subjective well-being. In Epidemiology, predominante the terms quality of life, quality of life in health, and positive mental health. Eventually, several of these terms are used at the same time, as in a Canadian study published in 2020, linked to a positive mental health epidemiological surveillance effort. This study used five indicators that proved to be related but independente variables: mental health self-assessment, happiness, life satisfaction, psychological well-being, and social well-being[21].

Boggatz[22] produced a conceptual analysis of the quality of life in old age construct, as shown in 208 articles published between 1992 and 2013. Three central concepts were derived from this analysis: (a) satisfaction of living conditions (objective living conditions of an aged person considered relevant to a good life and successful old age, such as financial status, health and functionality), (b) general subjective well-being (or hedonic well-being, indicated by life satisfaction) and (c) sense of completeness in relation to the main dimensions

of human life (of a eudaimonic nature), such as the search for personal growth, self-knowledge, self-acceptance, control, autonomy, positive relationships with others, and purpose. Van Leween et al.[23] analyzed data from 48 qualitative studies on the opinions of more than 3,400 aged people from 11 Western countries and derived 11 quality of life categories: autonomy, role and activity, health perceptions, social relationships, attitudes and adaptation, emotional comfort, spirituality, home and neighborhood, and financial security.

Aiming to build a quality of life scale for use in large longitudinal studies, Hyde et al.[24] developed a scalar measure of perceived quality of life, on the basis of a psychological construct translated into four cognitive-motivational dimensions designated by the acronym CASP-19 (control, autonomy, self-fulfillment, and pleasure, operationalized by a 19-item Likert scale. The four dimensions were theoretically assumed as ontological needs, that is, inherent to the Human Being. According to the authors, a perceived quality of life scale should not refer to physical health, functionality, and material conditions, because these variables are contextual, not constitutive elements of the construct. Originally produced in English, the scale was translated into Portuguese, submitted to semantic-cultural validation for use in samples of Brazilian adults aged 55 years and over, and submitted to psychometric studies that identified evidence of construct validity and convergent validity[25].

The subjective and eudaimonic aspects of the aging experience have the potential to act as protective resources and as motivational resources oriented towards self-care and self-education, in face of the increasing losses and adversities associated with longevity. As far as we know, are unknown data on the relationship between measures of perceived quality of life and meanings of happiness in old age with samples of Brazilian aged people.

This study was aimed to identifying associations between meanings attributed to the concept "being happy in old age" assessed at baseline (2008-2009), and perceived quality of life assessed at follow-up (2016-2017), in a sample of aged people recruited from the community.

METHODS

The data were derived from records contained in the baseline (2008-2009) and follow-up (2016-2017) databases of the Fibra Campinas Study, a population-based survey with repeated measures, whose objectives were to collect data on frailty and investigate associations between this geriatric syndrome with sociodemographic, health, functionality and psychosocial variables. The baseline sample (N=900) was composed from a random selection of 90 among 900 urban census tracts in Campinas, SP, Brazil, in whose households people aged 65 years and over were recruited, in gender and age quotas (65-69, 70-74, 75-79 and 80 years and over) representative of the resident population in each of the five health districts of the city[26]. The follow-up sample included those baseline study survivors who were located in the available adresses, and who answered to the CASP-19 perceived quality of life scale[27].

The flow of decisions taken to select the study participants reported here was as follows: (a) In the baseline database of the Fibra Campinas Study (2008-2009; N=900 participants aged 65 years and over), exclusion of 211 individuals who had cognitive deficit suggestive of dementia indicated by a score lower than the cutoff score on the Mini-Mental State Examination, adjusted for years of schooling[28,29]. (b) Among the 689 older people who remained in the baseline sample, 18 who had no record of answers about happiness in old age were excluded. (c) Study of the Fibra Campinas follow-up database (2016-2017) to know how many among the 671 older people with complete data on the meaning of happiness in old age at baseline had records of responses to the CASP-19 perceived quality of life scale in the follow-up. By this criterion, 324 older people were selected. One hundred and thirty losses due to death and 247 due to non-location were identified. (d) Among the 324 old survivors, 83 were excluded for having a score lower than the cutoff score in the cognitive test[26,27]. (e) Among the 241 older people who remained in the sample, 30 who did not answer to all items of the CASP-19 were excluded. Thus, the sample for this study consisted of 211 older adults aged 74 years and over.

The variables and measures involved in this investigation were as follows: (a) Meanings attributed to the concept "being happy in old age", in the presence of an open item that asked about it, in the baseline[27]. (b) Perceived quality of life indicated by the CASP-19 applied in the follow-up[28]. (c) Gender and age: the older person could answer male or female and should name the day, month and year of their birth. The reference age was that informed at follow-up.

The perceived quality of life was assessed using the CASP-19, an acronym for control, autonomy, self-fulfillment and pleasure, which designates a scale of 19 items that express non-hierarchical basic psychological needs. These are considered ontological by Hyde et al.[24], with potential to guide personality and development. The items are Likert type, anchored by four intensities (0=nothing, 1=a little, 2=a lot, and 3=very much). The total score ranges from 0 to 57[24,25].

Exploratory and confirmatory factor analyzes of the content of the CASP-19 translated and culturally adapted to Portuguese revealed a structure of latent meanings expressed in two factors, which were considered in this study: factor 1 - Self-fulfillment and Pleasure and factor 2 - Control and Autonomy[25].

The Mann-Whitney, Kruskal-Wallis and Dunn tests were used to compare the frequency distributions of scores on the CASP-19 total scale and its two factors, as previous normality tests demonstrated that the data were non-parametric. As the CASP-19 does not have cutoff scores decided by statistical criteria, nor are its results comparable to golden standards, the establishment of performance levels on the scale is normally done based on the scores obtained by the samples themselves. In this study, we used as a criterion the median value of the distributions of scores on the total scale and on the two-factor items. The frequencies of participants with scores above and below the median of each distribution were compared, considering the meanings of happiness in old age, gender and age.

The meanings of "being happy in old age" were obtained in an interview situation, asking the participants to speak freely about the subject. The responses were recorded on the survey form and then transcribed to the database[26]. The corpus formed by the textual records of oral responses was submitted to content analysis and category counting, for comparison with data from CASP-19.

Content analysis is a categorical and inferential technique for analyzing communication, which uses systematic and objective procedures for the description, classification, quantification, and qualification of messages. Any complete and intelligible issue, with any length or level of linguistic complexity, in response to the open question was considered as a unit of analysis. Category was defined as a class of meanings that share at least one common element, which differentiates them from another class; the themes, as above-ordered concepts that bring together a set of categories[30,31].

The analysis was carried out by three researchers who were informed about the method and the objectives, and were aware of the results of similar research[4,5]. First working independently and then together, the analysts derived four themes and 11 categories of meaning, supported by the concepts of hedonic and eudaimonic well-being[1] and by the Ryff's theoretical model of psychological well-being[14,32]. Data were translated into occurrence and non-occurrence records of the categories abstracted from each participant´s response, and were submitted for counting. The analysts worked under demand of 100% of inter-examiner agreement. Pearson's chi-square and Fisher's exact tests were used to compare frequencies of categorical variables produced by content analysis.

Univariate and multiple logistic regression analyses, which adopted the *step-wise* method of variable selection, were used to verify the associations between the variables of interest. The results of the statistical tests were considered significant for a value of $p<0.05$. Statistical analyzes were performed using SAS (Statistical Analysis System), version 9.4., and SPSS, version 21.0 packages.

Participants signed an informed consent form regarding the objectives, procedures and ethical commitments of the team, in both measurement times. The projects were approved by the Ethics Committee of the State University of Campinas, Brazil, under the permits No 20/8/2007, of 5/22/2007 and No 1.332.651, of 11/23/2015. The

project for this study was approved on 11/05/2019, under the permit No 3.684.200.

RESULTS

The sample consisted of 60 men and 151 women with an average age of 81.0±4.3 years at follow-up; the largest age group was that with 80 to 84 years. Content analysis on the concept "being happy in old age" identified four themes: health and functionality, psychological well-being, interpersonal relationships and material resources, and 11 categories subordinate to them (Table 1).

Table 2 presents data on sociodemographic variables, frequency of responses in the categories of meaning of happiness in old age, and values of medians, means and interquartile distances in the CASP-19, and in its factors Self-Accomplishment/Pleasure and Control/Autonomy. The categories of meaning of the concept "being happy in old age" with the highest frequency of occurrences were physical health, family relationships, self-development, and satisfaction and pleasure. Cognition and religiosity/spirituality were the less frequent. In the psychological well-being theme, the three categories related to eudaimonic well-being stood out (68.0% of the mentions), which surpassed in frequency those related to hedonic well-being (satisfaction and pleasure). The values of means and medians in the CASP-19 and in both factors of the scale were high.

Table 1. Themes and categories of the concept "being happy in old age" (n=211). Campinas, Brazil, 2020.

Theme 1. Health and functionality
Categories: 1.1. Physical health. Health status translated into medical diagnoses, signs, and symptoms; healthy lifestyles. E.g.: Take care of yourself.
1.2. Activity. Vital involvement, social participation, productivity, and energy. E.g.: having the will and strength to work.
1.3. Independence and autonomy. Physical and mental capacity that allows control over the environment; self-government, and self-determination. E.g.: Doing what you want, without any help.
1.4. Cognition. Preserved basic cognitive functions, allowing for problem solving, insight, reasoning, judgment, and autonomy. E.g.: I didn't want to lose my memory.
Theme 2. Psychological well-being
Categories: 2.1. Satisfaction and pleasure. Products of the sense that one has a good and happy life, in accordance with personal and social values, and expectations. E.g.: Have and joy, family.
2.2. Religiousness and spirituality. The sacred and the transcendent as sources of existential meaning and sense of belonging, and as coping resources. E.g.: First and foremost serve God.
2.3. Emotion-based coping. Management of stressful situations through cognitive-emotional strategies that protect self-esteem and save personal resources. E.g.: Being okay with yourself.
2.4. Self-development. Investments in self-knowledge and self-acceptance; seeking for personal excellence, purpose, and sense of self-fulfillment. E.g.: Learning to deal with difficulties.
Theme 3. Interpersonal relationships
Categories: 3.1. Family relationships. The family nucleus as a source of recognition, belonging, appreciation, respect, protection, affection, security, support, and satisfaction. E.g.: United family.
3.2. Social relationships. The group as a source of recognition, belonging, appreciation, protection, affection, security, and satisfaction. E.g.: It's about living well.. loving, living well with friends.
3.3. Social support. Relationships of giving and receiving affection, material goods, information, instrumental help, and help in solving problems. E.g.: It's about having a person who takes care of us, being able to take care of us.
Theme 4. Material resources
Possession of money, objects and opportunities that facilitate the achievement of well-being, in accordance with individual and social values. E.g.: Money to go to the doctor, to eat, to buy medicine.

Table 2. Descriptive summary of the sample (n=211). Campinas, Brazil, 2020.

	n (%)	Means (standard deviations)	Medians	Interquartile distances
Gender				
Male	60 (33.2)			
Female	151 (66.8)			
Age (years)		81.0 ± 4.3	81.0	6.0
70-79	71 (33.7)			
80-84	97 (46.4)			
≥ 85	42 (19.9)			
Occurrences of meaning categories of "being happy in old age"				
T1. Health and functionality				
C1.1. Physical health	122 (56.2)			
C1.2 Activity	40 (18.4)			
C1.3. Independence/autonomy	48 (22.2)			
C1.4. Cognition	7 (3.2)			
T2. Psychological well-being				
C2.1. Satisfaction and pleasure	66 (32.0)			
C2.2. Religiosity/spirituality	29 (14.1)			
C2.3. Emotion-based coping	42 (10.4)			
C2.4. Self development	69 (33.5)			
T3. Interpersonal relationships				
C3.1. Family relationships	80 (41.5)			
C3.2. Social relationships	54 (28.0)			
C3.3. Social support	59 (30.5)			
T4. Material resources	56 (26.5)			
Older people according to perceived quality of life score				
Total CASP-19 scale		40.2 ± 8.7	40.0	10.0
Score below the median	101 (47.8)			
Score above the median	110 (52.2)			
Factor 1: Self-fulfillment / Pleasure		26.6 ± 7.3	26.0	10.0
Score below the median	98 (46.4)			
Score above the median	113 (53.6)			
Factor 2: Control / Autonomy		4.4 ± 3.4	4.0	4.0
Score below the median	101 (47.8)			
Score above the median	110 (52.2)			

T = Theme; C = Category.

In the group that scored above the median on the CASP-19, there were a significantly higher frequency of participants who did not associate "being happy in old age" with health and functionality, or with material resources, than participants who did these associations. Among these, scoring below the median on the CASP-19 scale predominated. More seniors who scored high on the CASP-19 were observed among those who mentioned psychological well-being, satisfaction and pleasure, interpersonal relationships, family relationships, and social relationships, than those who did not mention these meanings. In this group, participants with scores lower than the median on the CASP-19 predominated. These relationships were repeated for the associations between the self-fulfillment and pleasure factor of the CASP-19 and the meanings health and functionality, material resources, satisfaction and pleasure, social relationships, and social support. There were more older people aged 80 to 84 years than 85 years and more with scores above the median in the self-fulfillment and pleasure factor. Among the latter predominated lower scores in the factor (Table 3).

Table 3. Associations between scores higher than the median on the CASP-19, considering the meanings of "being happy in old age", and gender and age of the participants (n=211). Campinas, Brazil, 2020.

Variables	n (%)	CASP-19 Scale		Factor 1. Self-fulfillment/ Pleasure		Factor 2. Control/ Autonomy	
		≤ 39.0 (n=101)	≥ 40.0 (n=110)	≤ 25.0 (n=98)	≥ 26.0 (n=113)	≤ 3.0 (n=101)	≥ 4.0 (n=110)
Meanings of "being happy in old age"							
T1. Health and functionality		*p*= **0.033**		*p*= **0.038**		*p*= 0.383	
No	69 (32.7)	33.3	66.7	36.2	63.8	52.2	47.8
Yes	142 (67.3)	54.9	45.1	51.4	48.6	45.8	54.2
C1.1. Physical health		*p*= 0.065		*p*= 0.226		*p*= 0.132	
No	89 (42.2)	40.0	59.6	41.6	58.4	53.9	46.1
Yes	122 (57.8)	53.3	46.7	50.0	50.0	43.4	56.6
C1.2. Activity		*p*= 0.515		*p*= 0.364		*p*= 0.450	
No	171 (81.0)	46.8	53.2	47.9	52.1	49.1	50.9
Yes	40 (19.0)	52.5	47.5	40.0	60.0	42.5	57.5
C1.3. independence/autonomy		*p*= 0.099		*p*= 0.923		*p*= 0.748	
No	163 (77.2)	44.8	55.2	46.6	53.4	48.5	51.5
Yes	48 (22.7)	58.3	41.7	45.8	54.2	45.8	54.2
C1.4. Cognition		*p*= 0.056		*p*= 0.051		*p*= 1.000	
No	204 (96.7)	46.6	53.4	45.1	54.9	48.0	52.0
Yes	7 (3.3)	85.7	14.3	85.7	14.3	42.9	57.1
T2. Psychological well-being		*p*= **0.006**		*p*= 0.127		*p*= 0.598	
No	113 (53.5)	56.6	43.4	51.3	48.7	49.6	50.4
Yes	98 (46.5)	37.8	62.2	40.8	59.2	45.9	54.1
C2.1. Satisfaction and pleasure		*p*= **0.004**		*p*= **0.048**		*p*= 0.172	
No	145 (68.7)	54.5	45.5	51.0	49.0	51.0	49.0
Yes	66 (31.3)	33.3	66.7	36.4	63.6	40.9	59.1

to be continued

Continuation of Table 3

Variables	n (%)	CASP-19 Scale		Factor 1. Self-fulfillment/ Pleasure		Factor 2. Control/ Autonomy	
		≤ 39.0 (n=101)	≥ 40.0 (n=110)	≤ 25.0 (n=98)	≥ 26.0 (n=113)	≤ 3.0 (n=101)	≥ 4.0 (n=110)
Meanings of "being happy in old age"							
C2.2. Religiosity/spirituality		*p*= 0.724		*p*= 0.832		*p*= 0.724	
No	182 (86.3)	48.3	51.7	46.1	53.8	48.3	51.7
Yes	29 (13.7)	44.8	55.2	48.3	51.7	44.8	55.2
C2.3. Emotion-based coping		*p*= 0.703		*p*= 0.861		*p*= 0.757	
No	169 (80.0)	48.5	51.5	46.7	53.2	47.3	52.7
Yes	42 (20.0)	45.2	54.8	45.2	54.7	50.0	50.0
C2.4. Self-development		*p*= 0.077		*p*= 0.138		*p*= 0.993	
No	142 (67.3)	52.1	47.9	50.0	50.0	47.9	52.1
Yes	69 (32.7)	39.1	60.9	39.1	60.9	47.8	52.2
T3. Interpersonal relationships		*p*= **0.011**		*p*= 0.120		*p*= 0.820	
No	102 (48.3)	56.9	43.1	52.0	48.0	47.1	52.9
Yes	109 (51.7)	39.4	60.6	41.3	58.7	48.6	51.4
C3.1. Family relationships		*p*= **0.038**		*p*= 0.142		*p*= 0.628	
No	131 (62.1)	53.4	46.6	50.4	49.6	46.6	53.4
Yes	80 (37.9)	38.7	61.3	40.0	60.0	50.0	50.0
C3.2. Social relationships		*p*= **0.031**		*p*= **0.025**		*p*= 0.190	
No	157 (74.4)	52.2	47.8	51.	49.0	45.2	54.8
Yes	54 (25.6)	35.2	64.8	33.3	66.7	55.6	44.4
C3.3. Social support		*p*= 0.108		*p*= **0.023**		*p*= 0.703	
No	152 (72.0)	51.3	48.7	51.3	48.7	48.7	51.3
Yes	59 (28.0)	39.0	61.0	33.9	66.1	45.8	54.2
T4. Material resources		*p*= **0.025**		*p*= 0.212		*p*= 0.709	
No	155 (73.5)	43.2	56.8	43.9	56.1	47.1	52.9
Yes	56 (26.5)	60.7	39.3	53.6	46.4	50.0	50.0
Gender		*p*= 0.486		*p*= 0.206		*p*= 0.599	
Male	60 (28.4)	51.7	48.3	53.3	46.7	45.0	55.0
Female	151 (71.5)	46.4	53.6	43.7	56.3	49.0	51.0
Age (years)		*p*= 0.228		*p*= **0.033**		*p*= 0.377	
70-79	71 (33.8)	53.5	46.5	50.7	49.3	43.7	56.3
80-84	97 (46.2)	41.2	58.8	37.1	62.9	47.4	52.6
≥ 85	42 (20.0)	52.4	47.6	59.5	40.5	57.1	42.9

T = Theme; C = Category; Statistically significant difference between groups if *p*-value <0.05, for Pearson's chi-square test.

According to the univariate logistic regression analysis, the participants who mentioned the themes health and functionality, and material resources were less likely to score above the median on the CASP-19 than those that did not mention these themes.Those who mentioned psychological well-being, satisfaction and pleasure, interpersonal relationships and family relationships were more likely to score above the median on the scale. According to data from the multiple logistic regression analysis, older people who did not mention material resources or health and functionality were more likely to score above the median on the CASP-19 than those who mentioned these meanings. Older people who mentioned interpersonal relationships were more likely to score above the median on the CASP-19 than those who did not (Table 4).

Univariate logistic regression analysis for associations between scores above the median in the self-fulfillment/pleasure factor and the meanings of "being happy in old age" revealed results similar to those obtained for the total scale. Compared with older people who did not mention it, those who mentioned social relationships, health and functionality, and satisfaction and pleasure had a greater chance of scoring above the median in the items of the self-fulfillment/pleasure factor. The multiple logistic regression analysis showed significant associations between scores above the median in the self-fulfillment and pleasure factor and the presence of mentions of social support, absence of mentions of health and functionality, and age from 80 to 84 years (Table 5). Regression analyzes were performed for factor 2 of the CASP-19 (control/autonomy), without statistically significant results.

Table 4. Logistic regression analyzes of scoring above the median on the CASP-19, meanings of "being happy in old age", and participants´s gender and age (n=211). Campinas, Brazil, 2020.

Variables	Univariate logistic regression analysis			Multiple logistic regression analysis		
Meanings of "being happy in old age"	*OR	**95% CI OR	*p*-value	*OR	**95% CI OR	*p*-value
T1. Health and Functionality						
No	1.00	---	---	1.00	---	---
Yes	0.41	0.23-0.75	**0.004**	0.44	0.24-0.82	**0.010**
T2. Psychological Well-Being						
No	1.00	---	---			
Yes	2.15	1.24-3.74	**0.007**			
T3. Interpersonal relationships						
No	1.00	---	---	1.00	---	---
Yes	2.02	1.17-3.50	**0.012**	1.92	1.08-3.41	**0.027**
T4. Material resources						
No	1.00	---	---	1.00	---	---
Yes	0.49	0.26-0.92	**0.026**	0.43	0.23-0.83	**0.012**
C1.1 Physical health						
No	1.00	---	---			
Yes	0.60	0.34-1.04	0.066			
C1.2 Activity						
No	1.00	---	---			
Yes	0.80	0.40-1.59	0.515			
C1.3 Independence/autonomy						
No	1.00	---	---			
Yes	0.58	0.30-1.11	0.101			
C1.4 Cognition						
No	1.00	---	---			
Yes	0.15	0.02-1.23	0.077			

to be continued

Continuation of Table 4

Variables	Univariate logistic regression analysis			Multiple logistic regression analysis		
Meanings of "being happy in old age"	*OR	**95% CI OR	*p*-value	*OR	**95% CI OR	*p*-value
C2.1 Satisfaction and pleasure						
No	1.00	---	---			
Yes	2.39	1.30-4.39	**0.005**			
C2.2 Religiosity/spirituality						
No	1.00	---	---			
Yes	1.15	0.52-2.53	0.724			
C.2.3 Coping/emotion						
No	1.00	---	---			
Yes	1.14	0.58-2.25	0.704			
C.2.4 Self-development						
No	1.00	---	---			
Yes	1.69	0.94-3.04	0.078			
C3.1 Family relationships						
No	1.00	---	---			
Yes	1.81	1.03-3.19	**0.039**			
C3.2 Social relations						
No	1.00	---	---			
Yes	2.01	1.06-3.82	**0.032**			
Gender						
Male	1.00	---	---			
Female	1.24	0.68-2.25	0.486			
Age (years)						
70-79	1.00	---	---			
80-84	1.64	0.89-3.04	0.116			
≥ 85	1.05	0.49-2.25	0.907			

T = Theme; C = Category. OR* = odds ratios for high scores: 110 with a score above the median and 101 with a score below the median. 95% CI OR** = 95% confidence interval for the odds ratio; p-value for Wald test statistically significant if p <0.05.

Table 5. Logistic regression analyzes of scoring above the median in Factor 1 (Self-fulfillment/Pleasure) of CASP-19, meanings of "being happy in old age", and participants´gender and age. Campinas, Brazil, 2020.

Variables	Univariate logistic regression analysis			Multiple logistic regression analysis		
	*OR	**95% CI OR	*p*-value	*OR	**95% CI OR	*p*-value
Meanings of "being happy in old age"						
T1. Health and Functionality						
No	1.00	---	---	1.00	---	---
Yes	0.54	0.30-0.97	**0.039**	0.51	0.27-0.95	**0.035**
T2. Psychological Well-Being						
No	1.00	---	---			
Yes	1.53	0.89-2.64	0.128			
T3. Interpersonal relationships						
No	1.00	---	---			
Yes	1.54	0.89-2.65	0.121			

to be continued

Continuation of Table 5

Variables	Univariate logistic regression analysis			Multiple logistic regression analysis		
	*OR	**95% CI OR	*p*-value	*OR	**95% CI OR	*p*-value
Meanings of "being happy in old age"						
T4. Material resources						
No	1.00	---	---			
Yes	0.68	0.37-1.25	0.213			
C1.1 Physical health						
No	1.00	---	---			
Yes	0.71	0.41-1.24	0.226			
C1.2 Activity						
No	1.00	---	----			
Yes	1.38	0.69-2.78	0.365			
C1.3 Independence/autonomy						
No	1.00	---	---			
Yes	1.03	0.54-1.97	0.923			
C1.4 Cognition						
No	1.00	---	---			
Yes	0.14	0.02-1.16	0.068			
C2.1 Satisfaction and pleasure						
No	1.00	---	---			
Yes	1.82	1.01-3.32	**0.049**			
C2.2 Religiosity/spirituality						
No	1.00	---	---			
Yes	0.92	0.42-2.01	0.831			
C.2.3 Coping/emotion						
No	1.00	---	---			
Yes	1.06	0.54-2.09	0.861			
C.2.4 Self-development						
No	1.00	---	---			
Yes	1.56	0.87-2.79	0.139			
C3.1 Family relationships						
No	1.00	---	---			
Yes	1.52	0.87-2.68	0.143			
C3.2 Social relations						
No	1.00	---	---			
Yes	2.08	1.09-3.97	**0.020**			
C3.3. Social support						
No	1.00	---	---	1.00	---	---
Yes	2.06	1.10-3.84	**0.024**	2.19	1.00-2.19	**0.019**
Gender						
Male	1.00	---	---			
Female	1.47	0.81-2.68	0.207			
Age (years)						
70-79	1.00	---	---	1.00	---	---
80-84	1.74	0.94-3.24	0.080	1.93	1.01-3.68	**0.047**
≥ 85	0.70	0.32-1.51	0.364	0.58	0.26-1.32	0.194

T = Theme; C = Category. OR* = odds ratios for high scores: 110 with a score above the median and 101 with a score below the median. 95% CI OR** = 95% confidence interval for the odds ratio; p-value for Wald test statistically significant if p <0.05.

DISCUSSION

We carried out a baseline and follow-up study investigating associations between the meanings attributed by the older people to the concept "being happy in old age", and the scores obtained by them in a measure of perceived quality of life (CASP-19). Older people who did not mention health and functionality or material resources at baseline were more likely to score high on the perceived quality of life scale at follow-up than those who mentioned these meanings. Those who cited interpersonal relationships were more likely to score high on the CASP-19 than those who did not. Participants who scored high on the self-fulfillment and pleasure factor were more likely to mention social support and not to mention health and functionality, and material resources. Associations were observed between high scores in the self-fulfillment and pleasure factor, absence of mentions of health and functionality, and material resources, presence of mentions of social support, and age from 80 to 84 years.

Participants manifested an understanding of the concept of happiness in old age as a condition that presents hedonic aspects (linked to the satisfaction of needs, the search for pleasure and the avoidance of suffering) and eudaimonic (linked to the search for personal excellence). They also showed that they value the eudaimonic aspects more than the hedonic aspects of the experiences of happiness and perceived quality of life, and that they perceive health, functionality, and material resources as aspects of well-being in old age, not as their only or critical facet, as the older people are commonly thought to think.

Elderly people who differentiate themselves by enjoying good physical and cognitive health for their age tend to overvalue their condition. Contact with others of the same age but physically and cognitively impaired can elicit compassion and help meet compensatory goals. In advanced ages, experiences of eudaimonic well-being reflected in psychological well-being, self-development, and spirituality gain prominence. Faced with the inevitable physical, cognitive and social decline that accompanies aging, family relationships and social support from a selected network of friends become increasingly important to the elderly. These notions about the data are in accordance with the theoretical literature[1,12,15,32,33] and with research on happiness[2,4,6,8,9,11], perceived quality of life[23,24], and well-being[2,5,10,13]. In this study, the importance given to interpersonal relationships would have been strengthened by the strong presence of women in the sample, data that are repeated in surveys with elderly people in different countries[8,9,12,15-17,32]. Another peculiarity of this study was the enhancement raised by the sense of self-fulfillment and pleasure factor and the emphasis given by the elderly to self-development, reinforcing the impression of superiority of eudaimonic reasons over hedonic ones in determining the adjustment of the elderly, replicating data from international research[12,17,19,33,34].

Circumstances of the Fibra Study design contributed to the differentiation of the sample, compared to other population-based studies: no participant had record of cognitive deficit suggestive of dementia and all responded to all items of two complex instruments, suggesting that they were healthier than those excluded by the cognitive criteria. Those who died between baseline and follow-up (37.5% of losses) were probably more frail and sicker than survivors. It is reasonable to assume that the non-location of a large part of the baseline participants owed this condition to the fact that they moved to their children's home or to long-term care facilities for older people (LTCF), due to illness, disability or widowhood.

Thus, a bias may have occurred due to the survival of participants with more robust health conditions. However, even accepting this hypothesis, the possibility that the sample harbors considerable heterogeneity within each age group should not be ruled out. Based on analyzes of large official databases in the United States and the database of one of the *Health and Retirement Study* waves, Lowski et al.[34] reported that 48% of the sample aged 51 to 54 years, 42% of those aged 65 to 69, 38% for those aged 70 to 75, 30% for those aged 80 to 84 and 28% for those aged 85 and over rated their health as excellent and very good. Between 51 and 54 years old, 96% were independent for all IADL (Instrumental Activities of Daily Living) and BADL (Basic Activities of Daily Living), a rate that went to 79% between 80 and 84 years and to 56% among 85 years and over. The

percentage of those diagnosed as having any of the five most prevalent chronic diseases in the US was 75% between 51 and 54 years, 50% between 65 and 69, and 35% between 80 and 84 years[34].

It should be noted that the sample was mostly female, which contributed to the higher frequency of mentions to the themes of interpersonal relationships, family relationships and psychological well-being than to the themes of material conditions and satisfaction and pleasure, while men tended to overvalue material resources and health and functionality. This is a trend observed in similar studies[8,9,12,16,18,20], due to genetic-biological, socioeconomic and gender factors.

If, on the one hand, the characteristics of the sample discourage broad generalizations, on the other, they created conditions for the observation of septuagenarians and octogenarians who had functioning patterns compatible with those of optimal or successful old age from a biomedical and psychological point of view. Their answers in the two measurement times reflect socially shared affective and cognitive values and meanings about happiness and quality of life in old age, in interaction with their living conditions and the way they lived and are living their old age. We do not reason as if the meanings observed at baseline could be considered as causes of the perceived quality of life scores assessed in the follow-up. Nor did we plan for the nine-year gap between the two measures, but we did plan to use it to better understand the interactions between the meaning of complex social concepts and subjective measures of quality of life in old age.

CONCLUSIONS

This baseline and follow-up study provides data on relevant aspects of the aging experience of septuagenarians and octogenarians, specifically on associations about quality of life referenced by psychological criteria and older people's conceptions of happiness in old age. It revealed that there are associations between the two sets of data, among which the most important are those led by issues of health and functionality, economic well-being, psychological well-being and hedonic and eudaimonic aspects, which are more valued by older people than those.

The data encourages the appreciation of the use of qualitative approaches in research on happiness, perceived quality of life and related issues. Likewise, it encourages the derivation of useful instruments for clinical, social and educational practices, and for the development of public policies centered on positive conceptions of aging. Of modifiable nature, they can be the target of theoretical and socially relevant research and interventions.

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RESPONSIBILITIES FOR AUTHORSHIP

AL Neri planned and coordinated the study, D Assumpção collaborated with the data analysis and CNA Valero and TFG Meira analyzed the data and prepared the first version of the manuscript, which was reviewed by AL Neri and D Assumpção.

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Performance of social movements and entities in the COVID-19 pandemic in Brazil: Older adults care in long-term care facilities

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Abstract

Objective: To analyze the content of documents proposed by social movements and professional associations to guide care in Long-Term Care Institutions for the Elderly (LTCF) during a COVID-19 pandemic in Brazil. *Method:* This is a documentary, retrospective, descriptive and exploratory research. It was found four websites and their respective documents were identified to guide the care of the older adultswho live in LTCF in the context of the pandemic in Brazil. Thematic analysis was performed using IRaMuTeQ software. *Results:* 28 texts were selected for analysis. The social movement "National Front for Strengthening the LTCF" presented the highest number of productions. In the thematic analysis, three classes emerged: (1) Care as a contagion prevention strategy for COVID-19 at the LTCF; (2) The support of public managers as a right of the older adults living in the LTCF; and (3) The preservation of the social link of the LTCF residents during the pandemic. *Conclusion:* Social movements and organizations had a quick performance in supporting the LTCF in Brazil through the dissemination of documents that guided the care of institutionalized older adults in situations of vulnerability. Greater involvement of public managers in the protection and the right to life of these older adults population is necessary.

Keywords: Health of the Elderly. Homes for the Aged. Coronavirus Infections. Covid- 19. Pandemics.

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INTRODUCTION

COVID-19 is a disease characterized by a severe acute respiratory syndrome caused by a virus of the coronavirus family, SARS-CoV-2. Due to its seriousness and rapid worldwide dissemination, it was recognized by the World Health Organization (WHO) as a public health emergency, in January 2020, and in March of the same year, as a pandemic[1].

The evolution of the pandemic in Asian and European countries highlighted the high risk of the disease for older people, especially those in fragile health conditions and extreme vulnerability. This group has the highest mortality rate when compared to other age groups[2,3].

The scenario proved to be even more critical for people residing in Long Term Care Facilities for Older People (LTCF). In Brazil, these institutions can be public or private, with the particularity of functioning as a residence for people aged 60 or over, regardless of whether they have family support or not, and are social assistance equipment[2].

However, the exact number of institutions with this purpose in the country is still unknown. According to the Institute for Applied Economic Research (IPEA), in a national survey carried out in 2010, approximately 3,548 institutions were counted, 1,617 (45.6%) of them of a philanthropic nature[2].

The population of older people living in LTCF has a set of factors that favor high vulnerability, such as advanced age, presence of multimorbidities (hypertension, diabetes mellitus, heart disease, lung diseases and others), different degrees of dependence and living in collective environments. Added to this problem is the lack of coping plans in Brazil for the protection of institutionalized older people during the pandemic[4,5].

Given the urgency to create efficient measures of contingency for COVID-19 in these environments and the deficiency on the part of the government in meeting this demand, different initiatives emerged by organizations, class entities and social movements. The main objective was to support the institutions with information, protocols, strategies, reports, manifestos and letters[6].

Thus, some entities and Brazilian social movements organized themselves and prepared several documents with the aim of guiding the care provided to the institutionalized older population. This attitude is legitimized by the invisibility of the implementation of public policies in the country aimed at this audience. Thus, knowing and analyzing this production is of fundamental importance to identify the weak points that can interfere with care at the LTCF, and fundamentally point out the necessary interventions for the adoption of preventive measures against COVID-19 in these spaces.

As a proposal for this study, the following research questions were elaborated: What are the documents elaborated by social movements and class entities in the guidance of care for older people in LTCF during the COVID-19 pandemic in Brazil? What is the content of these documents?

The study aims to analyze the content of documents proposed by social movements and class entities to guide care in LTCF during the COVID-19 pandemic in Brazil.

METHOD

Documentary, retrospective, descriptive and exploratory research. The sample consisted of documents produced by social movements and class entities to guide LTCF care during the COVID-19 pandemic in Brazil. For selection of documents, the following inclusion criteria were adopted: dissemination of content such as technical report, protocol, manifesto, contingency plan, brochure, newsletter, e-book chapter, recommendations, action plan and letter that were intended to guide care in LTCF; content available in full on their respective websites and which presented the keywords inside: Long-Term Care Facility for Older People, Older People and COVID-19 (Coronavirus); documents produced and released from March to October 2020.

Data collection was carried out in October 2020. The search for data was based on three phases: pre-analysis, material exploration and data analysis. In the first, a survey of the websites of

social movements and class entities was carried out, with the selection criteria: movements and entities operating in Brazil, carry out the preparation and dissemination of content about older people in the COVID-19 pandemic and about the orientation of care to the LTCF resident.

In the second stage, all documents produced were screened. In the third stage, the documents found were carefully read, identifying the inclusion criteria. In the final sample 28 productions composed the analyzed textual database. The flowchart of the data collection steps is shown in (Figure 1).

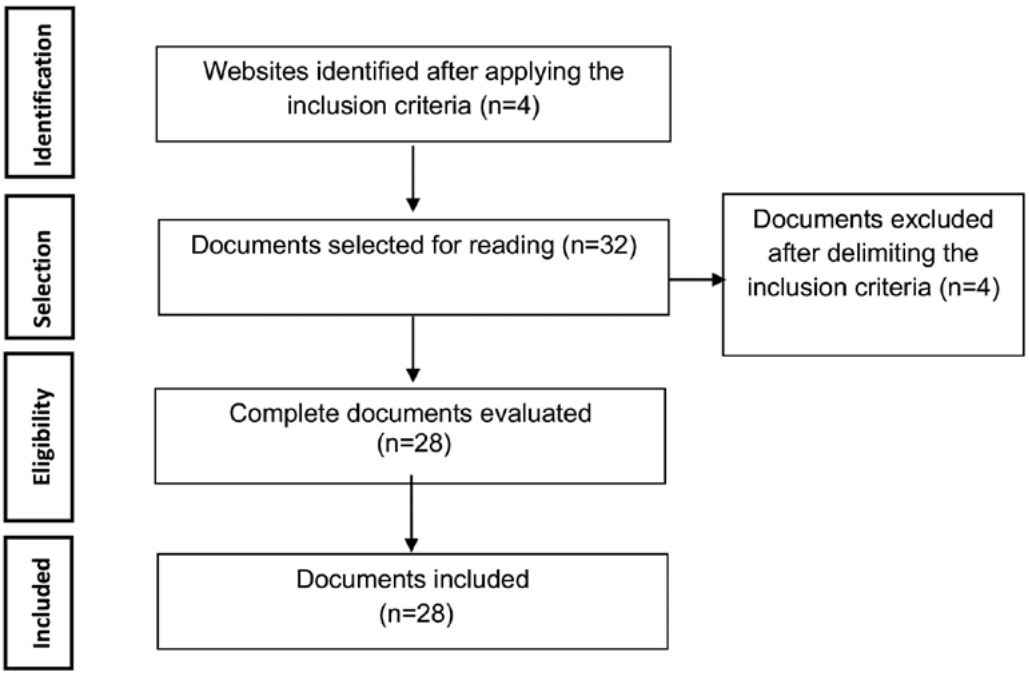


Figure 1. Flowchart of the selection of documents used in the study. Ribeirão Preto, SP 2020.

The documents were organized in a database, making it possible to identify the social movement or entity, title, type of document, objectives and content. After careful reading, the text database was obtained by grouping the texts in a single document, created in the notebook. Then, it was submitted to the textual analysis process, with the help of the software *Interface de R pour les Analyses Multidimensionnelles de Textes et de Questionnaires* - IRaMuTeQ, version 0.6 alpha 3[7].

To assist in the analysis, the thematic analysis was adopted as a reference[8], whose process consists of six phases: (1) data collection - first contact with the material; (2) creation of a list of initial ideas (codes), when the researcher looks for the existence of themes; (3) classification and grouping of codes into categories; (4) creation of themes, when there was independence for each theme and the principles of internal homogeneity and external heterogeneity were followed, which is a process that eliminates ambiguity in the process of thematic distribution; (5) assigning a name to each identified theme; and, finally, (6) the writing of the final report[8].

To assist in steps three to five, the IRaMuTeQ software was used with the choice of the Reinert method, which performs a hierarchical classification in a descending manner. Such classification is defined by lexical classes, each of which represents a theme and can be described according to the words that define it and the respective text segments[9]. For each class, the segments obtained in the analysis performed by the software and validated by the researchers were used.

In the thematic analysis, three classes emerged: a) Care as a contagion prevention strategy by COVID-19 in the LTCF; b) The support of public managers as a right of the older person residing in LTCF; and c) The preservation of the LTCF resident's socio-family bond during the pandemic.

Similitude Analysis was also used, which creates a similarity graph, representing the links between the analyzed shapes. To prepare the graph, the parameters used in the analysis were the active words and with a frequency greater than 35 (f ≥35), for viewing the most frequent terms, because with a lower frequency, the image has a polluted appearance, making reader's understanding difficult[7].

Based on the analysis report and the graphs generated, the data were analyzed in the light of the relevant literature according to the thematic content analysis technique.

Because it used free and publicly accessible information, available on the websites of social movements and trade associations, this research was not submitted to the Ethics Committee, in accordance with the Resolution No. 510/2016 of the National Health Council.

In addition to the ethical aspects, the stages of research and preparation of the article responded to the criteria of the Consolidated criteria for qualitative reporting research[10].

RESULTS

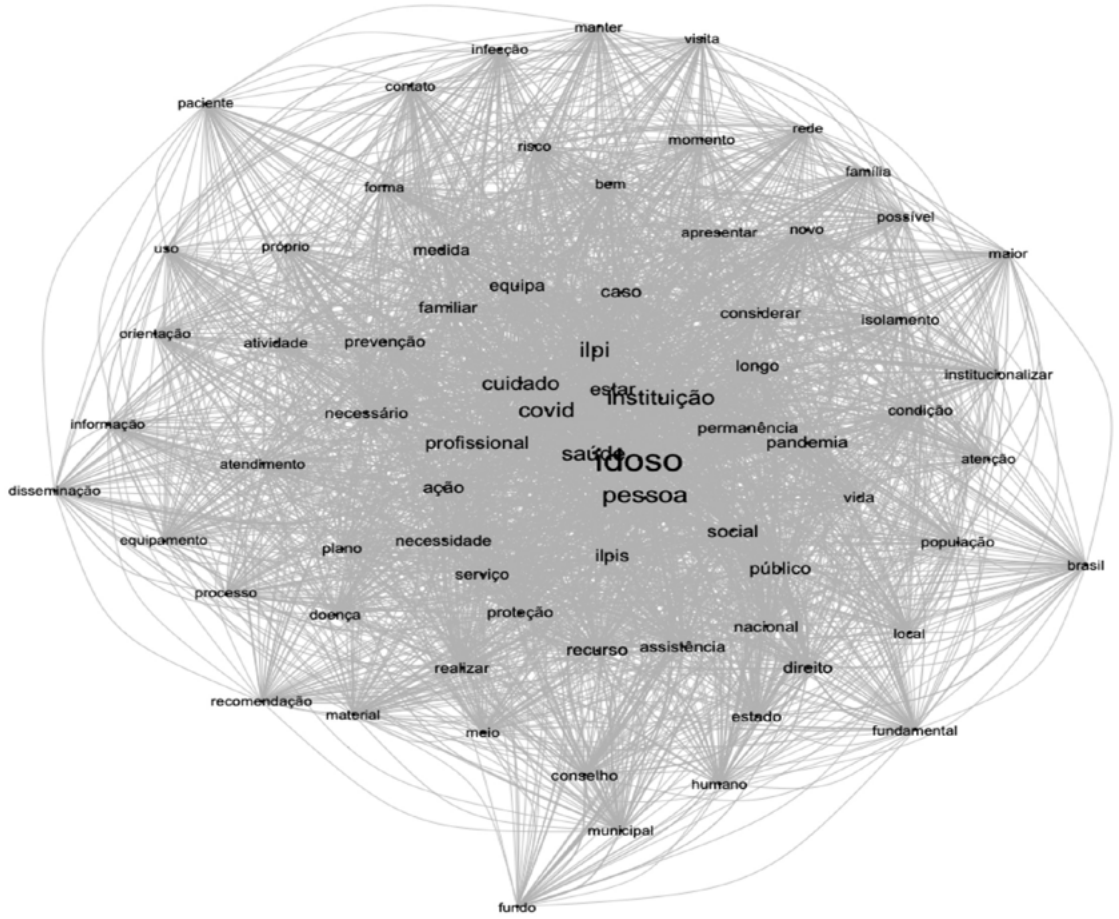
Among the social movements and entities selected to analyze the documents produced, the National Front for Strengthening the LTCF (FNILPI)[11] presented the largest quantity of documents, totaling 12, with 2 (two) reports, 6 (six) brochures, 1 (one) protocol, 1 (one) manifesto, 1 (one) informative and 1 (one) contingency plan. The Scientific Department of Gerontological Nursing of the Brazilian Nursing Association (DCEG)[12] presented 10, being 1 (one) informative and 9 (nine) book chapters. The Brazilian Society of Geriatrics and Gerontology (SBGG)[13] released 3 (three), through recommendations, and the Voluntary Alliance for the Protection of Institutionalized Older People (ILPI.me)[14] totaled 3 (three) documents, 1 (one) action plan, 1 (one) protocol and 1 (one) letter.

In the data analysis, the text database allowed the IRaMuTeQ software to form 154 text segments, which made it possible to identify 1,002 occurrences of terms, of which 332 words were selected. Of these, 190 different words were identified, with a single occurrence, corresponding to 57.23% of the total words analyzed and 18.96% of the occurrences found.

As for the content of the analyzed documents, according to Figure 2, the most recurrent terms using a frequency of words equal to or greater than 35 were: older person (f=475); person (f=250); LTCF (f=216); health (f=190); care (f=169); professional (f=138); social (f=127); public (f=114); right (f=111); action (f=100); equipment (f=98); family (f=96); pandemic (f=96); resource (f=92); assistance (f=76); Advice (f=72); consider (f=72); life (f=71); prevention (f=70); protection (f=69); service (f=69); need (f=66); required (f=66); plan (f=52); isolation (f=52).

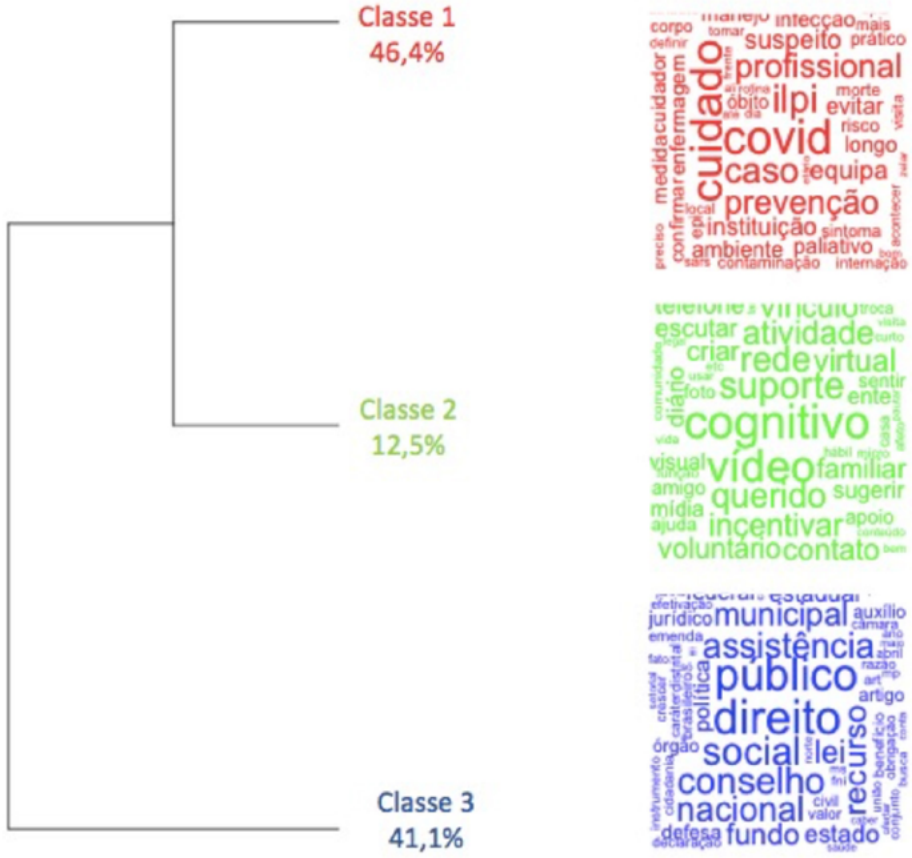
Figure 3 represents the descending hierarchical classification, with the organization in classes with a word cloud. Classes 1 and 2 make up the same subcorpus (58.9%), with Class 1 containing 46.4% of text segments and Class 2, 12.5% of text segments. In class 1, the most frequent words were: LTCF; COVID; Caution; professional; case; equipment; prevention; suspect. In class 2, the following stood out: family member; network; contact; cognitive; support; virtual; dear; to encourage. Class 3 presents the other subcorpus with 41.1% of the text segments, with emphasis on: public; social; right; resource; assistance; national; council.

The classes obtained in the analysis and some excerpts extracted from the documents prepared by the class movements and entities are represented in Chart 1.



ação = action
assistência = assistance
atenção = attention
atendimento = service
atividade = activity
bem = well
Brasil = Brazil
Caso = case
Condição = condition
conselho = advice
considerar = consider
contato = contact
cuidado = care
direito = right
disseminação = dissemination
doença = disease
equipamentos = equipment
estado = state
estar = be
família = family
familiar = familiar
forma = form
fundamental =fundamental
fundo = background
humano = human
idoso = elderly
ILPI = LTCF
Infecção = infection
Informação = information
Institucionalizar = institutionalize
Instituição = institution
isolamento = isolation
local = local
longo = long
maior = bigger
manter = keep
material = material
medida = measure
meio = quite
momento = time
municipal = municipal
nacional = national
necessário = required
necessidade = necessity
novo = new
orientação = guidance
paciente = patient
pandemia = pandemic
permanência = permanence
pessoa = people
plano = plan
população = population
possível = possible
prevenção = prevention
processo = process
profissional = professional
próprio = own
proteção = protection
público = public
realizar = accomplish
recomendação = recommendation
recurso = resource
rede = network
risco = risk
saúde = health
serviço = service
social = social
uso = use
vida = life
visita = visit

Figure 2. Similarity graph in network format with the words that were connected in the analyzed documents. Ribeirão Preto, SP 2020.



class 1

Ambiente = environment
Caso = case
Contaminação = contamination
Corpo = body
Cuidado = care
Cuidador = caregiver
Enfermagem = nursing
Equipamento = equipment
Evitar = avoid
ILPI = LTCF
Infecção = infection
Instituição = institution
Internação = hospitalization
Longo = long
Manejo = management
Medida = measure
Morte = death
Paliativo = palliative
Pratica = practice
Prevenção = prevention
Professional = professional
Risco = risk
Sintoma = symptom
Suspeito = suspect
Visita = visit

class 2

Ajuda = help
Amigo = friend
Apoio = support
Atividade = activity
Cognitive = cognitive
Contato = contact
Criar = to create
Diário = diary
Ente = ent
Escutar = to listen
Familiar = familiar
Foto = photograph
Incentivar = to encourage
Mídia = media
Querido = dear
Rede = network
Sentir = to feel
Sugerir =suggest
Suporte = support
Telephone = telephone
Troca = replacement
Video = video
Vínculo = bond
Virtual = virtual
Visual = visual
Voluntário = voluntary

class 3

Artigo = article
Assistência = assistance
Auxílio = aid
Câmara = chamber
Civil = civil
Conselho = advice
Defesa = defense
Direito = right
Efetivação = effectiveness
Emenda = amendment
Estado = state
Fundo = background
Jurídico = legal
Órgão = organ
Política = politics
Público = public
Razão = reason
Recurso = resource
Social = social
Valor = value

Figure 3. Dendrogram of classes provided by IRAMUTEQ in word cloud format from the analyzed documents that involved the theme of guidelines for the care of older people in the LTCF during the COVID-19 pandemic. Ribeirão Preto, SP, 2020.

Chart 1. Presentation of classes and some excerpts from the analyzed documents. Ribeirão Preto, SP, 2020.

Class	Excerpt from analyzed documents
Care as a contagion prevention strategy for COVID-19 at LTCF	*"LTCF managers must make sure that LTCF and support professionals have been trained and have practiced the appropriate use of Personal Protective Equipment PPE before starting care for the older people in the unit, including services provided in suspected or confirmed cases of new Coronavirus infection* [...]" *(FNILPI 01)*
	"Organizing action plans for the prevention and management of older residents, promoting training of the care team for the programmed measures, reinforcing local hygiene behaviors and hand hygiene protocols and protection of residents and employees [...]" *(SBGG 02)*
	"Presenting strategies and guidelines for teams of professionals working at LTCF on the prevention of COVID-19 [...]*" (ILPI.me 02)*
The support of public managers as a right of the older person residing in LTCF	*"The LTCFs are places of housing and social assistance facilities, with mostly no structure or human resources to provide specific health care* [...]" *(DCEG 08)*
	"Worldwide, the cruelest face of the pandemic is revealed in the abandonment of older people, in the lack of access to health resources with high mortality of those who live in shelters and institutions [...]" *(SBGG 03)*
	"The LTCFs represent the place of residence of older people and are social assistance facilities and therefore do not have the structure or human resources to offer specific health care to its residents. [...]" *(ILPI.me 01)*
The preservation of the LTCF resident's socio-family bond during the pandemic	*"Supporting families with institutionalized older people, maintaining a regular communication channel with the socio-family network, promoting virtual contact of families and friends with residents, communicating if there are suspected or confirmed cases of Covid-19 in the LTCF* [...]" *(FNILPI 03)*
	"It is extremely important that family members are adequately communicated, a well-made contact will avoid misunderstandings, will bring family members as allies in protecting the older person, will minimize indignation against restrictive measures, will bring a practical and clear path to guide behavior [...]*"(ILPI.me 2)*
	"Using digital tools with good connectivity for older people to contact their families with or without cognitive ability, implementing specific schedules for virtual visits, after cleaning tablets or cell phones [...]*"(DCEG 01)*

National Front for Strengthening the LTCF (FNILPI); Brazilian Society of Geriatrics and Gerontology (SBGG); Voluntary Alliance for the Protection of Institutionalized Older People (ILPI. me); Scientific Department of Gerontological Nursing (DCEG).

DISCUSSION

The results were based on the analysis, making it possible to identify classes that emerged from the content of the documents. Three aspects were found with an intrinsic relation to the degree of importance of the older person residing in the LTCF: care, support from the public authorities and maintenance of the socio-family bond. This finding denotes a concern of movements and entities in relation to the need for protection, reception and defense of the rights of this population to guide better care.

The documents analyzed express the importance of transmuting the look at older people who reside in LTCF, as they present an aging profile accompanied by vulnerabilities that demand the implementation of urgent public policies.

It is important to recognize that Class 1, which addresses the importance of targeted care as a prevention strategy for COVID-19 among institutional residents, and Class 2, which addresses care as a right, make up the same subcorpus. Thus, it is inferred the need for interaction between the proposed care and the desirable support of public management for the execution of this care.

In Brazil, the LTCF is classified as a place of residence, being directly linked to the Unified Social Assistance System[5,15]. However, this environment may lack adequate physical structure and human

resources to provide comprehensive care[2]. This characteristic was aggravated during the pandemic due to the high vulnerability of residents to contract the infection and develop complications[16-20], due to frailty, greater degree of dependence associated with reduced physiological reserve, loss of physical capacity and less positive reaction to adversities[21].

Furthermore, in practice, many LTCFs have difficulties in following the recommended hygiene recommendations to interrupt transmission[22], which requires the adoption of urgent measures to contain the spread of the virus in these spaces.

Thus, the adoption of effective prevention strategies to prevent the spread of infection in these places includes: organizing the space to avoid very close contact; the restriction of visits; guidance for employees on the importance of simple measures such as regular hand washing and/or use of 70% alcohol, as well as changing clothes and shoes upon arrival at the institution; the reconfiguration of activities carried out in groups; the systematic maintenance of the cleanliness of the place; in addition to the early identification of symptomatic residents[17,18,23,24]. It is noteworthy that, among these measures, the early identification of flu-like symptoms and their nuances is paramount, as frail older people can present atypical symptoms including the absence of fever, cough or sputum production[16]. Thus, it is necessary to train caregivers and LTCF staff for a prior intervention in order to protect residents.

The LTCF, being considered a place of residence, does not have the structural conditions to provide care for decompensated cases of COVID-19, as it was not designed for such situations and caregivers and staff were not trained to intervene in cases of severe respiratory diseases. However, the importance of working together with the health network to provide comprehensive care to its residents is highlighted[22].

The social movement of the National Front for Strengthening the LTCF also proposed a document for the intervention of care for older people in the LTCF, in the Good Practices manual[15]. The document considered the risk of contamination of residents related to the performance of caregivers, team members, visits, delivery people and even residents who may have come into contact with contaminated people within the institution[15,19].

The adoption of strategies for permanent training of professionals who work at the LTCF must be implemented, using the dissemination of knowledge and adoption of preventive measures based on official protocols and standards. It is necessary that these actions integrate the areas of health, social assistance, labor and human rights[15].

The pandemic signaled the need, in the near future, for a more focused look in relation to care in the LTCF, with the establishment of integrated care models, also involving the social-family bonding network[17].

Class 2 focused on the importance of the role of the government in guaranteeing the social right and protection of the older person's life in the pandemic. In northern hemisphere countries, a high rate of deaths was recorded in LTCFs, reflecting the vulnerability of residents living in these places, and also denoting a weakness of public policies with the non-inclusion of LTCFs in the systematic planning of response to COVID-19. It is important to emphasize that the lack of effective public policies for this group is a long-standing issue, with weaknesses related to funding, deficit of human resources and a team with limited knowledge in gerontology and long-term care[3,19].

In addition, the unusual moment experienced in these spaces has required the institution's employees, especially caregivers, to offer the best possible care. In practice, these changes have an impact on the increased workload as a result of the careful adoption of preventive measures and the need to reinvent the provision of safe care, given the scarcity of personal protective equipment and other essential supplies for the quality of care[19,25,26]. This moment encourages the impetus for changes in health-related policies and guidelines, which can promote a readjustment and be disseminated efficiently[16], especially for the institutionalized older people.

In this sense, emergency measures must be implemented by the States and Municipalities, including federal co-financing. The government must offer actions to protect life, offer aid in material goods and financial values in temporary situations in

the context of public calamity, requiring investment in LTCF in the pandemic[27].

The development of contingency plans to respond to the needs that emerged as a result of the pandemic must be adapted to the characteristics and needs of each LTCF. This requires a factual articulation with primary health care, working together with the institution's staff, in order to provide a follow-up that will enable a better quality of life and control of the spread of the virus. However, it will not prove to be a viable proposal if there is no allocation and/or organization of resources for this purpose[28].

Another impediment to the implementation of public policies in these places is the lack of integration between social and health services[28]. The difficulties in providing long-term care are based on the lack of integration of health care paradigms based on individual needs, as well as the absence of integration of health and social care[17]. The effective association between both spheres will reflect the availability of an integrated care model that is consistent with the needs of these institutions, as seen in developed countries.

Although the discussion about these spaces is still timid, especially when it comes to government positions, immediate reflections and actions are necessary, as these places, being more vulnerable to the spread of the virus, require urgent support and actions to protect against misfortune[21]. Furthermore, data indicate that the effects of the pandemic will persist even after its end, with serious repercussions on the economy and health[29]. Therefore, the need for political managers to prioritize the crisis in the care of older people in LTCF and to establish models of integrated care, also involving the social-family bonding network is ratified[17], as pointed out in Class 3.

Class 3 represented the importance of maintaining the socio-family bond as a strategy to minimize the effects arising from social isolation, a condition that is often common in the daily lives of LTCF residents. The restriction of visits was one of the first measures adopted to minimize the risks of contamination[17,19,20,25,26]. However, this determination caused suffering and had repercussions on the mental health of older people[29], in many cases triggering cases of depression and anxiety, being more evident in older people with dementia[25].

Social isolation among older people is a public health problem due to the high risks of neurological, cardiovascular and autoimmune complications, in addition to cognitive and mental health impairments[30]. Such conditions are even more evident among LTCF residents, who already live socially isolated[22] and present reduced opportunities for communicating with other people, spaces and engaging in social activities that have particular meaning. Thus, there is an urgent need for support and adaptation to communication needs in order to help decision-making and, consequently, improve the quality of life and well-being of this population[30].

It is essential that older people are informed about the threats to their health and about the procedures aimed at safety and protection so that they can adhere to the new moment demanded by the pandemic[17]. There is also an urgent need to rethink strategies for maintaining social and family bonds at this time.

The use of online technologies is a mechanism for social support, maintenance of the support network and a sense of belonging[30]. Interventions can be simple and involve virtual visits, sending letters, phone calls, video calls, exchanging photos, among other strategies[19,23,31] carried out with significant others, family, friends, and voluntary organizations that serve in the LTCF. On the other hand, the resident's family requires security for the prevention of COVID-19, but also dialogue with the older person and the team to transmit security for the care of their family member who lives at the LTCF.

In times of health emergencies, the older population is the invisible part of the crisis and, referring to the older person living in LTCF, this characteristic requires the adoption of strategies to ensure these people's lives. The carrying out of information campaigns for society should be directed towards protecting the most vulnerable, making them visible to the social body[32].

During this period, there was a rapid eruption of information related to care in these environments[31]. In Brazil, the Ministry of Health released technical notes[33-35] with guidelines for the prevention and control of infections by the new coronavirus in LTCF. However, initiatives carried out by movements and entities such as the National Front for

Strengthening the LTCF, the Scientific Department of Gerontological Nursing, the Brazilian Society of Geriatrics and Gerontology and the Voluntary Alliance for the Protection of Institutionalized Older People reinforced and favored the dissemination of information through documents, guidelines for care and adoption of best practices for infection control. All these initiatives contribute to the defense of older people living in LTCF and to the visibility of this collective for society.

A limitation of this study is identified as the selection of the main social movements and entities that made content available online, not covering possible publications in other dissemination formats.

CONCLUSION

The pandemic resulted in deaths of older people in several LTCFs worldwide, given the high vulnerability of its residents to infection and complications of the virus. Social movements and entities had a swift dynamic in supporting the LTCFs through the preparation and dissemination of documents to guide the care provided in these institutions in the context of the COVID-19 pandemic. They pointed out the urgent need to adopt preventive measures to control the spread of the virus in these places.

The documents analyzed also emphasized the need for guidance on care directed towards the prevention of COVID-19, with a focus on staff training, on the importance of the government's role in supporting these places, which are still forgotten and not valued, with co-financing to guarantee materials and equipment for quality care and maintenance of the support network for older people. These measures were highlighted in view of the great impacts on mental health and quality of life for everyone involved.

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Use of psychotropic drugs by older adults with hypertension: prevalence and associated factors

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Abstract

Objective: to analyze the factors associated with the use of psychotropic drugs by older adults with hypertension treated in primary care. *Method:* a cross-sectional study was carried out in a city in the northwest of the state of Paraná, Brazil. Data collection was carried out with older adults in the first semester of 2016, using an adapted validated instrument for assessing satisfaction with Primary Health Care services. The logistic regression model was used with the stepwise method and the magnitude of the associations was estimated by calculating Prevalence Ratio (PR). *Results*: 260 older adults with hypertension participated in the study, of which 25.4% were in use of psychotropic drugs, most were aged 60-69 years (48.8%) and female (67.3%). The multivariate analysis showed psychotropic drugs use was more prevalent in participants who used tobacco (PR: 4.09; 95%CI: 1.81–9.18), had abnormal waist circumference (PR: 2.58; 95%CI %: 1.29–5.18), were obese (PR: 2.43; 95%CI: 1.30–4.55) and reported side-effects of drugs used in AH treatment (PR: 2, 98; 95%CI: 1.23-7.21). Regarding the organizational and relational aspects of the family health strategy teams, participants with hypertension and in use of psychotropic drugs had a higher rate of dissatisfaction with the service (PR: 6.71; 95%CI: 1.37–32, 71) and with lack of support and understanding of the problems reported during consultations (PR: 2.17; 95%CI: 1.11–4.25). *Conclusions*: As a public health problem that affects a significant contingent of the elderly population at high risk of health problems, further studies should be conducted in this area. Future studies should seek alternatives to improve the quality of life of elderly with comorbidities and in use of psychotropic drugs through comprehensive care.

Keywords: Elderly. Hypertension. Psychotropics Drugs. Drug Prescriptions. Drug Therappy. . Primary Health Care.

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INTRODUCTION

Overuse of medications is part of Western culture based on the premise that all maladies and any kind of suffering must be remedied at all costs. In the context of this practice, polypharmacy has become one of the most rapid and effective ways of minimizing psychic suffering[1]. According to the World Health Organization (WHO), psychotropic drugs (psycho=mind and tropic=change) are selective modifiers of the Central Nervous System (CNS) which promote changes in behavior, mood and cognition. The use of this class of drugs is essential in the treatment of some mental or psychiatric disorders, such as anxiety, insomnia, depression, agitation, convulsion and pschosis[2].

Thus, the use of psychotropic drugs has grown considerably, particularly in the form of anti-depressants, due to improvements in diagnosing mental disorders, to the availability of new drugs on the market and new treatment indications[3]. More specifically for antidepressants, besides these factors there is the long-term nature of drugs treatment for depression. In the case of older patents, this includes late-life depression induced by the physical and social limitations imposed by ageing[4].

The most widely used psychotropic agents and other classes encompass the following medications: antipsychotic, barbiturates, benzodiazepines, neuroleptic and antidepressants, all of which can trigger serious adverse events, ranging from elevated risk of stroke, increased mortality, development of physical dependence and tolerance in sleep induction, to greater cognitive decline, falls risk and convulsions[3,4].

Older patients are the most likely group to be prescribed benzodiazepines, where this has become a major public health problem[5]. In this respect, a population-based study carried out in the city of Campinas, São Paulo state, found a prevalence of psychotropic drug use of 10.8% in older adults[6]. This rate differed depending on whether the individual was community-dwelling or institutionalized. Studies involving older adults in long-term care institutions found that between 59.7% and 74.6% used these medications, where greatest use was in European countries, predominantly antipsychotics[7,8]. Prevalence among community-dwelling older adults ranged from 9.3% to 37.6%, where benzodiazepines proved the most commonly used psychotropic drug[8]. In a study of a Brazilian elderly population, 21.7% had been in use of benzodiazepines for over 1 year[9].

Given that the incidence of polypharmacy is a factor associated with life expectancy, monitoring of this practice by Family Health Strategy teams has become necessary. Under the prevailing Brazilian mental health policy, Primary Health Care is defined as the gateway, and system responsible, for provision of care to users in psychic distress, and the remit of the teams encompasses the need to devise strategies aimed at the older population, in accordance with these policies[3,4].

Studies on the use of psychoactive drugs and polypharmacy are a field of investigation inherent to pharmacoepidemiology which are vital for promoting rational use of medications. In addition, elucidating the factors associated with the use of psychotropic medications by older adults with arterial hypertension (AH) treated in Primary Care can help inform strategies for prevention and to help promote quality of life of the older population, as well as for avoiding substance dependence and the adverse effects associated with overuse of this class of medication[3-9]. Against this background, the objective of the present study was to analyze the factors associated with psychotropic drugs use by older adults with arterial hypertension treated in primary health care.

METHOD

A cross-sectional study of older adults undergoing treatment for AH in Primary Care was conducted. The city in which the study was carried out is situated in the Northeast of the state of Paraná, Brazil. At the time of data collection, the city had an estimated population of 403,063 inhabitants. The Primary Health Care network is decentralized and comprises 34 Basic Healthcare Units and 74 Family Health Strategy teams, providing health coverage for 68.01% of the population[10].

The criteria for study inclusion were individuals with AH, aged ≥60 years, residing in the urban area of the city, having up-to-date medical records and having been seen by a health care professional of a Basic Healthcare Unit in the 12 months leading up to data collection. Exclusion criteria were not having information on clinical consultations or drugs prescriptions available in medical records.

The sample size was calculated based on number of people registered on the SISHIPERDIA system (program for registration and treatment of individuals with hypertension and Diabetes *Mellitus*) up to 2014, which totaled 27,741 individuals, 62.4% of whom were older adults. This timeframe was used as the basis for the calculation because the data for the year prior to data collection (2015) was still being processed and could have negatively impacted the reliability of the information. Therefore, the proportion of the population was calculated to determine the minimum sample size of the sample, adopting an estimated error rate of 5% and confidence interval of 90%. Given the population size was known and finite, the minimum representative sample was established as 252 older adults. This sample was subsequently randomized and stratified according to number of patients seen by each Basic Healthcare Unit in the city, giving a final sample of 260 older individuals.

Initial contact was made with the managers, physicians and nurses of the respective Basic Health Unit and then with the patients, after which the study was presented and invitations extended for participation. Data collection was carried out in the first half of 2016 by 3 nurses who were students on the Post-graduate Program of a public university in the city. For this stage, previous training on the study aims, interview techniques and on measuring clinical and anthropometric parameters of interviewees was given to the nurses. All interviews were individual and conducted in comfortable rooms, free of interference.

Two instruments were employed for data collection. The first instrument was adapted and validated by Paes[11], based on the Primary Care Assessment Tool (PCATool), and collected data on AH patients´ perceptions of the services provided by the Primary Care system. For the present study, the variables contained in the block of questions on sociodemographic and economic profile were used, in which educational level was established according to number of full years of formal study, and race/color was self-reported by participants. Respondents were questioned about medications use (divided according to which therapeutic group they belonged to) and about the health professional-patient relationship.

The second instrument collected data on participants´ socioeconomic profile, as per guidelines of the Brazilian Association of Research Companies (ABEP). For the present study, socioeconomic status was categorized into classes AB, C and DE[12]. Adequate follow-up was defined as when the patient attended pre-scheduled routine consultations at least 3 times a year, for the year prior to that of data collection[13].

After conducting of interviews, information was collected from study participants´ electronic medical records. Data on medications in use were drawn from the prescriptions tab of the electronic medical record and then transcribed to the data collection instrument. Medications were classified according to their main active substance, identified with the aid of the *Dicionário de Especialidades Farmacêuticas* (DEF), and subsequently grouped according to the rules of the Anatomical Therapeutic Chemical Classification System (ATC)[14]. Thus, the following classes were considered psychotropic: benzodiazepines, antidepressants, selective serotonin reuptake inhibitors, tricyclic agents and other anti-depressants. Antipsychotics were not included in the current analysis.

Anthropometric and clinical parameters were measured during the interviews using duly calibrated devices, observing the guidelines on techniques and procedures for taking measurements. Blood pressure values were determined based on the procedures outlined in the 7th Brazilian Guideline on Arterial Hypertension by the Brazilian Society of Cardiology (SBC)[15]. Adequate Blood Pressure Control was defined as Systolic Arterial Pressure (SAP) ≤140 mmHg and Diastolic Blood Pressure (DBP) ≤90mmHg[15].

Anthropometric parameters were collected in accordance with the rules of the Brazilian Association for the Study of Obesity and Metabolic Syndrome (ABESO)[16] and with recommendations from the

Handbook for Older Adults produced by the Ministry of Health[17]. A non-elastic tape was used for measuring waist circumference (WC), where values of ≥94 centimeters for males and ≥80 for females were deemed abnormal[16].

Weight and height measurements were taken using a duly calibrated anthropometric balance with stadiometer attached. Based on the anthropometry results, Body Mass Index (BMI) was calculated and classified as follows: normal weight <22 kg/m², adequate weight ≥22 and ≤27 kg/m² and excess weight > 27 kg/m² [16,17].

The result of the calculation of weight/height ratio (WHR) was coded according to a study on the diagnosis of excess weight in older adults using WHR as a marker, where values ≥0.56 were taken to indicate overweight[18]. The conicity index (CI) was determined using the equation of Pitanga and Lessa (Figure 1), with cut-off points for abnormality defined as CI >1.25 for men and CI >1.18 for women[19].

$$CI = \frac{\text{Waist circumference (m)}}{0.109\sqrt{\frac{\text{Body weight (kg)}}{\text{Height (m)}}}}$$

Figure 1. Mathematic equation for calculating conicity index (CI). Paraná, Brazil, 2016.

Legend: CI: conicity index; m: meters; kg: Kilos.

The dependent variable was the use of at least 1 psychotropic drug, confirmed by analyzing study participants´ medical records. Explanatory independent variables were split into the following blocks: economic and sociodemographic profile; clinical, anthropometric and life-habits profile; variables measuring organizational and relational aspects of the care provided by health professionals from the Primary Healthcare teams to the target population of the study, categorized based on a composite index of the questions for the blocks cited, resulting from the analysis of non-hierarchical clustering by repartitioning.

All questionnaires were checked, tabulated and then analyzed using the statistical software Statistical Package for Social Sciences (SPSS), version 20.0. A logistic regression model with the stepwise method was applied, incorporating all variables with a p-value <0.20 in the univariate analysis, while only retaining variables with a p-value <0.05 in the multivariate model. The magnitude of associations was estimated by calculating Prevalence Ratio (PR), adopting a 95% confidence interval as the measure of precision.

The ethical principles set forth by Resolution 66/12 of the National Board of Health were duly observed, and the study was approved by the Research Ethics Committee of the signatory institution (Permit no. 1.407.687/2016). All participants signed a Free and Informed Consent Form.

RESULTS

A total of 360 patients with AH were interviewed. Overall, 48.8% were aged 60-69 years, 67.3% female, 64.6% self-reported as white, 56.5% lived with a partner or children, and 62.7% had low educational level. Regarding economic aspects, most participants were retired and/or pensioners (74.2%) and predominantly classified into socioeconomic strata C based on purchasing power of the head of the family (40.8%) (Table 1).

Of the 260 participants, 66 (25.4%) were in use of psychotropic drugs, predominantly clonazepam (23.9%) in the benzodiazepine group and amitriptyline (22.8%) in the tricyclic class of antidepressants. The main selective serotonin reuptake inhibitor was fluoxetine (21.7%), while other atypical antidepressants, such as bupropion, were also identified in the analysis (2.2%) (Table 2).

Table 1. Sociodemographic and economic profile of older adults with hypertension treated in Primary Care (N=260). Paraná, Brazil, 2016.

Variables	n (%)
Age	
60 – 69	127(48.8)
70 – 79	96(36.9)
80 – 89	35(13.5)
>90	2(0.8)
Sex	
Male	85(32.7)
Female	175(67.3)
Race/Color	
White	168(64.6)
Black	38(14.6)
Brown	54(20.8)
Family Situation	
Living with partner and children	147(56.5)
Living with family members, without partner	62(23.8)
Living alone	51(19.6)
Educational level	
Illiterate	25(9.6)
Primary education	163(62.7)
Secondary education	61(23.5)
Higher education	11(4.2)
Occupation	
Not retired	67(25.8)
Retired/Pensioner	193(74.2)
ABEP - Associação Brasileira de Empresas de Pesquisa	
AB – High purchasing power	95(36.5)
C – Medium purchasing power	106(40.8)
DE – Low purchasing power	59(22.7)

Table 2. Class of psychotropic drugs used by older adults with hypertension treated in Primary Care (N=66). Paraná, Brazil, 2016.

Variables	ATC Code	N (%)*
Benzodiazepines	N05BA	
Clonazepam	N03AE01	22 (33.3)
Bromazepam	N05BA08	8 (12.1)
Diazepam	N05BA01	2 (3.1)
Antidepressants	N06A/N06AX/N06AB	
Amitriptyline	N06AA09	21 (31.8)
Imipramine	N06AA02	3 (4.5)
Clomipramine	N06AA04	2 (3.1)
Bupropion	N06AX12	2 (3.1)

to be continued

Continuation of Table 2

Variables	ATC Code	N (%)*
Mirtazapine	N06AX11	1 (1.5)
Venlafaxine	N06AX16	1 (1.5)
Fluoxetine	N06AB03	20 (30.3)
Paroxetine	N06AB05	5 (5.4)
Sertraline	N06AB06	3 (4.5)
Citalopram	N06AB04	2 (3.1)

ATC: Anatomical Therapeutic Chemical Classification System; *Participants were in use of more than one type of medication, value of n not calculated.

Table 3 shows that older adults aged 80-89 years had a lower rate of psychotropic drug use (PR: 0.32; 95%CI: 0.10–0.99). Also regarding demographics, the analysis revealed that patients who were female (PR: 2.14; 95%CI: 1.11–4.14), living with family members without partner (PR: 0.57; 95%CI: 0.27–1.21) and categorized as Class C (PR: 1.85; 95%CI 0.95–3.57) had a higher rate of psychotropic drug use. With regard to life-habits, a higher prevalence of medication use was evident in users of tobacco (PR: 3.12; 95%CI: 1.48–6.57); alcohol (PR: 3.03; 95%CI: 0.59–15.4) and among individuals who did not engage in regular physical exercise (PR: 1.79; 95%CI: 0.91–3.49). Concerning clinical profile, the rate of psychotropic drug use was significantly higher among patients that practiced polypharmacy (PR: 0.66; 95%CI: 0.36–120), who reported adverse drug effects (PR: 2.03; 95%CI: 0.91-4.49) and among subjects classified as obese (OR: 2.05; 95%CI: 1.06–3.97).

Table 3. Univariate analysis of factors associated with psychotropic drugs use in older adults with hypertension treated in Primary Care (n = 260). Paraná, Brazil, 2016.

Independent Variables	Psychotropic drug Use		Univariate Analysis		
	Yes (n=66) n (%)	No (n=194) n (%)	OR	95%CI	*p*
Sociodemographic and economic profile					
Age (years)					
60 - 69	36(54.5)	91(46.9)	1		
70 - 79	26(36.4)	70(36.1)	0.93	00.51 - 1.69	0.835
80 - 89	4(6.1)	31(16)	0.32	0.10 - 0.99	0.048*
>90	- (-)	2(1)	-	-	-
Sex					
Male	14(21.2)	71(36.6)	1		
Female	52(78.2)	123(63.4)	2.14	1.11 - 4.14	0.023*
Race/Color					
White	40(60.6)	128(66)	1		
Brown	16(24.2)	38(19.6)	1.14	0.51 – 2.55	0.745
Black	10(15.2)	28(14.4)	1.34	0.68 - 2.66	0.393
Educational level					
Illiterate	4(6.1)	21(10.8)	1		
Primary education	46(69.7)	117(60.3)	2.06	0.67 - 6.34	0.206
Secondary education	14(21.2)	47(24.2)	1.56	0.46 - 5.32	0.474
Higher education	2(3)	9(4.6)	1.16	0.18 - 7.55	0.872

to be continued

Continuation of Table 3

Independent Variables	Psychotropic drug Use		Univariate Analysis		
	Yes (n=66) n (%)	No (n=194) n (%)	OR	95%CI	*p*
Family situation					
Living with partner and children	40(60.6)	107(55.2)	1		
Living with family members, without partner	11(16.7)	51(26.3)	0.57	0.27 - 1.21	0.148*
Living alone	15(22.7)	36(18.6)	1.11	0.55 - 2.25	0.762
Occupation					
Retired	55(83.3)	161(83)	1		
Not retired	11(16.7)	33(17)	1.02	0.48 - 2.16	0.949
ABEP: Associação brasileira de empresas de pesquisa					
AB: high purchasing power	18(27.3)	77(39.7)	1		
C: medium purchasing power	32(48.5)	74(38.1)	1.85	0.95 - 3.57	0.068*
DE: low purchasing power	16(24.2)	43(22.2)	1.59	0.73 - 3.43	0.237
Clinical profile, drugs and life-habits					
Blood pressure control					
Adequate	34(51.5)	95(49)	1		
Inadequate	32(48.5)	99(51)	0.9	0.51 - 1.57	0.721
AH-related sequelae					
No	54(81.8)	171(88.1)	1		
Yes	12(18.2)	23(11.9)	1.65	0.77 - 3.54	0.197*
Tobacco use					
No	50(75.8)	176(90.7)	1		
Yes	16(24.2)	18(9.3)	3.12	1.48 - 6.57	0.003*
Alcohol use					
No	63(95.5)	191(98.5)	1		
Yes	3(4.5)	3(1.5)	3.03	0.59 - 15.4	0.181*
Level of engagement in physical activity					
Active	16(24.2)	58(29.9)	1		
Sedentary	41(62.1)	83(42.8)	1.79	0.91 - 3.49	0.087*
Moderately active	9(13.6)	53(27.3)	0.61	0.25 - 1.51	0.289
Polypharmacy					
No	45(68.2)	114(58.8)	1		
Yes	21(31.8)	80(41.2)	0.66	0.36 - 1.20	0.177*
Adverse effects of hypertensive medication					
No	46(69.7)	148(76.3)	1		
Yes	12(18.2)	19(9.8)	2.03	0.91 - 4.49	0.080*
Sometimes	8(12.1)	27(13.9)	0.95	0.40 - 2.24	0.913
Anthropometry					
Classification of Body Mass Index					
Normal	16(24.2)	46(23.7)	1		
Overweight	31(47)	65(33.5)	1.37	0.67 - 2.79	0.385
Obesity	19(28.8)	83(42.8)	2.05	1.06 - 3.97	0.031*

to be continued

Continuation of Table 3

Independent Variables	Psychotropic drug Use		Univariate Analysis		
	Yes (n=66) n (%)	No (n=194) n (%)	OR	95%CI	*p*
Waist Circumference					
Normal	15(22.7)	74(38.1)	1		
Abnormal	51(77.3)	120(61.9)	2.09	1.10 - 3.99	0.024*
Waist-Height Ratio					
Normal	9(13.6)	32(16.5)	1		
Abnormal	55(83.4)	162(83.5)	1.2	0.54 – 2.68	0.645
Conicity Index					
Normal	6(9.1)	13(6.7)	1		
Abnormal	60(90.9)	181(93.3)	0.71	0.26 – 1.97	0.521

OR: Odds ratio; CI: confidence interval; *Variables with p-value p<0.20 were incorporated into multivariate step, as per Stepwise logistic regression model.

Regarding clinical and anthropometric profile, the multivariate analysis revealed that participants who self-reported daily use of tobacco (PR: 4.09; 95%CI: 1.81–9.18), had abnormal WC (PR: 2.58; 95%CI: 1.29–5.18), were classified as obese (PR: 2.43; 95%CI: 1.30–4.55) and reported experiencing side-effects of medication used for treating AH (OR: 2,98; 95%CI: 1.23–7.21), had a higher rate of psychotropic drug use (Table 4). Concerning organizational and relational aspects of Primary Care teams, it was found that patients dissatisfied with the care provided (PR: 6,71; 95%CI: 1.37–32.71) who reported not feeling well-supported or understood by the health professionals for problems during consultations (PR: 2.17; 95%CI: 1.11–4.25), had a higher rate of psychotropic drug use, after adjusting by the ABEP demographic class variable (Table 4).

Table 4. Multivariate analysis of factors associated with psychotropic drugs use in older adults with hypertension treated in Primary Care (n = 260). Paraná, Brazil, 2016.

Variables	Psychotropic drug use		Multivariate Analysis		
	Yes (n=66) n (%)	No (n=194) n (%)	OR	95%CI	*p*
Smoker					
No	50(75.8)	176(90.7)	1		
Yes	16(24.2)	18(9.3)	4.09	1.81 – 9.18	**0.001**
Waist Circumference					
Normal	15(22.7)	74(38.1)	1		
Abnormal	51(77.3)	76(61.9)	2.58	1.29 – 5.18	**0.005**
Obese					
No	28(42.4)	118(60.8)	1		
Yes	38(57.6)	76(39.2)	2.43	1.30 - 4.55	**0.007**
Adverse effects of hypertensive medication					
No	46(69.7)	148(76.3)	1		
Yes	12(18.2)	19(9.8)	2.98	1.23 - 7.21	**0.015**
Sometimes	8(12.1)	27(13.9)	1.29	0.51 - 3.27	0.589

to be continued

Continuation of Table 4

Variables	Psychotropic drug use		Multivariate Analysis		
	Yes (n=66) n (%)	No (n=194) n (%)	OR	95%CI	*p*
ABEP: Associação brasileira de empresas de pesquisa					
AB: high purchasing power	18(27.3)	77(39.7)	1		
C: medium purchasing power	32(48.5)	74(38.1)	1.94	0.93 – 4.05	0.074
DE: low purchasing power	16(24.2)	43(22.2)	1.71	0.73 - 4.00	0.212

OR: Odds ratio; CI: Confidence interval; *Explanatory variables adjusted by ABEP variable.

DISCUSSION

The increase in life expectancy of the population has been accompanied by a rise in demand from older persons for health services in general, particularly Primary Care. The predominance of female participants in the present study can be justified by the greater attention paid to health by women and their aptitude for describing physical and psychological problems, a factor associated with a higher likelihood of receiving and adhering to medical prescriptions. Women are also considered to be more affected by non-fatal health problems and the group living longest with chronic diseases[20,21].

In the city of Campinas, São Paulo state, a study in primary care found greater use of psychotropics by women, individuals who were white, had poorer self-perceived health, common mental health disorders and emotional problems[6]. Another study, performed in Curitiba, the capital city of Paraná state, found that individuals that were female, lived with a partner, with low educational level and no formal occupation (housewives) had the highest rate of psychotropic drugs use[22].

With regard to the low educational level of the study participants, this result is consistent with findings associating educational level with knowledge on health and health services[20-22]. Consequently, low-educated older adults encounter greater difficulty with respect to self-care and self-perception of health needs, reducing their autonomy in seeking medical care and treatment[20-22].

Regarding economic aspects, most of the participants were classified into socioeconomic strata C, indicating low purchasing power of the head of the family. Psychic illness or predominant use of psychotropic medication in classes with a lower socio-economic level is justified in the literature by their social vulnerability, characterized by limited access to health services, leisure, poor diet, low income, basic sanitation, and low level of education and physical exercise, all of which favor the development and exacerbation of chronic diseases, and hospitalization[9,20,21].

A study of older adults in use of psychoactive drugs prescribed by national health system (SUS) professionals or physicians under private health plans was carried out. The results showed that the drugs most commonly taken by SUS users were those of lower cost which invariably caused more collateral effects, whereas the medications prescribed under the private system had lower risk of undesirable side effects. Although no significant difference was found between the number of psychoactive drugs used under the two systems, the evidence points to a lack of access to the latest drugs with fewer adverse effects among SUS users[23].

The most used psychotropic drugs by the participants of the present study were benzodiazepines, tricyclic antidepressants, selective serotonin reuptake inhibitor and other antidepressants. These results corroborate previous studies confirming prevalent use of fluoxetine[6], clonazepam, amitriptyline, fluoxetine and bupropion by the elderly population[3,4,24]. It is important to highlight that the use of bupropion in the present study might be related to its inclusion

as a drug prescribed to help give up smoking in the Clinical Protocol and Therapeutic Guidelines – Nicotine Dependence, and its use as a first-line treatment for nicotine dependence in Brazil[25].

Prescribing patterns to SUS users tend to be influenced by the list of free medications available[24,25]. A study conducted in a city situated in the Oeste Paulista region showed that SUS users made greater use of the same drugs described in the present study[26] and also contained in the National List of Essential Medications (RENAME), which forms the basis of procurement of medications provided under the SUS and dispensed by Primary Healthcare teams[27].

In this study, the rate of polypharmacy detected in the population assessed was 25%. This high rate was attributed, in a study of elderly people in Primary Health care in Belo Horizonte, to population aging and the rising trend in medications use. Thus, actions to ensure adequate pharmacotherapy for older people should be made a priority. Combined measures encompassing review strategies of drugs therapy, a computerized prescription and dispensing support system, continued education for health teams and specialized services in geriatrics are key to guaranteeing adequate prescriptions[28].

To this end, primary care professionals have the role of running actions for health prevention, promotion and education, including actions targeting users in use of psychotropic medications. Activities providing health guidance should be prioritized, particularly with regard to the potential adverse effects of concomitant use of psychoactive agents with other drug classes, aimed at preventing misuse and promoting rational use[13,23].

Some researchers report that, although the prevalence of psychotropic drugs use in the older population is high, some patients respond well to pharmacological monotherapy with milder, less harmful drugs which could be used in association with non-pharmacological therapies, especially in primary care via Family Health Strategy teams. However, care should be taken using this approach with regards to drug-drug interactions, because older patients are prone to polypharmacy, increasing their risk of falls and fractures due to the level of sedation, in addition to cognitive and memory losses[3-5].

The results of the multivariate analysis revealed an association of psychotropic drugs use with smoking, excess weight, abnormal WC, obesity and reported adverse effects of antihypertensive drugs. A study analyzing quality of life of in elderly people treated by Primary Care in Acre found an association between low perceived quality of life and clinically-diagnosed multi-morbidities and depression. Therefore, developing effective care that attenuates the impact of old age on quality of life represents a challenge for primary care professionals[29].

Regarding the treatments available for excess weight, ansiolytic and antidepressant classes of drugs were found. One of the key practices for managing chronic disease employed in Primary Care is aimed at controlling obesity, whose recommendations include encouraging changes in life style, commencing with engagement in physical activity, food reeducation, giving up smoking, among others[30]. In addition, scientific evidence shows a bi-directional association between excess weight and a number of psychiatric disorders, whereby the chance of an individual with excess weight developing depression is similar to that of a subject with depression becoming obese[31].

Therefore, follow-up of older individuals should take into account the multi-factorial nature and complexity of diseases during this stage of life, considering differences in perceptions of this population in relation to excess weight, with an emphasis on emotional frailties in multimorbidity, changes in perception regarding aging and health, and appreciation of functioning[30,31,32].

Smoking is also a factor potentially associated with greater risk of developing mental disorders, including depression. In the literature, the causality between smoking and depression has been attributed to different mechanisms, primarily the action of nicotine on neurochemical systems and also on neuroendocrine functions. Reverse causality may also play a role, where an individual with depression may start, and continue to use, tobacco-based products, possibly explained by an absence of behaviors for preserving health and/or by a heightened sensation of pleasure when smoking[33].

Running health education activities aimed at older people that involve the family constitutes a vital

tool for health professionals to highlight the harm that chronic smoking and alcohol use can cause. It should be emphasized that this older group is prone to aging-related health problems, increasing their susceptibility to chronic diseases. With combined use of both nicotine and alcohol, these individuals become more prone to hospital admissions and exacerbation of diseases[34].

Moreover, the health professional-user relationship can influence the way psychoactive drugs are used, where this connection is pivotal for monitoring the patient. A study of octogenarians assessing primary health services reported dissatisfaction over waiting times and clinic infrastructure. However, users expressed satisfaction with the service provided by the Community Health Workers for the attention and explanations given, the interest shown in their problems, and for their availability[35].

The benefits of professional advice for patients with AH were demonstrated by a study in which users´ blood pressure levels were reduced during the period of self-care management. With regard to psychotropic drugs use, although there was no statistically significant association with inadequate blood pressure control, it should be noted that half of the interviewees with hypertension were users of psychotropic drugs.

A study carried out in the south of Brazil found a strong association of non-adherence and poor relationship with the Primary Care team with inadequate blood pressure control and non-attendance at routine consultations scheduled under the hypertension program. Nonetheless, the evidence points to the need for reorganizing health actions and interventions to center on the need for professionals to deliver comprehensive interdisciplinary treatment, as opposed to focusing solely on symptoms and/or complication arising from uncontrolled blood pressure, in an effort to foster greater engagement of hypertension patients in routine visits and better adherence to drugs therapy[13].

The present study has some limitations, such as the methodological approach involving reverse causality bias, which may have led to the loss of important data for elucidating the topic. However, the study adds to the knowledge on service delivered to older users, encouraging health professionals to become aware of the factors associated with psychotropic drugs use by older patients with comorbidities in order to improve the service delivered to this population.

CONCLUSION

The results of the present study showed that 25% of the population assessed was in use of psychotropic drugs, with antidepressant and anxiolytic classes proving the most common. The most used drugs were benzodiazepines, tricyclic antidepressants, selective serotonin reuptake inhibitor and other antidepressants. The factors associated with psychotropic drugs use in older adults with arterial hypertension seen in Primary Care were daily tobacco use, sedentarism, obesity, abnormal waist circumference, and self-reported side effects of anti-hypertensive drugs.

Given this is a public health problem which affects a large contingent of the older population at high risk of health issues, further studies should be conducted in this area. Future studies should seek alternatives to improve the quality of life of older persons with comorbidities and in use of psychotropic drugs through universal comprehensive care, serving to reduce inequalities in the care delivered to the elderly population living with chronic diseases.

The unhealthy life habits identified as prevalent factors associated with the use of psychotropic medications are modifiable, and thus amenable to different intervention approaches devised by health professionals of the multiprofessional teams of primary care units. The organization of the work process hinges on knowledge of the population and on educational and informational actions promoting the adoption of new habits regarding diet and physical activity in an effort to reduce polypharmacy. Therefore, the results of this study can guide the health service in the provision of higher quality more effective care for the health problems diagnosed in the population.

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Impairment of appetite and associated factors in older adults hospitalized with cancer

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Abstract

Objective: To investigate appetite impairment in older adults hospitalized with cancer and its association with nutritional status and cachexia. *Method*: A cross-sectional study, conducted with older adults men and women diagnosed with malignant neoplasia from July 2017 to March 2019 at a university hospital. The final sample consisted of 90 patients. Appetite was evaluated using the Cancer Appetite and Symptom Questionnaire (CASQ) and nutritional status was determined using the Patient-Generated Subjective Global Assessment (PG-SGA). Presence of cachexia was assessed by weight loss >5% in the last 6 months; or body mass index (BMI) <20 kg/m^2 and weight loss >2%; or appendicular skeletal muscle index consistent with sarcopenia and weight loss >2%. *Results*: There was a predominance of male (56.7%) self-declared non-white individuals (56.7%), with tumors in the gastrointestinal tract (75.6%) and median age of 67.0 years. 75.6% of the individuals have impaired appetite, 57.8% suspected malnutrition or malnutrition of some degree, 54.4% cachexia and 92.2% needed nutritional intervention. There was significant association between CASQ categories with nutritional status (p= 0.001) and presence of cachexia (p=0.050). After logistic regression analysis, malnutrition remained associated with impaired appetite assessed by CASQ score [OR: 4.68 (CI 95%: 1.50-14.56), p=0.008] *Conclusion*: The presence of malnutrition increased the chances of appetite impairment, which reinforces the need for early nutritional screening and intervention, in order to reduce and/or avoid nutritional problems.

Keywords: Health of the Elderly. Cancer. Nutritional Status. Cachexia. Appetite.

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INTRODUCTION

According to the World Health Organization (WHO), among non-communicable diseases and injuries, cancer has occupied second place in terms of causes of illness and death[1]. In older people, the incidence of new cases of cancer is higher than younger individuals, in addition to representing the greatest fatal victims of the disease, particularly those over 65 years of age, representing about 50% of cases and 70% of deaths by malignant neoplasms[2].

In this age group, the physiological changes characteristic of aging, such as changes in taste and lean mass reduction, are aggravated by cancer, and contribute to the emergence of malnutrition[3,4].

Malnutrition can be caused by insufficient energy supply, in addition to inadequate consumption and/or absorption of nutrients, which may or may not be related to inflammation[5]. However, when related to diseases such as cancer, it results mainly from systemic inflammation induced by the tumor, with consequent inappetence, significant loss of body weight and changes in body composition[6].

In 2015, the Lusa-Brazilian Survey of the Old-aged Oncology Nutrition (INCA)[7] pointed out that 33.2% of older people with cancer were malnourished and 39.8% were at nutritional risk. Previous studies have shown that the prevalence of these changes in older people with cancer ranges from 40% to 60%, associated with nutritional impact symptons (NIS), tumor staging and location, type of treatment and previous nutritional status[4,8].

Older people with cancer and malnutrition are even more vulnerable and are at greater risk of weight loss due to the disease's aggravations and associated comorbidities, increasing the risk of morbidity and mortality, length of stay, hospital readmissions, susceptibility to infections, reduced functionality and manifestation of cancer cachexia[9,10]. This, in turn, is another condition commonly observed in older people with cancer and coexisting with malnutrition, which makes the diagnosis and effective and appropriate treatment difficult[9].

Cancer cachexia is a type of malnutrition with chronic inflammation present and should not be identified as an advanced and final stage of malnutrition, however these diagnostic criteria are still a challenge for professionals and the scientific community[5].

Cachexia is recognized as a multifactorial syndrome characterized by involuntary weight loss, with continuous loss of skeletal muscle mass, with or without loss of fat mass, which cannot be fully reversed by conventional nutritional support that can lead to progressive functional impairment[11].

Both malnutrition and cachexia have overlapping clinical presentations and diagnostic criteria, however they differ widely in pathophysiology, etiology, prognosis and therapeutic approaches[11,5,9]. Malnutrition is specifically associated with the intake and use of nutrients and, therefore, a screening instrument that can also identify impairment in oral food intake becomes necessary[9].

Reduced food intake is a common condition in malnutrition and cancer cachexia. Even though they can occur at different times, both conditions potentiate progressive weight loss, worsen quality of life, response to treatment and postoperative complications[5,12].

People with cancer have a high prevalence of appetite disorders that can significantly impact their nutritional status and quality of life[13]. In older people with cancer, impaired appetite can be even more serious, as it adds to the anorexia of aging, a process characterized by age-related reduced appetite and food intake[14].

Given this scenario and the worsening nutritional status, commonly observed in older people with cancer, this study aimed to investigate the impairment of appetite in older people hospitalized with cancer and its association with nutritional status and the presence of cachexia.

METHOD

This is a cross-sectional, non-probabilistic, convenience sampling study conducted at a tertiary public hospital in Vitória (ES), Brazil. Older people of both sexes, diagnosed with solid tumors (ICD: C00 to

C97), determined by the International Classification of Diseases for Oncology (ICD-O)[15] and who were admitted for surgical treatment in the Surgical and Reparatory and Internal Medicine Units, from July 2017 to May 2019 participated in the study.

Patients aged ≥60 years old[16], diagnosed with malignant neoplasm regardless of type and anatomical location, confirmed in medical records, evaluated in the first 48 hours of hospital admission, able to answer the applied instruments, with the possibility of having the anthropometric data measured directly and with the oral route preserved were included. Patients with cognitive and neurological alterations foreseen in the medical record, patients in respiratory isolation, in palliative care, who were using appetite-stimulating drugs, bedridden, in preoperative fasting and who did not present all the information investigated in the study were excluded. After this step, the final sample consisted of 90 older people with cancer.

Data collection took place through interviews by three researchers responsible for the study in the pre-surgical period, using specific protocols. In order to minimize possible sample selection and data collection biases, all researchers were properly trained to apply the instruments and to take anthropometric measurements. Hospitalizations and surgical indications were monitored daily so that all older people during the study period could be considered.

Appetite impairment was the dependent variable assessed. The independent variables investigated were: sociodemographic (age, sex, self-reported race/color), clinical (tumor location) and anthropometric [body mass (kg), height (m)]. As for race/color, this was grouped into whites and non-whites, for those who declared themselves yellow, brown and black[17]. Tumor location was obtained from medical records and grouped into two categories: gastrointestinal tract (GIT) - esophagus, stomach, duodenum, colon, rectum, appendix and adnexal glands (pancreas, liver and biliary tract); non-GIT: lung, blood, head and neck, prostate, skin, mediastinum, ovary, chest and pelvis.

For the present study, body mass (kg) and height (m) were directly measured, according to the technique recommended by the WHO[18]. Body mass was measured with the aid of a Tanita® tetrapolar bioimpedance scale, with a maximum capacity of 100kg and precision of 100g. To measure height, the AlturExata® portable stadiometer was used, with a bilateral scale in millimeters and a use capacity of 0.35 to 2.13 m. Body mass and height were used to calculate the body mass index (BMI). BMI was calculated by dividing current body mass (kg) by height squared (m).

The assessment of nutritional status was performed from the Patient-Generated Subjective Global Assessment (PG-SGA). The version translated and validated for Brazilian Portuguese by Gonzalez et al.[19], upon permission to use *PG-SGA/Pt-Global Platform* (www.pt-global.org). The PG-SGA is a subjective nutritional assessment and screening tool, indicated by the Brazilian Consensus on Oncology Nutrition[10] for the evaluation of cancer patients in Brazil.

The version used is divided into two parts. The first is answered by the patient and comprises questions related to nutritional risk symptoms common in cancer patients, such as functional deficit, weight changes, dietary changes and depression. The second part, completed by the researchers responsible for the study, assesses questions based on factors associated with the presence of metabolic stress (fever and use of corticosteroids), physical depletion (changes in fat reserves, muscle mass and water retention), percentage of weight loss in 1 month or 6 months and the presence of other factors related to the health condition such as cancer, pulmonary or cardiac cachexia, decubitus ulcer, presence of trauma, age over 65 years and acquired immunodeficiency syndrome (AIDS).

The PG-SGA allows classifying nutritional status into three categories: A= well nourished; B= Moderate/suspected malnutrition, C = Severely malnourished. This version also allows assessing the need for nutritional intervention, which is defined through a numerical score, where 0-1 points: no intervention required at this time. Re-assessment on routine and regular basis during treatment. 2-3 Patient & family education by dietitian, nurse, or other clinician with pharmacologic intervention as indicated by symptom survey and lab values as

appropriate. 4-8 Requires intervention by dietitian, in conjunction with nurse or physician as indicated by symptoms (Box 3). ≥ 9 Indicates a critical need for improved symptom management and/or nutrient intervention options.

Cachexia was identified according to the criteria defined by the International Consensus on Cachexia[11]: weight loss >5% in the last 6 months; or BMI<20 and any degree of weight loss >2%; or appendicular skeletal muscle index consistent with sarcopenia and any degree of weight loss >2%. In this study, all patients diagnosed with cachexia met the first criterion.

The dependent variable, appetite, was evaluated by the Cancer Appetite and Symptom Questionnaire (CASQ) from the translated and validated version for the Brazilian population with cancer[20]. The instrument assesses the presence of symptoms related to appetite, namely: presence of appetite; early satiety; lack of appetite; change in taste; pleasure in eating; presence of nausea; mood swings; changes in willingness to perform daily activities and presence of pain. The questions have answers arranged on a five-point Likert scale, with the exception of the question regarding pain, which presents answers ranging up to 6 points, being very mild or no pain, mild, moderate, severe, very severe. It is worth clarifying that four items of the instrument presented the response scale inverted in relation to the others. An equation proposed by Spexoto et al.[20] in order to generate a global score, which classifies the impairment of appetite into three categories: low (≤1 point); moderate (1–3 points) and severe (>3 points), for the present study, moderate and severe impairment were grouped.

A descriptive analysis expressed as median and percentiles was performed to describe continuous variables and absolute and relative frequency for categorical variables. The *Kolmogorov-Smirnov* test was used to verify the normality of quantitative variables. Only individuals with all data were included in the analysis, with no treatment for missing data.

To verify the association of proportions between nutritional status, the presence of cachexia and the need for nutritional intervention with the CASQ categories, Fisher's exact test or the chi-square test was used. For binary logistic regression, the PG-SGA categories B and C and the CASQ categories, moderate impairment and severe impairment, were grouped.

To determine the influence of the variables on appetite impairment identified by the CASQ (dependent variable) binary logistic regression analysis was used. The crude *Odds Ratio* (OR) was presented and after adjustments for sociodemographic variables. The adjustment variables were inserted in blocks: model 1: age and sex and model 2: age, sex and tumor location. The variables that presented $p \leq 0.05$ in the previous tests were included in the regression. The significance level adopted was $p \leq 0.05$ for all tests.

This study was approved by the Ethics and Research Committee of the Federal University of Espírito Santo, under number 2,141,932. All patients signed the Free Informed Consent Form (FICF), following resolutions 510/2016 and 466/12 of the National Health Council, which regulate research with human beings.

RESULTS

Table 1 shows the sociodemographic and clinical characteristics of older people hospitalized with cancer. 90 older people participated in the study, with a median age of 67.0 years, minimum age of 60 years and maximum of 88 years.

The diagnosis of nutritional status, the need for nutritional intervention obtained by the PG-SGA, the presence of cachexia and the impairment of appetite, identified by the CASQ are shown in Table 2.

Table 3 shows the difference between the CASQ categories and nutritional status, presence of cachexia, need for nutritional intervention and tumor location. Malnourished older people were those with moderate and severe impairment of appetite (p=0.005), the same occurring for older people with cachexia (p=0.050).

Table 4 shows the results of the binary logistic regression models. Significant associations were found between impaired appetite, according to the

CASQ, and malnutrition, even after adjusting for age, sex and tumor location. Older people with suspected malnutrition or malnourished were 4.68 times more likely to have their appetite compromised when compared to well-nourished older people [OR: 4.68 (95% CI: 1.50–14.56) p=0.008].

Table 1. Demographic and clinical characteristics of older people hospitalized with cancer (n=90). Vitória (ES), 2019.

Age group (years)	n (%)
60–69.9	57 (63.3)
70–79.9	27 (30.0)
≥80	06 (6.7)
Sex	
Female	39 (43.3)
Male	51 (56.7)
Race/color	
White	39 (43.3)
Non-white	51 (56.7)
Tumor location	
Gastrointestinal tract (GIT)	68 (75.6)
Non-GIT	22 (24.4)

Table 2. Nutritional status, need for nutritional intervention, presence of cachexia and impaired appetite in older people hospitalized with cancer (n=90). Vitória (ES), 2019.

Variables	Total n (%)
PG-SGA	
Well Nourished (A)	38 (42.2)
Moderate/suspected malnutrition (B)	48 (53.3)
Severely malnourished (C)	04 (4.5)
Presence of cachexia	
No cachexia	41 (45.6)
With cachexia	49 (54.4)
Need for nutritional intervention	
0 - 1 point	01 (1.1)
2 - 3 points	06 (6.7)
4 - 8 points	22 (24.4)
≥ 9 points	61 (67.8)
Appetite impairment (CASQ)	
Low	22 (24.4)
Moderate	61 (67.8)
Severe	07 (7.8)

PG-SGA: Patient-Generated - Subjective Global Assessment; CASQ: Cancer Appetite and Symptoms Questionnaire.

Table 3. Nutritional status, presence of cachexia, need for nutritional intervention, and tumor location according to CASQ classifications in older people hospitalized with cancer (n=90). Vitória (ES), 2019.

Variables	Cancer Appetite and Symptons Questionnaire (CASQ)		
	Low	Moderate/Severe	*p* value
PG-SGA			0.005*
Well nourished	16 (42.1)	22 (57.9)	
Suspicious or moderately malnourished	6 (12.5)	42 (87.5)	
Severely malnourished	-	4 (100.0)	
Presence of cachexia			0.050**
No cachexia	14 (34.1)	27 (65.9)	
With cachexia	8 (16.3)	41 (83.7)	
Need for nutritional intervention			0.142*
0 - 1 point	-	1 (100.0)	
2 - 3 points	3 (50.0)	3 (50.0)	
4 - 8 points	8 (36.4)	14 (63.6)	
≥ 9 points	11 (18.0)	50 (82.0)	
Tumor Location			0.934**
Gastrointestinal tract (GIT)	16 (23.5)	52 (76.5)	
Non-GIT	6 (27.3)	16 (72.7)	

*Fisher's exact test; **Chi-square test; PG-SGA: Patient Generated Subjective Global Assessment.

Table 4. Association between the categories of appetite impairment, according to CASQ and nutritional status after crude and adjusted binary logistic regression analysis in older people hospitalized with cancer (n=90). Vitória (ES), 2019.

Variables	Crude OR (95%CI)	Model 1 OR (95%CI)	Model 2 OR (95%CI)
PG-SGA			
Well nourished	1	1	1
Suspected malnutrition / Malnourished	**5.57 (1.92 – 16.20)**	**4.66 (1.50 – 14.50)**	**4.68 (1.50 – 14.56)**
Presence of cachexia			
No cachexia	1	1	1
With cachexia	2.65 (0.98 – 7.19)	1.46 (0.47 – 4.51)	1.44 (0.46 – 4.50)

Model 1: adjusted for age and sex; Model 2: adjusted for age, sex and tumor location; Values in bold have $p<0.05$.

DISCUSSION

This study showed that malnutrition increased the chances of impaired appetite in older people hospitalized with cancer. An even higher proportion of malnutrition, cachexia, need for critical nutritional intervention and symptom control, and moderate to severe appetite impairment were observed.

Brazilian Enquiry on Oncology Nutrition (INCA)[21] evaluated, with the same instrument, cancer patients from 45 Brazilian institutions, and found that 55.6% of the population over 65 years of age was malnourished or at nutritional risk. Other studies that evaluated older people with cancer using the PG-SGA found a prevalence of malnutrition between 60.4% and 78.7%, showing the greater vulnerability

of this population[22,23]. This tool has been considered a prognostic and comprehensive factor in the identification of nutritional status in older people with cancer, as it more extensively assesses weight changes, nutritional impact symptoms (NIS) and the need for nutritional intervention[22,23].

Another risk factor for malnutrition may be related to the location of the cancer in the GIT[24], and which was in greater proportion in this study. Tumors located in the GIT directly impact the process of ingestion, digestion and absorption of nutrients, such as the presence of obstructive tumors, dysphagia, odynophagia and vomiting, often associated with cancer, which will compromise food intake and, consequently, the nutritional status[24,25].

A cross-sectional study carried out in Brazil that evaluated patients with cancer in the GIT treated surgically showed that 63% of patients with tumors located in the upper GIT showed changes in appetite and 60% had compromised food intake[26]. For those with tumors in the lower GIT, the prevalences were 45% and 36%, respectively.[26]. Also in this study, it was observed that 46.3% of the patients were severely malnourished and 29.3% were suspected of being malnourished or moderately malnourished[26].

The high prevalence of changes in appetite and food intake, and the prevalence of severe malnutrition in these patients, demonstrate the relevance of considering the location of the tumor on the nutritional status, especially when located in the GIT, so that clinical and nutritional managements are implemented early, in order to reduce and/or avoid these scenarios. Malnutrition can further compromise appetite in this population, which already has suppressed physiological responses, and potentiate the consequences of the disease and malnutrition itself.

Faced with an impaired nutritional status, the high need for critical nutritional intervention was another outcome observed in this study. A previous study carried out in the same hospital in 2016 showed that 91.4% of the patients evaluated had a need for critical nutritional intervention upon hospital admission, showing that this is a common condition in these patients[27].

Dos Santos et al.[28] when comparing the nutritional diagnosis obtained by the PG-SGA with objective anthropometric measures in older people undergoing anticancer treatment, they found that higher values of the PG-SGA score, which indicate the need for nutritional intervention, were associated with reduced food intake and lower anthropometric measurements related to body mass, muscle tissue and fat reserves. The PG-SGA score has been used in nutritional assessment because it has a high degree of reproducibility, sensitivity and specificity when compared to other validated methods[27].

The presence of cachexia was observed in more than half of the older people evaluated. Lima et al.[29] verified the frequency of cancer-related cachexia in patients with tumors in the GIT and found a prevalence of 56.3%. Specifically in older people with cancer, Dunne et al.[30] identified that 65.0% of the geriatric cancer population assessed in their study had cachexia. In this age group and with cancer, the risk of developing cachexia may be even higher, due to the changes inherent to aging that contribute to the worsening of the nutritional status, as discussed above[10], which reinforces the importance of considering it in the screening and initial nutritional assessment, especially in the hospital environment.

Another change that is also little considered in the evaluation of older people, especially with cancer, is the impairment of appetite, which was identified in most of the older people evaluated. Studies that evaluated the loss of appetite in individuals with cancer found that this condition is more frequent in older people and is more present with advancing age[31,32].

Decreased food intake is a symptom frequently observed in cancer patients, and is associated with several metabolic changes originated or resulting from the tumor[26]. These changes are mediated by several factors that modulate central nervous system receptors and neurons, especially cytokines, released by the immune system and the tumor[33]. These substances, such as IL-1, IL-6, TNF-α and IFNγ, can induce anorexia by antagonizing the action of Neuropeptide Y (NPY) in the hypothalamus, inducing the release of corticotropin releasing factor

(CRF), a potent anorectic factor and modulate significant changes in the α-subunits of the ventromedial nucleus (VMN) G protein, which participate in the control of food intake[33].

Antineoplastic therapies and related symptoms also interfere with the maintenance of appetite and nutritional status, as they can affect the perception of smell and taste and interfere with patients' ability to consume and digest food[26].

Thus, it is observed that the processes that lead to impaired appetite, malnutrition and cancer-related cachexia are integrated, and that generally result mainly from systemic inflammation and adverse effects of treatment.

In the studied sample, it was evidenced that patients with cancer cachexia had greater appetite impairment. When evaluating the presence of cachexia, loss of appetite and anorexia are factors that should be considered, and are associated with weight loss and exacerbation of this syndrome[11]. The CASQ is a predictor of weight loss, therefore, it can early identify the risk of developing cachexia[20].

Another significant association found was between impaired appetite and malnutrition, which was confirmed after binary logistic regression analysis. Reduced appetite and food intake are often associated with malnutrition, especially in patients with GIT cancer[34], however the causal relationship can only be defined in longitudinal studies.

De Pinho et al.[35] evaluated the relationship between PG-SGA-diagnosed malnutrition and NIS in cancer patients, and identified that swallowing problems, loss of appetite, vomiting, and the presence of more than three NIS were independent factors associated with malnutrition. The high frequency of NIS contributes to reduced food intake, worsening the patient's nutritional status[35].

Finally, it is necessary to reaffirm that malnutrition significantly compromises the physiological and metabolic responses of individuals, with even greater damage to older people with cancer, including appetite. Thus, our results point to the need for nutritional screening in order to prevent and/or reduce the impact of malnutrition in this population.

Although lack of appetite is one of the characteristics of cancer cachexia, this study found no association between the presence of cachexia and impaired appetite after adjusted logistic regression analysis. A possible explanation for this result may be the fact that a predominance of moderate appetite impairment was observed, which still does not characterize anorexia itself, a common condition in cachexia. It is believed that the observed impairment of appetite is more related to anorexia of aging than the presence of cachexia[14]. Another point to consider is that the diagnosis of cachexia in this study was defined by the percentage of weight loss over time and did not consider appetite as one of the criteria. Furthermore, anorexia is not a condition implicit in cachexia, especially in its onset. However, the design of this study does not allow us to assess this causality.

As a contribution, this study used a validated and specific tool to assess appetite in cancer patients that is easy to apply in clinical practice. It also demonstrates the relevance of appetite disorders and the presence of malnutrition and cachexia in older people with cancer, themes little explored in this population. The results also indicate the importance of diagnosing malnutrition and impaired appetite as a way to provide individualized nutritional counseling to manage the complications inherent in both situations. Multimodal clinical treatment is an indicated strategy that must be implemented and guaranteed in the care of older people with cancer.

Among the limitations of this study is its cross-sectional nature, which does not allow determining causal relationships, the absence of information on tumor staging and absence/presence of metastasis, since this is a reference hospital for surgical treatment and this information does not appear in the medical record. Another limitation refers to the fact that this study was carried out in a single public hospital with specific characteristics, which prevents the extrapolation of our results. However, the assessments and instruments were carefully applied by a small trained team.

CONCLUSION

Older people hospitalized with cancer had a high prevalence of malnutrition, cachexia, impaired appetite and the need for critical nutritional intervention. The presence of malnutrition increased the chances of appetite impairment in the studied population, which reinforces the need for early nutritional screening and intervention, especially in this population, in order to reduce and/or avoid nutritional problems.

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Association between stressor events and inflammatory and anti-inflammatory cytokines in long-lived older people

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Abstract

Objective: To investigate the association between the frequency of stressor events and cytokines in long-lived older people. *Methods*: The participants answered a questionnaire consisting of sociodemographic variables, indicated which stressor events included in the Stressor Life Events Inventory occurred in the last five years and answered the Geriatric Depression Scale (GDS). The following were measured by flow cytometry: interleukin (IL) 10, IL-6, IL-4, IL-2, tumor necrosis factor (TNF-α) and interferon gamma (IFN-γ). We carried out a descriptive statistical analysis in order to characterize the sample. To investigate the association between the variables, a multiple linear regression model was developed, using the *Backward* method. *Results*: 91 older people with an age average of 82 years participated in the research. More than half of the sample reported the death of a loved one as the most prevalent stressor event (61%). In this sample, it was possible to notice that the more stressor events were reported, the lower the level of IL-4 (p=0.046), as well as the marital status of widowhood, where data showed that those who are widowed have fewer stressor events in comparison to who is married (p=0.037). *Conclusion*: The importance of a more careful look by health professionals in older people multidimensional assessment was evidenced, so that subsidies are obtained for the implementation of specific programs and interventions that can ease the perception of the stressor events experienced, collaborating with less resulting damage of immunosenescence.

Keywords: Health of the Elderly. Emotional stress. Cytokines. Interleukin-4. Older adults.

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INTRODUCTION

Emotional stress carries strong connotations of usual performance breakdown, but it is an inevitable factor during life[1] and aging itself can be considered a stressor factor, as it relates to increased dependence, diseases, losses of occupational and affective roles[2]. The experience of these events entails greater or lesser demand for emotional, social, and intellectual resources depending on the value that is attributed to them[3,4].

Life event was a term created by Aldwin[5] and Baltes[6] to designate a phase of change that occurred between relatively stable periods in the individual's life. Some of these events are typically expected such as menopause, university entry and retirement, others are unexpected, such as accidents, natural disasters and unemployment[6].

Unexpected and unpredictable events enhance the perception of uncontrollability, ineffectiveness of coping or excessive burden of demands[2], thereby having greater potential to be experienced as stressful[2,6,7]. The stress resulting from these events can reduce the immune system's ability to respond to an injury[8]. There are interactions between the endocrine, the immunological, and the Central Nervous System (CNS) that are necessary to obtain adequate responses to stressor events. Thus, the presence of these events can affect the circulation and the activity of immune system cells[9].

On the other hand, during systemic infections, cancer or autoimmune diseases, immunological repercussions lead to CNS stimulation that can lead to the development of symptoms of depression in vulnerable individuals. Inflammation is therefore an important risk factor for major depressive episodes, as well as more traditional psychosocial factors[8].

Physiological aging is related to changes in the immune system, which characterizes the process known as immunosenescence. These changes result in greater susceptibility of the older person to infectious diseases, degenerative diseases, cardiovascular diseases, autoimmune diseases and cancer[10]. Among the changes in immunosenescence, we highlight the increase of 2 to 4 times in plasma levels of cytokines both pro and anti-inflammatory[11].

The imbalance in the production and release of inflammatory mediators characterizes low-grade, clinically undetectable inflammation, called *inflammaging* [11,12]. This pro-inflammatory state occurs in older people even in the absence of associated diseases, and it is related to the increased risk of chronic diseases[12].

Among the fundamental principles of this paradigm is the increase of pro-inflammatory cytokines and the decrease in anti-inflammatory cytokines[13,14]. Pro-inflammatory cytokines include IL-1, IL-2, IL-6, IL-12, IL-15, IL18, IL-22, IL-23, TNF-α, IFN-γ and among anti-inflammatory drugs, il-1Ra, IL-4, IL-10, TGF-β [15].

These changes can be analyzed from an evolutionary perspective and not just as harmful[16]. The accumulated knowledge suggests that without the existence of double immunosenescence and *inflammaging*, human longevity would be greatly reduced which suggests that attempts to intervene in the immune system in aging aimed at rejuvenation should be based on the maintenance of general homeotase to adequately improve inflammatory immune functions[16].

Recognizing sources related to immunosenescence has been the basis for many studies in the field of human aging, but the relationship between the impact of stress on the immune system in older people, especially those with older age are still poorly understood. This study aimed to investigate the association between the frequency of stressor events and pro- and anti-inflammatory cytokines in long-lived old people.

METHOD

This is a cross-sectional, quantitative study. The sample was obtained for convenience and recruited from the Geriatrics and Internal Medicine outpatient clinic of the Catholic University Hospital of Brasília (HUCB) between March 2016 and May 2018. The older people who were already being taken care in the outpatient clinic were invited, personally or by telephone, to participate in the research on a voluntary basis.

Training was conducted with the field researchers' team to standardize data collection and apply the instruments to minimize evaluation errors and problems in filling out the database.

As inclusion criteria, we chose to select, preferably, those older than 80 years old, not being excluded those who would miss less than one and a half years to complete the desired age. Thus, older people aged 78 years and older and who were followed at the HUCB outpatient clinic were included.

Cognitive deficit was used as an exclusion criterion. Therefore, the 227 old people who initially consented to participate in the study and signed the consent form passed the global cognitive screening, where the Mini Mental State Examination (EMSE) was used, consisting of 30 questions that assess orientation in time and space, episodic memory, immediate repetition, praxia, visuospatial functions and language[17].

Of the 227 older people who participated in global cognitive screening, those who scored below the cut-off score for their level of education were excluded, 17 points for illiterate, 22 points for older with 1 to 4 years of education, 24 points for those with 5 to 8 years of education and 26 points for those who have 9 years or more of education, thus, the sample started to include 144 older people.

The 144 selected participants answered an interview consisting of sociodemographic variables: age, gender, self-declared color, whether they work or if they are retired, as well as about the presence of chronic diseases (heart disease, arterial hypertension, ischemic stroke, diabetes, cancer, rheumatoid arthritis, lung diseases, depression and osteoporosis).

To evaluate the presence of stressful events, we used the Life Course Stressor Events Inventory, validated by Aldwin[18], consisting of 31 items that present stressor events potentially experienced in the last 5 years prior to data collection. The instrument evaluates the frequency of stressor events and the level of stress attributed by the respondent. The answers were grouped into 9 categories: death of a loved one, illness of a loved one, illness of the person, care of a family person, loss of purchasing power, family conflicts, suffering from some type of violence, uncontrollable events that affect descent, loss of activity or friendship appreciated. Older people indicated which events listed were present in their lives in the last five years, or if they did not happen.

The geriatric depression scale (GDS) was also applied, an instrument used to track depression in older people, and the short version, consisting of 15 questions was also used, and it should be answered by assigning grade 1 for no and 0 for yes, where the sum greater than or equal to 5 is indicative of suspected depression[19-21].

For cytokine dosage, blood collection was pre-scheduled with participants for a second moment in a Sabin Laboratory unit. All collections were performed in the morning by qualified professionals.

A total blood sample was collected from each participant in tubes with coagulation activator and centrifuged. These venous total blood samples were transported to the Immunogerontology Laboratory of UCB and, at the time of biochemical evaluation, serum samples were obtained, being kept at the temperature of -80°C until thawed for evaluation of inflammatory mediators.

Cytokine dosages were obtained by flow cytometry using multiplex system with a ball-based immunoassay set (Human Th1/Th2/TH17, BD Biosciences, San Diego, California, USA). Laboratory procedures followed the protocols provided by the kit manufacturer. This allowed measurements for six different circulating mediators: IL-2, IL-4, IL-6, IL-10, IFN-γ and TNF-α. Lyophilized cytokine patterns and serum samples were processed together, following the manufacturer's protocol, and the results obtained used the BD FACSCalibur flow cytometer, FL4 channel. The data were analyzed using the FCAP software, version 3.0, (BD Biosciences).

All responses were recorded electronically by Google form and sent to the search database worksheet. To ensure data security against unauthorized access, alteration, disclosure, or unauthorized destruction of information, documents have been encrypted, with restricted access and two-step verification and safe browsing feature. At the end of the search, the data was downloaded to a local device and the data was erased from the cloud.

53 out of 144 participants were excluded because they did not show up for blood collection for cytokine dosages. The final analysis was performed with data referring to 91 long-lived old people.

To verify the difference in the dosage of biomarkers with the number of life stressful events, the Kruskal Wallis test was used.

The association between categorical variables was verified using the Chi-Square Person test, and when it was not possible to use it, Fisher's exact test was performed.

At the end, the variables with *p*-value less than 0.20 for linear regression analysis were selected. Then, a table was elaborated, removing the variables with higher values of *p* until reaching a model with all variables with p value less than 0.05, using *Backward* method.

The research was approved by the Research Ethics Committee of UCB, under opinion No. 3,061,534, meeting the requirements of Resolution No. 466/12 of the National Health Council, which provides for the rules and guidelines regulating research involving human beings.

RESULTS

The participants of the research were mostly female, corresponding to 61.5% of the sample, concentrating on the age group of 80 to 84 years, 48.4%, with the majority self-declared white, 68.1%. Singles represented 43.1% of the sample, with a majority of 59.7% having 4 children or more. Most of them do not work and receive retirement (Table 1).

Table 1. Sociodemographic variables of long-lived old people attended at the HUCB outpatient clinic, 2016.

Variables	Frequency
Age (in years)	
78 to 79	14 (15.4%)
80 to 84	44 (48.3%)
> 85	32 (35.2%)
Not reported	1 (1.1%)
Gender	
Male	34 (37.4%)
Female	56 (61,5%)
Not reported	1 (1.1%)
Color	
White	62 (68.1%)
Black	2 (2.2%)
Mixed	23 (25.3%)
Indigenous	1 (1.1%)
Yellow	2 (2.2%)
Not reported	1 (1.1%)
Work	
Yes	12 (13.2%)
No	78 (85.7%)
Not reported	1 (1.1%)
Retired	
Yes	75 (82,4%)
No	14 (15,4%)
Not reported	2 (2.2%)

The most reported chronic diseases were hypertension, 80.5%, osteoporosis, 36.3%, and diabetes, present in 28.9% of the sample.

Regarding the stressor events experienced in the last five years, more than half reported death of a loved one (61%). Other frequent events were loss of activity or friendship that he liked very much (48%), illness in a loved one (47%), illness in the person himself (38%), events that occurred in the offspring (34%) and loss of purchasing power (33%). The least reported events were violence to the older people (27%), family conflicts (21%) and care provided to some family member (3%). The percentages of stressful events are represented in Figure 1.

The mean cytokine values were 6.12 pg/mL for IFNγ, 3.32 pg/mL for TNF, 3.54 pg/mL for IL-10, 12.27 pg/mL for IL-6, 1.70 pg/mL for IL-4 and 9.10 pg/mL for IL-2.

The influence of the set of variables was verified: gender, age group, years of study, marital status, color, number of children, work, retirement, suspicion of depression by GDS, family arrangement and inflammatory biomarkers in the presence of stressor events. This association was made according to the number of events thus divided: 0 to 2; 3 and 4; 5 and more. In it, the number of stressor events was directly related to higher chances of depression and the fact that these long-lived older people were not working (Table 2).

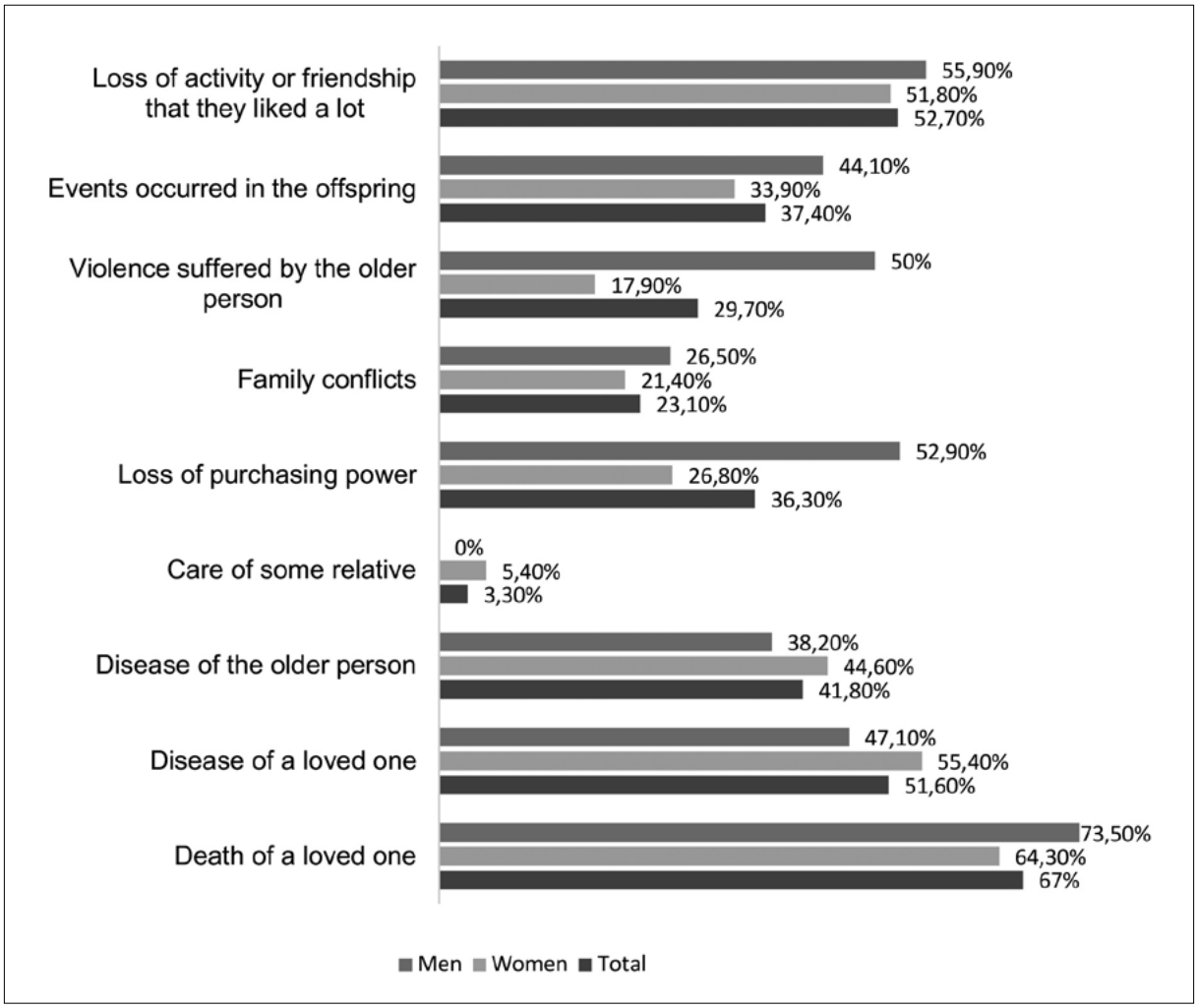

Figure 1. Number of stressor events presented by long-lived older people attended at the HUCB outpatient clinic, 2016.

Table 2. Analysis of the relationship between the number of life stressor events and inflammatory biomarkers and sociodemographic variables in long-lived older people attended at the HUCB outpatient clinic, 2016.

Variable	0 to 2 life stressor events	3 to 4 life stressor events	5 and more life stressor events	Total	*p*-value
Total	9	32	31	91	
IFN-γ					0.700[KW]
Median (IQR)	5.7 (4.8-6.5)	5.9 (5.4-6.6)	5.9 (5.5-6.4)	5.9 (5.4-6.5)	
TNF-α					0.680[KW]
Median (IQR)	2 (1-3.1)	2 (1.3-2.5)	1.8 (1.1-2.4)	1.9 (1.3-2.5)	
IL-10					0.572[KW]
Median (IQR)	3.2 (3-3.3)	3.7 (3-3.9)	3.6 (2.9-3.8)	3.6 (2.9-4)	
IL-6					0.933[KW]
Median (IQR)	5.2 (3.8-5.6)	4.8 (3.4-8.7)	4.6 (3.1-7.9)	4.8 (3.2-7.2)	
IL-4					0.307[KW]
Median (IQR)	1.9 (1.9-2.7)	1.6 (1.3-2.1)	1.5 (1.2-2)	1.6 (1.3-2.1)	
IL-2					0.699[KW]
Median (IQR)	8.9 (8.8-9.1)	9.2 (8.6-9.7)	8.9 (8.6-9.5)	8.9 (8.6-9.4)	
Gender					0.978[Qq]
Male	4 (44.4%)	13 (40.6%)	13 (41.9%)	30 (41.7%)	
Female	5 (55.6%)	19 (59.4%)	18 (58.1%)	42 (58.3%)	
Age group (years)					0.555[TF]
78 to 79	1 (11.1%)	4 (12.5%)	6 (19.4%)	11 (15.3%)	
80 to 84	3 (33.3%)	16 (50.0%)	17 (54.8%)	36 (50.0%)	
85 and more	5 (55.6%)	12 (37.5%)	8 (25.8%)	25 (34.7%)	
Years of Education					0.944[TF]
None	1 (11.1%)	7 (21.9%)	8 (25.8%)	16 (22.2%)	
1 to 4	4 (44.4%)	14 (43.8%)	11 (35.5%)	29 (40.3%)	
5 to 8	2 (22.2%)	6 (18.8%)	8 (25.8%)	16 (22.2%)	
9 and more	2 (22.2%)	5 (15.6%)	4 (12.9%)	11 (15.3%)	
Marital status					0.074[TF]
Married	1 (11.1%)	1 (3.1%)	4 (12.9%)	6 (8.3%)	
Single	1 (11.1%)	17 (53.1%)	13 (41.9%)	31 (43.1%)	
Divorced	1 (11.1%)	1 (3.1%)	5 (16.1%)	7 (9.7%)	
Widow/Widower	6 (66.7%)	13 (40.6%)	9 (29.0%)	28 (38.9%)	
Number of children					0.423[TF]
0 to 1	2 (22.2%)	4 (12.5%)	3 (9.7%)	9 (12.5%)	
2 to 3	4 (44.4%)	9 (28.1%)	7 (22.6%)	20 (27.8%)	
4 and more	3 (33.3%)	19 (59.4%)	21 (67.7%)	43 (59.7%)	
Work					**0.022**[TF]
Yes	4 (44.4%)	4 (12.5%)	2 (6.5%)	10 (13.9%)	
No	5 (55.6%)	28 (87.5%)	29 (93.5%)	62 (86.1%)	
Retirement					0.083[TF]
Yes	6 (66.7%)	30 (93.8%)	27 (90.0%)	63 (88.7%)	
No	3 (33.3%)	2 (6.2%)	3 (10.0%)	8 (11.3%)	

continua

Continuation of Table 3

Variable	0 to 2 life stressor events	3 to 4 life stressor events	5 and more life stressor events	Total	*p*-value
Depression					**0.013**[Qq]
Yes	0 (0)	5 (16.7%)	13 (41.9%)	18 (25.7%)	
No	9 (100%)	25 (83.3%)	18 (58.1%)	52 (74.3%)	
Without assistance					0.964[Qq]
Yes	3 (33.3%)	10 (31.2%)	9 (29.0%)	22 (30.6%)	
No	6 (66,7%)	22 (68,8%)	22 (71,0%)	50 (69,4%)	
Partner					0.332[Qq]
Yes	2 (22.2%)	16 (50.0%)	14 (45.2%)	32 (44.4%)	
No	7 (77,8%)	16 (50,0%)	17 (54,8%)	40 (55,6%)	
Children					0.574[TF]
Yes	6 (66,7%)	15 (46,9%)	17 (54,8%)	38 (52,8%)	
No	3 (33.3%)	17 (53.1%)	14 (45.2%)	34 (47.2%)	
Grandchildren					0.561[Qq]
Yes	4 (44,4%)	10 (31,2%)	8 (25,8%)	22 (30,6%)	
No	5 (55,6%)	22 (68,8%)	23 (74,2%)	50 (69,4%)	
Great-grandchildren					0.184[TF]
Yes	1 (11.1%)	2 (6.2%)	0 (0.0)	3 (4.2%)	
No	8 (88.9%)	30 (93.8%)	31 (100.0%)	69 (95.8%)	
Other relative					0.626[TF]
Yes	0 (0.0)	1 (3.1%)	3 (9.7%)	4 (5.6%)	
No	9 (100.0%)	31 (96.9%)	28 (90.3%)	68 (94.4%)	
Friend					0.724[TF]
Yes	1 (11,1%)	2 (6,2%)	3 (9,7%)	6 (8,3%)	
No	8 (88.9%)	30 (93.8%)	28 (90.3%)	66 (91.7%)	

IQR: Interquartile range; KW: Kruskal-wallis; Qq: Chi-square; TF: Fisher Test.

Then, data with *p* values lower than 0.20 were submitted to linear regression, with the number of stressor events added to all inflammatory biomarkers as a dependent variable. Depression was the only significant variable in this linear regression analysis, evidencing that the more stressor events, the higher the GDS score.

In a second round, data with *p* values lower than 0.20 were again removed, reserving only the variables corresponding to inflammatory biomarkers, until the most significant variables were reached, all having a *p* value lower than 0.05. The data obtained are shown in Table 3.

Table 3. Factors associated with the number of stressor events among long-lived old people in the Federal District.

Variables	Coefficient (95% CI)	*p*-value
IFN	0.34 (-0.21-0.89)	0.224
TNF	-0.02 (-0.06-0.02)	0.406
IL-10	0.16 (-0.49-0.8)	0.624
IL-6	0.03 (-0.05-0.12)	0.428
IL-4	-0.66 (-1.3- -0.01)	**0.046**
IL-2	0 (-0.72-0.72)	1
Marital status*		
Single	-0.51 (-2.06-1.03)	0.508
Divorced	-0.23 (-2.08-1.62)	0.804
Widow/Widower	-1.73 (-3.36- -0.11)	**0.037**
Depression		
Yes vs No	1,35 (0,42-2,29)	**0,005**

* Reference for marital status: being married; IC: Confidence Interval.

In the end, the variables that were statistically significant were IL-4, widowhood and depression. Thus, the more stressor events were reported, the lower the IL-4 count. Regarding widowhood, the data showed that widowers have 1.63% fewer stressor events compared to those who are married. The data also showed that those who tested positive for depression (GDS score≥5) have 1.17% more stressor events when compared to those without depression.

DISCUSSION

The main objective of the present study was to evaluate the relationship between cytokines and stressor events in long-lived older people, where a significant relationship was observed between the highest number of events and lower il-4 concentrations.

Our results also showed that there is a strong association between the number of stressor events and the presence of depressive symptoms, observed in 25.7% of the sample. A similar fact also observed in a study conducted with 385 Chinese older people living in the community, where it was observed that the increase in the number of life stressor events and lower levels of resilience were significantly associated with higher levels of depressive symptomatology[22].

Stress can also become an aggravating factor for immunological alterations, especially in old age, which is also characterized by immunosenescence. Among the inflammatory mediators analyzed, IL-4 presented an association inversely proportional to stressor events.

In addition to the known anti-inflammatory immunological functions, IL-4 shows signs of relationship with depressive behaviors, as observed in research by Wachholz et al[23]. These authors, using interferon-α in rats, observed that a lower responsiveness to il-4 of the microglia was specifically related to the development of depressive behavior. Thus, IL-4 seems to be related to the regulation of depressive behavior in an untreated condition. However, this effect was evident only in combination with an additional genetic disposition that seems to be absent in a certain strain of mice[23].

Now, in a study conducted by Lee et al.[24] in mice submitted to immobilization stress, there was a significant decrease in IL-4 secretion in the brain stem in relation to the control group, and inverse relationship between the activation of the primary neuroendocrine and neuronal components of stress response and IL-4 concentration.

This interleukin was first discovered as a factor secreted by T cells, promoting the increase in the proliferation of B cells stimulated by anti-IgM in 1982[25]. It is now recognized as a regulator of a wide variety of functions in immune cells such as Th2

lymphocytes, basophils, eosinophils, and mast cells, has receptors expressed in many cell types, and can stimulate cell proliferation and differentiation, tissue regeneration and neurological functions[25,26].

IL-4 is a regulatory cytokine par excellence, playing a vast role in immune function, with increasingly recognized anti-inflammatory functions[26]. At the time of its discovery, little was imagined how broad its functionality would be, nor was it foreseen that blocking its receptor proved to be a valuable strategy, as demonstrated with the efficacy of creating a drug to moderate to severe asthma and atopic dermatitis[26].

Inflammatory immune activation has often been associated with the development of major depression, and microglia (brain immunological cells) can serve as an important interface in the communication of this system with the brain. IL-4, the main cytokine of type Th2, can act as a protector against depression due to the ability to negatively regulate inflammatory processes and inhibit serotonin carrier activity[24].

Regarding marital status, widowers had a lower number of stressor events when compared to married patients. This fact can be compared with a result obtained by a study by Trevisan et al[27] that showed that while older men may suffer negative consequences after the death of their partner, widowed older women appeared to become healthier.

Although this study did not reveal in its results the marital status of the participants according to male or female gender, most of the sample was composed of women who, due to traditionally typical social functions as caregivers of partner and descendants assuming household tasks with weight of "obligation," tend to suffer more fatigue and anxiety[27].

Several studies relate emotional stress and changes in the immunological pattern, where IL-1 cytokines stand out as more studied, IL-6 and TNF-α[28], among which we can mention a meta-analysis performed by Black and Miller[29], where high levels of IL-1β and IL-6 were observed in brain and blood samples after the death of people with suicidal tendencies compared to healthy controls without suicide and IL-8 levels cerebrospinal fluid in individuals exhibiting suicidal behavior.

However, the limited number of studies relating other cytokines such as IL-4 to neurological alterations in response to stress suggests a wide knowledge gap. This situation highlights researchs that investigate the theme in specific populations such as this, focusing on older populations.

The *inflammaging* has great impact for the older person, culminating in baseline levels of increased pro-inflammatory cytokines[10-12.15], with more intense changes in age, especially in the age group studied, a fact observed in the high dosage levels of these cytokines in the sample.

The imbalance in cytokine production may also be exacerbated by the presence of events with stressful potential, which can act as potentiators of inflammatory activity[9]. In the present study, a relationship was observed between lower IL-4 concentrations and a higher number of stressor events.

Given the high frequency of women in the sample, the number of events presented, the relationship of this number with marital status and the report of violence highlights the need for public policies that focus on the protection of older people rights, especially women.

In addition, a more careful view of health professionals in the multidimensional evaluation of the older person, so that subsidies are obtained for the implementation of specific programs and interventions that can soften the perception of stressor events experienced, identifying them early and strengthening coping mechanisms[22,28] for a more active old age, and even with less damage from immunosenescence.

The present study presents some limitations, such as sample size. We believe that this is due to the older person's profile in this study (long-distance) and the dependence of third parties to participate in data collection, where many older people stopped participating in the stages. Regarding the validation stage of the Inventory of Life Stressor Events, no publications were found for the Brazilian population, although it is already widely used in research in this population. In addition, the level of stress attributed to each event was not evaluated, only the presence or not of the occurrence of each stressor event.

Similar studies in humans specifically relating IL-4 to stressor events have not been found in the literature, for this reason we consider that the present study gains great relevance because it is a subject that has not yet been studied, and the need to present data from older people with an average age of more than eighty years in Brazil.

CONCLUSION

The performance of this study allowed verifying the relationship between the presence of stressor events and inflammatory biomarkers, where the decrease in IL-4 was highlighted, which has anti-inflammatory function, with the increase in the number of events. Thus, it is noted the relevance in the continuity of studies that deepen the relationship between this cytokine and psychological aspects, especially in long-lived older people.

By knowing the frequency of events, it was possible to verify a higher frequency relationship of depressive symptoms and lower risk to these events among older widowers when compared to married people.

The results bring important contributions to the development of public policies to improve the quality of life of the older people population, such as the evidence of the importance of investigating stressor events in this population.

Therefore, it is understood the need for reception and follow-up by health professionals in clinical practice, considering events with stressor potential to create a framework that helps them to live or even overcome, favoring resilience.

Public investment in coping strategies and the creation of support networks as a health promotion action can optimize public health resources, due to the potential to mitigate the damage resulting from the negative effects related to immunosenescence.

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Screening the risk of sarcopenia in adults aged 50 years or older hospitalized

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Abstract

Objective: To screen the risk of sarcopenia in hospitalized individuals using the SARC-F and SARC-Calf instruments and verify the association between the risk of sarcopenia with the sociodemographic and clinical variables and those that make up the sarcopenia phenotype. *Methods*: This is a cross-sectional study. Sociodemographic, clinical characteristics, and all variables (handgrip strength, muscle mass and gait speed) that construct the sarcopenia phenotype were investigated. For the screening and diagnosis of sarcopenia, the algorithm, and criteria proposed by the European Working Group on Sarcopenia in Older People (EWGSOP2). *Results*: A total of 90 individuals participated. Most were without risk of sarcopenia, both by SARC-F (58.9%) and by SARC-Calf (68.9%), with normal handgrip strength (HGS) (28.6±9.2; 26.7±10.6) and appendicular skeletal muscle mass index (ASMI) (9.3±1.78; 9.6±1.6) and with low gait speed (GS) (0.69±0.26; 0.68±0.4), respectively. SARC-F showed a significant association with the variables gender (p=0.032), HGS (p<0.001), GS (p=0.001) and sarcopenia (p<0.001). When adding the calf circumference (CC), an association was found with the variables age group (p=0.029), work activity (p=0.008), HGS (p<0.001), ASMI (p=0.033), GS (p=0.019) and the sarcopenia (p<0.001). *Conclusion*: The risk of sarcopenia was observed in approximately one-third of the evaluated patients. It is suggested the routine use in hospitals of the sarcopenia screening tool SARC-Calf, since it was associated with the three predictive factors of sarcopenia, in addition,it is an instrument of agile application, low cost and non-invasive. When a possible, investigation of the diagnosis of sarcopenia should be encouraged in clinical practice.

Keywords: Sarcopenia. Diagnostic Screening Programs. Muscle Mass.

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INTRODUCTION

According to the *European Working Group on Sarcopenia in Older People* (EWGSOP2), sarcopenia is characterized by a reduction in muscle strength and a qualitative and/or quantitative reduction in muscle mass. Once sarcopenia is diagnosed, functionality/performance assessment is recommended to check the severity of sarcopenia muscle disease. Sarcopenic older people with low physical performance or low functional capacity are diagnosed with severe sarcopenia[1].

Screening for sarcopenia should be performed when the patient spontaneously reports signs and symptoms regarding the consequences of sarcopenia such as falling, feeling weak, slow gait, difficulty in sitting and/or getting up from a chair, or involuntary loss of weight/muscle mass , or should be performed in the form of population screening[1].

The EWGSOP2 proposed the use of the SARC-F (*Simple Questionnaire to Rapidly Diagnose Sarcopenia*) questionnaire for agile and initial screening. There are five elements that assess muscle strength and function (strength, ability to walk, getting up from a chair, climbing stairs and number of falls)[2,3].

This questionnaire was the first instrument used to screen for sarcopenia and is able to predict functional impairment, hospitalization, quality of life and early death[2,4,5], in addition to being considered an effective tool to predict results regarding the possible recovery from sarcopenia and to promote subsidies and information to contribute to early therapeutic actions[6]. Although it has high specificity, that is, it correctly diagnoses individuals without risk of sarcopenia, its sensitivity is low, and it may neglect the diagnosis of people with sarcopenia[7,8].

In order to obtain better results, Barbosa-Silva et al.[9] proposed to incorporate into the original questionnaire the measurement of calf circumference (CC), with the aim of providing a more thorough assessment of muscle function and loss of lean mass. SARC-Calf may be a more advisable tool for screening for sarcopenia[9]. The addition of CC in the SARC-F proved to be effective for the diagnosis of SARC-F, especially regarding the sensitivity and general diagnostic accuracy of this instrument[10]. CC can be a useful tool to measure muscle mass[1,11,12] and offers healthcare professionals alternatives to screen and diagnose sarcopenia in different hospital settings[1].

In Brazil, three studies were found[13–15] which addressed the use of these instruments and considered the sociodemographic and clinical characteristics and the sarcopenia phenotype of hospitalized patients, one of them with a sample of cancer patients[14]. However, studies that have conducted a comparison of scores of both instruments according to these characteristics were not observed.

Given the above, the objectives of this study were to track the risk of sarcopenia in hospitalized individuals using the SARC-F and SARC-Calf instruments and to verify the association between the risk of sarcopenia with sociodemographic and clinical variables and the variables that make up the sarcopenia phenotype.

METHODS

Cross-sectional study with a non-probabilistic sampling design of convenience sampling, carried out at a University Hospital in Brazil from April 2019 to March 2020.

This was a census of all eligible patients during the study period. A total of 122 patients, who met the eligibility criteria, were invited to participate in this study. The inclusion criteria were defined as: patients admitted to surgical and clinical inpatient units within the first 48 hours, of both genders, aged 50 years or over, able to answer the instruments and questionnaires. Patients able to perform the gait speed test and able to perform the anthropometric assessment were also included.

Patients in respiratory isolation by aerosols, with edema or restriction to assess the strength of the right hand, unable to walk, with cognitive deficit, neurodegenerative diseases or severe psychiatric disorders confirmed in medical records were excluded, as well as indigenous patients because it is a population that requires particular ethical procedures and in the hospital in question there is no distinction of beds for hospitalization of these individuals.

There were refusals due to dyspnea, abdominal discomfort, pain, anxiety and nervousness, weakness, drowsiness and being close to the medication time. Thus, the final sample consisted of 90 patients.

Sociodemographic variables (age, marital status, presence of work activity and economic class distributed in strata A, B, C and DE according to monthly household income estimates proposed by the Brazilian Economic Classification Criteria – ABEP)[16], were obtained through an interview and the clinical variables (related to the disease) were obtained by consulting the medical record. The age group was defined by adults and seniors (aged 60 years or older). As clinical variables, the presence of previous chronic diseases was considered, classified into three categories: none; 1 to 2; 3 or more.

For the anthropometric assessment, measurements of current weight (kg), height (cm) and calf circumference (CC) were included. Weight, height and LC were measured according to Lohman et al.[17].

The tracking of sarcopenia risk was obtained using the instruments SARC-F and SARC-Calf in their versions proposed in Portuguese by Barbosa e Silva et al.[9]. The SARC-F assesses five criteria: strength, assistance with walking, getting up from a chair, climbing stairs and falls, scored on a scale from 0 to 2 points. A score of ≥4 points (maximum of 10) indicates risk of sarcopenia[2,3]. SARC-Calf comprises the five items of SARC-F with the addition of CC. The CC receives a score of 0 if its value is greater than the cutoff point and a score of 10 if its value is equal to or less than the cutoff point. A score of ≥11 points (maximum of 20) is suggestive of sarcopenia[9].

To characterize sarcopenia, the algorithm suggested by *EWGSOP2*[1], including three parameters: muscle strength, muscle mass and physical performance.

Muscle strength was assessed using handgrip strength (HGS), through a manual hydraulic dynamometer. The test was performed only on the right hand with the individual seated, feet flat on the floor, with the arm close to the chest, elbow flexed at 90° without being supported. The measurement was taken in triplicate, with an interval of 1 (one) minute between measurements, and considered the measurement with the highest value for the result. The cutoff point adopted was the one proposed by the EWGSOP2 according to gender (men: <27kg/f; women: <16kg/f)[1].

Muscle mass was determined using the predictive equation of total body muscle mass (Equation 1) proposed by Lee et al.[18]. The appendicular skeletal muscle mass index (ASMI) was computed using the value obtained in Lee's equation for height squared and classified as low muscle mass individuals with <7.0 kg/m² for men and <5.5 kg/ m² for women.

$$ASM = (0.244 \times weight) + (7.8 \times height) - (0.098 \times age) + (6.6 \times sex) + (race - 3.3)$$

Predictive Lee's equation of total skeletal muscle mass (ASM: appendicular skeletal muscle mass)

Physical performance was assessed using the gait speed test (GS)[9,19,20]. The individual was asked to walk at their usual pace for a distance of four meters, previously marked with a black band of 4-meter inelastic fabric placed in a flat corridor, and then the time spent to complete the route, with the aid of a stopwatch. The cutoff point proposed by the EWGSOP2 was adopted, which considers a velocity ≤0.8 m/s as an indicator of severe sarcopenia[1,19,20].

This research followed the rules and guidelines of Good Clinical Practice in accordance with Resolution CNS 466/2012 and was approved by the Research Ethics Committee (CEP) for human beings under opinion number 4,078,472.

Descriptive statistics were performed, using mean and standard deviation for continuous variables, and percentages for categorical variables. To study the comparison of mean scores of SARC-F and SARC-Calf according to sociodemographic, clinical and sarcopenia phenotype variables, Analysis of Variance (ANOVA) was used. In view of the violation of the homoscedasticity assumption, *Welch*'s correction was used and the *Games-Howell* was used as a post-test. To compare the means of continuous variables between adults and older people, *Student*'s t test was used. The chi-square test (χ^2) was used for the associations of interest. Data analysis was performed using the IBM SPSS *Statistics* program (v.22, SPSS An IMB Company, Chicago, IL), with a significance level of 5% for all tests.

RESULTS

Ninety hospitalized individuals, adults and older people, with mean age equal to 55.0±3.2 and 69.9±7.9 years, respectively, participated in this study. There was a predominance of older people (70.0%), male individuals (56.7%), with no work activity (70.5%), married (68.9%), belonging to economic class C (72.2%), white race (62.2%) and hospitalized for surgical procedure (58.8%). Most patients had 1 to 2 previous chronic diseases (60.0%). Most individuals (57.8%) had normal HGS. On the other hand, low GS was predominant (80.2%). Most individuals had no sarcopenia (57.8%) (Table 1).

Table 1. Characterization of participants (N=90) and mean scores of the SARC-F and SARC-Calf instrument scores. Dourados, MS, 2020.

Variables	n (%)	SARC-F	*p* value#	SARC-Calf	*p* value#
Sociodemographic					
Gender			0.017*		0.931
Male	51 (56.7)	2.39±2.58		6.90±5.99	
Female	39 (43.3)	3.74±2.63		6.79±5.50	
Age group			0.114		0.033*
Adult	27 (30.0)	2.30±2.54		4.89±4.98	
Older person	63 (70.0)	3.27±2.70		7.70±5.89	
work activity			0.009*		0.001*
Absent	62 (70.5)	3.45±2.80		8.27±5.68	
Present	26 (29.5)	1.81±2.10		3.73±4.79	
Marital status			0.352		0.648
Single	8 (8.9)	3.25±2.81		8.25±6.71	
Married	62 (68.9)	2.66±2.84		6.35±5.71	
Widowed	12 (13.3)	4.08±2.23		8.25±5.71	
Separated/divorced	8 (8.9)	3.50±1.31		7.25±5.73	
Economic class**			0.021*		0.041*
Class A	3 (3.3)	0.33±0.58 [a. b]		0.33±0.58 [a]	
Class B	9 (10.0)	1.22±1.64 [a. b]		3.44±5.10 [a.b]	
Class C	65 (72.2)	3.11±2.73 [a. b]		7.40±5.54 [b]	
Classes D and E	13 (14.4)	4.15±2.44 [a. c]		8.00±6.48 [b]	
Race/Color			0.214		0.597
White	56 (62.2)	3.36±2.83		7.29±5.81	
Brown	32 (35.6)	2.31±2.32		6.03±5.77	
Black	2 (2.2)	3.00±2.83		8.00±4.24	
Clinics			0.056		0.248
Past chronic disease					
None	26 (28.9)	3.62±2.98		7.46±5.98	
1 to 2 chronic diseases	54 (60.0)	2.44±2.25		6.13±5.63	
3 or more chronic diseases	10 (11.1)	4.20±3.46		9.20±5.55	

to be continued

Continuation of Table 1

Variables	n (%)	SARC-F	*p* value#	SARC-Calf	*p* value#
Sarcopenia Phenotype					
Hand grip strength (HGS)			<0.001*		<0.001*
Normal	52 (57.8)	2.00±2.34		4.87±4.92	
Low muscle strength	37 (41.1)	4.41±2.52		9.81±5.64	
Appendicular Skeletal Muscle Mass Index (ASMI)			0.015		0.007
Normal	88 (97.8)	2.88±2.62		6.61±5.58	
Low muscle mass	2 (2.2)	7.50±0.71		17.50±0.71	
Gait speed (GS)			0.018*		0.002*
Normal	17 (19.8)	1.59±2.26		2.76±3.99	
Low gait speed	69 (80.2)	3.30±2.69		7.49±5.68	
Sarcopenia†			<0.001*		<0.001*
No sarcopenia	52 (57.8)	2.00±2.34 [a]		4.87±4.92 [a]	
Sarcopenia probable	35 (38.9)	4.23±2.47 [b]		9.37±5.48 [b]	
Confirmed sarcopenia	-	-		-	
Severe sarcopenia	2 (2.2)	7.50±0.71 [b]		17.50±0.71 [b]	

* Statistically significant difference (p<0.05); [a, b, c] equal letters indicate statistical similarity; ** Average household income: A = BRL 25,554.33; B = BRL 5,641.64 to 11,279.14; C = BRL 1,748.59 to 3,085.48; D and E= BRL 719.81; † For the determination of sarcopenia, all individuals were considered with clinical suspicion according to the EWGSOP2; # Analysis of Variance (ANOVA) with *Welch* correction.

Regarding the mean values of the instruments according to sociodemographic and clinical characteristics and sarcopenia phenotype, for the SARC-F, statistically significant differences were observed for gender (p=0.017) and work activity (p=0.009) and economic class (p=0.021). Statistically significant differences were noted for the variables HGS (p<0.001), ASMI (p=0.015), GS (p=0.018) and sarcopenia (p≤0.001). As for the SARC-Calf instrument, significant differences were observed for the variables age group (p=0.033), work activity (p=0.001) and economic class (p=0.041). Significant differences were also found between SARC-Calf and HGS (p<0.001), ASMI (p=0.007), GS (p=0.002) and sarcopenia (p<0.001) (Table 1).

Table 2 shows the means and standard deviations of the investigated variables according to the age group of participants. Significant differences were found in relation to current weight (p=0.039) and CC (p=0.019) and SARC-Calf score (p=0.033).

Table 3 shows that the risk of sarcopenia was observed in approximately one third of the patients evaluated, both by SARC-F (41.1%) and by SARC-Calf (31.1%). Statistical difference was found when comparing instruments (p=0.038).

Regarding the association between the instruments proposed for screening the risk of sarcopenia and the variables of interest in this study, SARC-F showed a significant association with the variables gender (p=0.032), HGS (p<0.001), GS (p =0.001) and sarcopenia (p<0.001). When adding CC, an association was found with the variables age group (p=0.029), work activity (p=0.008), HGS (p<0.001), ASMI (p=0.033), GS (p=0.019) and sarcopenia (p<0.001) (Table 4).

Table 2. Summary measures of the investigated variables according to the age group of the participants. Dourados, MS, 2020.

	Mean (SD)		
Variables	Adults (n=27)	Older people (n=63)	*p* value*
Current weight (kg)	77.12±18.29	69.13±15.76	0.039*
Height (m)	1.63±0.10	1.61±0.11	0.334
Body mass index (kg/m2)	28.86±6.30	26.76±6.16	0.146
Hand grip strength - right hand (kg)	25.73±10.98	23.07±10.53	0.289
Calf Circumference (cm)	36.65±4.64	34.25±4.26	0.019*
Gait speed (meters/seconds)	0.63±0.22	0.61±0.45	0.829
SARC-F Score	2.30±2.54	3.27±2.70	0.114
SARC-Calf Score	4.89±4.98	7.70±5.89	0.033*

* *t*-Test.

Table 3. Sarcopenia risk using the SARC-F and SARC-Calf instruments. Dourados, MS, 2020.

Sarcopenia risk screening	SARC-F n (%)	SARC-Calf n (%)	*p* value*
No signs suggestive of sarcopenia	53 (58.9)	62 (68.9)	0.038
Suggestive of sarcopenia	37 (41.1)	28 (31.1)	

* Chi-square test.

Table 4. Relationship between the SARC-F and SARC-Calf instruments and sociodemographic, clinical and sarcopenia phenotype variables. Dourados, MS, 2020.

Variables	SARC-F			SARC-Calf		
	No suggestive	Suggestive	p***	No suggestive	Suggestive	p***
Sociodemographic						
Gender			0.032*			0.603
Male	35 (68.6)	16 (31.4)		34 (66.7)	17 (33.3)	
Female	18 (46.2)	21 (53.8)		28 (71.8)	11 (28.2)	
Age group			0.147			0.029*
Adult	19 (70.4)	8 (29.6)		23 (85.2)	4 (14.8)	
Older person	34 (54.0)	29 (46.0)		39 (61.9)	24 (38.1)	
work activity			0.084			0.008*
Absent	33 (53.2)	29 (46.8)		37 (59.7)	25 (40.3)	
Present	19 (73.1)	7 (26.9)		23 (88.5)	3 (11.5)	
Marital status			0.226			0.404
Single	5 (62.5)	3 (37.5)		4 (50.0)	4 (50.0)	
Married	40 (64.5)	22 (35.5)		46 (74.2)	16 (25.8)	
Widowed	4 (33.3)	8 (66.7)		7 (58.3)	5 (41.7)	
Separated/divorced	4 (50.0)	4 (50.0)		5 (62.5)	3 (37.5)	

to be continued

Continuation of Table 4

Variables	SARC-F			SARC-Calf		
	No suggestive	Suggestive	p***	No suggestive	Suggestive	p***
Economic class**			0.129			0.309
Class A	3 (100.0)	-		3 (100.0)	-	
Class B	7 (77.8)	2 (22.2)		8 (88.9)	1 (11.1)	
Class C	38 (58.5)	27 (41.5)		43 (66.2)	22 (33.8)	
Classes D and E	5 (38.5)	8 (61.5)		8 (61.5)	5 (38.5)	
Race/Color			0.621			0.781
White	31 (55.4)	25 (44.6)		38 (67.9)	18 (32.1)	
Brown	21 (65.6)	11 (34.4)		23 (71.9)	9 (28.1)	
Black	1 (50.0)	1 (50.0)		1 (50.0)	1 (50.0)	
Clinics						
Past chronic disease			0.376			0.808
None	13 (50.0)	13 (50.0)		18 (69.2)	8 (30.8)	
1 to 2 chronic diseases	35 (64.8)	19 (35.2)		38 (70.4)	16 (29.6)	
3 or more chronic diseases	5 (50.0)	5 (50.0)		6 (60.0)	4 (40.0)	
Sarcopenia Phenotype						
Hand grip strength (HGS)			<0.001*			<0.001*
Normal	41 (78.8)	11 (21.2)		44 (84.6)	8 (15.4)	
Low muscle strength	11 (29.7)	26 (70.3)		17 (45.9)	20 (54.1)	
Appendicular Skeletal Muscle Mass Index (ASMI)			0.087			0.033*
Normal	53 (60.2)	35 (39.8)		62 (70.5)	26 (29.5)	
Low muscle mass	-	2 (100.0)		-	2 (100.0)	
Gait speed (GS)			0.001*			0.019*
Normal	16 (94.1)	1 (5.9)		16 (94.1)	1 (5.9)	
Low gait speed	35 (50.7)	34 (49.3)		45 (65.2)	24 (34.8)	
Sarcopenia†			<0.001*			<0.001*
No sarcopenia	41 (78.8)	11 (21.2)		44 (84.6)	8 (15.4)	
Sarcopenia probable	11 (31.4)	24 (68.6)		17 (48.6)	18 (51.4)	
Confirmed sarcopenia	-	-		-	-	
Severe sarcopenia	-	2 (100.0)		-	2 (100.0)	

* Statistically significant difference (p<0.05); ** Average household income: A = BRL 25,554.33; B = BRL 5,641.64 to 11,279.14; C = BRL 1,748.59 to 3,085.48; D and E = BRL 719.81;*** Teste qui-quadrado.

DISCUSSION

Approximately one third of individuals who were hospitalized for clinical or surgical care during the investigation period are at risk of sarcopenia, which is higher using the SARC-F instrument. It was expected to find greater risk by SARF-Calf, as this instrument is more sensitive[9]. However, most individuals in our sample had normal CC, which may have influenced our findings. Rolland et al.[11] found a correlation between CC and skeletal muscle mass, using a CC value < 31.0 cm. Also, the measures of HGS, GS and sarcopenia were associated with the two instruments. According to Malmstrom et al.[2], the association of SARC-F with muscle function is expected, being an adequate instrument to identify individuals with treatable muscle weakness.

On average, women had a higher score than men on the SARC-F, but when muscle mass was considered there was no difference between the scores. We found an increased risk of sarcopenia in the older people group when assessed by SARC-Calf. With aging, there is a significant reduction in the levels of testosterone and insulin-1-like growth factor, contributing to the decline in mass and probable sarcopenia in men[21]. Similarly, women experience a decline in mass and sarcopenia probable during the early stages of menopause due to a significant reduction in the hormone estrogen[22]. In addition, the decrease in anabolic acting androgens may explain the higher prevalence of women at risk for sarcopenia[23]. It should be considered that individuals aged 50 years and over were included in this study, which reinforces this result.

Individuals with no work activity, regardless of the addition of muscle mass loss to the SARC-F, presented with higher scores than individuals with work activity. According to Rom et al.[24], retired people are generally inactive and more sedentary, being one of the most important risk factors for decreased physical function in older people[25]. On the other hand, functional limitations interfere in the performance of work activities, and older individuals tend to have ceased their work activities due to retirement.

Regardless of the instrument used, mean scores were higher in individuals with low muscle strength, low muscle mass and low physical performance. It is noteworthy that these findings are important predictors of the occurrence of sarcopenia, and that at this point the two instruments were discriminating and obtained significant differences in the assessment of the risk of sarcopenia.

In the investigated population, women, individuals with low muscle strength and those with low physical performance had a higher risk of sarcopenia. These findings reaffirm the high specificity of the SARC-F, which only allows the assessment of muscle function (strength and physical performance)[9]. The findings reinforce the usefulness of the SARC-F for measuring muscle function and for screening for probable sarcopenia in hospitalized individuals. When CC was added to the instrument, work activity and ASMI were also significant variables. It can be speculated that in fact the increment of the instrument with CC enables us to assess function and loss of muscle mass[9]. According to Peixoto et al.[26], CC is positively associated with muscle mass, being an instrument capable of measuring muscle quantity.

In the present study, we were able to observe that, regardless of the instrument used, the highest mean scores were found in individuals belonging to the lowest economic class. Socioeconomic factors, such as lack of education, reflect on the functionality of older people, and they can be almost three times more dependent in daily life than literate individuals[27]. In addition, the unfavorable outcomes in older sarcopenic patients after hospital admission are well known. Hospitalization, due to a combination of acute inflammatory load and muscle disuse, leads to an acute decline in muscle mass and function, contributing to some individuals acutely meeting sarcopenia criteria[28].

The results of this study draw attention to the need to expand investigations in this area, especially with the older population, which must be carefully assisted during the hospitalization period. We encourage prospective studies to be carried out so that cause-and-effect relationships can be established. Furthermore, we suggest that future research be conducted with an expanded sample of clinical and surgical hospitalized individuals, to strengthen analysis and comparisons and allow for more robust results.

This work has the limitation of being a cross-sectional study, which limits the causal relationship. However, our findings may contribute to the clinical practice of nutritionists and other health professionals. It is known that magnetic resonance, *Dual-energy X-ray Absorptiometry* (DEXA) or bioelectrical impedance are considered more accurate methods for assessing skeletal muscle mass. However, the application of these methods can be costly or difficult to use in research with patients admitted to public hospitals, so we chose to use the predictive equation to estimate the ASMI. As this was a census with all eligible patients during the study period, a possible selection bias may have occurred, with an attempt to minimize them with good study conduct and data analysis.

CONCLUSION

The risk of sarcopenia was observed in approximately one third of the patients evaluated. The instruments SARC-F and SARC-Calf were associated with HGS and GS, in addition to the diagnosis of sarcopenia, and can be considered satisfactory for evaluating muscle function and strength in hospitalized adults aged ≥50 years. Female individuals, with no work activity and older people seem to be at greater risk of sarcopenia and, therefore, should receive greater attention during hospitalization.

There was a statistically significant difference between the instruments in tracking the risk of sarcopenia. Our findings suggest the use of SARC-Calf in clinical practice to screen the risk of sarcopenia in adults and older people, as it was associated with the ASMI, in addition to other predictive factors HGS and GS. This further reinforces the use of the CC measurement in this population. Finding possible cases of sarcopenia in public hospitals through a simple, quick, low-cost and non-invasive assessment can contribute to the minimization of negative outcomes during hospitalization, such as acute sarcopenia.

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Prevalence and factors associated with excessive polypharmacy in institutionalized older people in southern Brazil

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Abstract

Objective: To verify the prevalence and factors associated with excessive polypharmacy in institutionalized older people. *Method*: Cross-sectional study with 478 older people living in long-term care facilities. The dependent variable was excessive polypharmacy which is defined as the concomitant use of ten or more medications. The independent variables included sociodemographic and health information. The Poisson regression with robust variance was used to analyze the effect of the independent variables compared to the outcome. *Results*: The prevalence of excessive polypharmacy was 29.3% associated with heart disease (PR=1.40; 95%CI 1.03-1.91), diabetes *mellitus* (PR=1.52; 95%CI 1.15-2.01), depression (PR=1.42; 95%CI 1.08-1.87), hospitalization in the last year (PR=1.36; 95%CI 1.02-1.80), and the use of potentially inappropriate medication for older people (PR=2.13; 95%CI 1.60-2.83). *Conclusion:* Excessive polypharmacy was frequent among institutionalized older people. The results suggest that prevalent diseases among older people, hospitalization, and the use of potentially inappropriate medications are reasons for the use of excessive polypharmacy by this population. Said findings can guide actions aimed at optimizing the pharmacotherapy prescribed to older people.

Keywords: Polypharmacy. Elderly. Homes for the Aged. Health of the Elderly. Cross-Sectional Studies.

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INTRODUCTION

Chronic and multiple diseases tend to manifest frequently in the group of older people and contribute to the use of polypharmacy by this population[1,2]. One or more drugs can be used to treat each disease or symptom[2,3] leading to complex therapeutic regimens[3,4].

Polypharmacy is a global public health problem[5] and one of the greatest challenges related to the aging population, with a burden on older people, their families, and healthcare systems[6]. The medication prescription rates show an increasing trend worldwide due to the increasingly older population and the availability of drugs[2,6]. The prevalence of polypharmacy reported in the literature ranges from 10% to around 90% in studies considering different age groups, polypharmacy definitions, and geographic locations[6].

There is no literature consensus regarding the definition of polypharmacy and excessive polypharmacy. However, most studies use the numerical criterion[2,6] that considers polypharmacy as the simultaneous use of five or more medications[7,8] and excessive polypharmacy as the concomitant use of 10 or more medications[4,9].

Excessive polypharmacy alone does not denote inadequate polypharmacy[2,3]. The use of multiple medications is not necessarily imprudent, and in some cases, it may be necessary and beneficial[2,5]. However, although an adequate combination of drugs for patients with complex health problems can improve their clinical condition[2], the greater the number of medications they use, the greater the risks for the older person[1] as the chances of adverse effects and drug interactions are increased[2].

Chronic diseases, functional status, and physiological changes inherent to aging cause changes both in the body's action on drugs and in the drug's action on the body. The reduction of body water, serum albumin, hepatic and renal blood flow, and the increased body fat are examples of physiological changes that lead to changes in the volume, concentration, and distribution of medications[10].

No drug is completely safe for use by older people as the pharmacokinetic and pharmacodynamic properties of many of them are not completely known for this group. Older people are frail and present multimorbidities which are commonly excluded from the research necessary for the approval of new medications. However, this group is often more present in clinical practice and is more subject to polypharmacy[2].

In this sense, the institutionalized older population deserves more attention as they are generally frailer, have a greater number of chronic diseases, and make use of more medications compared to older people in the community[1–4], thus being more susceptible to the risks of complications associated to polypharmacy[2]. Studies show that the average number of medications used and the prevalence of excessive polypharmacy are higher among institutionalized older people. Previous investigations have reported the prevalence of excessive polypharmacy among older people living in institutions, from 16.8%[3] to 44.1%[11], a segment demanding special attention[3,11]. Factors such as using 10 or more medications and living in a long-term care facility can increase the likelihood of an older person suffering medication-related harm[2].

In some countries, especially in the developed ones, the study of this topic is well established[3,4]. However, no publication on the prevalence and factors associated with excessive polypharmacy among older people living in long term care facilities (LTCF) was found in Brazil after an extensive search in the MEDLINE/Pubmed database using the descriptors "Polypharmacy", "Aged" and "Homes for the Aged" in the last 10 years.

Therefore, the present study aimed to verify the prevalence and factors associated with excessive polypharmacy among institutionalized older people.

METHOD

This is a cross-sectional study with people aged 60 years and over living in Long Term Care Facilities (LTCF). The present study is an excerpt from the research *Patterns of aging and longevity: biological, educational, and psychosocial aspects* developed under the coordination of Universidade Estadual de Campinas

(UNICAMP), São Paulo (SP) with the participation of Universidade Católica de Brasília (UCB), Federal District (DF) and Universidade de Passo Fundo (UPF), Rio Grande do Sul (RS). Data were collected in 2017 at 19 LTCFs located in the municipalities of Passo Fundo (RS), Carazinho (RS), and Bento Gonçalves (RS), Brazil.

All LTCFs in the municipalities of Passo Fundo (RS), Carazinho (RS), and Bento Gonçalves (RS) located in the northern and the mountains of the state of RS were included in the study due to the need to add a larger sample of institutionalized older people. The choice of municipalities followed criteria such as geographic proximity and similar characteristics to the ratio of older people in the population and distribution by gender and age group. The estimated population for the year 2015 in the municipality of Passo Fundo (RS) was 196,741 inhabitants, in Carazinho (RS) was 62,037 inhabitants, and in Bento Gonçalves (RS) was 113,287 inhabitants, and the respective ratio of older people in the population was 13.58%, 16.13%, and 14.11%. Among the older people in each location, the majority were women (58.2%, 58.1%, and 56.1%), and the ratio of people aged 80 years and over was 13.9%, 14.6%, and 14.1%, respectively[12].

All the 35 LTCFs located in the selected municipalities were invited to participate in the research. However, only 19 accepted, of which 14 (58.3%) were located in the municipality of Passo Fundo (RS) where 281 older people lived, 1 (50.0%) in the municipality of Carazinho (RS) with 92 older people, and 4 (44.4%) in the municipality of Bento Gonçalves (RS) where 106 older people lived. The total population living in these facilities was 479 older people. After the LTCFs were accepted, the older people and their guardians were invited to participate in the study. All individuals aged 60 years and over were included, and those who were hospitalized at the time of the interview or who were not located after three attempts by the interviewers on alternate days and times were excluded.

To calculate the sample, a confidence level of 95%, the statistical power of 80%, the ratio of not exposed: exposed (presence of Non-Communicable Chronic Disease) of 2, the prevalence of the outcome in the exposed group of 30% were taken into account[1,4,9,11], totaling 291 older people, and 20% was added for losses and refusals (n=349). However, as this is a study with different outcomes, we decided to investigate all older people living in LTCFs who met the inclusion criteria in the selected municipalities. The study sample comprised 478 older people.

Excessive polypharmacy is defined as the concomitant use of 10 or more medications prescribed in the three months before the research, and it was considered as the dependent variable. The use of medications was analyzed in the medical records of older people, and the active substances were listed according to the fifth level of the Anatomical Therapeutic Chemical (ATC) classification system[13].

The independent variables defined based on previous investigations[1,4,9,11,14] included sociodemographic and LTCF related information: type of LTCF (private/philanthropic), age (in years), longevity considered as age 80 years and older (long-lived/non-long-lived), gender (male/female), color/race (white/non-white), marital status (with a partner/without a partner), length of hospital stay (in months), education (attended/did not attend school), and family visits (yes/no);

Health-related variables included heart disease (yes/no), systemic arterial hypertension (yes/no), cerebrovascular accident (yes/no), diabetes *mellitus* (yes/no), pulmonary disease (yes/no), depression (yes/no), dementia (yes/no), chronic pain in the last six months (yes/no), multimorbidity (yes/no), use of potentially inappropriate medication for older people (PIM) (yes/no), urinary incontinence in the last 12 months (yes/no), fecal incontinence (yes/no), insomnia (yes/no), hospitalization (yes/no), and number of hospitalizations (number). The functionality-related variables were cognitive status (with cognitive decline/no cognitive decline), and basic activities of daily living (BADL) (independent/dependent).

Multimorbidity was characterized by the presence of two or more chronic conditions in an individual. As the list of morbidities for its operationalization has not yet been defined for the Brazilian context, conditions with one or more of the following

characteristics were included for the construction of the variable: they cause non-reversible pathological changes in the body, generate residual disability, are permanent, indicate the need for rehabilitation or long term care[15]. Thus, the morbidities included were the presence of heart disease, systemic arterial hypertension, diabetes *mellitus*, rheumatism, pulmonary disease, depression, osteoporosis, dementia, Parkinson's disease, sarcopenia, and frailty.

For the variable use of PIM, the criteria of Beers 2015[16] were used. The Mini-Mental State Examination (MMSE) was used to assess the cognitive status with cutoff points suggested by Bertolucci et al[17]: 13 for illiterate, 18 for low and medium education, and 26 for high education. The older person was classified (with cognitive decline/without cognitive decline) based on the score obtained.

For BADL, the older person was classified as independent or dependent according to the Katz Index[18]. Those who were able to perform one or more activities only with help were classified as dependent[7].

The sociodemographic, health and medication information were obtained from the medical record, and those related to functionality were obtained directly from the older person in an individualized environment designated by the person responsible for the LTCF.

To minimize inconsistencies in data collection, the 4 interviewers - nursing and physiotherapy students - underwent a training program and were followed by two research professors responsible for the study.

Categorical variables were presented using univariate frequency distributions and bivariate and multivariate contingency tables. The quantitative variables were described using measures of central tendency or position and variability, and the normality was verified using the Kolmogorov-Smirnov test. The Pearson's chi-square test was applied to assess the association between excessive polypharmacy and the categorical independent variables. The nonparametric Mann Whitney U test was used to compare the groups of quantitative independent variables regarding the dependent variable. The level of significance adopted was 5%. The Poisson regression with robust variance was used for the multivariate analyses to estimate the crude and adjusted prevalence ratios and calculate the respective 95% confidence intervals. In the multiple model, the variables with a *p-value* ≤ 0.20 in the bivariate analysis were considered, and those with $p<0.05$ remained in the model.

The research was approved by the Research Ethics Committee of Universidade de Passo Fundo (UPF), Opinion No. 2,097,278 according to Resolution 466/2012 of Conselho Nacional de Saúde (the Brazilian National Health Council). All the participants in the study signed the Informed Consent Form.

RESULTS

The study included 478 older people with an average age of 80.3 (±9.77) years, with a minimum variation of 60 and a maximum of 109 years. Women were predominant (71.1%), long-lived people (57.0%), educated (83.5%), and those living in philanthropic LTCF (57.1%), as shown in Table 1.

They had an average length of stay at the LTCF of 50.53 (±73.46) months, and the average number of drugs used was 7.40 (±3.65), with a minimum variation of 1 and a maximum of 22 medications. Only 1.5% did not use medication.

There was a high prevalence of cognitive decline (73.2%) and dependence for BADL (85.0%) in the population studied. The most prevalent chronic disease was systemic arterial hypertension (54.8%), and 59.6% presented multimorbidity (Table 2).

Excessive polypharmacy was observed in 29.3% of older people. There was a higher prevalence of excessive polypharmacy in residents of private LTCF (33.7%), females (32.6%), among those who used PIM (45.6%), those who had a diagnosis of heart disease (44.0%), diabetes *mellitus* (41.8%), pulmonary disease (40.0%), and depression (38.6%) (Table 3).

The main groups of medications responsible for excessive polypharmacy in the population studied were those acting on the digestive system and metabolism (95.4%), followed by those acting on

the nervous system (88.5%). In each of the groups, the most frequently used substances were omeprazole (53.4%) and quetiapine (40.5%), respectively.

In the present study, age, length of stay at the LTCF, and the number of hospitalizations were not related to excessive polypharmacy (p>0.05).

In the crude analysis, excessive polypharmacy was associated with gender (p=0.011), heart disease (p=0.001), systemic arterial hypertension (p=0.003), diabetes *mellitus* (p=0.002), depression (p=0.001), urinary incontinence (p=0.016), hospitalization in the last year (p=0.008), and use of PIM (p<0.001) (Table 3).

Table 1. Sociodemographic characteristics and those related to the Long Term Care Facility for Older People of institutionalized older people (n=478). Passo Fundo, Carazinho, and Bento Gonçalves, RS, Brazil, 2017.

Variable	n (%)	95% CI*
Type of LTCF		
Philanthropic	273 (57.1)	52.3 - 61.5
Private	205 (42.9)	38.5 - 47.7
Longevity		
Non-long-lived	205 (43.0)	38.8 – 47.2
Long-lived	272 (57.0)	52.8 – 61.2
Gender		
Male	138 (28.9)	25.1 – 33.3
Female	340 (71.1)	66.7 – 74.9
Family visit		
Yes	411 (87.4)	84.7 – 90.6
No	59 (12.6)	9.4 – 15.3
Color		
White	424 (89.5)	86.7 – 92.0
Non-white	50 (10.5)	8.0 – 13.3
Marital status		
With spouse	30 (6.3)	4.2 – 8.4
Without spouse	445 (93.7)	91.6 – 95.8
Education		
Did not attend school	76 (16.5)	13.0 – 19.7
Attended school	386 (83.5)	80.3 – 87.0

LTCF: Long Term Care Facility; *CI: Confidence Interval. The total absolute frequencies diverge due to missing data. Valid longevity =477; Family visit n valid =470; Color n valid =474; Marital status n valid =475; Education n valid =462.

Table 2. Health characteristics and medication use of institutionalized older people (n=478). Passo Fundo, Carazinho, and Bento Gonçalves, RS, Brazil, 2017.

Variable	n (%)	CI* 95%
Cognitive status		
With decline	349 (73.2)	69.0 - 77.4
Without decline	128 (26.8)	22.6 - 31.0
Heart disease		
Yes	84 (17.8)	14.4 – 21.4
No	389 (82.2)	78.6 – 85.6
Arterial hypertension		
Yes	259 (54.8)	49.9 – 59.2
No	214 (45.2)	40.8 – 50.1
Cerebrovascular Accident		
Yes	103 (21.6)	18.1 – 26.1
No	373 (78.4)	73.9 – 81.9
Diabetes *mellitus*		
Yes	98 (20.6)	17.2 – 24.4
No	378 (79.4)	75.6 – 82.8
Depression		
Yes	176 (37.4)	32.9 – 42.5
No	295 (62.6)	57.5 – 67.1
Dementia		
Yes	236 (49.8)	44.5 – 54.2
No	238 (50.2)	45.8 – 55.5
Urinary incontinence		
Yes	309 (65.2)	61.0 – 69.6
No	165 (34.8)	30.4 – 39.0
Hospitalization		
Yes	148 (31.5)	27.0 – 36.4
No	322 (68.5)	63.6 – 73.0
Chronic pain		
Yes	167 (36.6)	31.4 – 41.5
No	289 (63.4)	58.5 – 68.6
Insomnia		
Yes	156 (33.3)	29.1 – 37.8
No	312 (66.7)	62.2 – 70.9
Potentially Inappropriate Medication		
Yes	158 (35.3)	31.1 – 39.4
No	289 (64.7)	60.6 – 68.9
Basic activities of daily living		
Independent	69 (15.0)	12.1 – 18.4
Dependent	392 (85.0)	81.6 – 87.9
Excessive polypharmacy		
Yes	140 (29.3)	25.3 – 33.7
No	338 (70.7)	66.3 – 74.7
Multimorbidity		
Yes	283 (59.6)	55.4 – 64.2
No	192 (40.4)	35.8 – 44.6

MMSE: Mini Mental State Examination; *CI: Confidence Interval. The total absolute frequencies diverge due to missing data. Cognitive status n valid =477; Heart disease n valid =473; Arterial hypertension n valid =473; Cerebrovascular accident n valid =476; Diabetes mellitus n valid =476; Depression n valid =471; Dementia n valid =474; Urinary incontinence n valid =474; Hospitalization n valid =470; Chronic pain n valid =456; Insomnia n valid =468; PIM n valid =447; Basic activities of daily living n valid =461; Multimorbidity n valid =475.

Table 3. Prevalence of excessive polypharmacy and factors associated in institutionalized older people (n=478). Passo Fundo, Carazinho, and Bento Gonçalves, RS, Brazil, 2017.

Variable	n (%)	*p**	RR** (95% CI)	RR***(95% CI)
Gender		0.011		---
Female	111 (32.6)		0.69(0.47 - 1.00)	
Male	29 (21.0)		1.00	
Type of LTCF		0.069		---
Philanthropic	71 (26.0)		1.21(0.90 - 1.63)	
Private	69 (33.7)		1.00	
Heart disease		0.001		
Yes	37 (44.0)		1.70(1.24 – 2.33)	1.40(1.03 – 1.91)
No	101 (26.0)		1.00	1.00
Arterial hypertension		0.003		---
Yes	90 (34.7)		1.74(1.25 – 2.43)	
No	48 (22.4)		1.00	
Diabetes *mellitus*		0.002		
Yes	41 (41.8)		1.82(1.35 – 2.46)	1.52(1.15 – 2.01)
No	98 (25.9)		1.00	1.00
Pulmonary disease		0.121		---
Yes	16 (40.0)		1.47(0.96 – 2.24)	
No	123 (28.3)		1.00	
Depression		0.001		
Yes	68 (38.6)		1.53(1.14 – 2.05)	1.42(1.08 – 1.87)
No	71 (24.1)		1.00	1.00
Dementia		0.060		---
Yes	78 (33.1)		1.24(0.92 – 1.67)	
No	60 (25.2)		1.00	
Urinary incontinence		0.016		---
Yes	102 (33.0)		1.45(1.03 – 2.04)	
No	37 (22.4)		1.00	
Fecal incontinence		0.063		---
Yes	74 (33.5)		1.22(0.91 – 1.65)	
No	65 (25.7)		1.00	
Multimorbidity		0.109		---
Yes	90 (31.8)		1.18(0.86 – 1.61)	
No	48 (25.0)		1.00	
Hospitalization		0.008		
Yes	56 (37.8)		1.52(1.13 – 2.05)	1.36(1.02 – 1.80)
No	83 (25.8)		1.00	1.00
PIM		<0.001		
Yes	72 (45.6)		2.43(1.81 – 3.27)	2.13(1.60 – 2.83)
No	54 (18.7)		1.00	1.00

**p*: Pearson's chi-square test; **RR: Crude Prevalence Ratio, Poisson Regression with robust variance; ***RR: Adjusted Prevalence Ratio, Poisson Regression with robust variance.

In the final model, having heart disease (RR=1.40; 95%CI 1.03–1.91), diabetes *mellitus* (RR=1.52; 95%CI 1.15–2.01), depression (RR=1.42; 95%CI 1.08–1.87), history of hospitalization in the last year (RR=1.36; 95%CI 1.02–1.80), and use of PIM (RR =2.13; 95%CI 1.60–2.83) remained associated with excessive polypharmacy (Table 3).

DISCUSSION

The present study analyzes the prevalence and factors related to excessive polypharmacy among older people living in an LTCF in southern Brazil. The results suggest that excessive polypharmacy is common in the studied population, with one in every four older people taking 10 or more drugs and that not only chronic diseases such as heart disease, diabetes *mellitus*, and depression but also a history of hospitalization in the last year and the use of PIM are associated with it.

In the present study, the prevalence of concomitant use of 10 or more medication was higher than that found among older people living in nursing homes in Europe, 24.3%[4] and in France, 21.1%[9]. Other studies with institutionalized older people found a higher prevalence of excessive polypharmacy, as in the Swedish example -35.5%[1] and in the Swiss one -44.1%[11].

In the Brazilian context, studies investigated the use of polypharmacy (five or more medications) among older people living in LTCF and found a prevalence of 27.5%, in a survey including LTCF in Rio de Janeiro, Minas Gerais, Mato Grosso, and Mato Grosso do Sul[7] and 73.9% in the state of SP[8]. However, no publication was found analyzing the simultaneous use of 10 or more medications by institutionalized older people. Only one study with older people in the community treated at two basic healthcare units in Minas Gerais analyzed the use of excessive polypharmacy, in which 4.8% of older people used 10 or more medications[14]. This percentage is much lower than that found in the present study, which could be explained by the fact that institutionalized older people are generally more fragile, have a greater number of chronic diseases, and use more medications compared to those in the community[1–4]. However, it is prudent to consider that the different methodologies used in the studies make comparisons difficult, besides influencing the prevalence of excessive polypharmacy.

The differences in the prevalence of excessive polypharmacy among institutionalized older people from different contexts may be influenced by the different attitudes of prescribers facing the challenge of treating complex patients[4]. While some adopt therapeutic approaches based on guidelines or protocols in force in the country, others may consider, for example, the characteristics and preferences of the older person[2,4] as the basis for the therapeutic recommendation, which could result in different amounts of the medication prescribed.

From this perspective, a factor that could contribute to the use of excessive polypharmacy by institutionalized older people in the South of the country is the growing use of clinical protocols and therapeutic guidelines as the basis for medical conduct. In Brazil, the Ministry of Health recommends for primary care teams - who are the first entry of older people to the healthcare system - to use evidence-based clinical guidelines for the treatment of people with chronic diseases[19]. Traditionally, these guidelines are based on single diseases and do not consider the complexity of the individual with multimorbidity, which is why older patients with coexisting diseases may be prescribed several medications[2]. This evidence is in line with our findings since most older people who use excessive polypharmacy also have multimorbidities.

And issues related to the healthcare system of each country may be at the genesis of such differences. In the Brazilian healthcare system, the implementation of public policies in recent years aimed at guaranteeing the treatment and control of prevalent diseases in the country has allowed for the expansion of access to medicines[20] with emphasis on the South region, in which the highest percentage of access to pharmaceutical care in the country is registered[21]. The highest percentage of older people using polypharmacy is also seen in this region, with 25.0% versus only 3.0% in the

North region[22]. This evidence makes us believe that the excessive polypharmacy analyzed in the present study could be favored by the greater ease of access to medication, as people with free drug coverage show a greater polypharmacy risk compared to those who need to pay for pharmaceutical care[23,24]. This hypothesis is also corroborated by the fact that in the present study the medications most frequently used by older people in excessive polypharmacy, namely omeprazole and quetiapine, are part of the National List of Essential Medications, and therefore are made available free of charge by the Unified System of Health[20].

In the present study, excessive polypharmacy was associated with heart disease, diabetes *mellitus,* and depression. Other studies found the same association[4,23]. Said diseases are highly prevalent among older people regardless of the context in which they live[4,23], and are commonly treated with a combination of drugs[23,25].

Counterintuitively, no association was identified in this study between excessive polypharmacy and multimorbidity. This finding contrasts with the literature on the topic[5,6] and can be justified by the fact that the main substances responsible for excessive polypharmacy in the population studied were omeprazole and quetiapine, and the use of these medications does not necessarily indicate a chronic condition[26,27].

Among those studied, excessive polypharmacy was associated with hospitalization in the last year. This result is supported by the literature[3,22,28]. A survey carried out among older people hospitalized in Pakistan found that patients using excessive polypharmacy had 37 times higher odds ratio of hospitalization compared to those not exposed to polypharmacy[28]. The use of multiple medications can cause harm capable of determining hospitalization[5], and the greater the number of medications in use, the greater the probability of adverse events that can be serious and fatal[1].

In Brazil, hospitalizations related to damage caused by medications show a growing trend, especially in the South and Southeast regions of the country, with the representation of the older population. Older people are more susceptible to adverse effects, interactions, and toxicity caused by medication[29] which could contribute to the need for hospitalization in this group and justify the association between excessive polypharmacy and hospitalization.

Another possible explanation could be supported by the fact that hospitalization presupposes the displacement of the older person via different care settings, and this movement could favor the occurrence of inconsistencies in the list of medications used by the older person. Data from the World Health Organization reveal that most institutionalized older people have already been victims of inconsistencies in the list of medications[30]. In this context, it is possible that the medications in use and the previous health problems are not considered for the onset of a new therapeutic scheme, making the identification of adverse effects to medications and their possible interactions unlikely. Thus, adverse reactions can be interpreted as new health problems and treated with new drugs, which starts the prescription cascade, a factor that could contribute to the use of excessive polypharmacy[25].

In the present study, excessive polypharmacy was associated with the use of PIM. Our findings are in line with the literature[1,11,31]. Among those exposed to excessive polypharmacy, most used PIM, but this percentage was reduced by half in the unexposed group. In fact, evidence suggests that the greater the number of medications prescribed, the greater the chances of receiving a PIM[11,28,31].

These results point to a worrying condition, as they indicate a high prevalence of PIM use among institutionalized older people using excessive polypharmacy, which should be a reason for warning professionals and managers since the risks of harmful effects of these drugs can exceed the benefits[15]. However, despite the relevant concern with the negative results associated with the use of PIM, the literature shows that the prescription of these medications is frequent and points to an increased prevalence over time[9,11], which indicates the need for interventions aimed at reducing the prescription of PIM.

As for strengths, we emphasize the period considered for the analysis of medication use involving the three months before the survey, which could reduce the possibility of underestimating excessive polypharmacy as medications can be used weekly or monthly; information on the health status was collected to allow us to study the factors associated with excessive polypharmacy; information regarding the use of medications, health status, and the presence of chronic diseases was obtained by the analysis of medical records, which contributes to the reliability of the findings.

The present study has some limitations: the cross-sectional design of this survey does not allow establishing a cause-and-effect relationship; the percentage of refusals may have occurred in LTCF with older people with a health profile different from the investigated sample, influencing the study results and the non-response rate in some variables; some medications classified as a product may contain more than one chemical, thus the user may have been wrongly classified as non-excessive polypharmacy, which could contribute to the underestimation of the outcome. As this is a non-probabilistic sampling, the generalization of the results is harmed. However, the findings are similar to those found in the scientific literature.

CONCLUSION

Our findings follow the internationally observed trend and suggest that diseases prevalent among older people, hospitalization, and the use of potentially inappropriate medications are factors contributing to the use of excessive polypharmacy. Most of the associated factors fall into the non-modifiable group, as is the case with chronic diseases. However, the use of potentially inappropriate medications for older people is a modifiable factor, as safer and more effective alternatives are often available. Thus, actions are needed to optimize the pharmacotherapy prescribed to institutionalized older people. Interventions aimed at training and continuing education of teams working in institutions considering the specificities of the area of geriatrics and gerontology could contribute to the quality of drug therapy recommended for older people. In addition, the periodic review of drug prescriptions and the implementation of a referral and counter-referral system between different professionals and services involved in the health care of older the person are initiatives with the potential to reduce excessive polypharmacy and the use of potentially inappropriate medications.

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Hospitalization of Older People in a Large Brazilian Urban Center and its Associated Factors

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Abstract

Objective: To evaluate the frequency of Hospital Admission (HA) in the last twelve months in older adults treated at Primary Health Care (PHC) and its associated factors, through a Comprehensive Geriatric Assessment (CGA). *Methods:* Cross-sectional study, with a random sampling of 400 older adults using PHC. The frequency of HA for at least 24 hours was self-reported (yes; no). A sociodemographic and health survey was used, tools to evaluate basic and instrumental daily life activities, cognition, depression, falling, and fear of falling. The association of factors to HA was analyzed using multiple logistic regression analysis. *Results:* Mean age was 75.23 (±8,53), 63.2% of participants were female 62.6% reported a poor/fair state of health and 38% reported HA in the previous twelve months. Older patients, with a poor perceived health, chronic illnesses, daily use of medications, dependent for basic and instrumental daily life activities, cognitive impairment, and having fallen in the previous year demonstrated associations with hospitalization. Knowing how to read and write was associated with protection from hospitalization. The frequency of hospitalization was high in this study. *Conclusion:* The frequency of HA of older people attended at basic health units was high and was associated with modifiable and non-modifiable factors, indicating that the multidimensional approach is an important tool in the care of the older adults in primary health care settings.

Keywords: Elderly. Hospitalization. Geriatrics. Geriatric Assessment.

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INTRODUCTION

Older adults access health services more frequently, involving a higher cost, prolonged treatment and impairment of the recovery stage[1]. Hospital Admission (HA) in this population is at high risk due to the presence of multiple comorbidities1. In the literature, there is relevant information on risk factors for HA in the older adults[1,2]. However, there is a need for a multidimensional approach, centered on the older adults, considering modifiable and non-modifiable factors[2].

Due to the increase in the older adults population, it will require a greater demand for health care at all levels, and an increase in the frequency of HA[3]. Older adults make greater use of health services than do other age groups[3]. Furthermore, the disease profile of older adults demands more health system resources, principally at the level of hospitalization, thus increasing costs[3,4]. Primary Health Care (PHC) has a fundamental role in reducing HA rates in the older population[3-6]. Most of the time, older adults can avoid HA by way of effective PHC measures[6]. There is no doubt that there is a great effort on the part of geriatricians, gerontologists, gerontologists and researchers to identify risk factors for HA in older adults[3]. Previous studies have shown that Non-Communicable Chronic Diseases (NCCDs), especially multimorbidities, functional incapacity, poor perceived health, polypharmacy, low educational levels, and advanced age were associated with the risk of HA among older Brazilians[5-8].

Understanding the factors associated with the HA of older adults is essential for developing policies to prevent the harm caused by this outcome[5]. For this reason, it is essential to carry out a multidimensional assessment focused on the older adults[2]. In this sense, the Comprehensive Geriatric Assessment (CGA) is the most appropriate way to assess the needs of the older adults[9].

To the best of our knowledge, few studies have used a multidimensional evaluation using validated scales of functional capacity, mental health, history of falls and HA among older Brazilians attended in PHC facilities. Therefore, preventing HA in this population is relevant for preserving quality of life and reducing health system costs[5-7]. Thus, the aim of this study was to assess the frequency of HA in the last twelve months in older adults assisted in PHC and its associated factors, through CGA.

METHODS

A cross-sectional study with probability sampling of adults 60 and older, treated at one of the PHC units in the city of São Paulo, SP, Brazil. This study followed the recommendations of Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)[10]. Research was conducted at the Marcus Belenzinho (Belenzinho) Primary Care Unit (PCU), located in the eastern zone of the municipality of São Paulo, SP, Brazil. The PCU has approximately 40,000 individuals registered, of whom 5,000 are older adults. Four hundred subjects were needed to do hierarchical logistic regression models with a dependent variable and fifteen independent variables, mean frequency of 14%[5,7]. HA of older adults, alpha value of 5% significance (α=0.05), and statistical power of 90%. Selection of older adults was done by way of simple random sampling, using those 5,000 registered of older adults' record numbers.

Inclusion criteria were being 60 and older and registered in the Belenzinho PCU. Exclusion criteria were having a severe physical limitation and medical diagnosis of cognitive deficits or dementia. Data collection was carried out between February and August 2018 by a nurse holding a doctoral degree with more than ten years' experience in PHC. After random selection of potential research participants, those chosen were contacted during nursing appointments at the PCU. Interviews (lasting approximately 40 minutes) were conducted individually in a private setting. The frequency of HA was obtained using a subjective, self-reported question: *Have you been hospitalized for more than 24 hours in the previous twelve months (yes, no)*? Sociodemographic variables: gender (male, female); age group (65 to 70 years of age; 70 to 79; 80 or more); marital status (with partner, no partner); knowing how to read/write (yes; no); level of studies (none; 1 to 4 years; >4 years); living alone (yes; no).

Variables related to state of health: satisfaction with life (yes; no), perceived health (poor; fair; good; excellent), chronic disease (yes; no), use of medications (yes; no), polypharmacy – daily use of ≥5 medications (yes; no); tobacco use (yes; no).

Basic activities of daily living: Katz Index – created by Sidney Katz in 1976 and validated for Portuguese in 2008[11]. This instrument is used to evaluate Basic Activities of Daily Living (BADL), according to the degree of independence in the outcomes of six BADL functions (bathing, dressing, going to the toilet, transferring, continence, and feeding). The Brazilian validation demonstrated excellent psychometric properties, with a Cronbach's alpha between 0.80 and 0.92[11]. The score varies from 0 to 6 points and classifies patients as independent (score of zero) and dependent (score greater than or equal to 1)[11].

Instrumental activities of daily living: Lawton Scale – elaborated by Lawton and Brody in 1969, validated for Portuguese in 2008[12]. This instrument is used to evaluate Instrumental Activities of Daily Life (ADL), in accordance with scores varying from 0 to 21. It classifies patients as dependent (score less than or equal to 20) and independent (score equal to 21)[12].

Cognition: Mini-Mental State Examination (MMSE) – elaborated by Folstein in 1976, used to evaluate cognitive function, transculturally adapted to Brazilian Portuguese in 1994[13]. The score varies between a minimum of 0 and maximum of 30 points. One of the cut-off points used in Brazil was based on level of education (in years of schooling): 13 points for illiterate; 18 for low to medium level of education (up to eight years of formal education), 26 for older adults with high levels of education (more than eight years of schooling)[13].

Depression: Geriatric Depression Scale, short form with 15 items (GDS-15); developed by Yesavage in 1983 and validated for Portuguese in 2005[14]. It is a fifteen-item scale, with two options for answers (yes; no). Scoring varies from 0 to 15, and classifies patients as not having depression (less than or equal to 5) and having depression (equal to or greater than 6)[14].

Fear of Falling: Falls Efficacy Scale – International (FES-I) was developed by Yardley in 2005[15]. This scale was validated for Portuguese in 2010, with a Cronbach's alpha equal to 0.96[15]. The FES-I evaluates fear of falling (FOF) in 16 distinct daily activities. The FES-I scoring scale, from 16 (not at all concerned) to 64 (extremely concerned), with each item measured on a four-point *Likert* scale. The cut-off points for the FOF were as follows: 16–22 = low concern and 23–64 = high concern[15]. Variables for presence of falls were a history of falls (yes; no) and last fall (<12 months ago; yes; no).

Presence of comorbidities with Prince et al.[16], cardiovascular (yes; no), neoplasm (yes; no), pulmonary (yes; no), musculoskeletal (yes; no), neurological (yes; no), metabolic (yes; no), obesity (yes; no)[16].

Descriptive analysis was presented in absolute and relative (categorized variables) values and measures of central tendency (continuous numeric variables). The proportion of categorized variables was compared using the Chi-Square test (or Fisher Test, according to the sample size). Multiple Logistic and Hierarchical Regression was used with dichotomous variable HA (yes, no). Five models were developed: Model 1: socio-demographic (age, gender, read/write, marital status, family arrangement), Model 2: Model 1 + state of health (perception of health (poor), chronic disease, use Daily Medication, polypharmacy - ≥5 medication per day, tobacco use. Model 3: Model 2 + functional capacity (Katz - dependent or independent, Lawton dependent or independent). Model 4: Model 3 + mental health (Depression- GDS15 yes; no, cognitive function - MMSE). Model 5: Model 4 + falls (falls in the last 12 months yes; no, FOF – FES-16 yes; no). Significance level of 5% was chosen for the test, with a 95% confidence interval and $p<0.05$*; $p<0.01$**; $p<0.001$***.

This project was approved by the Ethics and Research Committee of the São Paulo Municipal Health Secretariat, Protocol 2.468.315, January 17, 2018. All participants signed a Free and Informed Consent Form. The research is in accordance with Resolution No. 466/2012 and Resolution No. 510/2016.

RESULTS

From 488 older adults of this study, 400 (83.33%) completed all questionnaires. Of those who did not participate, 50 older adults did not meet the inclusion criteria and 38 refused to participate in the study. Sociodemographic and health variables are found in *Table 1*. Mean age was 75.23 (SD: 8.53) years. 63.20% were female, 67% had no partner, 39.5% did not know how to read and write, and 31.5% lived alone. More than half (54.2%) of the older adults were not satisfied with life. In regard to self-perception of state of health, 62.6% evaluated their health as poor or fair, and 92.3% had NCCDs.

In Table 2**,** we find the prevalence of the principle non-communicable chronic diseases.

The frequency of hospitalization in the previous twelve months was 38.0% (CI 95%= 33,30%-42,70%). Unadjusted multiple logistic regression gave evidence that older adults, with more advanced age, regular or poor health perception perceived health, having chronic diseases, using daily medication, dependent for BADL and IADL, and having fallen in the previous twelve months were associated with higher risk of hospitalization. The variables of knowing how to read and write and having better cognitive status were associated with less risk of hospitalization (Table 3).

In Table 4, Five models of Hierarchical Logistic Regression were conducted. In the first model, "Sociodemographic Variables", knowing how to read and write presented less risk of being hospitalized (OR=0.45; CI 95%:0.29–0.68, p<0.001). In the 2nd model "Sociodemographic Variables and State of Health", older adults with self-perception of a poor state of health (OR: 10.65; CI 95%: 1.19–95.23, p=0.034) and tobacco users showed greater chances of being hospitalized (OR=3.41; CI 95%=1.44–8.07, p=0.005). In the third model, "Sociodemographic Variables, State of Health, and Functional Capacity", older adults who are dependent for BADL – Katz showed more risk of HA (OR=2.93; CI 95%= 1.42–6.01, p=0.003). In the last model, older adults with a poor perceived health (OR=13.49; CI 95%= 1.26–144.38, p=0.031), or fair perceived health (OR=11.82; CI 95%=1.12–123.86, p=0.039), tobacco users (OR=3.36; CI 95%=1.36–8.29, p=0.008), dependent for BADL - Katz (OR=2.39; CI 95%=1.18–4.87, p=0.016) and falling in the previous twelve month (OR=2.37; CI 95%= 1.09–5.15, p=0.028) showed greater chances of HA.

Table 1. Sociodemographic and Health Characterization of the Older Adults (n=400). São Paulo,SP, 2018.

Variables	n (%)
Age	
60-69	104 (26.0)
70-79	159 (39.7)
≥80 years	137 (34.3)
Gender	
Male	147 (36.8)
Female	253 (63.2)
Marital Status	
With partner	132 (33.0)
No partner	262 (67.0)
Know how to Read/Write	
Yes	242 (60.5)
No	158 (39.5)
Schooling	
None	158 (39.5)
1 to 4 years	242 (60.5)
> 4 years	0 (0)
Lives Alone	
Yes	126 (31.5)
No	274 (68.5)
Satisfaction with Life	
Yes	183 (45.8)
No	217 (54.2)
Perceived health	
Poor	89 (22.3)
Fair	161 (40.3)
Good	120 (30.0)
Excellent	30 (7.4)
Chronic Disease	
Yes	369 (92.3)
No	31 (7.7)
Daily Medication	
Yes	363 (90.7)
No	37 (9.3)
Polypharmacy	
Yes	148 (37.0)
No	252 (63.0)
Tobacco	
Yes	110 (27.5)
No	290 (72.5)
FOF[b]	
Yes	251 (62.7)
No	149 (37.3)
Fall in past 12 months (yes)	
Yes	51 (20.3)
No	200 (79.70)

FOF: Fear of Falling; [b]The cut-off points for the FOF were as follows: 16–22 = no and 23–64 = yes.[15]

Table 2. Prevalence of Non-Communicable Chronic Diseases (n=400). São Paulo,SP, 2018.

Comorbidities*	n (%)
Cardiovascular	
Yes	295 (73.70)
No	105 (26.30)
Neoplasm	
Yes	19 (4.70)
No	381 (95.30)
Pulmonary	
Yes	26 (6.50)
No	374 (93.50)
Musculoskeletal	
Yes	118 (29.50)
No	282 (70.50)
Neurological	
Yes	199 (49.80)
No	201 (50.20)
Cardiometabolic	
Yes	206 (51.50)
No	194 (48.50)

*Chronic diseases were categorized according to Prince et al.[22]

Table 3. Associated factors with hospitalization of older adults (n=400). São Paulo,SP, 2018.

Sociodemographic and clinical variables	Hospital Admissiona OR, unadjusted (95%IC)	*p*-value
Age (mean)	1.09 (1.06 – 1.12)	<0.001***
Gender (female)	1.08 (0.71 – 1.65)	0.691
Read/Write (yes)	0.45 (0.29 – 0.68)	<0.001***
Marital status (yes)	1.41 (0.91 – 2.19)	0.117
Family Arrangement (yes)	0.91 (0.58 – 1.41)	0.677
Perceived health (poor)	5.62 (2.09 – 15.11)	<0.001***
Perceived health (fair)	2.92 (1.13 – 7.54)	0.026*
Perceived health (good)	1.10 (0.40 – 2.99)	0.842
Chronic Disease (yes)	3.44 (1.29 – 9.17)	0.013*
Daily Medication (yes)	2.38 (1.06 – 5.36)	0.036*
Polypharmacy (yes)	1.35 (0.89 – 2.05)	0.150
Tobacco (yes)	0.90 (0.57 – 1.43)	0.678
Katz (dependent)	6.31 (3.88 – 10.26)	<0.001***
Lawton (dependent)	4.29 (2.78 – 6.60)	<0.001***
Depression (yes)	0.77 (0.50 - 1.01)	0.222
MMSE (mean)	0.83 (0.76 – 0.90)	<0.001***
FES-I (With fear of falling)	1.74 (0.81 - 3.71)	0.150
Fall in past 12 months (yes)	2.93 (1.51 – 5.69)	0.001**

[a]Hospital admission at list 24 hours in the last 12 months. 0= no; 1=yes. * p<0.05; p<0.01**; p<0.001***. OR: Odds Ratio; CI: Confidence Interval; MMSE: Mini Mental State Examination; FES-I: Fall Effectiveness Scale – International.

Table 4. Hierarchical logistic regression among independent variables and hospitalization of older adults (n=400). São Paulo,SP, 2018.

Models	Hospitalization[a] OR, adjusted (95%IC)	*p*-value
1st Model		
Age (mean)	1.07 (0.99 – 1.15)	0.056
Gender (female)	0.72 (0.39 – 1.32)	0.295
Read / Write (yes)	0.45 (0.29 – 0.68)	<0.001***
Marital status (yes)	1.79 (0.91 – 3.49)	0.087
Family Arrangement	0.77 (0.41 – 1.42)	0.405
2nd Model		
Perceived health (poor)	10.65 (1.19 – 95.23)	0.034*
Chronic Disease (yes)	1.08 (0.12 – 9.37)	0.939
Daily Medication (yes)	2.75 (0.55 – 13.62)	0.214
Polypharmacy (yes)	1.21 (0.67 – 2.20)	0.511
Tobacco (yes)	3.41 (1.44 – 8.07)	0.005**
3rd Model		
Katz (dependent)	2.93 (1.42 – 6.01)	0.003**
Lawton (dependent)	1.91 (0.97 – 3.76)	0.061
4th Model		
Depression (yes)	1.06 (0.55 – 2.02)	0.852
MMSE (mean)	0.92 (0.80 – 1.06)	0.270
5th Model		
Age (mean)	1.04 (0.99 – 1.09)	0.087
Gender (female)	0.07 (0.41 – 1.84)	0.724
Read/Write (yes)	1.44 (0.70 – 2.94)	0.316
Marital status (yes)	1.25 (0.62 – 2.51)	0.526
Perceived Health (poor)	13.49 (1.26 – 144.38)	0.031*
Perceived health (fair)	11.82 (1.12 – 123.86)	0.039*
Perceived health (good)	5.54 (0.51 – 59.54)	0.157
Chronic Disease (yes)	1.07 (0.10 – 10.64)	0.952
Daily Medication (yes)	3.29 (0.61 – 17.64)	0.164
Polypharmacy (yes)	1.19 (0.64 – 2.21)	0.563
Tobacco (yes)	3.36 (1.36 – 8.29)	0.008**
KATZ (dependent)	2.39 (1.18 – 4.87)	0.016*
Lawton (dependent)	1.72 (0.89 – 3.34)	0.106
Depression (yes)	1.10 (0.58 – 2.08)	0.759
MMSE (mean)	0.92 (0.80 – 1.06)	0.286
FES-I (with fear of falling)	0.92 (0.20 – 4.16)	0.914
Fall in past 12 months (yes)	2.37 (1.09 – 5.15)	0.028*

[a] Hospitalization at list 24 hours in the last 12 months. 0= no; 1=yes. * $p<0.05$; $p<0.01$**; $p<0.001$***. Odds Ratio; CI: Confidence Interval, MMSE: Mini Mental State Examination, FES-I: Fall Effectiveness Scale – International.

DISCUSSION

This study researched the frequency of HA and factors associated with older patients treated in primary care. The frequency of HA in the sample studied was greater than that in other Brazilian publications[5-7]. Older adults of more advanced age, poor perceived health, having chronic diseases, using daily medication, being dependent for BADL, IADL, and having fallen in the previous twelve months showed greater chances of HA. Nevertheless, older adults who knew how to read/write and having better cognitive status demonstrated fewer chances of HA.

These findings are consistent with scientific literature and are important for health professionals who deal with older patients from primary to tertiary care[3-8]. In this context, identification of indicators associated with greater chances for hospitalization represents an essential tool in clinical practice, corroborating with preventive measures and resolvability[3-8]. The prevalence of hospitalization in the sample studied was greater when compared to other national publications that varied between 7.6% and 17.7%[5-7]. Possible explanations that illustrate the sample's greater fragility are that these older adults were treated at a PHC unit, almost one third were over 80 years of age, the vast majority of them have at least one NCCD and use medication daily, most have perceptions of poor health or lack of satisfaction with life, and a history of falling.

Older adults with perceptions of poor health show greater chances of HA. Negative self-perception of health is shared by various studies as an important indicator of health[5,17-19]. In a population based study of 23,815 older adults, it was shown that older adults with a perception of poor health had a 1.35 greater chance of being hospitalized[5]. The evaluation of self-perception of health is an important subjective tool in clinical practice, is easily applied, and is an excellent screen for health outcomes as a predictor of hospitalization and death in older populations[5,20].

Tobacco use was associated with HA in the sample studied. In a prospective populational study with 7.2 years follow up and 188,167 individuals with a mean age of 55, tobacco use was associated with HA and mortality due to various cardiovascular diseases[21]. Data from literature highlights tobacco use's deleterious effect, including reduced life expectancy[21,22]. In a national study, tobacco use by women subtracted 4.47 years of life compared to those who did not use it, and in the male population, the impact was 5.03 years for smokers[22]. Furthermore, the use of tobacco undermines the quality of life, due to the morbidities related to it, such as cardiovascular diseases, chronic obstructive pulmonary disease (COPD), and cancer[21]. In another international study, the fragility of older adults was greater in smokers, principally in the 60 though 79 year age range[23].

Older adults dependent for BADL presented a greater chance of HA. Diverse studies have shown that Functional Capacity (FC) is a dynamic composition that manifests itself as a central element of the older population's health[5-7,24]. Impairment of activities like bathing, and feeding and dressing oneself is related to increased fragility in older adults and, consequently, greater demands for medical care and the risk of HA[5,24].

Impairment of FC is more conspicuous and has implications for older adult's life, as it infringes on their autonomy, giving rise to a poorer evaluation of their quality of life and, consequently, greater need for medical intervention and hospitalization[5]. And, further, as literature has shown, increased hospitalizations potentially result from the deterioration of older adult's BADL[5-7,24].

A history of falls in the previous twelve months is related to greater rates of HA. Between 1996 and 2012, there were nearly 66,876 deaths in Brazil from falls and 941,923 hospitalizations in adults aged 60 or above[25]. According to the Center for Disease Control and Prevention (CDC), falls are the principal cause of morbidity and mortality in older adults in the United States of America (USA)[26]. In 2014, almost 28.7% of older adults in the USA reported a fall, resulting in 29 million falls, 37.5% of which necessitated HA[27]. In the older population there is a close relation with a history of falls as an indicator of fragility and serious morbidity[27,28].

Study participants who could read/write were less prone to HI. The higher level of literacy is a protective factor against worse health outcomes[29], especially among the older adults[30]. On the other

hand, there is strong evidence that low literacy is a risk factor for the development of CNCDs, low adherence to treatments and higher mortality[30]. Participants who had better cognitive status also had a lower risk of HI[31]. There is solid evidence that older adults with better cognitive status have better health outcomes[31,32].

The last model expresses modifiable and nonmodifiable risk factors relevant to hospitalization of older adults. The use of a multidimensional approach to the older adults can improve the permanence and link to PHC. There is solid evidence that the use of AGA by health professionals improves health outcomes, quality of life, accelerates rehabilitation and decreases the risk of HI in the older adults[33,34]. On the other hand, disease focused care provides outcomes with a risk of HA and, consequently, higher costs and indices of rehospitalization[3-8]. Professionals, especially those acting in PHC, must be aware of the factors illustrated in Figure 1.

This study has some limitations that must be addressed. The cross-sectional design limits the evaluation of cause and effect relationships. Greater proportion of female participants limits assessing exposure to older men. Furthermore, some independent variables suffer contextual influences, such as the emotional and physical state in which an individual finds him- or herself at the moment of going to the PCU. However, we must highlight the use of a multidimensional approach, contemplating sociodemographic variables, state of health, FC, mental health, and falls. Another important point is the participation of a specific population of older adults treated in a PCU. These results can be an important tool for health professionals who care for older adults in PHC. We recommend conducting longitudinal studies with larger samples in different locales in order to identify possible predictors of HA in older adults.

CONCLUSION

This study has identified factors associated with HA of older adults in PHC using a multidimensional approach. Older adults of a more advanced age, noncommunicable chronic diseases, the daily use of medication, a history of falls in the previous year, poor perception of health, tobacco use, and basic and instrumental incapacity in daily life present higher chances of having been hospitalized in the previous twelve months. Factors like knowing how to read and write and having better cognitive status presented lower chances of having been hospitalized. In conclusion, the knowledge of modifiable and nonmodifiable factors for hospital admission is a valuable instrument for the care of the older adults population.

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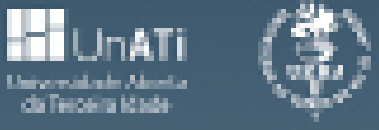
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