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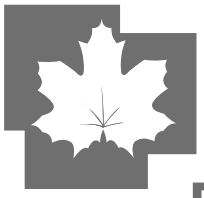

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Our Role in Advocating for Older People

I write today as a gerontologist, as the President of the International Society for the Study of Behavioral Development and the current Secretary-General of the International Association of Gerontology and Geriatrics (IAGG), but most of all as a concerned citizen of the world. I write to advocate for engagement from all citizens and especially to outline what gerontologists and geriatricians can, should, and, I would say, must do as we look to 2021 and beyond. Worldwide we are living in most difficult times. We are facing a number of significant problems with both current and long-lasting implications. Certainly, this is the case in Brazil, where the coronavirus has hit hard and where economic and political troubles are at crises levels. Of course, Brazil is not alone. Similar crises are being faced in my own country (the US) and in many countries around the world. All the more reason to emphasize that we are in this together and must work together if we are to successfully address the crises we face.

My comments and recommendations are drawn from my experience as head of the IAGG's UN team. Since the Brazilian Geriatrics and Gerontology Society is a member of IAGG, this means IAGG's UN team is also your team. The team is mainly based at the UN Headquarters in NY and I hope you will be proud to know that one of our long-standing members is Brazil's own Dr. Laura Machado. The main goal of the team is to advocate for older people in issues being addressed by the UN. We participate in the UN Commission on Social Development; UN Commission on Women; UN Open Ended Working Group on Aging; UN High Level Political Forum; UN International Day of the Older Persons (IDOP); Stakeholders Group on Aging; General Assembly of Partners Concerned with Older People, Committee on Aging. As a result, when one of these groups takes up an issue, our team frequently prepares or co-sponsors a complementary UN side event, formal written or oral statement addressing how older people are affected by that issue. Most often the issues taken up are based on the 17 sustainable development goals (SDGs)[1,2]. The SDGs outlined a comprehensive plan of action to build a global partnership for sustainable development to improve human lives and protect the environment (https://sdgs.un.org/goals). Brazilians may know that the origins of these goals can be traced to the 1992 Earth Summit in Rio de Janeiro during which Agenda 21 was adopted by more than 178 countries.

Recently, the UN Commissions have focused on the SDGs. Topics the UN team has addressed include the role and relevance to older people of: Climate Change; Long Term Support and Care; Homelessness; Global Progress through Education, Training, and Life-long Learning; International Day of the Older Person: Decade of Healthy Aging; IDOP/IAGG -Healthy Aging During the COVID-19.

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I am not a policy person by training. Nevertheless, as we prepared these pieces for the UN I was particularly impressed by how much of what gerontologists and geriatricians know is relevant to policy. We see the needs of older people and how their needs affect others in their family but also how they contribute to their families and our society, a point that is frequently lost on policy makers who too often think of older people only as a drain or burden. Certainly, the pandemic has shown older people's vulnerability but also their contributions to their families during these difficult times. While I am not advocating that you change careers, since we need you where you are, I do want to highlight that we should take every opportunity to advocate for the rights of older people whenever we can. Further, I think we must recognize that our role as advocates is important not only for older people but for their families and our society. Every issue mentioned above involves not only the older person but also a broader slice of society.

Preparation of the UN statements have provided a clarity for me that I wish to share with you. While we, as gerontologists and geriatricians, care about old people, we also care about people of all ages. Brazilian gerontologist and geriatricians and the Brazilian Geriatric and Gerontology society have important roles to play in assuring the future of older people including through the success of the Decade of Healthy Ageing and in advocating for an International Convention on the Rights of Older Persons. Advocating for and recognizing both the strengths and vulnerabilities of older people can benefit present and future generations, thereby investing in the human rights of all, creating a Society for All Ages.

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Translation and cross-cultural adaptation of Pfeiffer's Short Portable Mental Status Questionnaire (SPMSQ) for brazilians older adults

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Auristela Duarte de Lima Moser[1]
Javier Jerez-Roig[2]

Abstract

Objective: Culturally adapt Pfeiffer's Short Portable Mental Status Questionnaire (SPMSQ) for use in Brazil. Methods: The process involved the following phases: initial translation; synthesis of translations; back-translation; review by a committee of experts in the field to analyze the apparent and content validity, considering the semantic, idiomatic, cultural, conceptual and clarity equivalences and, finally, a pre-test with the target population. *Results:* In the initial translation and in the back-translation, there were disagreements between the translators, in items 19 and 7 respectively, which were later discussed and reconciled by the committee. The expert committee suggested changes from the layout to adjustments to technical terms to facilitate the applicability of professionals and to make the final instrument clearer and more understandable to the target population. In the pre-test, 36.6% of those evaluated showed difficulties in understanding an item in the questionnaire; the item was replaced, the scale was reapplied obtaining 100% understanding. *Conclusion:* The study demonstrated that the Brazilian version of the SPMSQ established as a Brief Cognitive Capacity Scale was cross-culturally adapted, with its items considered clear and understandable by specialists and the target population. The adapted instrument contributes because it is a brief assessment tool available to track the cognitive ability of old people. The analysis of psychometric properties is recommended, establishing the degree of validity and reliability, which is already under development by the authors of this study.

Keywords: Translating. Cross-Cultural Comparison. Health of the Elderly. Mental Status and Dementia Tests. Cognitive Aging. Cross-Cultural Studies.

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INTRODUCTION

Among the functional losses that affect old people, cognitive losses are in evidence, increasing the vulnerability of this population. Dementia can lead to physical dependence[1], being an important risk factor for the mortality of this public. The number of individuals living with dementia worldwide was estimated at 35.6 million in 2010 and the literature assumes that this number should almost double every 20 years, reaching 65.7 million in 2030[2]. These data call on governments and policy makers to make dementia a global public health priority.

Cognitive decline increases dependence, that is, the inability to perform activities of daily living, influencing their functionality and quality of life[3], which require constant and long-term multidisciplinary monitoring. For this follow-up, evaluations are necessary, ranging from the initial tracking of the problem to the analysis of the results and treatment applied.

In this context, the Short Portable Mental Status Questionnaire (SPMSQ) by Pfeiffer[4] stands out, an instrument of cognitive screening and diagnostic support for dementia, designed specifically for old people. This test is easy to administer, as it does not require any specific material for its completion and can be applied by any health professional, in addition to the fact that it has good sensitivity (S=86.2%) and specificity (E=99%) in its original English version[5-6].

There are several cognitive assessment instruments[7], many of which have already been translated and culturally adapted for Brazil. Although widely used in clinical practice and research with old people, some of them, in their original version, were not specifically created for this audience. Some end up restricting the participation of old people with motor impairment and visual deficits that are not corrected when they request reading, sentence writing and drawing reproduction. There are tests that need third parties, such as caregivers and family members to complete them, and there are very extensive instruments. According to Polit[8], the longer the instrument, the more tiring it can be for the interviewee.

Considering the limited time of primary care consultations, it becomes necessary to validate diagnostic support instruments that are easy and quick to apply, in order to reduce the number of patients with cognitive problems diagnosed late, delaying or even preventing early treatment and possible delay in disease progression[6].

The SPMSQ is a short scale with ten questions, considered a support tool for the diagnosis and monitoring of therapeutic measures and the evolution or not of the cognitive deficit, which assesses memory, temporal orientation, mathematical capacity and information on facts and everyday skills[4-6,9]. The scale does not need third parties for its completion and does not exclude patients with physical and visual impairment, in addition to having wide international use.

A study recently conducted in Israel[10] analyzed through SPMSQ the impact of sedative medications on the cognition of hospitalized old people who had a normal cognitive status at the time of admission. In another recent study carried out in Germany by Schönstein et al.[11], the instrument was used to stratify the risk of older patients in the emergency department. Several studies still use it as a screening for inclusion and exclusion criteria in research, such as that of Sri-on et al.[12], carried out in Thailand.

Such an instrument, despite being widely cited in the international scientific literature[6-11] and having versions in other languages[6,11,13,14], has not yet been translated and culturally adapted to the Brazilian Portuguese language; the versions used by SPMSQ in Brazil correspond to free adaptations or to its Spanish version[9]. This hinders its use by researchers and professionals in clinical practice, decreasing the availability of valid and reliable tools to support the identification of cognitive conditions and their degree of impairment in old people.

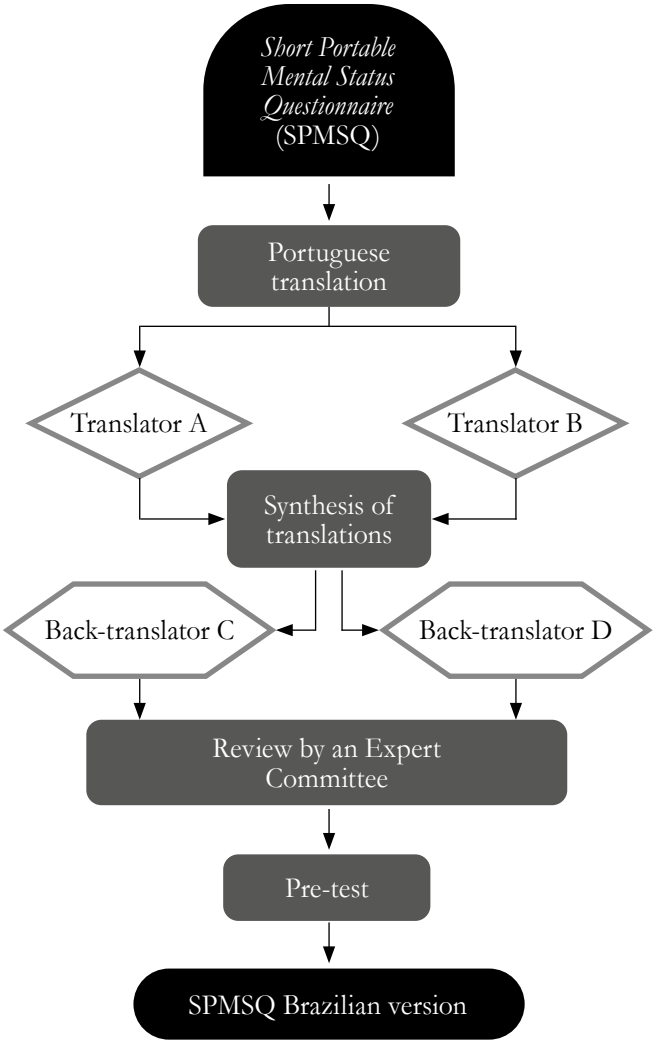
The cross-cultural adaptation of instruments promotes cultural exchange between different sociocultural realities, seeking to follow a series of methodological care and severity, ensuring that the measurement aspects of the instrument are reliable and not distorted to the socio-cultural reality to which it is intended to adapt[15,16]. Coluci et al.[17] and Knaut

et al.[18] report that the use of a foreign instrument without its proper adaptation may jeopardize the validity and precision of the results obtained in the evaluations. Thus, the translation of a scale must be clear in its language, remaining equivalent in terms of its cultural and social concepts[17-18].

The adapted instrument will contribute to the realization of robust cross-cultural studies, for comparison between different contexts and production of a more dense and significant body of knowledge19. To meet this need, the objective of this study was to describe the process of cross-cultural adaptation, with the apparent and content validation of Pfeiffer's SPMSQ for Brazilian old people.

METHOD

The cross-cultural adaptation of Pfeiffer's SPMSQ met the methodological recommendations widely accepted and recommended in the international literature, which suggest the following steps: translation; synthesis of translations, back-translation, analysis by a committee of experts and pre-test of the adapted version[15,18]. The study was carried out from June to December 2019, with old people both from Long Term Care Facilities for old people (LTCF) and from the community in the city of Curitiba (PR, Brazil). Figure 1 demonstrates, through a flowchart, the process of cross-cultural adaptation.



Source: Author (based on the flowchart by Beaton et al.[15]).

Figure 1. Flowchart of the process of translation and cross-cultural adaptation. Curitiba, PR, 2020.

Phase I – Translation: two bilingual translators participated in the first phase, having Portuguese as their mother tongue, that is, two Brazilians fluent in English who carried out two translations independently; only one was aware of the purpose of the study.

Phase II – Synthesis of the translations: the translations were compared and analyzed by a review committee, composed of the two translators, the researcher and the study supervisor. In this committee, the item by item differences between the versions were discussed in order to synthesize (consensus) the two translations forming the first Portuguese version of the instrument.

Phase III – Back-translation: the instrument was translated back into English by two other translators, native Americans who mastered Portuguese. They performed the translation independently, were unaware of the purpose of the study and did not have access to the original questionnaire.

Phase IV – Analysis by a committee of experts (apparent and content validity): the committee was composed of a multidisciplinary team within the criteria adapted from Fehring[20]. There is no consensus in the literature as to the criteria for selecting experts, but Fehring establishes parameters for selecting experts to perform validation of nursing diagnoses. Although their criteria were created for another purpose, they have been widely used in validation studies and adapted when necessary to the research object, providing a basis for analyzing the level of practical experience, knowledge and skill of each professional related to the topic. Therefore, to standardize the eligibility criteria of the specialists in this study, an adaptation of the Fehring criteria was used, namely: (i) a minimum of five years of clinical experience in the field of Geriatrics/Gerontology; (ii) *lato sensu* or *stricto sensu* specialization in Geriatrics/Gerontology; (iii) research with publications related to the theme of aging.

The professionals were invited to voluntarily collaborate with the study and a brief explanation was made about the research and its objectives. After meeting the adapted criteria of Fehring[20], the committee consisted of two doctors, two physiotherapists, two psychologists and a social worker. The objective of this stage was to analyze the clarity of the questions for ease of understanding of the target population, considering the semantic, idiomatic, conceptual and cultural equivalences, as well as the appearance of the instrument and the technical terms of access to the professional.

The experts evaluated the translated instrument using a Likert scale from 1 to 4 points: "not equivalent, little equivalent, quite equivalent and totally equivalent" for each item of the equivalences and "not clear, little clear, quite clear and totally clear" for the clarity of content. For items classified as 1 and 2, justification was requested; to this end, each specialist was given a specific document to record this analysis containing guidelines for its performance and spaces for observations, pointing out doubts and suggestions for adaptation.

The experts' proposed changes were analyzed, reviewed, discussed and reconciled to ensure the best fit for Brazilian culture. A consensus was reached in the expert committee and a pre-test version was developed[15,20].

Phase V – Pre-test: in this stage, the pre-final version was tested on 30 people aged 60 years or older, in the city of Curitiba (PR), in order to verify the content clarity. The sample size for this stage was defined according to the recommendations proposed by Beaton[15] and Reichenheim and Moraes[16]. We sought to cover men and women of different age groups, institutionalized and non-institutionalized and with different educational levels, as did Pfeiffer in the construction of the original instrument.

The SPMSQ instrument consists of ten questions, which assess memory, temporal orientation, mathematical capacity and daily information; its score ranges from 0 to 10, considering the sum of the evaluated errors. It allows the classification of the individual in preserved cognitive capacity, mild, moderate or severe cognitive impairment, taking into account the education level of the evaluated[6,9].

At this stage, the old person was not assessed regarding their cognitive ability, but their understanding in relation to the ten questions. The items classified with more than 10% of "non-understanding" were reformulated and replaced

by equivalent alternatives, so that the instrument's basic concept and structure were not altered, and then tested again in another group of participants with the same characteristics. Thus, the Portuguese version of Pfeiffer's SPMSQ was only defined when at least 90% of its items were considered clear and understandable[16,17].

The study was carried out after review and approval by the Research Ethics Committee of the Pontifical Catholic University of Paraná (nº 3,526,745). All participants, including old people and specialists, were informed about the objectives of the study and signed the Informed Consent Form.

RESULTS

Thirty old people were evaluated in the first round of the pre-test, 56.7% women and 43.3% men, composing a heterogeneous sample, with a wide age range, covering old people from 60 to 92 years old, with an average of 72.17 years (±10.16). Of these, 46.7% were institutionalized and 53.3%, from the community, with different levels of education, with a predominance of one to four years of study (50.0% of the sample). In the second round, 30 other old people with sociodemographic characteristics similar to those of the first group were evaluated, as can be seen in Table 1.

Table 1. Sociodemographic characteristics in the pre-test (N=60). Curitiba, PR, 2020.

Variable	1st Group - n(%)	2nd Group - n(%)
Sex		
Male	13 (43.3%)	14 (46.7%)
Female	17 (56.7%)	16 (53.3%)
Education		
Not literate	2 (6.7%)	4 (13.3%)
1-4 years	15 (50.0%)	12 (40.0%)
5-8 years	4 (13.3%)	7 (23.3%)
9-11 years	5 (16.7%)	6 (20.0%)
University education	4 (13.3%)	1 (3.3%)
Marital status		
Married	6 (20.0%)	4 (13.3%)
Not married	6 (20.0%)	9 (30.0%)
Widower	7 (23.3%)	9 (30.0%)
Divorced	11 (36.7%)	8 (26.7%)
Home		
Community	16 (53.3%)	12 (40.0%)
LTCF	14 (46.7%)	18 (60.0%)

LTCF = Long-term Care Facilities.

In the initial translation, the two translators presented similar versions, with differences in 19 items of the questionnaire, however, in terms considered synonyms. The use of terms and expressions familiar to the Brazilian population was prioritized, as shown in Table 2, in which it is possible to observe the versions of translators A and B and their synthesis. After discussion between translators and researchers, consensus was reached on the translation of "years of education" for "escolaridade", rather than "educação". Likewise, considering the original term "record", for which translator A suggested the word "registre" and translator B the word "grave", after discussion a consensus was reached and the term was replaced by "registre". In questions 5 and 6, the sentences

"How old are you?" and "When were you born?", relatively simple, generated a lot of doubt about which translation would be more appropriate, if "Qual é a sua idade?" or "Quantos anos você tem?" in question 5 and "Qual é a data de seu nascimento?" or "Quando você nasceu?" in question 6. We opted for "Quantos anos você tem?" and "Qual é a data de seu nascimento?", respectively.

In the back-translation, the versions showed small differences that were adjusted by consensus. Table 3 shows that seven items have been modified, with access only to the examiner. In the header the word "lista" was replaced by "escala", "indivíduo", by "avaliado", "não tiver", by "não possuir" and "ajuda", by "auxílio". In the instructions part of questions 3 and 9, the sentence "descrição da localização for dada" was replaced by "descrição da localização for fornecida" and "nome próprio feminino mais um sobrenome", by "nome próprio feminino seguido de um sobrenome", in order to standardize with more formal terms, as it is assumed that the questionnaire will be used by health professionals with higher education.

Table 2. Initial translation and synthesis of the Short Portable Mental Status Questionnaire. Curitiba, PR, 2020.

	Versions		Synthesis of translations
Original	Translator A	Translator B	Consensus
Header			
Circle Appropriate	Circule a melhor opção	Circule o apropriado	Circule a melhor opção
Yrs of education	Escolaridade	Educação	Escolaridade
Record	Grave	Registre	Registre
Subject	Paciente	Indivíduo	Indivíduo
Without reference	Sem ajuda	Sem o uso	Sem ajuda
Based	Baseado	Com base	Com base
Questions	Questões	Perguntas	Questões
Questions and Instructions			
What is the name of this place?	Onde você está?	Qual é o nome deste lugar?	Qual é o nome deste lugar?
What is your telephone number?	Qual seu número de telefone?	Qual é o seu número de telefone?	Qual é o seu número de telefone?
What is your street address?	Qual o seu endereço?	Qual é o seu endereço?	Qual é o seu endereço?
How old are you?	Qual é a sua idade?	Quanto anos você tem?	Quantos anos você tem?
Stated age	Idade informada	Idade indicada	Idade informada
When were you born?	Qual é a data de seu nascimento?	Quando você nasceu?	Qual é a data de seu nascimento?
Needs no verification	Não é necessário verificação	Não precisa de verificação	Não é necessário verificação
Subtract	Diminua	Subtraia	Subtraia
All the way down	Até o final	Até o fim	Até o fim
The entire series must be performed	A série inteira deve ser feita	Toda a série deve ser realizada	Toda a série deve ser realizada
Footnote			
Allow one more error	Permita um erro a mais	Permitir um erro a mais	Permitir um erro a mais
Intact intellectual functioning	Função intelectual intacta	Funcionamento intelectual intacto	Função intelectual intacta

Table 3. Changes made after the back-translation process. Curitiba, PR, 2020.

Synthesis of translations	Changes after back-translation
Da lista abaixo	Da escala abaixo
Indivíduo	Avaliado
Não tiver um telefone	Não possuir um telefone
Sem ajuda	Sem o auxílio
Ou outra ajuda para a memória	Ou outros recursos para a memória
Descrição da localização for dada	Descrição da localização for fornecida
Nome próprio feminino mais um sobrenome	Nome próprio feminino seguido de um sobrenome

Expert committee review

After analysis by the expert committee, changes to the title were suggested, namely: in place of "questionnaire", place "scale" and, "mental state", "cognitive capacity". Thus, the final title of the test was "Breve Escala de Capacidade Cognitiva".

They also recommended, in place of "education", place "years of study" and subdivide them into "1-4, 5-8, 9-11 and more than 11/higher education", in addition to adding the item "not literate".

It was suggested that the item "guidelines for the evaluator" be placed in bold and capital letters to draw attention before starting the evaluation. The initial text of the guidelines was not altered, however, it was placed in topics to provide a clearer appearance, indicating the importance of the instrument being read by the examiner, before its application.

In question 3, they suggested changing the question "what is the name of this place?" to "where are we now?", as it facilitates the understanding of the proposed question. In question 4, due to the second question option, it was suggested, instead of "4" and "4a", which generated confusion among some specialists, the placement of "4a" and "4b", adding an exponent "a" and "b" to help the application of the scale, drawing attention to the answer to only one of the two questions.

They also suggested changing the arrangement of questions 5 and 6, changing places, as they were complementary, since one question about age and the other, the date of birth. For the professional to confirm that the reported age matches, it is good that the question related to the date of birth is asked before.

In the item "instructions" of questions 7 and 8, after the initial translation and back-translation process, it stated "requires only the surname", but the experts identified that the interpretation of the sentence implies that only the surname would be accepted as an answer and not the name; for that reason, the sentence was changed to "may be full name or not". In question 10, they suggested, instead of the word "subtract", the term "decrease" and, from "to the end", "to 0", so that there is no continuation of the subtraction for negative numbers.

It was also recommended to add an "R:" to all questions, to make it possible to record the results, and the phrase "total number of errors" in uppercase and bold, to highlight the importance of noting the sum of the errors and not successes.

The original test took into account the education of the evaluated person for the classification of the final result; for this reason, the best term or expression was sought to facilitate the examiner's understanding of this section. The idea of using "removing a mistake" for not literate old people and "adding a mistake" for those with higher education was proposed; however, the not literate individual without any error could not have a negative result (-1). After discussion, it was decided to keep the word "permit", which makes it possible to use this resource if necessary; a specific location was also requested to place this score. Finally, the terms "intellectual function" and "intellectual disability" were changed to "cognitive ability" and

"cognitive disability", respectively, as they reflect those most used in current literature.

For the pre-test, a minimum agreement of 90% was considered for the validation of each question, that is, if a number greater than or equal to 90% of the participants classified the question as clear, it would not need corrections, while those with percentage less than 90% would be submitted to corrections and a new round of evaluation by another group of old people[26,27]. The results of this assessment are shown in Table 4.

Only one question evaluated had an agreement percentage less than 90% (question 10), being reformulated to "From 20, decrease by threes until 0" and reassessed in the second round by another group of old people, obtaining 100% clarity. From this, all questions were considered clear and understandable by the target audience, not requiring a new round of evaluations.

After the conclusion of the pre-test, the final Portuguese version of the questionnaire (complementary file) was finally obtained.

Table 4. Pre-test Content Clarity Assessment. Curitiba, PR, 2020.

Questions	Clarity			
	Not clear n(%)	Little clear n(%)	Quite clear n(%)	Totallly clear n(%)
1. Qual é a data de hoje?	0 (0)	0 (0)	0 (0)	30 (100%)
2. Que dia da semana é hoje?	0 (0)	0 (0)	0 (0)	30 (100%)
3. Em que lugar estamos agora?	0 (0)	2 (6.7%)	1 (3.3%)	27 (90%)
4[a]. Qual é o seu número de telefone?	0 (0)	0 (0)	0 (0)	30 (100%)
4[b]. Qual é o seu endereço?	0 (0)	0 (0)	0 (0)	30 (100%)
5. Quantos anos você tem?	0 (0)	0 (0)	0 (0)	30 (100%)
6. Qual é a data de seu nascimento?	0 (0)	0 (0)	0 (0)	30 (100%)
7. Quem é o presidente do Brasil atualmente?	0 (0)	0 (0)	0 (0)	30 (100%)
8. Quem foi o presidente antes dele?	0 (0)	0 (0)	0 (0)	30 (100%)
9. Qual era o nome de solteira da sua mãe?	0 (0)	0 (0)	0 (0)	30 (100%)
10. Diminua 3 de 20 e continue diminuindo 3 de cada novo número até o 0.	1 (3.3%)	10 (33.3%)	5 (16.7%)	14 (46.7%)

BREVE ESCALA DE CAPACIDADE COGNITIVA

Tradução Brasileira do *Short Portable Mental Status Questionnaire* (SPMSQ) de Pfeiffer

Data: ____/____/____

Nome: _____ Idade: _____ Sexo: ☐ Masculino ☐ Feminino

Anos de estudo: ☐ Não alfabetizado ☐ 1-4 anos ☐ 5-8 anos ☐ 9-11 anos ☐ Ensino superior

ORIENTAÇÕES PARA O AVALIADOR

- Faça as perguntas de 1 a 10 da escala abaixo.
- Realize a pergunta 4[b] somente se o avaliado não possuir um telefone.
- Registre o número total de ERROS com base nas respostas às 10 perguntas.
- Todas as respostas devem ser dadas sem o auxílio de calendário, jornal, documentos ou outros recursos para a memória.

QUESTÕES	INSTRUÇÕES	+	-
1. Qual é a data de hoje? R: ____/____ /____	Correto somente quando dia, mês e ano estiverem certos.		
2. Que dia da semana é hoje? R: _____	Correto apenas se o dia da semana estiver certo.		
3. Em que lugar estamos agora? R: _____	Correto se qualquer descrição da localização ou local for fornecida. (Minha casa, a cidade, nome do hospital / instituição em que está)		
4[a]. Qual é o seu número de telefone? R: _____ - _____ / _____ - _____	Correto quando o número puder ser verificado ou o paciente puder repetir o mesmo número mais tarde na entrevista.		
4[b]. Qual é o seu endereço? R: _____	Pergunte somente se o paciente não possuir um telefone.		
5. Qual é a data de seu nascimento? R: ____/____ /____	Correto somente quando dia, mês e ano estiverem certos.		
6. Quantos anos você tem? R: _____ anos	Correto quando a idade informada corresponder à data de nascimento.		
7. Quem é o presidente do Brasil atualmente? R: _____	Pode ser nome completo ou não.		
8. Quem foi o presidente antes dele? R: _____	Pode ser nome completo ou não.		
9. Qual era o nome de solteira da sua mãe? R: _____	Não é necessário verificação, somente se requer um nome próprio feminino seguido de um sobrenome diferente do paciente.		
10. De 20, diminua de 3 em 3 até o 0. R: (17 – 14 – 11 – 8 – 5 – 2)	Toda a série deve ser realizada; qualquer erro na série ou falta de vontade de tentar é classificado como incorreto.		
	NÚMERO TOTAL DE ERROS		

0-2 erros – Capacidade cognitiva preservada
3-4 erros – Incapacidade cognitiva leve
5-7 erros – Incapacidade cognitiva moderada
8-10 erros – Incapacidade cognitiva grave

- Para idosos não alfabetizados – permitir um erro a mais*
- Para idosos com ensino superior – permitir um erro a menos*

***PONTUAÇÃO CORRETA** ☐

Reference:

Teigão FCM, Moser ADL, Roig JJ. Tradução e adaptação transcultural do Short Portable Mental Status Questionnaire (SPMSQ) de Pfeiffer para pessoas idosas brasileiras.

Rev Bras Geriatr Gerontol. 2020;23(4):e200128. Complementary file, Breve escala de capacidade cognitiva: tradução brasileira do Short Portable Mental Status Questionnaire (SPMSQ) de Pfeiffer; p.9.

DISCUSSION

The process of translation and cross-cultural adaptation of an instrument is a complex activity, since it involves a set of tasks until functional equivalence is reached, and it is important that scales of any order follow standards for validation, as this makes it possible to compare studies from different countries, languages and cultures[16]. The method followed in the translation process of this study was chosen because it is comprehensive and requires detailed explanations of the steps taken[15] and because it is an internationally accepted and recommended methodology[19].

In the initial translation phase, the two translators presented versions without major discrepancies, which facilitated their synthesis, and the same occurred with the back-translation process, in which there were minor adjustments of words and expressions. This was probably due to the fact that the questions represent issues related to everyday life, as happened with the Spanish version of SPMSQ, which had minor adjustments in the translation process[6].

The recommendations made by the expert committee happened primarily around the best writing of the expression. Adjustments were suggested from the layout, to facilitate applicability for professionals, to clearer and more understandable expressions, in order to achieve a better understanding by old people. More appropriate words, without conceptual alteration, to guarantee a better semantic and cultural equivalence were suggested, such as the change from "questionnaire" to "scale", since the result of the application of the instrument is expressed in predetermined alternatives, with a measure graduation.

There was also a change in the term "mental state" to "cognitive capacity", as this expression covers several psychiatric diseases and, in this instrument, memory and dementia detection are specifically evaluated, relating only to cognitive issues[21], in addition to reflecting the most used term in current literature[22].

The substitution of the term "education levels" for "years of study" was due to the difficulty in understanding "elementary education" and "high school"; the terms used in the pre-test on the level of education were not familiar to the participants, since in their day the curricular bases of Brazilian education indicated the terms "primary", "gymnasium" and "collegial"[23] and the merger of the primary school with the gymnasium only took place in the 1970s[24], being that the oldest participant of the research was born in 1928. For this reason, it was decided to use "years of study", as already done by some questionnaires, such as Brucki et al.25, who proposed suggestions for the use of the Mini Exam of Mental State (MMSE) in Brazil, in which the level of education was the main influence on the performance of the test.

The changes suggested by the specialists were analyzed and discussed until a consensus was reached to guarantee the best adaptation to the Brazilian culture, as did Moraes and Alvarenga[26] who used the same method as the present study, where in their translation process, they ensured the quality, clarity of writing and especially maintenance of the original idea of the test, unlike the study by Catani et al.[27] in which consensus was only reached after three rounds of evaluation by the experts.

Changes were made to the layout of the scale, to improve visually and avoid errors in the evaluation. Changes in the appearance of the tests are common in the process of cross-cultural adaptation, as did Cauduro et al.[28], in whose study the experts suggested changing the position of the instructions and changing the nomenclature used on the scale.

The item of greatest discussion among the experts was the final consideration considering the respondent's education, reflecting on the evaluator's understanding of "allow one more error" for not literate old people and "allow one less error" for those with higher education , that is, if an appraisee has three errors and is not literate, one error will be disregarded and the final result will be two errors; for the same example, if you have higher education, one more error will be considered and classified as having four errors in the final result. For this reason, a specific location was requested to record this result.

In order to carry out an appropriate cross-cultural adaptation and to ensure that the construct was properly evaluated in the target population, the pre-test of the Brazilian version of SPMSQ was carried out with old people from the LTCF and the community, with different levels of education and conditions varied socioeconomic conditions, in order to verify the clarity of the items or possible "misunderstandings" by this population.

There was a problem in understanding question 10, the only question that had a percentage of agreement lower than 90%; 36.6% of the individuals evaluated considered the question not clear or little clear, having suggested changes considered pertinent, so that it was modified and in the second application it obtained 100% understanding.

A similar occurrence was observed in the cross-cultural adaptation of SPMSQ to Spanish[6], in which, in addition to minor adjustments, only question 9 was reformulated. Instead of asking the mother's maiden name, lost with the marriage in Anglo-Saxon culture and meaningless to their cultural environment, the SPMSQ-VE asks for the first and second surnames.

There is use of SPMSQ in several countries, however, some do not mention whether the scale was adapted or validated for the reality in question. An example is the study by Ferruci et al.[13], carried out in Italy, prospectively with 5,024 subjects, who were followed for three years to verify the association of cognitive impairment (with SPMSQ) with the risk of stroke. The study concluded that the incidence of stroke was lower in those with normal SPMSQ scores and higher in those with severe impairment.

Despite its relevance, the study, in addition to removing question 3, in this case, using nine of the ten questions, still uses the total number of correct answers 7-9 (normal), 4-6 (moderate impairment) and 0-3 (severe impairment), showing disagreement with the original scale and not reporting the reasons for such change, which may compromise the reliability of the results.

For these reasons, due cross-cultural adaptation is essential to assert whether the instrument is suitable for the cultural context, as well as meeting the proposed objectives[29,30].

The lack of assessment of psychometric properties is considered a limitation of this study, a fundamental step to increase the power of evidence of the instrument and which is under development by the authors of this study.

Recognizing the importance of making adapted instruments available, in view of the researcher's commitment to society, offering professionals and researchers an appropriate instrument nationally, the authors made it available in a complementary file.

CONCLUSION

This study demonstrated that the Brazilian version of the Short Portable Mental Status Questionnaire (SPMSQ-BR), called Breve Escala de Capacidade Cognitiva, is adequate and it was cross-culturally adapted to Brazilian Portuguese, since the items were considered clear and understandable by specialists and the target population. The translation and cultural adaptation of the instrument, in addition to providing a new tool that stood out among the existing ones for being brief, does not need third parties and does not exclude old people with visual impairment, will assist Brazilian professionals in clinical and research environments in cognitive screening that audience. The process of evaluation and analysis of psychometric properties is recommended to increase the power of evidence of the instrument, which is being developed by the authors of this study, establishing its degree of validity and reliability.

The completion of all stages will contribute to health professionals and the scientific community, as it is yet another evaluation tool available, to be used in clinical trials, comparisons of international indicators, in addition to tracking, planning and monitoring the treatment of cognitive dysfunction of old people.

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Potentially inappropriate medications prescribed to patients at the Reference Center in Health Care for Old People

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Abstract

Objective: To analyze the pharmacotherapeutic profile of the old people assisted at a Reference Center in Health Care for Old People regarding the use of potentially inappropriate medications (PIM) using three screening criteria and to determine factors associated with the prescription of PIM. Method: Cross-sectional study with data obtained by retrospective review of the medical records of the old people, attended between 2017 and 2018 by a geriatric doctor. To identify the PIM, the Beers Criteria, the Screening Tool of Older Persons' Potentially Inappropriate Prescriptions (STOPP) and the Brazilian Consensus on Potentially Inappropriate Medications for Old People were used. Characteristics related to the sociodemographic profile (age and sex), lifestyle (smoking and alcohol consumption), clinical (diseases) and pharmacotherapeutic (medications and Medication Regimen Complexity Index - MRCI) were evaluated. *Results:* 406 medical records were analyzed and 3,059 prescription medications were identified, of which 32.1% are PIM according to STOPP Criteria, 14.4% by the Brazilian Consensus and 11.7% by the Beers Criteria. In total, 81.1% of the old people had at least one PIM. Poisson regression demonstrated an association between the prescription of PIM with polypharmacy, a greater number of signs and symptoms and a higher MRCI value in at least one of the criteria. The strength of agreement between the PIM criteria was moderate. *Conclusions:* Most of the analyzed medical records had at least one prescribed PIM, and the STOPP Criteria identified a greater amount of PIM. Strategies must be implemented to improve the pharmacotherapy of old people with attention to those who have factors associated with PIM in their profile.

Keywords: Health of the Elderly. Potentially Inappropriate Medicaton List. Polypharmacy.

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INTRODUCTION

The aging process is generally associated with the appearance of multiple diseases and, consequently, with the greater need to implement pharmacological therapies[1-3]. Thus, the use of medication is one of the main therapeutic approaches for controlling diseases and improving the expectation and quality of life of old people[1-3]. In the United States, in 2015, about 90% of the old people over 65 years old used at least one medication[3]. In Brazil, in 2015, the prevalence of use of more than five medications by old people in primary care, characterizing polypharmacy, was 18.1%[4].

The use of multiple medications, associated with the natural physiological modifications of aging, leads to the need for a rational prescription of medications, given the propensity of medication-related problems (MRP)[1-3] and associated damages, such as mental confusion, falls and functional decline[5]. MRP in old people may be associated with the use of Potentially Inappropriate Medications (PIM), medications for which the risk of adverse events exceeds the benefits they can offer. A medication can also be considered inappropriate when used in excessive doses or for a prolonged period, in combination with other medications, when there is duplication of therapeutic classes, drug-disease interactions and underprescription[6-10].

The proportion of old people who use some PIM depends on the location studied and the tools used for analysis[11], but about 20% to 65% of the old people use at least one PIM[5]. The evaluation of the discharge prescription of old people from a public hospital in Minas Gerais, Brazil, showed that 58% included some PIM[12]. The use of PIM is associated with the occurrence of adverse drug reactions (ADRs), hospitalizations and increased health costs[11,13,14]. It is estimated that PIM are related to a 44% higher chance of ADR and 27% higher chance of hospitalization[11]. Associations between PIM and higher chance of death (OR 2.22) has been reported, especially with medications that can increase the risk of falls, such as benzodiazepines[15].

The need to monitor the use of PIM in the old people population led to the development of lists presenting implicit (based on clinical judgment) and explicit (based on the use of defined criteria) criteria for the classification of PIM[16]. The Beers Criteria[8] was the first list launched and, together with the Screening Tool of Older Persons' Potentially Inappropriate Prescriptions (STOPP)[17] are the most referenced tools[11]. In Brazil there is the Brazilian Consensus on Potentially Inappropriate Medication for Old People (BCPIM), developed based on the criteria of Beers and STOPP as a way to obtain a tool that reflected the reality of the country's prescriptions[18].

Estimates of the prevalence of PIM represent an important indicator of the quality of health care, regarding pharmacotherapy[6]. Knowing the PIM prescription pattern and investigating groups most affected by the use of these medications can help rationalize pharmacotherapy, improving old peoples' health outcomes. Thus, this study aimed to analyze the pharmacotherapeutic profile of the old people assisted at a Reference Center in Health Care for Old People (CRASPI) regarding the use of PIM using three screening criteria and to determine factors associated with the prescription of PIM.

METHOD

A cross-sectional study, which used a retrospective review of medical records of old people treated in secondary health care by geriatric physicians. The study was approved by the Research Ethics Committee, CAEE nº 77479917.1.0000.5083.

The study was carried out in a specialized secondary care clinic, CRASPI, located in a city of about 1.5 million inhabitants in the Midwest region of Brazil. Patients are seen at this unit via the Brazilian Unified Health System (SUS). The primary care physician makes the referral via regulation and, according to the clinical picture, the old people are selected by a regulating physician from the Municipal Health Department according to the availability of vacancies for care at CRASPI. The old people are accompanied by a geriatrician and are treated on average every three to six months as needed, depending on the adaptation to the new therapeutic regimes established, requested tests and identified health problems. The returns are scheduled by the physician himself at the end of each consultation.

The study sample was randomly selected among the 1045 old people attended at the health unit during 2017 and 2018. The parameters considered for calculating the sample size were a margin of error of 5%, frequency expectation of 50% for all observed characteristics and 99% confidence level. Thus, the defined sample size was 406 patients.

Numbers were randomly generated between 1 and 1,045 for patients registered in the unit's system. Subsequently, an online random-number generator was used to select the sample, with 406 different numbers being drawn. Randomized records that did not meet the inclusion criteria were excluded from the sample and a new drawing was carried out to replace it. Thus, the sample number (n=406) corresponds to the total of medical records analyzed in this study. Medical records were included in which there was a record of at least one medication prescribed by the geriatrician, presenting dosage data.

Data were collected by a clinical pharmacist from January to November 2018. Training sessions were performed as a pre-test before retrospective analysis of medical records to decrease variability. Due to the fact that in the medical records, in the item medications in use, the information "according to the previous prescription" or the expression "keep the others" appears, it was necessary to analyze the latest prescriptions to actually identify all the medications that were prescribed to the old person by the geriatrician. In this way, the last four consultations were analyzed to obtain sufficient information regarding the prescribed medications, diagnosed diseases and signs and symptoms.

The prescribed medications were categorized as appropriate or inappropriate, using three lists of explicit criteria for PIM assessment: Beers Criteria (2015 version)[6], STOPP Criteria (2015 version)[17] and BCPIM (2016 version)[18]. As a dependent variable, PIM was considered assessed by each of these criteria.

Regarding the Beers Criteria[6], the following lists were considered to classify medications as PIM: PIM to be avoided for old people; PIM for use in old people with certain clinical conditions/diseases; potential interactions that should be avoided and; PIMs that should be avoided or reduced in dose depending on kidney function.

In view of the STOPP[17] criteria, the items in section A (indication of the drug) were not considered: criteria A1 (any drug prescribed without clinical evidence based on evidence) and A2 (any drug prescribed beyond the recommended duration, in which the duration of treatment is well defined), due to the lack of necessary information for such analysis. Finally, regarding BCPIM, the lists were considered: medications that should be avoided regardless of clinical conditions and medications that should be avoided in certain clinical conditions/diseases[18].

The variables considered independent in the study were: sociodemographic profile (age and sex); profile of lifestyle habits (alcohol and tobacco consumption); clinical profile [length of follow-up at the service (in months), diagnosed diseases (types and quantity) and signs/symptoms (types and quantity)]; and the pharmacotherapeutic profile [prescription medications, number of medications and Medication Regimen Complexity Index (MRCI)].

The prescribed medications were identified by the active principle and classified up to the second level of the Anatomical Therapeutic Chemical (ATC) classification system[19]. The number of medications prescribed was assessed to determine the practice of polypharmacy (prescription of ≥5 medications)[20]. The MRCI was calculated, considering the actions necessary for the administration of the medication, such as pharmaceutical form, frequency of doses and additional information considered when using the medication. This index is divided into three sections (A/B/C), each item has a specific weight and the final MRCI value is obtained by adding the scores of each section[21,22]. The complexity of pharmacotherapy was classified according to the scores: MRCI ≤9 (low); MRCI >9 and ≤16.5 (average) and MRCI >16.5 (high)[23].

Descriptive statistics was used to summarize the distribution of patients' characteristics in general and considering those with and without PIM prescription for each of the criteria. Categorical variables were presented in relative and absolute frequencies. The normality of numerical data was assessed by the Kolmogorov-Smirnov test and medians followed by the interquartile range (IQR) were calculated for data with non-normal distribution. Inferential analysis used the chi-square and Fisher's exact tests,

with a significance level of 5%. Poisson regression with robust variance was used and variables with $p<0.20$ in the bivariate analysis were included in the multiple model. The measure of association between variables was Prevalence Ratio (PR), with a 95% Confidence Interval (CI). The Kappa coefficient (k) was used to assess the degree of agreement of the three instruments regarding the presence or absence of PIM among patients. As a parameter for classifying the degree of agreement, the following kappa values were adopted: <0 poor; 0.01-0.20 slight; 0.21-0.40 fair; 0.41-0.60 moderate; 0.61-0.80 substantial; and 0.81-1.0 almost perfect[24].

RESULTS

Among the 406 old people who had their medical records analyzed, 70.4% (n=286) were women, with a median age of 81 years (IQR=75-87). The old people had a median follow-up time in the service of 72 months (IQR=30-96) and as for lifestyle habits involving alcoholism and smoking, 1.5% (n=6) of the medical records had the information of alcohol consumption and 3.9% (n=16) of tobacco. The characteristics of the studied sample and the presence of PIM in the prescription are shown in Table 1.

Regarding clinical characteristics, a total of 2,655 diseases were identified in the medical records, with a median of six (IQR=5-8) diseases per patient. The most frequent diseases in the studied group were systemic arterial hypertension (n=328, 12.4%), depression (n=208, 7.8%), dyslipidemia (n=180, 6.8%), osteoporosis (n=177, 6.7%), diabetes mellitus (n=118, 4.4%) and arthrosis (n=115, 4.3%). In total, 1,441 signs/symptoms were reported in the medical records, representing a median of three (IQR=2-5) signs/symptoms per old person. The main signs/symptoms found were fall (n=133, 9.3%), insomnia (n=98, 6.8%), chronic constipation (n=86, 6.0%), lower limb edema (n=76, 5.3%), arthralgia (n=74, 5.1%) and dyspepsia (n=61.4.2%).

As for the pharmacotherapeutic profile, a total of 3,059 medications were prescribed. The old people used a median of seven (IQR=6-9) medications. The prevalence of polypharmacy was approximately 86.0% (n=349), and 78.8% (n=320) of patients with at least one PIM were categorized as patients taking five or more medications. The complexity of pharmacotherapy, calculated by the MRCI, had a median score of 19 (IQR=14-24.5) and 61.3% (n=249) of the old people had a ≥16.5 score (high complexity).

When considering the three criteria used together, of the 406 patients, 87.9% (n=357) had at least one prescribed PIM. When each criterion was analyzed separately, 84.4% (n=343) of the old people had at least one PIM according to the STOPP criteria; 66.8% (n=271) by BCPIM and 56.9% (n=231) by Beers' Criteria.

Regarding the 3,059 medications prescribed, it was found that 32.1% (n=983) were PIM according to the STOPP Criteria; 14.4% (n=441) by BCPIM and; 11.7% (n=357) by the Beers Criteria. For each old person, there was a median prescription of two PIMs according to the STOPP Criteria, and at least one PIM according to the Beers Criteria and the BCPIM.

The medications that act on the cardiovascular system were the most prescribed (28.9%, n=887). Of these, 27.0% (n=267) were considered as PIM by the STOPP Criteria; 8.6% (n=38) by BCPIM; and 1.2% (n=4) by the Beers Criteria. The medications that act on the nervous system were the second most prescribed class (26.7%, n=817), with 63.5% (n=226) being inappropriate according to the Beers Criteria; 52.7% (n=232) by BCPIM and; 36.4% (n=361) by the STOPP Criteria (Table 2).

Omeprazole, quetiapine and escitalopram were the most frequently prescribed PIMs according to the three criteria used. Omeprazole was considered inappropriate in 10.7% (n=105) of the prescriptions by the STOPP Criteria, in 23.8% (n=105) by the BCPIM and in 17.9% (n=64) by the Beers Criteria. The distribution of the main prescribed PIMs, according to each criterion, are described in Table 3.

Poisson regression demonstrated an association between a higher prevalence of PIM prescription with polypharmacy, a greater number of signs and symptoms and a higher MRCI value in at least two of the studied criteria (Table 4). As for the agreement between the criteria in the identification of individuals with PIM prescription, moderate agreement was observed when the three criteria were

evaluated together (k=0.567, 95% CI=0.511-0.623). The agreement between the Beers criteria and the BCPIM showed a higher kappa value (k=0.659, 95% CI=0.584-0.734) (Table 5).

Table 1. Sociodemographic, clinical and pharmacotherapeutic characteristics of the old people attended at the referral center regarding the prescription of inappropriate medications (n = 406). Goiânia, GO, 2018.

Variables	Total n (%)	Beers criteria n (%)	*p*	*STOPP* criteria n (%)	*p*	BCPIM n (%)	*p*	All criteria n (%)	*p*
Sex									
Male	120(29.6)	61(15.0)	0.110[b]	99(24.4)	0.495[b]	76(18.7)	0.344[b]	103(25.4)	0.401[b]
Female	286(70.4)	170(41.9)		244(60.1)		195(48.0)		254(62.6)	
Age (years)									
≤ 70	41(10.1)	22(5.4)	0.659[b]	35(8.6)	0.869[b]	28(6.9)	0.825[b]	36(8.9)	0.979[b]
> 70	365(89.9)	209(51.5)		308(75.9)		243(59.9)		321(79.1)	
Tobacco Consumption									
Yes	16(3.9)	8(2.0)	0.570[b]	15(3.7)	0.485[a]	10(2.5)	0.713[b]	15(3.7)	0.705[a]
No	390(96.1)	223(54.9)		328(80.8)		261(64.3)		232(57.1)	
Alcohol consumption									
Yes	6(1.5)	3(0.7)	1.000[a]	6(1.5)	0.596[a]	4(1.0)	1.000[a]	6(1.5)	1.000[a]
No	400(98.5)	288(70.9)		337(83.0)		267(65.8)		351(86.5)	
Number of signs/symptoms									
None	17(4.2)	5(1.2)	0.019[b]	9(2.2)	0.000[b]	6(1.5)	0.005[b]	11(2.7)	0.003[b]
≥ 1	389(95.8)	226(55.7)		334(82.3)		265 (65.3)		346(85.2)	
Number of diseases									
1 to 5	156(38.4)	78(19.2)	0.027[b]	125(30.8)	0.056[b]	87(21.4)	0.000[b]	128(31.5)	0.004[b]
6 to 15	250(61.6)	153(37.7)		218(53.7)		184(45.3)		229(56.4)	
Number of medicines									
1 to 4	57(14.0)	21(5.2)	0.001[b]	36(8.9)	0.000[b]	20(4.9)	0.000[b]	37(9.1)	0.000[b]
≥ 5 (polypharmacy)	349(86.0)	210(51.7)		307(75.6)		251(61.8)		320(78.8)	
Follow-up time (in months)									
≤ 12	20(4.9)	9(2.2)	0.271[b]	18(4.4)	0.752[a]	12(3.0)	0.511[b]	18(4.4)	1.000[a]
> 12	386(95.1)	222(54.7)		325(80.1)		259(63.8)		339(83.5)	
Pharmacotherapy Complexity Index									
≤ 16.5	164(40.4)	80(19.7)	0.007[b]	118(29.1)	0.000[b]	88(21.7)	0.000[b]	126(31.0)	0.000[b]
> 16.5	242(59.6)	151(37.2)		225(55.4)		183(45.1)		231(56.9)	

[a]Fisher's exact test; [b]Chi-square test; p<0,05; *STOPP: Screening Tool of Older Persons' Potentially Inappropriate Prescriptions;* BCPIM: Brazilian Consensus on Potentially Inappropriate Medication for old people.

Table 2. Distribution of prescribed and potentially inappropriate medications for old people classified by pharmacological group according to the ATC classification[a] (n=3.059). Goiânia, GO, 2018.

Anatomical group/Therapeutic group	Prescribed n(%)	STOPP criteria n(%)	BCPIM n(%)	Beers criteria n(%)
Cardiovascular system	887(28.9)	267(27.0)	38(8.6)	4(1.2)
Agents acting on the renin-angiotensin system - C09	255(8.3)	99(10.0)	-	-
Lipid-modifying agents - C10	237(7.7)	-	-	-

to be continued

Continuation of Table 2

Anatomical group/Therapeutic group	Prescribed n(%)	STOPP criteria n(%)	BCPIM n(%)	Beers criteria n(%)
Beta blocking agents - C07	114(3.7)	36(3.6)	3(0.7)	-
Diuretics - C03	110(3.6)	66(6.7)	1(0.2)	-
Calcium channel blockers - C08	82(2.7)	38(3.9)	-	-
Cardiac therapy - C01	42(1.4)	16(1.6)	27(6.1)	1(0.3)
Antihypertensives - C02	19(0.6)	11(1.1)	7(1.6)	3(0.9)
Vasodilators - C04	2(0.1)	1(0.1)	-	-
Nervous system	817(26.7)	361(36.4)	232(52.7)	226(63.5)
Psychoanaleptics - N06	442(14.5)	169(17.1)	87(19.9)	87(24.5)
Psycholeptics - N05	127(4.1)	126(12.7)	107(24.1)	114(31.9)
Antiepileptic - N03	95(3.1)	26(2.6)	25(5.7)	13(3.7)
Analgesics - N02	90(2.9)	14(1.4)	13(3.0)	12(3.4)
Antiparkinsonian medications - N04	38(1.25)	19(1.9)	-	-
Other nervous system drugs - N07	25(0.8)	7(0.7)	-	-
Alimentary tract and metabolism	656(21.4)	200(20.3)	130(29.5)	80(22.4)
Mineral Supplements - A12	266(8.7)	24(2.4)	-	-
Medicines used in diabetes - A10	172(5.6)	47(4.8)	1(0.2)	1(0.3)
Drugs for acid-related disorders - A02	137(4.5)	129(13.1)	129(29.3)	79(22.1)
Blood and hematopoietic organs	254(8.3)	93(9.4)	13(3.0)	34(9.5)
Antithrombotic medications - B01	209(6.8)	83(8.4)	13(3.0)	34(9.5)
Anti-anemic preparations - B03	45(1.5)	10(1.0)	-	-
Skeletal muscle system	243(7.9)	45(4.6)	8(1.8)	5(1.4)
Medicines for treating bone diseases - M05	144(4.7)	42(4.3)	-	-
Anti-inflammatory and anti-rheumatic products - M01	79(2.6)	-	8(1.8)	-
Muscle relaxants - M03	7(0.2)	3(0.3)	5(1.1)	5(1.4)
Systemic hormonal preparations. excluding sex hormones and insulins	93(3.1)	1(0.1)	2(0.5)	1(0.3)
Corticosteroids for systemic use - H02	4(0.1)	1(0.1)	2(0.5)	1(0.3)
Respiratory system	61(2.0)	8(0.8)	5(1.1)	5(1.4)
Medicines for obstructive airway diseases - R03	51(1.7)	3(0.3)	-	-
Antihistamines for systemic use - R06	6(0.2)	5(0.5)	5(1.1)	5(1.4)
Urinary genito system and sex hormones	21(0.7)	8(0.8)	7(1.5)	2(0.6)
Urological - G04	18(0.6)	8(0.8)	5(1.1)	1(0.3)
Urinary genito system and sex hormones	21(0.7)	8(0.8)	7(1.5)	2(0.6)
Sex hormones and system modulators - G03	2(0.1)	-	2(0.4)	1(0.3)
Anti-infectives for systemic use	1(0.03)	-	1(0.2)	-
Antimicrobials - J01	1(0.03)	-	1(0.2)	-
Others	500(15.8)	12(1.2)	7(1.6)	3(0.9)
Phytotherapics	8(0.3)	n/a	n/a	n/a
Total	3059(100)	983(100)	441(100)	357(100)

[a]Anatomic Therapeutic and Chemical Classification; - None available; n/a: Not applicable; *STOPP: Screening Tool of Older Persons' Potentially Inappropriate Prescriptions;* BCPIM: Brazilian Consensus on Potentially Inappropriate Mediciation for Old People.

Table 3. Distribution of most prescribed PIM according to the Beers, STOPP and BCPIM criteria (n=406). Goiânia, GO, 2018.

Medicines	*STOPP* criteria n (%)	BCPIM n (%)	Beers criteria n (%)
Acetylsalicylic acid	51(5.2)	7(1.6)	28(7.8)
Sodium alendronate	41(4.2)	*	*
Alprazolam	9(0.9)	9(2.0)	9(2.5)
Amiodarone	10(1.0)	25(5.7)	**
Amlodipine	32(3.3)	*	*
Citalopram	18(1.8)	30(6.8)	35(9.8)
Clonazepam	23(2.3)	22(5.0)	22(6.2)
Donepezila	37(3.8)	1(0.2)	1(0.3)
Escitalopram	28(2.8)	26(5.9)	30(8.4)
Esomeprazole	9(0.9)	9(2.1)	4(1.1)
Gliclazide	31(3.2)	*	*
Hydrochlorothiazide	50(5.1)	**	*
Losartana	63(6.4)	*	*
Omeprazole	105(10.7)	105(23.8)	64(17.9)
Pantoprazole	14(1.4)	14(3.2)	10(2.8)
Quetiapine	60(6.1)	47(10.7)	53(14.8)
Risperidone	11(1.1)	9(2.0)	9(2.5)
Sertraline	5(0.5)	6(1.4)	9(2.5)
Trazodone	33(3.4)	6(1.4)	1(0.3)
Zolpidem	13(1.3)	12(2.7)	13(3.6)
Others	452(46)	133(30.2)	75(21)
Total	**983(100)**	**441(100)**	**357(100)**

PIM: Potentially inappropriate medications; *STOPP: Screening Tool of Older Persons' Potentially Inappropriate Prescriptions);* BCPIM: Brazilian Consensus on Potentially Inappropriate Medication for Old People; *Medication not considered potentially inappropriate by the criterion; **No old person had the conditions specified for the medication to be classified as potentially inappropriate.

Table 4. Factors associated with the prescription of potentially inappropriate medications for old people according to Poisson regression with robust variance (n=406). Goiânia, GO, 2018.

Variables	Beers criteria		*STOPP* criteria		BCPIM	
	p	*PR* (95%CI)	*p*	*PR* (95%CI)	*p*	*PR* (95%CI)
Polypharmacy	0.031	1.53 (1.04-2.25)	-	-	0.004	1.76 (1.19-2.60)
Number of signs/ symptoms (≥1)	-	-	0.026	1.60 (1.05-2.43)	0.040	1.91 (1.03-3.56)
MRCI (>16.5)	-	-	0.011	1.17 (1.03-1.33)	0.038	1.21 (1.01-1.47)

CI: Confidence interval; PR: Prevalence Ratio; *STOPP: Screening Tool of Older Persons' Potentially Inappropriate Prescriptions;* BCPIM: Brazilian Consensus on Potentially Inappropriate Medication for Old People; MRCI: Medication Regimen Complexity Index; 95%CI: 95% confidence interval.

Table 5. Agreement between the Beers, STOPP and BCPIM Criteria in identifying potentially inappropriate medications for old people (n=406). Goiânia, GO, 2018.

Criteria	Kappa	95%CI	Agreement
Beers-Stopp	0.281	0.166-0.397	Fair
Beers-Consensus	0.659	0.584-0.734	Substantial
Stopp-Consensus	0.400	0.291-0.505	Fair
Beers-Stopp-Consensus	0.567	0.511-0.623	Moderate

CI: Confidence interval; *STOPP: Screening Tool of Older Persons' Potentially Inappropriate Prescriptions;* BCPIM: Brazilian Consensus on Potentially Inappropriate Medication for Old People; 95%CI: 95% confidence interval.

DISCUSSION

This study, based on the review of the medical records of patients attended at a center for the care of old people, showed that the prescription of PIM is frequent among patients. Approximately 88% of the old people had at least one prescribed PIM, when considering the analysis of the medications by the three criteria together. Separately, 84.4% of the old people had at least one PIM according to the STOPP criteria; 66.8% by BCPIM and 56.9% by Beers' Criteria.

The percentages of PIM use by the old people can vary according to the study location, characteristics of the population studied and the prescribers, and the criteria used[25]. In this sense, the generalization of our results based on other studies is difficult due to different ways of collecting data and applying the criteria (considering that it is not always that all items of the criteria are applied in a consensual way). A study carried out with old people attended at a basic health unit in Belo Horizonte, MG, Brazil, found a prevalence of PIM prescription for the old people of 53.7% by the Beers criteria and 55.9% by the BCPIM[25]. A survey conducted with old people from the community of Juiz de Fora, MG, Brazil, using the STOPP criteria identified that 46.2% of the old people used at least one PIM and 50.0% by the Beers criteria[26]. A study using Beers Criteria in Medicare beneficiaries identified that 24.2% of the old people used PIM[13]. In hospital discharge prescriptions, PIM was found in 59.1% of the old people by STOPP[15] and in 58.4% by BCPIM[12].

Although the results found in this study show a higher prevalence of PIM than in studies carried out in units that are not specialized in the health of old people, it must be considered that the fact that the medication is included in one of these lists does not prevent it from being included in the therapeutic regimen. Therefore, there is an indication that the risks/benefits are observed and that the patient is monitored. In the sample studied, about 95% of the old people had been followed by a geriatrician for more than a year[18]. So, one of the great challenges about these medications is the way they are prescribed, requiring greater attention in the assessment of risks and benefits when they cannot be avoided, so that, thus, the doctor can safely prescribe[27].

In this study, the greatest exposure to PIM was due to the prescription of omeprazole, quetiapine and escitalopram, medications belonging to the class of proton pump inhibitors (PPIs), atypical antipsychotics and antidepressants (selective inhibitors of serotonin reception-SSRI), respectively. This profile, in which PPI is the main cause of PIM exposure in old people, is similar to that in the literature[28]. The characterization of these medications as inappropriate is related to the fact that the prolonged use of PPI causes and potentiates osteoporosis, fractures, renal failure, risk of infection with *Clostridium difficile* and deficiency of vitamins and minerals[6,17,18].

According to the three criteria analyzed, PPIs are inappropriate when used for more than eight weeks. The STOPP and BCPIM Criteria are mandatory regarding the prolonged use of PPI for more than eight weeks. The Beers Criteria, on the other hand, consider its use appropriate for more than eight weeks only when the patient has peptic ulcer, Barrett's esophagus, esophagitis or is in chronic use of corticosteroids or non-steroidal anti-inflammatory

medications[6]. One of the main reasons attributed in the literature as a cause of prolonged use of PPI in old people is the non-withdrawal of the medication when the indication for which it was prescribed is no longer present, education of health professionals regarding the prolonged use of PPI in old people[29].

Quetiapine was the antipsychotic most commonly identified as PIM. The STOPP criteria and the Beers criteria consider, in general, all medications belonging to this class as PIM[6,17], whereas the BCPIM specifies which antipsychotics are inappropriate within the class[18]. According to the STOPP criteria, antipsychotics are inappropriate when prescribed for old people with dementia or Alzheimer's, cognitive impairment and/or to treat behavioral changes, as they increase the risk of stroke, which can also aggravate chronic constipation and, still, for presenting potential to cause gait ataxia, parkinsonism, hypotension and falls[17]. They are also inappropriate when prescribed as a hypnotic to treat insomnia, together with another antipsychotic or medication with anticholinergic properties, due to the potential risk of causing falls[17]. The Beers Criteria consider them inappropriate when they are prescribed for old people with behavioral changes due to dementia, cognitive impairment, Alzheimer's, delirium, falls/fractures, or because they are prescribed with two other medications that activate the central nervous system (CNS) as benzodiazepines, non-benzodiazepine hypnotics, tricyclic antidepressants, SSRIs and/or opioids[6].

According to the BCPIM, antipsychotics are inappropriate when prescribed to treat behavioral problems of dementia or insomnia, for old people with Alzheimer's, cognitive impairment, delirium, and for those with benign prostatic hyperplasia, falls/fractures and with Parkinson's disease, as it can aggravate these clinical conditions[18]. In the STOPP[17] and Beers criteria[6], unlike BCPIM, quetiapine is considered safe to be prescribed for old people with Parkinson's. This medication is considered appropriate when prescribed to treat schizophrenia or panic syndrome, only by the Beers Criteria[6].

In this study, among SSRIs, escitalopram was the most identified as PIM. The STOPP Criteria, Beers Criteria and BCPIM consider SSRIs to be inappropriate for old people only under certain clinical conditions[6,17,18]. According to the STOPP Criteria, SSRIs are inappropriate when prescribed together with an acetylcholinesterase inhibitor, as this interaction can promote a reduction in heart rate, it is also inappropriate for old people with chronic constipation or hyponatremia[17]. According to the Beers Criteria, they are inappropriate when prescribed to patients with reports of falls/fractures or who are using two other CNS-activating medications such as benzodiazepines, non-benzodiazepine hypnotics, tricyclic antidepressants, other SSRIs and/or opioids[6]. According to BCPIM, they are considered inappropriate when prescribed to patients who report falls/fractures or hyponatremia[18].

In the present study, by the Beers and BCPIM criteria, the prevalence of PIM was higher in individuals with polypharmacy and by the STOPP and BCPIM criteria, the prevalence was higher in individuals exposed to more complex therapies. Polypharmacy and the medication regimen complexity index (MRCI) are factors associated with PIMs found in other studies as well. Another factor associated with a higher prevalence of PIM in the STOPP and BCPIM criteria was the greater number of signs/symptoms, which may reflect more health problems that need to be treated[30,31].

Although there is still no gold standard categorization for the MRCI, according to the proposal by Pantuzza et al. the overall score for the complexity of pharmacotherapy among old people at the referral center is high[23]. This high complexity may be related to the large amount of prescription medications, to be used several times a day or in alternate doses. Other factors that can contribute to a higher MRCI score are polypharmacy and health problems profile, since old people with more health problems tend to have more complex pharmacotherapy[30,32]. The MRCI has satisfactory psychometric properties that allow measuring the complexity of therapy for old people[22]. This characterization can contribute to greater patient safety, helping to select those who need pharmacotherapeutic follow-up for possible treatment optimization, thus increasing the chances of reducing MRP and improving adherence[23,30,32,33].

The strength of agreement between the criteria for screening PIM was moderate, this can be explained by the fact that they present some differential points to define a medication as PIM. The agreement between BCPIM[18] and the Beers Criteria was substantial, this may be related to the fact that the BCPIM was developed based on the Beers Criteria[10] 2012, which had few changes for the 2015 version[6]. Among STOPP[17] and BCPIM[18] Criteria, the agreement was fair, this can be justified by the fact that BCPIM was based on the 2008 version of the STOPP Criteria and in this study the 2015 version was used, with the addition of 15 new criteria. The fair agreement presented between Beers Criteria and STOPP Criteria can be attributed to the fact that these two lists differ more in terms of the criteria for classifying a medication as PIM. In addition, this is one of the few studies using the four lists of the Beers Criteria, which provides greater sensitivity in the screening of PIMs and may have contributed to a higher frequency of these medications. Thus, the complementary use of these instruments is recommended in the decision-making process[18,34], however, in clinical practice, using three lists may be impractical due to the service flow. In this way, the ideal would be to use the most current one, which includes the standardized medications in place and whose professional is able to perform better the screening of the PIMs.

Regarding the strengths, this study collected data from patients seen in secondary care directly from the medical records, including old people with many concomitant diseases and using a large number of medications. In the characterization of the PIM, three different PIM evaluation criteria were used, with different characteristics, presenting the results identified for each one. Although there is no gold standard list to identify PIM, using the Beers Criteria (2015)[6], STOPP Criteria (2015)[17] and BCPIM[18] it was possible to obtain relevant information for the general characterization of inappropriate prescriptions in the old people studied.

Regarding the limitations of the study, the findings reflect the pattern of prescription of medicines in a health unit, so that trends may occur by the prescribers of the place. In addition, not all clinical patient data were available for collection, and information that would be useful in the classification of PIMs, such as results of creatinine clearance and glomerular filtration rate, and identification of advere drug events were not present. Another point to be considered is that the Beers Criteria, version 2015, was used for PIM analysis, and not the 2019 update[35]. The use of the previous version is justified by the fact that the prescriptions analyzed are from the years 2017 and 2018 and the data collection took place in 2018, before the update was released. The purpose of this new update was to determine whether new criteria should be added, removed or changed in the recommendations and interaction with diseases, thus, new studies can be carried out considering these recent changes[35].

CONCLUSIONS

The prescription of potentially inappropriate medications (PIM) was a common finding in the analysis of the medical records of a referral center in health for old people, and the three criteria used showed moderate agreement in the identification of PIM. At least one PIM was prescribed for approximately 90% of the old people, 86% were on therapeutic regimens with five or more medications, and about 60% had highly complex therapies prescribed. The factors associated with the prevalence of PIM were polypharmacy, a greater number of signs/symptoms and a higher Medication Regimen Complexity Index (MRCI).

Thus, strategies must be implemented to improve the pharmacotherapy of the old people with due attention to those who have these associated factors in their profile. This reinforces the importance of effective monitoring of the old people, in order to reduce the adverse events that such medications may cause, in addition to stimulating the deprescription in this population group. This action can be benefited with the participation of a clinical pharmacist trained in the review of medicines and specialized in gerontology. In addition, educational interventions aimed at prescribers can help ensure a more appropriate prescription process. Future studies can be carried out to investigate whether the description of PIM helps in reducing the signs and symptoms presented and in improving the quality of life. In

addition, an update on the Brazilian Consensus on Potentially Inappropriate Medication for Old People, based on the updated version of the Beers and STOPP Criteria is suggested, in order to obtain a more complete list to be implemented in the clinical routine, ensuring the safety of the older patient.

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Dietary pattern of non-frail very old people and relationship with underweight, muscle mass and strength and gait speed test

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Abstract

Objectives: To identify the dietary pattern of non-frail very old people and to evaluate the association of this pattern with body composition, strength, and gait speed. *Methods:* Cross-sectional study with a sample of 96 old people aged 80 or over, non-frail. Food consumption was analyzed using three non-consecutive food records. Muscle mass was assessed using arm muscular area. Muscle strength was measured by grip strength. Cluster analysis was used to distinguish dietary patterns. Bivariate analysis and multivariate Poisson Regression were performed, exploring the relationship between dietary patterns and specific independent variables. *Results:* Two dietary patterns were identified, labeled healthy and traditional. The prevalence of underweight among the old people of the traditional pattern was 10% (95%CI 1.01-1.20) higher than among the old people of the healthy pattern and this prevalence was practically maintained (PR 1.09; 95%CI 1.00-1.18) in the model adjusted by functionality. Regarding the classification of the arm muscular area, the old people of the traditional pattern presented 15% (95%CI 1.00-1.32) more prevalence of low muscle mass, when compared with the old people of the healthy pattern. This prevalence in the functionality-adjusted model was no longer statistically significant. No association was found between dietary pattern and strength and gait speed. *Conclusions:* The findings showed that old people who adhere to healthy dietary patterns have a lower risk of underweight and that low muscle mass is probably more associated with functionality than with dietary patterns.

Keywords: Feeding Behavior. Elderly Nutrition. Healthy Aging. Body Composition.

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INTRODUCTION

The Brazilian population ages at a much higher rate than that observed in countries that have already undergone the demographic transition process such as France, Sweden, the United Kingdom, etc. A significant increase in the old aged 80 and over is visible[1]. Advanced age is the main risk factor associated with the development of chronic diseases and loss of autonomy and independence[1]. However, the quality of life and health of the old people is quite heterogeneous, which indicates an opportunity for preventive strategies, not only to live longer, but to live better[1,2]. Studies on the aging process list mechanisms by which healthy lifestyle habits such as moderate to vigorous physical exercise, healthy eating, regular consumption of meals, adequate fluid intake and absence of smoking can contribute to the maintenance of functional capacity and healthy aging[1,2].

In this context, nutrition, recognized for its impact on general morbidity and mortality and the extension of life expectancy, has been the subject of extensive scientific research[2,3]. High intake of fruits, vegetables, fish and seafood, whole grains and nuts associated with low consumption of beef or processed meats and sugary drinks is associated with lower risk of chronic non-communicable diseases (NCDs) and healthy aging[2,4].

Many studies assess the relationship between food and health by analyzing the consumption of nutrients and isolated foods[4]. However, dietary intake is very complex. Nutrients and foods interact with each other with synergistic and antagonistic effects and addressing dietary patterns can better reflect the diet of daily life[3]. Thus, studying the dietary pattern of populations at the expense of the isolated study of nutrients has been recommended[3].

The dietary patterns most related to longevity are those of low energy density and high density of nutrients and bioactive substances, with emphasis on the dietary patterns of the Mediterranean and Okinawa[3,5,6]. A healthy dietary pattern is related to successful aging not only by preventing NCDs, but also by reducing functional decline, mainly through maintaining physical function and proper body composition[5,7,8]. The association between the adequacy of a healthy dietary pattern with the increase in years free of disability in old people[9] has also been demonstrated, that is, it promoted the compression of morbidity, one of the main objectives of the approach of old people.

Changes in body composition in old people are characterized by a redistribution and increase in fat mass and a concomitant decrease in lean mass and bone density, independent of changes in body weight and body mass index (BMI)[10]. The reduction in lean mass occurs even in physically active old people, but to a lesser extent when compared to sedentary ones[11]. A study comparing the amount of muscle mass assessed by dual energy X-ray absorptiometry (DXA) of young people at the peak age of muscle mass (18 and 34 years old) and old people over 80 years found an annual loss of muscle mass of 3.3 and 2.3% in men and women, respectively[12]. Between 60 and 79 years the loss was 0.5 and 0.3 kg and from 80 to 94 years of age 1.7 and 0.7 kg in men and women, respectively[12].

Although changes in body composition occur regardless of changes in BMI[10], old people are more susceptible to underweight than young people and this underweight is usually related to low muscle mass and not to low fat mass, as in adults[13], which suggests the use of BMI cutoff points different from those of adults[14]. A recent review study evaluating the relationship between dietary pattern and the effects of nutrients and bioactive components of the diet on muscle aging, found that the Mediterranean food pattern shows highly consistent and positive associations with muscle health[7].

Most studies that relate diet to longevity, quality of life and muscle health have an emphasis on Mediterranean diet or similar dietary patterns. Thus, it is necessary to understand the binomial diet and longevity with quality, in regions of food and cultural reality far from the Mediterranean. The existence of few studies in gerontological nutrition research with long-lived old people[7,15] is also noteworthy and even fewer studies with populations that survived until that age with preserved functionality[15].

In this sense, considering the hypothesis that long-lived old people with a healthy dietary pattern preserve more body and muscle mass, muscle

strength and physical performance, the objective of this study was to identify the dietary pattern of non-frail old people and assess the association of this pattern with body composition, muscle strength and gait speed test.

METHODS

This is a retrospective cross-sectional study, with a convenience sample composed of all the old people assisted in a multiprofessional outpatient clinic for the long-lived old people in a public reference center for old people health in a capital and a rural municipality both in the southeast region of Brazil. This outpatient clinic serves old people aged 80 and over, independent for basic and instrumental activities of daily living and at risk of frailty, functional independents who have sarcopenic syndrome or frailty phenotype. Centenarians are eligible for outpatient care regardless of their functionality because they are considered models of healthy aging[16].

The inclusion criteria were old people aged 80 or over, of both sexes, non-institutionalized, with a classification of functionality, according to the Visual Frailty Scale[16] in robust old people or at risk of frailty. This scale is based on dependence or independence for basic, instrumental or advanced activities of daily living and on the presence of risk factors for functional decline, diseases and comorbidities. The exclusion criteria were frail old people, classified by the same scale[16], institutionalized and under the age of 80 years.

The research included the care provided during the period from May 2015 (beginning of the outpatient service) to October 2018. During this period, a total of 101 old people were served, five old people who were fragile were excluded from this research. Of these, two were residents of a long-term institution. The research project was approved by the Research Ethics Committee of the Federal University of Minas Gerais (CAAE: 80295616.1.0000.5149).

All data were collected from multidisciplinary medical records of geriatric and nutrition consultations. Data were collected that characterize the population studied, including demographics such as sex and age and socioeconomic data such as education in years, place of residence and number of people in the household. Health data were also collected, including information on the presence of systemic arterial hypertension (SAH) or diabetes, the presence of edentulism, the presence of smoking and the use of alcohol.

Food intake was analyzed using food records for three non-consecutive days, one being a weekend day. Each participant received a form and guidelines for filling out the records prior to the nutritional consultation, which can be noted by the old person or someone in his/her community. They were instructed on how to fill in, in a detailed manner, on the intake of the food consumed with their respective quantities, whether in homemade measure, unit, volume or kilogram, the meal time and the possible "nibbles" carried out throughout the day. Additional information regarding the intake of oil, fats, salt, industrialized seasoning and water was also collected.

The information contained in the records was checked and doubts clarified by nutritionists at the clinic during the nutrition consultation. To improve the reliability of this check, contributing to the recall of the information recorded, it was requested to fill out the record in the days before the nutritional consultation.

For the identification of the dietary patterns of the old people, the homemade measures of the food included in the food records were first converted into grams using tables of homemade measures or food labels when not found in the reference tables. Subsequently, foods were grouped into 19 food groups: whole fruit and vitamin; fruit in juice; vegetables; beef; pork; chicken and poultry; fish; eggs; sausages; legumes; milk and dairy products; whole grains; non-whole grains; roots and tubers; nuts and seeds; sweets and sugar; soft drink and artificial juice; alcoholic beverage; and oils and fats. Then, the average amount of food from each food group consumed in the 3 registered days was calculated.

For anthropometric assessment, performed by previously trained nutritionists, height and body mass measurements were taken on a digital scale with a stadiometer (PL 200 LED, Filizola®, São Paulo,

SP, Brazil), in addition to the arm circumference measurement with the inelastic tape measure and tricipital skinfold measurements, bicipital skinfold, subscapular skinfold and supra iliac skinfold using an skinfold caliper (Model 68902, Lange®, Santa Cruz, California, USA). Such anthropometric measurements followed the techniques recommended by the World Health Organization (WHO)[17]. The body mass index (BMI) was calculated by dividing body mass in kilograms by height in meters squared and classified as follows: underweight (<22 kg/m²), normal weight (22-27 kg/m²) and overweight (>27 kg/m²)[14].

The muscle mass information was obtained by calculating the arm muscular area (AMA), from the arm circumference and the tricipital skinfold[18], according to the following formula: AMA (cm²) = {[Arm circumference in cm - (tricipital skinfold in cm x 3.14)]² / 12.56} - [10.0 cm² (for men) or 6.5 cm2 (for women)]. AMA was classified into percentiles, considering values from the 15th percentile as normal muscle mass[19], with ≥36.65 cm² for men and ≥27.97 cm² for women[18].

A manual hydraulic dynamometer (BL5001, Jamar®, Lafayete, Indiana, USA) was used to measure muscle strength. Three standardized measurements of maximum handgrip strength of the right hand and left hand were performed. The measurements on each side (kg) were noted and the one with the highest value was used, as recommended by the literature and references that supported the European consensus on sarcopenia[20]. Gait speed was assessed by the 4-meter gait speed test. The test was applied three times and the average of the three speeds in seconds was considered[20].

Physical activity was considered as any body movement produced by skeletal muscle that requires energy expenditure, such as housework and gardening, among others, whereas physical exercise was considered as any exercise performed in a planned and structured way with the objective of maintaining or achieving good physical and health status, such as walking, cycling, weight training, among others[21]. The information was obtained through an open question: do you perform physical activity (yes/no), do you perform physical exercise (yes/no).

To identify dietary patterns, cluster analysis was carried out, a posteriori cluster analysis. First, the food quantity variables were converted into a z-score. The similarity measure used was the Euclidean metric. For the formation of clusters, the K-means non-hierarchical grouping method was applied. Finally, a number of clusters was determined, opting for a number of groups that would ensure the greatest intra-group homogeneity and heterogeneity between groups. To interpret the results of the cluster analysis, the means of the z-scores obtained were used, with negative values representing a lower intake than the general average and positive values representing a higher intake than the general average.

The Kolmogorov-Smirnov test was conducted to verify the normality of continuous variables. For comparisons between groups, Student's t test was used for continuous normal variables, Mann-Whitney U test for non-normal variables and Pearson's chi-square test or Fisher's exact test for categorical variables. The results were expressed as mean and standard deviation, median and 25th and 75th percentiles or absolute frequency and percentage.

Poisson regression was also performed with robust variance, exploring the relationship between dietary patterns and specific independent variables (BMI, BMI classification, AMA, handgrip strength and gait speed). For this purpose, all independent variables that had p <0.20 in the bivariate analysis were included in the model, using the backward method. Those with greater significance (higher p-value) were removed one by one from the model, the procedure being repeated until all the variables present in the model had statistical significance (p<0,05). To verify the adjustment of the final model, the Hosmer & Lemeshow test was performed and for effect measurement, the prevalence ratio (PR) was used with a 95% confidence interval (95% CI). In model 2, the procedure was the same, however, the variables were adjusted for functionality. Statistical analyzes were performed using SPSS software version 17 (SPSS Inc, Chicago, IL, USA), with the exception of Poisson regression analysis, subsequently performed using Stata software version 14 (Stata Corp, College Station, TX, USA). The level of statistical significance was set at p <0.05.

RESULTS

Ninety-six old people participated in this study, with a mean age of 87.45±1.34 years and a higher proportion of males (53.1%). Two clusters were identified for the dietary pattern. The average intake of the food groups was described in z-score and the first cluster represented by 11.5% of the sample (n=11), was labeled "healthy pattern". The second cluster, represented by 88.5% of the sample (n=85), was labeled "traditional pattern" (Figure 1). Assessing daily food intake, a significant difference is observed between dietary patterns (Table 1).

The characteristics of the old people, according to the dietary pattern are shown in Table 2. Most of the studied old people are robust. The old people with a healthy dietary pattern studied longer. There is a high prevalence of hypertension and edentulism among the old people in both groups. Although the practice of physical exercise was not very frequent, the practice of physical activity was high. In the preparation and seasoning of the food it is observed that the healthy dietary pattern used more olive oil and less animal fat.

When comparing anthropometric measurements between the old people of the two dietary patterns, it was observed that underweight was present only among the old people of the traditional pattern, although there was no statistical difference in the BMI classification between the groups. Regarding the AMA classification, it was observed that the old people of the healthy pattern presented, in the great majority, an adequate AMA in comparison to the old people of the traditional pattern (Table 3).

The multivariate Poisson Regression model, without adjustment (model 1) showed that the prevalence of underweight among the old people of the traditional pattern was 10% higher than among the old people of the healthy pattern and this prevalence was practically maintained in the model adjusted by functionality. Regarding the AMA classification, the old people of the traditional pattern have a 15% higher prevalence of low muscle mass, when compared to the old people of the healthy pattern. This prevalence in the model adjusted for functionality is no longer statistically significant (Table 4).

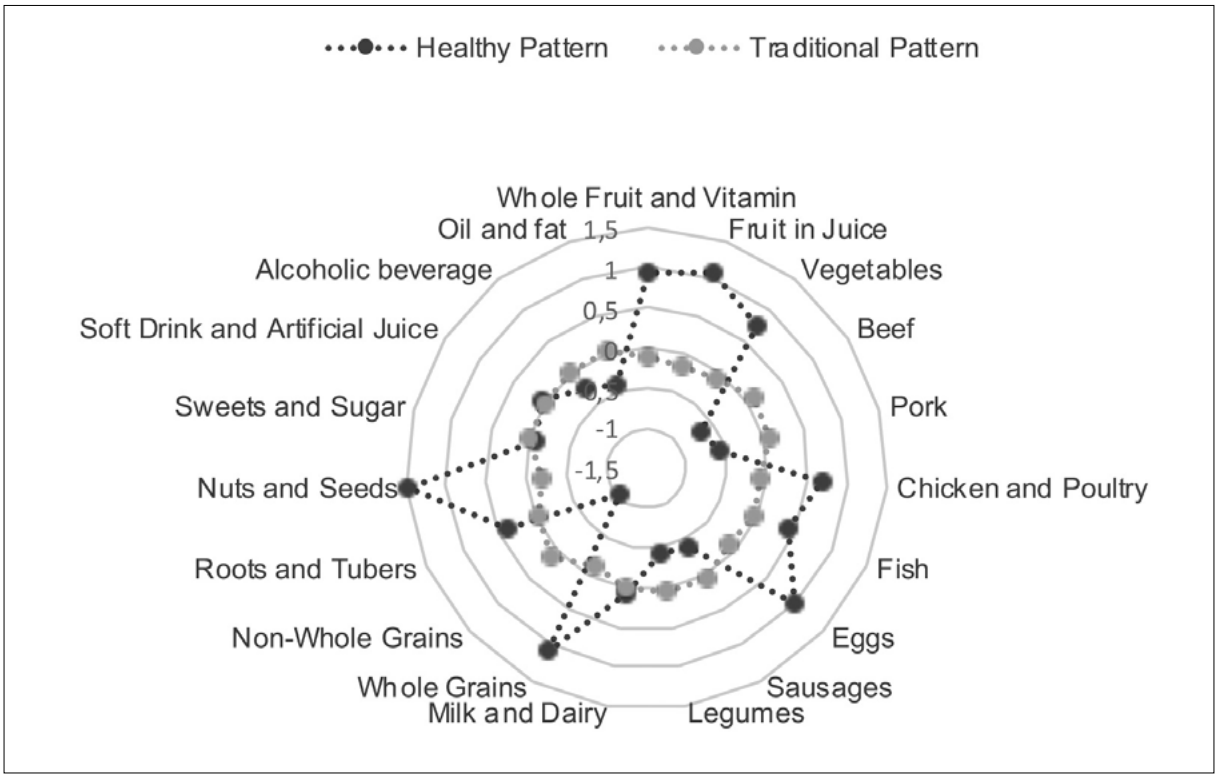

Figure 1. Graphical representation of the dietary pattern of long-lived non-frail old people, obtained through cluster analysis using the non-hierarchical method. Z-score data. Belo Horizonte/MG, May 2015 to October 2018.

Table 1. Dietary pattern of long-lived non-frail old people, through cluster analysis using the non-hierarchical method, data presented in z-score. Belo Horizonte/MG, May 2015 to October 2018.

Food or food groups	Cluster 1	Cluster 2	*p* value
	Healthy pattern n=11	Traditional pattern n=85	
Whole Fruit and Vitamin	0.933592588	-0.120817864	<0.001
Fruit in Juice	1.078302866	-0.139545077	0.002
Vegetables	0.747760712	-0.096769033	0.036
Beef	-0.694703353	0.089902787	0.004
Pork	-0.561386833	0.072650061	0.024
Chicken and Poultry	0.685183159	-0.088670762	0.022
Fish	0.406038672	-0.052546181	0.036
Eggs	0.994994113	-0.128763944	0.002
Sausages	-0.375576813	0.048604058	0.031
Legumes	-0.420312838	0.054393426	0.238
Milk and Dairy	0.096470833	-0.012484461	0.800
Whole Grains	1.087293382	-0.140708555	0.001
Non-Whole Grains	-1.041004795	0.134718268	<0.001
Roots and Tubers	0.396968313	-0.05137237	0.111
Nuts and Seeds	1.473293922	-0.190661566	<0.001
Sweets and Sugar	-0.065813114	0.008516991	0.457
Soft Drink and Artificial Juice	0.042751829	-0.00553259	0.591
Alcoholic beverage	-0.243315969	0.031487949	0.291
Oil and fat	-0.384606804	0.049772645	0.019

P values derived from Mann-Whitney's U test for continuous data without normal distribution.

Table 2. Sociodemographic, health and food preparation characteristics, according to the Dietary Pattern, of long-lived non-frail old people. Belo Horizonte/MG. May 2015 to October 2018.

Characteristics	Dietary Pattern		*p* value
	Healthy n=11	Traditional n=85	
Age[a]	87.6 ± 7.3	87.4 ± 5.96	0.919
Sex[b]			0.588
Male	5 (45.4)	46 (54.1)	
Female	6 (54.5)	39 (45.9)	
Place of housing[b]			0.158
Urban	9 (81.8)	52 (61.2)	
Rural	2 (18.2)	33 (38.8)	
Years of study[c]	4.0 (3.0 – 8.0)	1.0 (0.0 – 4.0)	0.004
No. of people in household[c]	2.0 (1.0 – 2.0)	2.0 (2.0-3.0)	0.078
Functionality[b]			0.160
Robust	10 (90.9)	61 (71.8)	
At risk of becoming frail	1 (9.1)	24 (28.2)	

to be continued

Continuation of Table 2

Characteristics	Dietary Pattern		*p* value
	Healthy n=11	Traditional n=85	
Use of alcoholic beverage[b]	3 (27.3)	17 (20.0)	0.452
Smoking[b] (n=73)	0 (0.0)	12 (18.8)	0.179
Edentulism[b] (n=35)	2 (50.0)	21 (67.7)	0.725
Presence of comorbidities[b]			
Diabetes *mellitus*	3 (27.3)	11 (12.9)	0.199
Systemic arterial hypertension	7 (63.6)	57 (67.1)	0.533
Practice of physical exercise[b]			0.411
Yes	1 (9.1)	15 (17.6)	
Practice of physical activity[b]			0.281
Yes	10 (90.9)	66 (77.6)	
Food preparation and seasoning			
Olive oil[b]	9 (81.8)	28 (32.9)	0.003
Animal fat[b]	1 (9.1)	35 (41.2)	0.035
Salt (g/day)[c]	5.2 (3.7-18.1)	7.1 (5.1-11.1)	0.536
Industrialized seasoning[b]	4 (44.4)	33 (39.8)	0.526

[a] mean ± standard deviation; [b] number (%); [c] median (25th and 75th percentiles); P-values derived from Student's t-test for normally distributed continuous data, Chi-square test for categorical data and Mann-Whitney U test for continuous data without normal distribution.

Table 3. Comparison of anthropometric measurements, muscle strength and gait speed test between the dietary patterns of long-lived non-frail old people. Belo Horizonte/MG, May 2015 to October 2018.

Characteristics	N	General	Dietary Pattern		*P* value
			Healthy	Traditional	
Body Mass (kg)[a]	93	61,0 ± 13,3	67,4 ± 15,8	60,2 ± 12,8	0,089
Body Mass Index (kg/m²)[a]	92	25,4 ± 4,4	27,6 ± 5,0	25,1 ± 4,3	0,081
BMI classification[b]	92				
Underweight		18 (19,6)	0 (0,0)	18 (22,2)	0,076
Normal weight		41 (44,6)	6 (54,5)	35 (43,2)	
Overweight		33 (35,9)	5 (45,5)	28 (36,6)	
Low AMA[b]	95	36 (37,9)	1 (9,1)	35 (41,7)	0,033
Skinfolds sum (mm)[a]	87	57,4 ± 20,7	61,8 ± 11,8	56,9 ± 21,4	0,305
Handgrip strength (kg)[b]	73	26 (8,3)	29,8 (13,1)	25,6 (7,5)	0,402
Gait speed (m/s)[b]	67	1,0 (0,3)	1,1 (0,3)	1,0 (0,3)	0,300

[a] mean ± standard deviation; [b] number (%); AMA = muscular area of the arm; m/s = meter per second; P-values derived from Student's t-test for normally distributed continuous data and Chi-square test for categorical data.

Table 4. Poisson Regression Analysis with robust variance for the traditional dietary pattern and anthropometric variables adjusted or not by functionality among long-lived non-frail old people. Belo Horizonte / MG, May 2015 to October 2018.

Anthropometric variables	PR	95%CI	*P* value
Model 1 (without adjustment)			
Underweight			
No	1.0	-	
Yes	1.1	1.01-1.20	**0.026**
Arm Muscular Area			
Proper	1.0	-	
Low	1.15	1.00 -1.32	**0.044**
Model 2 (Adjusted by functionality)			
Underweight			
No	1.0	-	
Yes	1.09	1.00 -1.18	**0.039**
Arm Muscular Area			
Proper	1.0	-	
Low	1.14	0.99 -1.31	0.067

PR: Prevalence ratio; CI: Confidence interval. Model adjustment: Goodness off it=1.00.

DISCUSSION

This study evaluated the dietary pattern of long-lived non-frail old people and the association of this pattern with body composition, muscle strength and gait speed test. Two distinct dietary patterns have been identified and called healthy and traditional. The healthy pattern was characterized by a higher intake of fruits and vegetables, white meat, fish, eggs, whole grains, nuts and oilseeds and olive oil and a lower intake of beef or processed meat, refined cereal and oils and animal fats. Such dietary characteristics are associated with health and longevity and prevention of NCDs[4,5], in this way called healthy. The old people of this dietary pattern studied longer. Despite the fact that long-lived old people usually have less education than younger people[15,22], the positive association between dietary pattern and education is commonly evidenced[23], confirming that a higher level of education has an important influence on the choice of healthier foods.

However, it is noteworthy that the majority of the studied population had a dietary pattern with a high intake of beef, processed meat, refined cereals and animal fat, associated with a lower intake of fruits, vegetables, white meat, fish, eggs, nuts and oilseeds. According to the 2017-2018[24] Household Budget Survey, in Brazil, the old people in general, as well as in the Southeast region, the site of that research, have a high intake of rice and beans, beef, poultry and pork, moderate consumption of fruits and a reduced intake of vegetables, fish and eggs. Thus, due to the characteristics of this cluster being very similar to the traditional dietary pattern of the population, it was labeled a traditional pattern.

From a dietary point of view, the key ingredients for healthy aging are fruits, vegetables, whole grains, legumes and fish[2,3]. The Global Burden Disease[25] study, conducted in 195 countries from 1990-2017, showed that an unsatisfactory diet is responsible for a higher number of deaths than tobacco use and that improving the diet can prevent one in five deaths worldwide, regardless of gender, age and socioeconomic status. It was also demonstrated that the dietary factors that most contribute to the increase in mortality and the burden of survival with disabilities are, in this order of importance: high sodium intake, low intake of whole grains, fruits, nuts and seeds, vegetables and omega 3 fatty acids, the first three factors accounting for more than 50% of deaths and 66% of the survival with disabilities burden attributable to diet[25].

The intake of table salt in both dietary standards was above the WHO recommendations, which is 5 grams daily[26], despite being below the national average in the old people, which is 9.01 grams per day[27]. It is suggested that due to the high prevalence of hypertension in the old people in this study, there is a greater awareness of the risk of high salt intake and changes in blood pressure. On the other hand, almost half of the studied population uses industrialized spices, despite the amount and frequency of this intake not being available, this suggests that sodium consumption undoubtedly exceeds the maximum recommendation of 2,000 mg per day[26], even in the old people of the healthy pattern. Changes in sensory perception, with decreased ability to perceive taste with age[28], in addition to dietary culture, could explain the higher salt intake, despite the fact that most old people are hypertensive.

As for whole grains, although the old people of the healthy standard stood out, with a higher intake, this was below the recommended for the reduction of NCDs and mortality, which is 100 to 150 grams per day[23,25]. The average daily intake of whole grains in Brazil is only 13.6 grams, consumption positively associated with the socioeconomic level[23]. In addition to access to food, culture, habit and food preferences hinder the introduction of new foods, especially among old people, and may also be related to the perception of taste[28], or even the ability to chew, reduced in the old people studied due to the high presence of edentulism, with half or more of the population presenting this problem.

Fruit intake was higher in the old people with a healthy pattern, a habit that contributes to reducing the risk of NCDs and mortality[25]. Fruits are widely available in Brazil and in the studied rural area, however intake is positively associated with socioeconomic status[23]. Ingestion of 200 to 300 grams per day is recommended[23,25], however in Brazil and among the old people of the traditional pattern this intake was well below the recommended. Recent study on food intake in Latin American countries found fruit consumption in Brazil of 70.5 grams per day, being slightly higher in the age group from 50 years old (104.6 grams per day)[23].

However, it is known that healthy aging is not only related to a good dietary pattern, but to a healthy lifestyle[1,2]. It is observed that, in the present study, the prevalence of overweight is lower than the Brazilian average among the old people[28], the vast majority practice physical exercises, smoking is very low and the consumption of alcoholic beverages is not high. Still, it is necessary to remember that the old people studied are long-lived and not fragile individuals, therefore, even the traditional diet has somehow protected them until the moment of functional loss and fragility, similar to that found by Gu et al.[15], when studying the dietary pattern of healthy super old people (individuals ≥85 years old), found a higher probability of being super old, more associated with a western diet than with a healthy diet. However, it cannot be ignored that the sample studied is at risk for health problems and frailty, due to advanced age[2]. Even though they are not frail, they are vulnerable in terms of health. Thus, the traditional diet eaten by a large part of the old people, can contribute to an increase in NCDs and functional decline[4,8].

The greater risk of underweight, even when adjusted for functionality, presented by the old people of the traditional pattern, may be an indicator of greater vulnerability of these old people, increasing the risk of sarcopenia and frailty[16]. In the old people, adherence to a dietary pattern similar to the traditional pattern in this study was associated with an increased risk for unintentional weight loss, a characteristic that was considered one of the factors for frailty[8].

Low muscle mass was also more present in individuals of the traditional dietary pattern. When analyzing old women during three years of follow-up, Isanejad et al.[30], found that those with greater adherence to the Mediterranean and Baltic Sea diets lost less muscle mass, as assessed by the relative skeletal muscle index and total lean body mass. Also Nikolov et al.[31], observed that adopting a healthy dietary pattern has a positive effect on lean body mass, assessed by the appendicular lean mass ratio on BMI.

However, in the present study, due to the results found in the regression analysis, this low muscle mass found in these old people is probably more related to

functionality than to the diet itself. Corroborating these results, Tyrovolas et al.[22], studying old people from Mediterranean islands, observed that those with a higher healthy aging score (better functionality), had a greater chance of high lean mass even after adjusting for demographic, health and adherence to the Mediterranean diet variables. Although the positive relationship between muscle mass and functionality[32] is not unanimous in the literature, as all old people lose muscle mass, regardless of functionality[10], frail old people tend to have lower levels of this tissue[11]. It is noteworthy that the quality and not the quantity of muscle mass has a direct effect on functionality[10,11].

Unlike other studies[8,33,34], the study did not show differences in gait speed and muscle strength between the two dietary patterns, which may be due to the population studied being composed of non-frail old people and independent for activities, a population which tends to present the most preserved muscle strength and best performance in the gait speed test, closely related to healthy aging and longevity[11]. Makizako et al.[32], in a study with 356 old people in the community, observed that frail old people had a higher risk of muscle weakness (OR 2.04, CI 95% 1.06–3.95), compared to non-frail people.

Finally, it is observed that, regarding the dietary pattern, no differences were found between the old people in the rural area and those in the urban area. Regarding the reasons for this similarity, the data in the present study are not conclusive, but we must consider the proximity between the rural and urban areas studied and the possibility of "bilateral influences" in the dietary pattern[35]. That is, the urban old people, mostly from rural areas, bring with them the tradition of this dietary culture, at the same time that the rural old people absorb habits of the urban dietary culture through means of communication and personal interactions.

This study has some positive points that should be highlighted. First, it is that the method of investigation of food intake used was the food record and the old people could count on the help of third parties to fill it in when consuming meals, which limited memory bias. Second, food records for three non-consecutive days were requested to better detect habitual intake and each information entered was checked at the time of the nutritional consultation. To reduce the memory bias in this check, it was requested to fill in the records in the days prior to the consultation. Another positive point was the use of specific food composition tables for the Brazilian population. However, there are also some limitations to be considered. The study design was cross-sectional, which prevents the establishment of causal relationships between the findings, the number of old people in the healthy pattern was reduced, which may have influenced the lack of association between muscle strength and gait speed with the dietary pattern. Finally, the method of assessing muscle mass in the old people using AMA was also a limitation because it is not a reference method in assessing muscle mass.

CONCLUSIONS

This study contributes to new evidence about the dietary pattern of long-lived non-frail old people. The findings showed that old people who adhere to healthy dietary patterns have a lower risk of low weight and that low muscle mass is probably more associated with functionality than with dietary patterns. As there is great interest in studying the healthy aging of populations, more research is needed to assess the dietary pattern of long-lived old people and other Brazilian cities, in addition to the need for a thorough investigation of the association between dietary patterns and muscle mass, muscle strength and gait speed test of this population. However, one cannot fail to consider the complex interaction of genotype, diet, lifestyle and environmental factors and the interaction of the individual with these factors, promoting different responses regarding healthy aging.

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The effectiveness of the law of special priority in relation to judicial health demands in the 2nd. Instance of the Rio de Janeiro State Court of Justice

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Abstract

Objective: To evaluate the effectiveness of the law of special priority regarding the processing of lawsuits about health demands in the 2nd Instance of the Court of Justice of the State of Rio Janeiro, RJ, Brazil. *Method*: A descriptive cross-sectional study was carried out on the lawsuits referring to old people judged from August 2017 to July 2018. The data were accessed from the court's website. The effectiveness of the law was assessed considering: request of priority, citation of the law in the judicial decision and/or if the median time of duration of lawsuits was shorter for octogenarians than for the others. *Results*: A total of 990 lawsuits were identified, but only 72 eligible (7.3%). The main defendant was the health plan (76.4%). The predominant demand was home care service (31.9%). There was a request and decision of priority for old people (86.1%), but none for special priority, no difference was observed too in the review time of the lawsuit between the octogenarians and of the other old people ($p \geq 0.650$). *Conclusion*: The law of special priority still has no legal effectiveness in the lawsuits to exercise the right to health in Rio de Janeiro.

Keywords: Aged Rights. Aged, 80 and Over. Legislation. Health's Judicialization. Human Rights. Octogenarians.

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INTRODUCTION

The right to health was incorporated into the Magna Carta as a fundamental social right, being considered a right of all and a duty of the State[1]. The political, social and economic scenario, however, has hampered the population's access to services and health care, which has led to an increase in lawsuits to guarantee rights to medicines, care and other demands[2,3]. The Protection of the Right to Health for old people has been more relevant, due to the growth of this portion of the population and the consequent increase in the demand for health care, both in the private and public spheres[4]. The Statute of the Old Person[5] constituted a true legal and political framework in order to realize the rights of old people, recognizing them as special human beings who must be fully respected. This law, however, presents a homogeneous look for the Brazilian old person, not taking into account numerous fundamental factors in the aging process, such as the differences between the third and fourth age.

Brazil signed the Inter-American Convention on the Protection of the Human Rights of the Old Person[6], of the Organization of American States (OAS) in 2015, which is the first international treaty on the human rights of the old person. Since 2017, its text is in the process of being approved by a legislative decree and if approved, the ratification process begins. This implied the requirement to create a Special Subcommittee, to reformulate and update the Statute of the Old Person and the National Old People Policy. The country, however, had already become sensitized to the issue, leading to the sanction of a law that amended articles 3, 15 and 71 of the Statute of the Old Person, giving special preference to the octogenarians[7], mainly in health care (except in emergency cases) and in court proceedings. The priority is special, since the Statute in its original wording already gave priority to old people over 60 years old, however, there was a need to create a new type of priority in an attempt to guarantee guaranteed rights and interests. This group is more vulnerable due to the conditions resulting from age, requiring a faster service both in lawsuits and in health care.

Despite the existing laws guaranteeing the fundamental rights of old people, in particular the octogenarians, they are not always effective, that is, they are applied as planned. The analysis of the dimension of a legal norm is based on the study of some of its aspects, among them the study of effectiveness. Effectiveness, for some authors, is also known as social efficacy, that is, it is the recognition and compliance with norms by society, and thus, being materialized in social life[8].

The objective of the present study is to evaluate the effectiveness of the Law of special priority regarding the judicial health demands in the 2nd Instance of the Court of Justice of the State of Rio Janeiro, which is fundamental to understand the repercussion of this recent law in the community.

METHOD

This is an observational, cross-sectional descriptive study, referring to the cases judged at the 2nd Instance of the Court of Justice of the State of Rio de Janeiro (TJ/RJ), a state that has the highest proportion of old people (19.0%) in Brazil[3]. In the 2nd Instance, the appeals of the cases decided in the 1st Instance are judged, which presuppose non-conformity, dissatisfaction with judicial decisions and which seek another pronouncement from the Judiciary, regarding the issues submitted to it. The Brazilian legal system, as a rule, allows judicial decisions to be reviewed.

In this study, cases related to old people(60 years or more), as established in the Statute of the Old Person[5], judged from August 2017 to July 2018, after the promulgation of the octogenarian law[9]. Non-health claims, non-old-people plaintiffs, non-appeal lawsuits, civil liability lawsuits, extinction of lawsuits and other actions related to consumer law that did not deal with health were excluded.

The data were accessed from the website of the Court of Justice of the State of Rio de Janeiro (TJ/RJ), which are publicly accessible, after consulting the jurisprudence, considering the Judgments and Monocratic Decisions. The descriptors used were: old people and health.

The variables analyzed were related to the characteristics of the old person, the processes

and types of demand. Regarding the old person, socioeconomic and demographic characteristics were described: age group (60 to 79 years and 80 years and over), sex, marital status, nationality, municipality of residence, economic under-sufficiency (request for free justice) and profession/occupation.

In relation to the proceedings, the following were identified: the type of defendant (Public Sphere or Private Sphere, which may be State, Municipality or both and Health Plans), type of lawsuit (Appeal, Instrument Appeal, Writ of Mandamus, etc.), type of document (Judgment or Monocratic Decision), type of decision (recognized and provided, recognized and not provided, recognized and partially provided and not recognized), judging body (composed of 27 civil chambers), origin of the Process (regional, capital and other districts), length of the process (interval between the date of distribution and the date of the court decision, between distribution and publication of the court decision, and between court decision and publication), priority request (old people and octogenarian) and citation of the priority law (old people and octogenarian) in the judicial decision. The law will be classified as legally effective when there is a request for the speed of action of the process according to the law, if it is considered in the grounds of the decision, and/or if the median time for processing the cases is shorter among the octogenarians than among the other seniors.

Regarding the characteristics of the demands, those related to the health area were verified: hospitalization, supply of medications, carrying out exams, admission to the ICU, provision of health supplies, surgery, medical insurance with SUS, home care, among others.

The percentage of each category of the studied variables and the median time of processing of the process were calculated, stratifying by age group (octogenarians and other old people). The chi-square test was calculated to assess the existence of a statistically significant difference ($p \leq 0.05$) between the strata. Curves of the processing time of the resource at the 2nd Instance of the TJ/RJ were also constructed, using the Kaplan-Meier method and the respective Log-rank test, to compare the strata of the variables[10]. The data were stored in the Excel program, version 2013, and analyzed in the statistical program R version 3.4.3.

The study was excused from the Research Ethics Committee of the National Public Health Sérgio Arouca (ENSP) of the Oswaldo Cruz Foundation (Fiocruz), opinion number 15/2018.

RESULTS

Figure 1 shows the procedure performed to select the processes. A total of 990 cases were identified, with only 72 eligible (7.3%). The excluded cases were: repeated cases (2.8%), with entry date prior to the survey period (0.5%), which were not an appeal (36.6%), related to consumer law demands (30.8%), non-old-person author (4.5%) and demand unrelated to health (12.3%).

Most of the old people who filed demands related to the right to health were female (69.4%), married or in a consensual union (36.1%), and retired (70.8%) (Table 1). The age group of 80 years or more had a higher percentage of widowed (47.2%) and retired (83.3%) than the others ($p<0.050$). There was no difference between the age groups studied for the other variables analyzed ($p \geq 0.354$).

Table 2 presents the characteristics of the lawsuits. The main defendant was the health plan (76.4%) and there was a request to anticipate the effects of guardianship (95.8%). Most of the cases were recognized, but not provided (65.3%), and had a request and priority decision for the old person (86.1%). There was no difference between the age groups for the variables analyzed ($p \geq 0.307$).

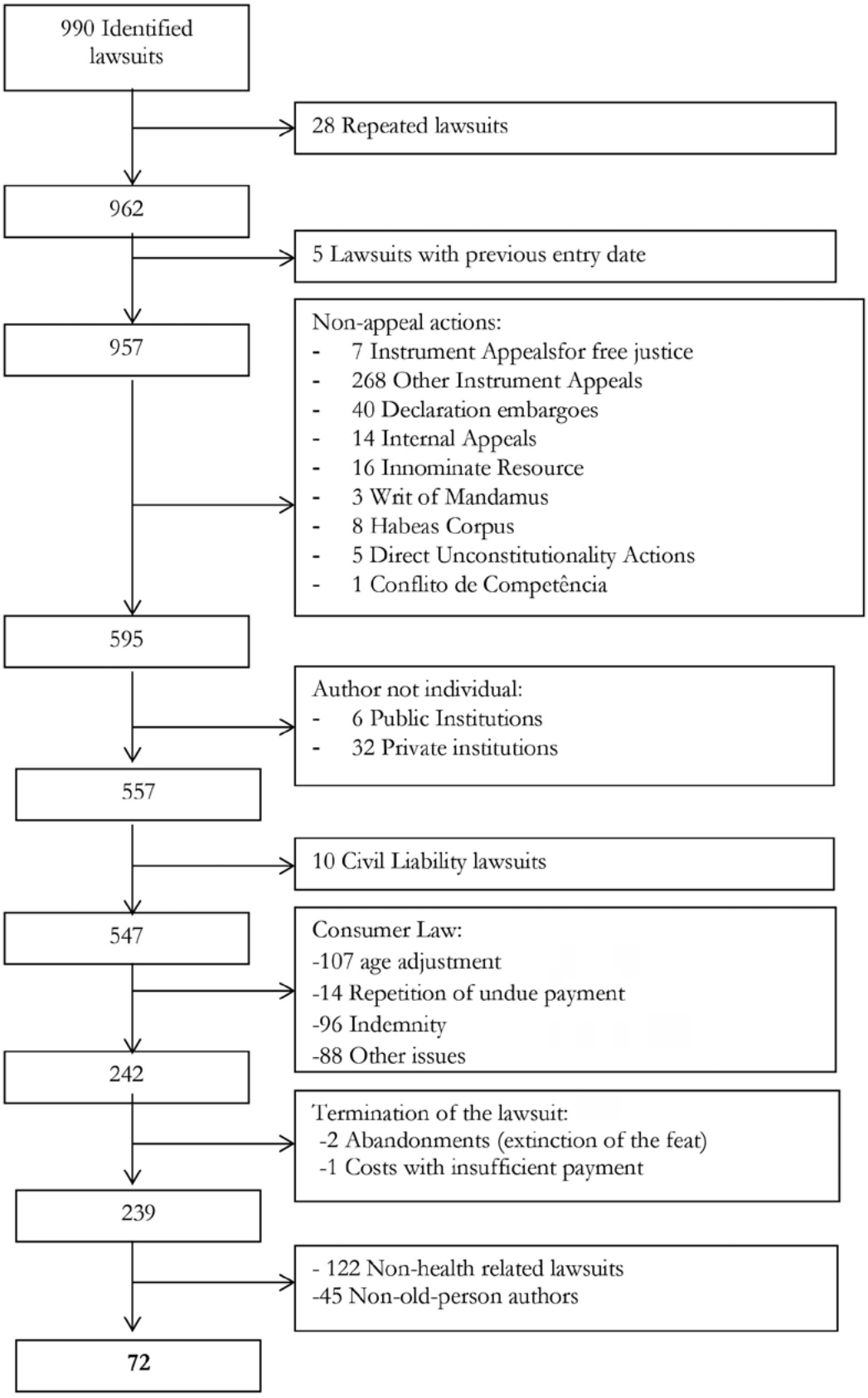

Figure 1. Diagram of the procedure for identifying health-related lawsuits of old people at the 2nd Instance of the Rio de Janeiro State Court of Justice, August/2017-July/2018.

Table 1. Distribution of the sociodemographic characteristics of the old people, by age group, authors of the proceedings at the 2nd Instance of the Court of Justice of the State of Rio de Janeiro, August/2017-July/2018.

Characteristics of the old person	Total N(%)	60 to 79 years n(%)	80 years and more n(%)	*p* value
Sex				
Male	22(30.6)	12(33.3)	10(27.8)	0.798
Female	50(69.4)	24(66.7)	26(72.2)	
City of residence				
Capital	41(56.9)	19(52.8)	22(61.1)	0.634
Others	31(43.1)	17(47.2)	14(38.9)	
Marital status				
Not married	10(13.9)	6(16.7)	4(11.1)	0.012
Married or consensual union	26(36.1)	15(41.7)	11(30.6)	
Divorced	5(6.9)	3(8.3)	2(5.6)	
Widower	21(29.2)	4(11.1)	17(47.2)	
Ignored	10(13.9)	8(22.2)	2(5.6)	
Profession				
Retired	51(70.8)	21(58.3)	30(83.3)	0.038
Others	21(29.2)	15(41.7)	6(16.7)	
Nationality				
Brazilian	67(93.1)	35(97.2)	32(88.9)	0.354
Foreign	5(6.9)	1(2.8)	4(11.1)	

Table 2. Distribution of the characteristics of the lawsuits of old people people by age group in the 2nd Instance of the Court of Justice of the State of Rio de Janeiro, August/2017-July/2018.

Characteristics of the lawsuits	Total N(%)	60 to 79 years n(%)	80 years and more n(%)	*p* value
City and State	15 (20.8)	7(19.4)	8(22.2)	0.959
Municipality, State and Union	2(2.8)	1(2.8)	1(2.8)	
Health insurance	55(76.4)	28(77.8)	27(75.0)	
Decision type				
Recognized and provided	8(11.1)	3(8.3)	5(13.9)	0.458
Recognized and not provided	47(65.3)	26(72.2)	21(58.3)	
Recognized and partially provided	17 (23.6)	7(19.4)	10(27.8)	
Guardianship Request				
Yes	69(95.8)	34(94.4)	35(97.2)	1.000
Not	3(4.2)	2(5.6)	1(2.8)	
Origin of the Lawsuit				
Capital	36(50.0)	17(47.2)	19(52.8)	0.847
Regional	18(25.0)	10(27.8)	8(22.2)	
District	18(25.0)	9(25.0)	9(25.0)	

to be continuation

Continuation of Table 2

Characteristics of the lawsuits	Total N(%)	60 to 79 years n(%)	80 years and more n(%)	*p* value
Priority Request for Old Person				
Yes	62(86.1)	29(80.6)	33(91.7)	0.307
Not	10(13.9)	7(19.4)	3(8.3)	
Priority Decision for Old People				
Yes	62(86.1)	29(80.6)	33(91.7)	0.307
Not	10(13.9)	7(19.4)	3(8.3)	

The lawsuits originated predominantly in the capital (50.0%), and were processed in the 23rd (15.3%) and 27th Civil Chamber (16.7%). In the present study, the request for special priority was not verified and there was no judgment in the 2nd Instance that cited the special priority in a discretionary manner by the court.

The median time between the start of the lawsuit and the judicial decision, and between the start of the lawsuit and the publication of the judicial decision was 13.5 months; ranging from twelve days to nine months and from twelve days to almost ten months, respectively. Between the court decision and the publication, the median time was two days, ranging from publication on the same day to 28 days.

Figure 2 shows the processing time curves and publication of judicial processes stratified by age groups. There was no statistically significant difference in the evaluated times ($p \geq 0.650$).

The main request was for Home Care service (31.9%), followed by Surgery (23.6%) (Table 3). Old people aged 80 and over had a higher proportion of demand for Home Care than the others ($p=0.043$). There was no difference between the age groups for the other demands analyzed ($p>0.050$).

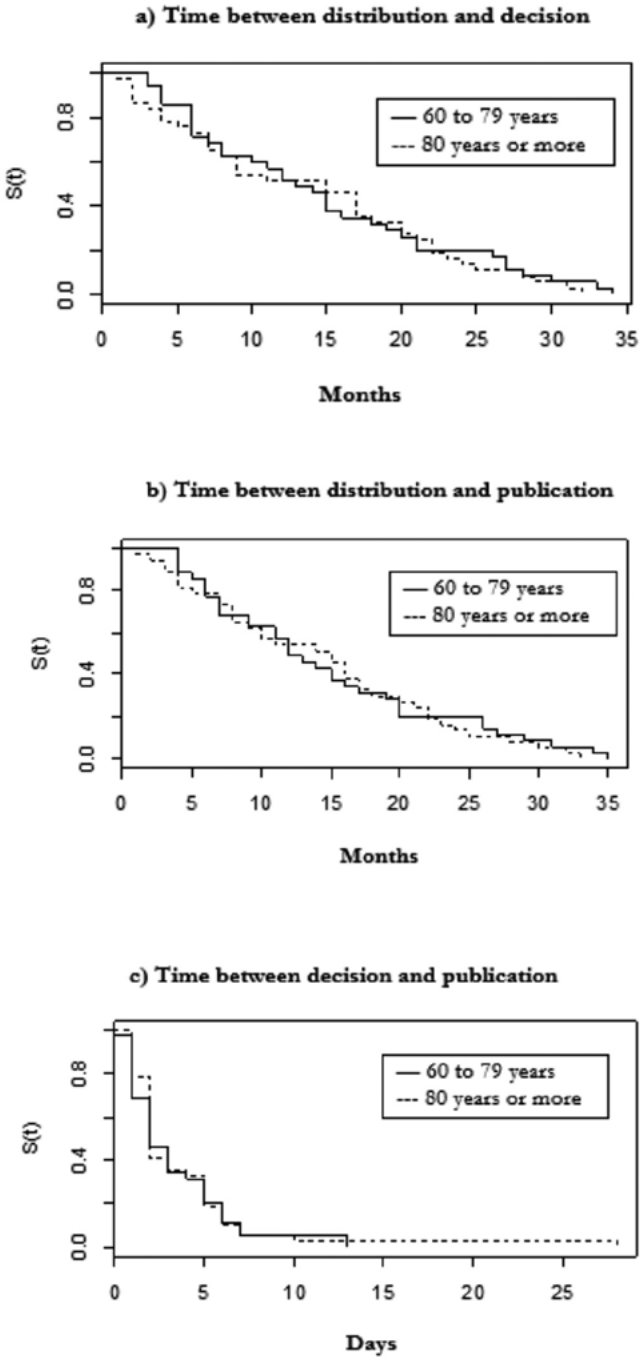

Figure 2. Time curves, in months, between the distribution of the case and the court decision (a) and between the distribution of the case and the publication (b), and the interval in days between the court decision and the publication (c), by age group, at the 2nd Instance of the Rio de Janeiro State Court of Justice, August/2017-July/2018.

Table 3. Characteristics of the demands of the old people, by age group and judicial decision at the 2nd Instance of the Court of Justice of the State of Rio de Janeiro, August/2017-July/2018.

Demand	Total N(%)	Age Group		Judicial Decision		
		60 to 79 years	80 years or more	Provided	Not provided	Partially provided
		n(%)	n(%)	n(%)	n(%)	n(%)
Hospitalization	7(9.7)	4(11.1)	3(8.3)	2(28.6)	4(57.1)	1(14.3)
SUS medication	8(11.1)	4(11.1)	4(11.1)	1(12.5)	5(62.5)	2(25.0)
Non-SUS medication	4(5.6)	1(2.8)	3(8.3)	1(25.0)	3(75.0)	0(0.0)
Hospitalization and Non-SUS Medication	1(1.4)	1(2.8)	0(0.0)	0(0.0)	1(100.0)	0(0.0)
Surgery	17(23.6)	10(27.8)	7(0.0)	2(11.8)	12(70.6)	3(17.6)
Examinations	5(6.9)	4(11.1)	1(2.8)	2(40.0)	2(40.0)	1(20.0)
Home Care	23(31.9)	7(19.4)	16(44.4)	0(0.0)	14(60.9)	9(39.1)
Prostheses	2(2.8)	1(2.8)	1(2.8)	0(0.0)	2(100.0)	0(0.0)
Transfer	1(1.4)	1(2.8)	0(0.0)	0(0.0)	1(100.0)	0(0.0)
Treatment	4(5.6)	3(8.3)	1(2.8)	0(0.0)	3(75.0)	1(25.0)
Total	72(100.0)	36(100.0)	36(100.0)	8(11.1)	47(65.3)	17(23.6)

Of the 23 requests for home care, 14 (60.9%) were denied. Of these, 10 due to the lack of justification for the need for treatment under a hospitalization regime, which must be proven through medical reports and expertise. The others (4) were denied due to the absence of a contractual clause that includes home care in the coverage of the health plan. In relation to the nine partially met demands, the provision of full-time home care service was denied, restricting to only 12 hours of day care, according to a medical report on the need for home care.

Most of the requests for surgery were not provided (70.6%), and all the defendants were from health plans. The judicial decision considered the lack of provision in the contract for the use of imported materials or products or a specific supplier not registered in the health plan, or without coverage by the National Health Agency (ANS) list, or the absence of precise and specific information in the doctors' reports.

Regarding the three requests for surgeries that were partially provided (17.6%), the use of imported surgical material requested by the attending physicians was denied, due to the defendant's claim of its high financial cost, but the surgery with similar surgical materials of national origin was provided.

Of the seven demands that dealt with hospitalization, four were denied respectively due to: lack of signature confirming receipt of the summons by the plaintiff; contracted health plan with only outpatient coverage and 12-hour emergency care; divergence between the material requested by the doctor in relation to that provided by the health plan and the medical indication was home care and not hospital. With regard to partially provided hospitalization, the request for admission to the ICU was denied due to the lack of a bed in the public network because the patient was admitted to the SUS in a common bed before the action was judged.

The five denied SUS drug requests were due to the defendant's proof of availability of the medicine at the municipal or popular pharmacy. Of the two that were partially provided, in one the reason for the denial was in relation to a drug that was not registered with the National Health Surveillance Agency (Anvisa) and in the other the requested moral damage was denied.

The remaining denied or partially met demands related to the request for prostheses, transfer, treatment and exams. The judicial decision for dismissal was based on the lack of evidence or on

the rules established by the National Supplementary Health Agency (ANS).

Only one medication request, referring to a vitamin supplement, which is not made available by SUS, was provided. The judicial decision considered the prerequisites established by the Superior Courts: ineffectiveness of the drugs provided by SUS for the purpose of the intended treatment, financial incapacity of the plaintiff and existence of registration of the drug with Anvisa.

DISCUSSION

In the evaluated period, 990 lawsuits were identified in the 2nd Instance of the Court of Justice of the State of Rio de Janeiro (TRT/RJ), but only in 72 (7.3%) the plaintiffs were old people and with demands related to health. The identification procedure on the institution's website is inflexible, not allowing the restriction of authors' characteristics and the exclusion of uninteresting aspects, making the identification process more laborious and time-consuming.

Aging is a natural consequence of the life process, so if the number of old people increases, there will also be an increase in the search for health care, both in the public and private spheres. In this study, the majority of judicialized health demands had health plans as a defendant, despite the fact that a large part of the old people are assisted by the Unified Health System[11].

Old people are the fastest growing age group among health insurance customers in the country, mainly from the age of 80, and also those who pay the highest monthly fees. In the last ten years, the number of beneficiaries over 80 years of age has increased by around 60%, corresponding to four times the growth registered for the total beneficiaries in the country[12].

When the old person has a contract with a health plan, they are within a consumption relationship, in which the consumer is the vulnerable part of the relationship. When this consumer is an old person, however, hypervulnerability occurs, that is, a potentialized vulnerability, as it is a principle of the law that recognizes the quality of the person's weakness before the service provider, in this case, the health insurance. Furthermore, in the situation of sick old person and in need of care, the vulnerability becomes even greater[4,5,13].

The home care service was the main demand and none was fully provided. This service involves the provision of a multidisciplinary team to provide assistance at the patient's residence, which is clinically stable, as well as diagnostic and therapeutic resources[14]. Home care provides benefits for patients who may be close to their family members and for health plans the financial costs are generally lower than in the hospital environment.

At the end of 2017, the National Supplementary Health Agency (ANS) regulated this service[15], determining that if the health operator offers home care instead of hospitalization, with or without contractual provision, it must comply with the requirements of the National Health Surveillance Agency (ANVISA) and the provisions of the Health Plans Law[16], referring to hospitalization. These legal provisions are consistent with the rules of the Federal Council of Medicine[17]. Despite the existing legislation, health plans have denied the request for home care, based on the exclusion of this service in the contract. The Consumer Protection Code[13], which governs this type of relationship, however, states that any adhesion contract, that is, contracts in which the parties do not discuss the clauses, will be interpreted in favor of the consumer. Additionally, there is jurisprudence from the Supreme Court of Justice[18] emphasizing that the health plan can establish the diseases that will be covered, but not the type of therapy indicated by a qualified professional in the search for a cure, which is why you must bear the expenses related to medical treatment at home. Precedent 90 of the São Paulo Court of Justice[19] also establishes that the request for home care must be granted if there is a medical indication.

In the cases analyzed, judicial requests for home care, even those with a proven medical indication, were also denied due to the absence of a contractual provision, going against current legislation. This argument has also been used to disregard the other demands.

The study found that there was no legal effectiveness in the law of special priority for octogenarians[7]. In none of the cases analyzed, the lawyers requested the law in the petition and the judges considered it in the grounds of the decision. Additionally, there was no difference in the time taken to process octogenarians' cases in relation to other old people ($p \geq 0.650$). The analysis, however, was carried out during the first year after the publication of the law, therefore, the short time that the law is in force may have contributed to the result found. In addition, the Rio de Janeiro State Court System itself provides only the alternative of priority for the old people when filing a lawsuit, without making a distinction for the old person aged 80 and over.

The priority for old people in general[5], however, which has been around fifteen years since publication and has a specific space for indicating whether the author is an old person in the online petition form, was 86.1% legally effective. Although the Statute of the Old Person contains this preemptive right in its text, it was the Civil Procedure Code (CPC) that determined how the request should be made in practice, indicating that "The priority procedure is independent of approval by the court and should be immediately granted upon proof of beneficiary status"[20]. For many authors, however, this text was difficult to understand, which ended up leading to different positions. Some authors argue that there is no need for approval of the request for processing, by any authority or judicial officer, as it deals with a right created especially to protect old people, who need greater speed, that is, they should not speak of granting but to comply with a right[21]. On the other hand, other authors maintain that there is no way to have priority processing without a judicial decision, because without this determination the judicial registry office will not have the autonomy to establish the priority. Even the approval is discussed, even in the face of the documentary presentation proving the age, which may or may not occur in office, regardless of the party's requirement, as the form provided for in the article, there remains a small appearance that the approval depends on provocation. , which does not seem to be the most appropriate[22].

Therefore, it is worth questioning whether a law that changed the Statute of the Old Person, which is not enforced in the judiciary, should have its effectiveness properly questioned by society. Thus, for the positivized right to be effective in the context of people's social relations and with the State, the necessary efforts of the public administration are necessary, due to a political decision to comply with the current law. The formulation and execution of public policies are the main drivers of the process of making the proposed law effective[23].

It is very serious to imagine that a right conquered by old people would be just a disguised political maneuver to reach votes, as legal norms are not created randomly, but to achieve certain social results. On the other hand, even if the rules are structured to provide maximum effectiveness, it may not be achieved; but there are several levels of effectiveness[24] and it is up to society to accompany and claim it.

Any interpretation or application of this right in a manner disconnected from the attribute of effectiveness would be inadmissible, which consists in the fact that a legal norm is observed by its addressees and by those applying the Law. Insofar as, no legal norm is produced by chance, but aiming to achieve certain social results.

It is necessary to point out that the natural consequence of a law being enforced is an obligation, which emanates from one of the general characteristics of legal norms, that is, it is an imposition and not merely advice. In Brazilian law, we do not have the possibility of alleging ignorance of the law, since the Principle of Mandatory Law presupposes that no one can refrain from complying with it even under the allegation of ignorance or error of law[25]. This absolute presumption, however, clashes with the observed reality.

Undoubtedly, the non-application of the law, which gives octogenarians such a unique right, demonstrates some aspects for possible reflection, among them: that the law has not undergone the necessary social adaptation; that the octogenarian population that makes demands on health is still a tiny part, which would result in a lack of interest in lawyers; the reflex of the situation of hypervulnerability that the old people suffer, because

even though they are holders of a right, they are still unable to enforce it.

The question is: how to ignore the rights of the fastest growing part of the population in recent years? The population has aged and continues to age progressively, but there are still few policies that lead to social protection for old people, to minimize existing inequities.

In addition, some setbacks are underway, such as the extinction or reduction of representatives of the National Council for the Rights of the Old Person, as it removes popular participation, which is a constitutional guarantee for the full exercise of citizenship[26,27]. On the other hand, there are legislative movements aimed at establishing staggered priority in favor of old people, for decades of life (centenarians, nonagenarians, octogenarians, etc.), over the less old[28].

One of the limitations of the present study is that the analysis included lawsuits that were judged at least fifteen days after the publication of the special priority law for octogenarians, and the ignorance of the recent law may have negatively affected the effectiveness indicators. When a law enters into force, however, it must have immediate effects in the specific cases that fall under and knowledge of the law is mandatory, as provided for in the current legislation. In any case, all changes take time to be implemented, but the speed of this process depends on the monitoring of society.

Another limitation was the restriction of proceedings in the second instance, in which judges review the cases already analyzed by the singular judges of the first instance. This review, however, requires compliance with some assumptions (intrinsic and extrinsic), in order to be known (admissibility judgment) and on the merit provided or not (judgment on the merits), so not all claims will be subject to appeal. In addition, it implies attorney's fees and additional procedural costs, which may inhibit the follow-up of the process to higher levels. Thus, the sample used may not correspond to reality.

Future investigations are necessary with the inclusion of lower court cases, courts in other states and extension of the study period, to subsidize society if the law will present the expected effectiveness.

CONCLUSION

The observed results indicate a precariousness of the current legal system. Bearing in mind that, every right duly conquered, especially, in this case, the right to special priority for octogenarians, should be properly applied in the legal and administrative spheres.

Each day we move further away from reflecting on how our judicial and political system will act to protect this portion of the Brazilian population. Therefore, celebrating the increase in life expectancy without assessing the scenario in which it presents itself, diminishes the significance of this achievement, which is considered one of the greatest in humanity.

And even in the face of this dramatic moment, it is hoped that the possibility of the effectiveness of the rights conquered by old people still exists. However, it is necessary to view the old person in their fullness as a human being, and must have the equality and dignity of the human person ensured.

It is hoped that the results of this study can contribute to the improvement of professionals, as well as giving greater visibility to the topic for society, since the growth of the old people population is an undisputed fact.

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Epidemiologic characterization of hepatitis B among older adults

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Abstract

Objective: to characterize the epidemiologic profile of Hepatitis B in the population aged 60 years old or more from the southwest region of the state of Paraná, Brazil, between 2007 and 2017. *Method*: an epidemiologic, descriptive, and inferential study was conducted based on notifications obtained from the Notifiable Diseases Information System(or SINAN). *Results*: Hepatitis B was more frequent in men, those with low levels of schooling and among individuals who worked in agriculture. Most of the cases were reported between 2013 and 2017 in subjects who reported having been exposed to biological material. According to logistic regression, hepatitis B infections were associated with non-white ethnicity (OR: 2.89; 95%CI 1.07 – 7.87), a history of blood transfusions (OR: 14.51; 95%CI 5.44 – 38.74), living in municipal regions with 10,000 to 20,000 inhabitants (OR: 4.57; 95%CI 1.59 – 13.12) and also among individuals from municipal regions with 20,000 to 50,000 inhabitants (OR: 4.33; 95%CI 1.61 – 11.56). *Conclusion*: the epidemiological profile reported here represents a risk factor for hepatitis B in this population. The data can support more effective interventions, as well as further studies to guide comprehensive public health policies for older adults.

Keywords: Health of the Elderly. Hepatitis B. Epidemiology. Risk Factors.

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INTRODUCTION

Hepatitis B is caused by the hepatitis B virus (HBV), a DNA virus belonging to the *Hepadnaviridae* family[1]. Such a virus has high infectivity and can be transmitted directly or indirectly through percutaneous or mucosal exposure to body fluids or blood contaminated with the virus[2]. Negative HBV outcomes are believed to be influenced by factors most commonly found in the older population, including age-related physiological changes and a higher rate of comorbidities[3].

HBV is therefore a highly significant illness, as the probability of complications resulting from acute and chronic liver disease, as well as the general mortality caused by the virus, also increases with aging. Advanced age also increases the likelihood that an individual has previously undergone a blood transfusion or has had multiple sexual partners, among other risk factors[4,5]. Recent studies have shown that HBV increases the chances of developing a variety of neoplasms, while immunization can reduce the chance of the occurrence and recurrence of cancers[6,7], which are known to affect a greater proportion of older adults[8].

Hepatitis B immunization has been part of the vaccination calendar in Brazil since 1998. It is known that, as age increases, so immunogenicity decreases, with only about 75% of vaccinees aged around 60 developing protective antibodies[9]. This is due to changes in the composition of the bone marrow, which reduces the individual's ability to produce and nourish stem cells, atrophying the thymus gland by reducing the production of T cells. In this situation, the response to vaccination is impaired due to functional defects at various levels in the innate and adaptive immune responses[10,11].

Between 1999 and 2017, Brazil had 218,257 confirmed cases of Hepatitis B, 31.6% of which were concentrated in the southern region of the country. Between 2007 and 2017, the population aged 60 and over underwent an increase in detection rates, from 4.4 to 7.4 cases for every 100,000 inhabitants[12]. In the state of Paraná, between 2007 and 2017, 29,268 cases of Hepatitis B were reported in the Notifiable Diseases Information System (SINAN), with a downward trend since 2011 and a greater concentration in the west of the state. Of this total, 10.08% of cases were concentrated in the population aged 60 or over[13]. It should be noted that the study area is endemic for hepatitis B[14].

The epidemiological profile of older individuals involves a high prevalence of chronic diseases, and is associated with higher mortality due to complications and/or the lack of adequate treatment. Considering that around 20% of the population of the state of Paraná will be ≥60 years old by 2040[15], together with the consequences of the impact of acute and chronic diseases on health systems, the present study aimed to characterize the profile of and identify the factors associated with Hepatitis B in the population aged 60 or over in the southwest of the state of Paraná, Brazil.

METHOD

A descriptive and inferential epidemiological study was performed, which quantitatively analyzed secondary data obtained through the Brazilian Notifiable Diseases Information System (or SINAN) between 2007 to 2017[16]. SINAN is one of the main tools available for the collection and processing of disease data, allowing the assessment of the extent and possible impacts of a disease on the general or a specific population, enabling the development of epidemiological hypotheses. The present study was approved by the Human Research Ethics Committee of the Universidade Estadual do Oeste do Paraná (the State University of Western Paraná), under opinion No. 3,359,586 dated May 31, 2019.

Of the total of 589 notifications for Hepatitis B and C in the southwest region of Paraná in the period of the study, 26 cases involved a co-infection (ie, HBV and HCV), and were excluded from the study. The final number of reported cases included in the survey was 563. The inclusion criteria were: individuals aged 60 years or over, residing in one of the 37 municipal regions in the southwest region of Paraná, with a notification of Hepatitis B confirmed from their serological markers for active or past infection (in the case of Hepatitis B, positive for total Anti-HBc, with or without HBsAg reagent).

The outcome analyzed in this study was the presence of hepatitis B (yes /no). The explanatory variables were: sex (male/female), age (grouped according to the classification of the Brazilian Institute of Geography and Statistics)[17], ethnicity/skin color (white/other), schooling (≤4 years and>4 years), population of municipal region of residence (grouped by number of inhabitants: up to 10,000, 10,000 to 20,000, 20,000 to 50,000 and 50,000 to 100,000 inhabitants) and micro-region, notification period (grouped every five years) and professional occupation. Professions were grouped according to the list of the Brazilian Classification of Occupations (or CBO)[18]. In addition, the following variables were included, classified in a dichotomous manner (yes/no): history of sexual contact and contact in the home with people with HBV, history of multiple sexual partners, exposure to injectable drugs/substances, blood transfusions, surgical and dental treatment, hemodialysis and organ transplantation.

The data extracted from the SINAN database were converted into a format compatible with Microsoft Excel for further analysis. The southwest region was considered to be the Microregions of Capanema, Francisco Beltrão and Pato Branco, totaling 37 municipal regions, according to the IBGE classification, which differs from that used by the Instituto Paranaense de Desenvolvimento Econômico e Social (the Paranaense Institute for Economic and Social Development), which includes the Microregion of Palmas, comprising five municipal regions[15]. The initial association analyzes were performed using Pearson's chi-square test (x^2) and Fisher's exact test. The variables that presented a probability value equal to or less than 0.25 by the x^2 test were selected for multivariate analysis, applying a non-conditional logistic regression model. A value of $p<0.05$ was adopted as an indication of significance.

RESULTS

The average age of the sample was 66.05 years (± 6.09), 65.86 (± 5.51) of whom were male and 66.28 (± 6.69) of whom were female. The ages of the participants ranged from 60 to 83 years. Most of the participants (50.6%) performed activities related to agriculture. In the univariate analysis, there was a higher frequency for Hepatitis B among men (53.1%), those aged over 64 years (56.7%), white individuals (93.3%), those with up to four years of schooling (67.1%), those who worked in agriculture (50.6%) and those who resided in municipal regions with up to 10,000 inhabitants (33.9%). In addition, a greater proportion of reported cases occurred between 2013 and 2017 (74.7%), among subjects who had been exposed to injectable drugs/substances (59.4%) and had a history of dental treatment (58.3%).

Table 2 describes the variables that underwent regression analysis. It was observed that those of a non-white ethnicity/skin color (OR: 2.89; 95% CI 1.07 -7.87), who had undergone a blood transfusion (OR: 14.51; 95% CI 5.44-38.74), resided in municipal regions with from 20,000 to 50,000 inhabitants (OR: 4.33; 95% CI 1.61 to 11.66) or 10,000 to 20,000 inhabitants (OR: 4.57; 95% CI 1, 59-13,12) were more likely to be infected with HBV.

Table 1. Characteristics of older adults with or without Hepatitis B in the southwest region of Paraná, between 2007 and 2017

Variables	Hepatitus B		P value
	Yes (n=522)	No (n=41)	
Sex	N (%)	N (%)	0.714
Male	277 (53.1)	20 (48.8)	
Female	245 (46.9)	21 (51.2)	
Age group (years)			0.949
60 to 64	226 (43.3%)	17 (41.5%)	
> 64	296 (56.7%)	24 (58.5%)	
Ethnicity/skin color:			0.119
White	485 (93.3)	35 (85.4)	
Other	35 (6.7)	6 (14.6)	
Schooling (years)			**0.036**
Up to 4	322 (67.1)	18 (48.6)	
> 4	158 (32.9)	19 (51.3)	
Occupation			**0.006***
Agriculture	118 (50.6)	2 (16.7)	
Retail	15 (6.4)	4 (33.3)	
Construction	11 (4.7)	1 (8.3)	
Drivers	13 (5.6)	0 (0)	
Other	76 (32.6)	5 (41.7)	
Population of municipal region			**<0.001**
50-100,000	106 (20.3)	22 (53.7)	
20-50,000	85 (16.3)	8 (19.5)	
10-20,000	154 (29.5)	6 (14.6)	
Up to 10,000	177 (33.9)	5 (12.2)	
Microregion			0.131*
Capanema	85 (16.3)	4 (9.7)	
Francisco Beltrão	241 (46.2)	9 (22)	
Pato Branco	196 (37.5)	28 (68.3)	
Notification period			**0.016**
2007-2012	132 (25.3)	18 (43.9)	
2013-2017	390 (74.7)	23 (56.1)	
Sexual contact with HBV carrier			0.119*
Yes	74 (15.8)	2 (5.9)	
No	394 (84.2)	32 (94.1)	
Contact in the home with HBV carrier			**0.002***
Yes	133 (28.1)	1 (3)	
No	340 (71.9)	32 (97)	
Exposure to three or more sexual partners			0.735
Yes	61 (11.8)	6 (15)	
No	454 (88.1)	34 (85)	
Exposure to drugs/injectable substances			0.075
Yes	308 (59.4)	18 (43.9)	
No	210 (40.5)	23 (56.1)	

to be continued

Continuation of Table 2

Variables	Hepatitus B		P value
	Yes (n=522)	No (n=41)	
Blood transfusion			**<0.001**
Yes	14 (2.7)	11 (27.5)	
No	504 (97.3)	29 (72.5)	
Surgical treatment			0.719
Yes	205 (39.7)	18 (43.9)	
No	311 (60.3)	23 (56.1)	
Dental care			0.582
Yes	302 (58.3)	21 (52.5)	
No	216 (41.7)	19 (47.5)	
Hemodialysis			**0.006***
Yes	3 (0.6)	3 (7.3)	
No	516 (99.4)	38 (92.7)	
Organ Transplantation			**0.029***
Yes	2 (0.4)	2 (4.9)	
No	516 (99.6)	39 (95.1)	

Source: SINAN. Statistically significant differences are shown in bold; * Fisher's exact test; HBV: Hepatitis B Virus

Table 2. Predictive factors for Hepatitis B in older adults in the southwest region of Paraná, between 2007 and 2017.

Variables	Gross OR (95% CI)	P value	Adjusted OR (95% CI)	P value
Schooling (years)				
Up to 4	1		--	
> 4	2.15 (1.10-4.21)	**0.026**	--	--
Ethnicity/skin color:				
White	1		1	
Other	2.38 (0.94-6.03)	0.069	2.89 (1.07-7.87)	**0.037**
Blood transfusion				
No	1		1	
Yes	13.66 (5.70-32.72)	**<0.001**	14.51 (5.44-38.74)	**<0.001**
Exposure to drugs/injectable substances				
No	1		--	
Yes	1.87 (0.99-3.56)	0.055	--	--
Population of municipal region				
Up to 10,000	1		1	
50-100,000	2.21 (0.94-5.20)	0.071	1.31 (0.52-3.30)	0.570
20-50,000	4.57 (1.88-11.07)	**<0.001**	4.33 (1.61-11.66)	**0.004**
10-20,000	7.35 (2.70-20.00)	**<0.001**	4.57 (1.59-13.12)	**0.005**
Notification period				
2007 to 2012	1		--	
2013 to 2018	0.43 (0.23-0.83)	**0.016**	--	--

Source: SINAN. Statistically significant differences are shown in bold; * Fisher's exact test; CI: confidence interval: OR: odds ratio.

DISCUSSION

While sexually transmitted infections are recurrent themes in debates focusing on the younger population, the increase in life expectancy and the change in the behavioral profile of the older population has led to a greater risk of exposure to STIs[19,20], including HBV infection, among this group[21]. Factors such as a reduced vaccine response, increased susceptibility to diseases and the low efficacy of the immune system[22], as well as the difficulty in accessing health services in towns in rural areas of Brazil and the lack of or limited knowledge about prevention mechanisms and health status make this population more vulnerable to hepatitis B[23].

In the present study, older adults living in municipal regions with a population of between 10,000 and 50,000 inhabitants were more likely to be infected with HBV than older adults living in municipal regions with a population of over 50,000 inhabitants. HBV contamination may be associated with the lifestyle of relatively larger cities, with a larger population in vulnerable situations, including those with a greater number of sexual partners and higher rates of drug use. On the other hand, 61.27% of older adults in the present study lived in small towns, with a heavily agricultural economic structure, where the beliefs and taboos related to the sexuality of older adults are more deeply entrenched, and are associated with the reluctance of such adults and health professionals to address the subject[23]. It is understood, therefore, that specific sociodemographic risk factors can make older adults more susceptible to exposure to STIs, both in small and medium-sized cities. In this way, preventive campaigns should focus on such specificities.

The significant number of hepatitis B cases among individuals with a history of blood transfusion presented in this study can be traced back to the 1980s and 1990s, when methods for detecting HBV in the blood of donors and in blood products finally began[24]. In other words, those who underwent this type of procedure before the implementation and improvement of virus detection techniques – most of whom are today older adults – may have been exposed to HBV, explaining the high rate of this source of infection in the population evaluated in the present study. This indicates the importance of serological testing, through complementary or confirmatory tests, in order to reduce the transmission of viral hepatitis through the transfusion route[25]. In addition, these findings emphasize the importance of comprehensive care for older adults who, even whilst asymptomatic, correspond to one or more of the risk factors associated with HBV infection detected in this study. Furthermore, the importance of epidemiological surveillance related to viral hepatitis is emphasised, in order to encourage policies that expand vaccine coverage in endemic regions, such as that analyzed in the present study.

As biological age increases, society tends to disregard the economic, social and sexual life of aging individuals. Care is directed towards biological health and questions about sexuality are rarely addressed. The use of drugs for erectile dysfunction is a contributing factor to the maintenance of sexual activity among older adults. Allied to this is resistance to the use of condoms, even after their importance has been explained, resulting in unprotected sexual practice – considered a behavior of risk – a further warning of the need to examine for STIs, including hepatitis B[26]. Perhaps for this reason, the sexual and injectable routes are usually the main forms of transmission of HBV[27].

The highest frequencies of HBV were identified among those older adults who performed agricultural activities. This is most likely because this population is more remote, has greater difficulty in accessing health services and limited knowledge of their oqn serological status, as well as high rates of illiteracy, among other social and economic needs[28]. Level of schooling was found to be a factor associated with hepatitis B in the population aged 60 or over. Formal education throughout life can be a protective factor in relation to communicable diseases[29], as level of schooling contributes to increased cognitive aptitude and, consequently, leads to the acquiring of knowledge and skills. When improving the processing and handling of information, education represents a social determinant in the behavior of this population. Thus, the absence of or low levels of schooling can result in reduced understanding of preventive measures, as well as greater exposure to risk factors, although this relationship is not

homogeneous among the population. For example, Henn et al. demonstrated that level of education and risk of infection were not associated[30].

In relation to the difference in the frequency of notifications between the first and the second halves of the period analyzed, it is likely that the underreporting or underdiagnosis of cases was a determining factor, since, according to the Epidemiological Bulletins of viral hepatitis in Brazil, the incidence of hepatatis has not increased significantly over the years. On the contrary, there was little variation during this period, which suggests that the result presented for this variable may be an indication of improvements in the notification system[31].

For historical reasons, the entire southern region of Brazil has a predominantly white population[32], which is related to the greater number of cases of hepatitis among white individuals found in this study. However, a greater chance of occurrence of hepatitis B in the non-white population has been identified, which may be linked to the situations of social vulnerability more commonly found among this group, resulting in greater susceptibility to communicable and non-communicable health problems[33].

A limiting factor of the present study is its use of secondary data, which are potentially subject to errors in the information registration process, the possibility of case underreporting, and the presence of missing data in the database. Another limitation is the difficulty of establishing temporality and causality[34]. Despite this, the associated factors identified in this study are important in relation to the predictive model presented. Furthermore, the use of secondary data has the advantage of allowing the identification of relationships between predictor and outcome variables, and has been underused in studies in the context of hepatitis B and population aging. Analysis of secondary data can contribute to the designing of larger studies and provide hypotheses for further investigations.

CONCLUSION

HBV is relevant for its ability to cause acute hepatitis and chronic infection can result in the development of cirrhosis and hepatocellular carcinoma over time. HBV infection was strongly associated with a non-white ethnicity/skin color, a history of blood transfusion, residing in a municipal region with 10,000 to 20,000 inhabitants or from 20,000 to 50,000 inhabitants. Population aging and the course of infectious diseases, such as hepatitis B, pose a challenge to public health, especially in small towns, where sociodemographic and care characteristics tend to present failings in the provision of specialized listening to patients and screening for HBV. Studies on HBV among the older population allow health professionals to consider a sexually active individual who should be made aware of the risks of contamination and given guidance on treatment, implementing strategies for the monitoring and minimizing of vulnerabilities associated with the stigmas of old age.

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Uncontrolled blood pressure among hypertensive old people assisted in Primary Health Care

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Abstract

Objective: To investigate the prevalence of uncontrolled blood pressure (BP) and associated factors in hypertensive old people assisted by the Family Health Strategy in a municipality in Piauí, Brazil. *Method:* Cross-sectional study conducted with 384 hypertensive old people, selected by random sampling. A questionnaire included questions about sociodemographic aspects, health behaviors, the presence of comorbidities and treatment for hypertension. BP was measured using digital devices. To test the association between the independent variables (gender, age, education, alcohol consumption, smoking, presence of other diseases, adherence to drug treatment, and others factors) and uncontrolled BP, Poisson regressions with robust variance were performed in order to estimate the prevalence ratio (PR) and 95% confidence intervals (CI). *Results:* The prevalence of uncontrolled BP was 61.7% and 51.8% had low adherence to antihypertensive medication. The prevalence of uncontrolled BP was higher among participants with low medication adherence (PR=2.41; 95% CI: 1.96-2.97) when compared to those with high adherence. Statistically significant associations were not maintained for the other variables. *Conclusion:* The findings highlight the high prevalence of uncontrolled BP among hypertensive old people and the strong association between uncontrolled BP and low adherence to treatment. Efficient interventions for better control of hypertension continue to be necessary, as well as strategies for the adequate management of the disease in the scope of primary care, from prevention actions to appropriate treatment plans for each individual.

Keywords: Hypertension. Medication Adherence. Health of the Elderly. Primary Health Care.

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INTRODUCTION

In the last decades, systemic arterial hypertension (SAH) has stood out as an important modifiable risk factor for cardiovascular diseases[1] and the main cause of death worldwide[2], responsible for 18.1% of all deaths[3].

The increase in the prevalence of SAH has been observed mainly in low and middle income countries[4] and approximately two thirds of the global burden of SAH is found in developing countries[5]. In Brazil, population surveys have shown a prevalence of SAH over 30%, reaching about a quarter of the adult Brazilian population[6], becoming progressively more common with advancing age, with a prevalence above 60% in people in the above 60 years age group[7].

High blood pressure (BP) is the main global contributor to premature deaths, representing almost 10 million deaths and over 200 million years of life lost adjusted for disability, with systolic blood pressure ≥140 mmHg responsible for most of the burden of mortality and disability (approximately 70%)[8].

Adequate treatment of SAH requires adequate and regular clinical assessments that, in general, are less frequent in groups with a lower level of education and income or residents in areas of poorer social and health infrastructure[9].

On the other hand, the excess of common medications in the old people population, the high cost of medications, side effects, low adherence to changes in lifestyle and health behaviors, the low number of health consultations and non-adherence to medication treatments compromise adequate control of blood pressure levels[10].

Despite advances in the diagnosis of SAH and the multitude of treatment options available, a substantial part of the hypertensive population has uncontrolled BP and blood pressure control rates remain poor worldwide and far from satisfactory levels[11].

Many studies have been published on the prevalence of SAH among the adult population worldwide, but relatively little is known about the factors associated with SAH control among old people[12].

In this context, the Family Health Strategy (FHS) is presented as a priority policy for primary care with regard to the achievement of the goals of BP control (<140/90), due to its conformation and work process, in addition to more favorable conditions for the management of chronic non-communicable diseases, among them Arterial Hypertension[13].

The identification of factors associated with inadequate BP control can contribute to better management of this chronic disease. Thus, the present study aimed to investigate the prevalence of uncontrolled BP and associated factors in hypertensive old people assisted by the Family Health Strategy in a Brazilian city in the state of Piauí, Brazil.

METHOD

Cross-sectional, descriptive study with a quantitative approach, developed in Picos, Piauí, Brazil. The municipality has 36 Family Health Strategy Teams (FHS), 25 in the urban area and 11 in the rural area. The study included old people aged ≥60 years, accompanied by the FHS of the urban area of the city, of both sexes, with a medical diagnosis of hypertension and who used antihypertensive medication. Institutionalized and/or hospitalized old people were excluded.

To define the sample size, the number of hypertensive old people registered in the FHS of the urban area of the municipality was considered (N=3524). The sample was calculated based on the statistical formula for finite populations, with a 95% confidence level, a margin of error of 5% and a prevalence of 50% for the event of interest[14], plus 10% for possible losses, resulting in a minimum sample of 382 people. After losses and refusals, the final sample of this study was composed of 384 old people.

Participants were selected by stratified random sampling by FHS team, with proportional distribution to the number of hypertensive old people registered in each FHS team, so that everyone had the same probability of being included in the study and in order to determine representative samples of old people of the respective FHS areas. The randomly selected old people were located by the community

health agents of the reference FHS, informed about the objectives of the study and invited to participate.

A standardized questionnaire was applied containing questions related to socioeconomic and demographic aspects, health behaviors, clinical data, use of health services, presence of comorbidities and variables related to treatment for SAH.

Data collection took place from June to November 2019, using an interview technique conducted at home, in a private location, scheduled and agreed between the team of researchers and the participants. All data were collected by a team of researchers, nurses and nursing students from the State University of Piauí (UESPI) and Federal University of Piauí (UFPI), duly trained with a standardized protocol for the application of the questionnaire and BP measurement.

All interviewers participated in theoretical and practical training conducted in two stages. First, the questionnaire and scale of adherence to drug treatment were read, as well as the instructions for correct completion of the same, with clarification of doubts about the instruments and data collection. Subsequently, practical training and qualification of the collection team were carried out by filling in the instruments with an approach to the appropriate procedures for conducting the interview and the appropriate technique for measuring BP.

Systolic blood pressure (SBP) and diastolic blood pressure (DBP) were obtained using a digital tensiometer with automatic monitor (Model HEM-7130), properly tested and calibrated regularly according to the device's technical manual, and universal cuff (HEM-RML31) appropriate to the individual's arm circumference, according to standardized protocols, in order to avoid the occurrence of failures and errors and to guarantee the accuracy of the results obtained through the digital BP meter.

Three consecutive BP measurements were performed, with an interval of 2 minutes between measurements. The mean of the last two blood pressure measurements was used as a final measure. Hypertensive patients with uncontrolled BP were considered to be those with SBP values≥140 mmHg and/or DBP≥90 mmHg[13].

The independent variables included in the study were: sex, age group, education, skin color, marital status, family income, number of residents in the same household, consumption of alcoholic beverages, smoking, physical activity, presence of morbidities, time from the last consultation to monitor the treatment for hypertension, number of anti-hypertensive pills for continuous use and therapeutic regimens of drug treatment, where he usually obtains anti-hypertensive drugs and adherence to drug treatment.

Moderate alcohol consumption was defined as the average consumption of up to two daily doses of alcoholic beverages for men and up to one daily dose for women. One serving contains about 14g of ethanol and is equivalent to 350mL of beer, 150mL of wine and 45mL of distilled beverage[15]. Smokers (those who currently smoke), non-smokers (those who never smoked) and ex-smokers (those who stopped smoking more than 12 months ago) were considered.

The antihypertensive drugs used by the participants were classified into categories according to the 7th Brazilian Guideline on Hypertension and according to the main pharmacological action[16].

Adherence to medication for hypertension was assessed using the Brief Medication Questionnaire (BMQ), an instrument validated for the hypertensive population[17], composed of three domains that identify barriers to adherence in terms of regimen, beliefs and recall in relation to drug treatment. The BMQ allows individuals to be classified into four categories in relation to treatment adherence, according to the number of positive responses in any of the domains: high adherence (no positive response), likely high adherence (1), likely low adherence (2) and low adherence (3 or more). For analysis purposes, the results of the BMQ were categorized considering low adherence those with a score ≥ 2 points in the three domains.

The data obtained were organized in the Epi Info version 3.4.3® program, by means of double entry and subsequent validation, and all statistical analyzes were performed using software R version 3.6.1, both open access. The description of the study sample was presented through frequencies in absolute numbers and percentages. Pearson's chi-square test was used

for nominal categorical variables and Linear Trend for ordinal categorical variables. Poisson regression analyzes with robust variance were used to estimate crude and adjusted prevalence ratios (PR) and the respective 95% CI.

The multiple regression analyzes considered the inclusion of three blocks of variables: 1) sociodemographic; 2) behavioral; and 3) adherence to treatment. Each block of variables was composed of those with p <0.20 in the crude analysis. In the adjusted analysis, gender, age and education were considered confounding variables and maintained in the final model, regardless of the p value; for the other variables, associations with a p-value <0.05 were considered statistically significant.

This study was approved by the Research Ethics Committee of the National School of Public Health Sergio Arouca - Fiocruz, under opinion No. 3,307,403, of May 12, 2019, and all participants signed the Informed Consent Form (ICF), respecting the ethical and legal aspects of research involving human beings in accordance with Resolution 466/2012 of the National Health Council.

RESULTS

Among the 384 hypertensive old people, the majority (64.3%) were female and the age of the participants ranged from 60 to 93 years (mean=71.7±7.90 years). More than half of the hypertensive individuals had only elementary education and an income of 1 to 2 minimum wages and 46.9% declared themselves to be brown. It was found that 57% were married and just over half lived with 1 to 2 residents in the same household (Table 1).

Table 1. Characteristics of the hypertensive old people in the sample (n=384). Picos, PI, 2019.

Variables	n (%)
Sex	
Female	247 (64.3)
Male	137 (35.7)
Age group (years)	
60 to 69	178 (46.4)
70 to 79	139 (36.2)
80 and over	67 (17.4)
Education	
Fund. Complete / Incomplete	258 (67.2)
High School Complete / Incomplete	102 (26.6)
Superior and over	24 (6.2)
Family Income (Minimum Wage)	
Less than 1	32 (8.3)
1 to 2	217 (56.5)
2 to 3	69 (18.0)
> 3	66 (17.2)
Skin color	
Black	70 (18.2)
White	134 (34.9)
Brown	180 (46.9)
Marital status	
Married / Companion	219 (57.0)
Not married	27 (7.0)
Widower	109 (28.4)
Separated / Divorced	29 (7.6)

to be continued

Continuation of Table 1

Variables	n (%)
Number of Residents	
None	41 (10. 7)
1-2	205 (53.4)
3-4	106 (27.6)
5 and over	32 (8.3)
Alcohol consumption	
None	333 (86.7)
Low	27 (7.0)
Moderate / High	24 (6.3)
Smoking	
Never smoked	180 (46.9)
Current smoker	40 (10.4)
Smoked and stopped	164 (42.7)
Physical activity	
Yes	157 (40.9)
No	227 (59.1)
Diabetes	
Yes	116 (30.2)
No	268 (69.8)
Cardiac insufficiency	
Yes	55 (14.3)
No	329 (85.7)
Dyslipidemias	
Yes	156 (40.6)
No	228 (59.4)
Last consultation	
<30 days	84 (21.9)
1 to 3 months	92 (24.0)
3 to 6 months	70 (18.2)
> 6 months	138 (35.9)
Medications per day	
1	206 (53.7)
2	153 (39.8)
3 and over	25 (6.5)
Where do you usually get your medicines	
SUS	110 (28.7)
You need to buy them	224 (58.3)
Part in SUS and another part buys	50 (13.0)
Treatment adherence	
Adherent	185 (48.2)
Non-adherent	199 (51.8)
Controlled Blood Pressure	
Yes	147 (38.3)
No	237 (61.7)

SUS= Unified Health ySUS= Brazilian National Health System

As for life habits, it was found that 13.3% consumed alcohol, 10.4% smoked and less than half practiced physical activity. In addition, it was observed that a little more than a third reported that the time of the last consultation was more than 6 months and most of the interviewees used only one antihypertensive medication. Among these drugs, more than half were purchased and almost 30.0% were obtained from the public SUS network. More than half of the hypertensive individuals reported low adherence to treatment and 61.7% had uncontrolled hypertension (Table 1). The classes of drugs most frequently used to treat hypertension were: diuretics (31.0%), angiotensin II antagonists (25.3%), and angiotensin converting enzyme inhibitors (12.6%) (Table 2).

There was a higher prevalence of uncontrolled BP among men among the older and less educated. The prevalence of higher uncontrolled BP was also observed among participants with moderate/high alcohol consumption, ex-smokers, who do not practice physical activity and do not adhere to the treatment of SAH, as shown in Table 3.

Table 4 shows the multiple regression models for the association between uncontrolled BP and sociodemographic, behavioral characteristics and adherence to the treatment of SAH. In Model 1, statistically significant associations were observed between male gender and uncontrolled BP (PR=1.23; 95% CI:1.06-1.44). In Model 2, after the inclusion of the variables alcohol consumption, smoking and physical activity, sex remained associated with the outcome. It is observed that men have 18% (PR =1.18; 95% CI: 1.01-1.38) higher prevalence of uncontrolled pressure in relation to women. Low alcohol consumption (PR =1.38; 95% CI: 1.10-1.73) and ex-smokers (PR=1.25; 95% CI:1.05-1.47) were also significantly associated with uncontrolled BP. However, in model 3, when adherence to treatment was included, there was a loss of statistical significance for the other variables. Hypertensive old people with low adherence to drug treatment showed 2.4 (95% CI:1.96-2.97) times the prevalence of uncontrolled BP when compared to those with high adherence to treatment (Model 3).

Table 2. Use of antihypertensive drugs by classes and combinations of drugs used by hypertensive old people. Picos, PI, 2019.

Antihypertensive drug classes and combinations	n (%)
Diuretics	194 (31.0)
Angiotensin II antagonists	158 (25.3)
Angiotensin converting enzyme inhibitors	79 (12.6)
Beta-blockers	54 (8.6)
Calcium channel blockers	51 (8.2)
Beta-blockers + Angiotensin converting enzyme inhibitors	20 (3.2)
Angiotensin converting enzyme inhibitors + Diuretics	16 (2.6)
Calcium channel blockers + Diuretics	11 (1.8)
Beta-blockers + Angiotensin converting enzyme inhibitors + Diuretics	08 (1.3)
Calcium channel blockers + Angiotensin converting enzyme inhibitors	07 (1.1)
Beta-blockers + Calcium channel blockers + Diuretics	05 (0.8)
Beta-blockers + Calcium channel blockers + Angiotensin converting enzyme inhibitors	05 (0.8)
Calcium channel blockers + Angiotensin converting enzyme inhibitors + Diuretics	04 (0.6)
Beta-blockers + Diuretics	04 (0.6)
Others	09 (1.4)
Total	625 (100%)

Table 3. Crude associations between uncontrolled blood pressure (BP) and socioeconomic, demographic characteristics, health behavior, comorbidities and adherence to treatment in hypertensive older adults monitored in the Family Health Strategy (n=384). Picos, PI, 2019.

Variables	Uncontrolled BP n (%)	PR_{crude} (95%CI)	p-value
Sex			0.006 [a]
Female	140 (56.7)	1	
Male	97 (70.8)	1.25 (1.07-1.46)	
Age group (years)			0.138[b]
60 to 69	105 (59.0)	1	
70 to 79	85 (61.2)	1.04 (0.86-1.24)	
80 and over	47 (70.1)	1.19 (0.97-1.45)	
Education			0.065[b]
Basic	168 (65.1)	1.20 (0.82-1.76)	
High school	56 (54.9)	1.01 (0.67-1.52)	
Superior and over	13 (54.2)	1	
Family income			0.261[b]
Less than 1 MW	23 (71.9)	1.25 (0.92-1.68)	
1 to 2 MW	134 (61.8)	1.07 (0.85-1.35)	
2 to 3 MW	42 (60.9)	1.06 (0.80-1.40)	
> 3 MW	38 (57.6)	1	
Self-reported skin color			0.901[a]
White	82 (61.2)	1	
Black	43 (61.4)	1.00 (0.79-1.26)	
Brown	112 (62.2)	1.02 (0.85-1.21)	
Marital Situation			0.639 [a]
Married/Companion	135 (61.6)	1	
Single	17 (63.0)	1.02 (0.75-1.39)	
Widower	65 (59.6)	0.97 (0.80-1.17)	
Separated/Divorced	20 (69.0)	1.12 (0.86-1.46)	
Number of Residents			0.318[b]
Lives alone	24 (58.5)	0.81 (0.58-1.14)	
1-2	125 (61.0)	0.84 (0.66-1.07)	
3-4	65 (61.3)	0.85 (0.65-1.11)	
5 and over	23(71.9)	1	
Alcohol consumption			0.030[a]
None	197(59.2)	1	
Low	21(77.8)	1.31(1.05-1.64)	
Moderate/High	19(79.2)	1.34(1.07-1.67)	
Smoking			0.021[a]
Never smoked	99(55.0)	1	
Current smoker	24(60.0)	1.09(0.82-1.45)	
Smoked and stopped	114(69.5)	1.26(1.07-1.49)	

to be continued

Continuation of Table 3

Variables	Uncontrolled BP n (%)	PR_{crude} (95%CI)	p-value
Physical activity			0.140[a]
Yes	90(57.3)	1	
No	147(64.8)	1.13(0.96-1.33)	
Diabetes			0.747 [a]
Yes	73(62.9)	1.03(0.87-1.22)	
No	164(61.2)	1	
Cardiac insufficiency			0.359 [a]
Yes	37(67.3)	1.11(0.90-1.36)	
No	200(60.8)	1	
Dyslipidemias			0.713 [a]
Yes	98(62.8)	1.03(0.88-1.21)	
No	139(61.0)	1	
Last consultation			0.492[b]
< 30 days	47(56.0)	1	
1 to 3 months	55(59.8)	1.07(0.83-1.38)	
3 to 6 months	44(62.9)	1.12(0.86-1.46)	
> 6 months	91(65.9)	1.18(0.94-1.47)	
Medications per day			0.252[b]
1	122(59.2)	1	
2	98(64.1)	1.08(0.92-1.27)	
3 or more	17(68.0)	1.15(0.86-1.54)	
Where do you usually get your medicines			0.741[a]
SUS	69(62.7)	0.98(0.82-1.17)	
You need to buy them	138(61.6)	0.96(0.73-1.25)	
Part in SUS and another part buys	30(60.0)	1	
Treatment adherence			<0.001[a]
Adherent	64(34.6)	1	
Non-adherent	173(86.9)	2.51(2.05-3.09)	

[a]Chi-square test; [b]Linear Trend Test; MW=Minimum wage; PR=Prevalence ratio; 95% CI=95% Confidence Interval.

Table 4. Factors associated with uncontrolled blood pressure in hypertensive older adults followed up in the Family Health Strategy (n=384). Picos, PI, 2019.

	Model 1		Model 2		Model 3	
Variables	$PR_{Adjusted}$ (95%CI)	*p-value*	$PR_{Adjusted}$ (95%CI)	*p-value*	$PR_{Adjusted}$ (95%CI)	*p-value*
Sex						
Female	1	0,011	1		1	
Male	1.23(1.06-1.44)		1.18(1.01-1.38)	0.023	1.05(0.92-1.20)	0.702
Age group (years)						
60 to 69	1		1		1	
70 to 79	1.01(0.84-1.20)	0.964	1.00(0.83-1.19)	0.988	1.04(0.89-1.21)	0.802
80 and over	1.14(0.93-1.39)	0.468	1.09(0.90-1.33)	0.620	1.11(0.94-1.30)	0.576
Education						
Basic	1.21(0.83-1.75)	0.515	1.19(0.82-1.72)	0.553	1.17(0.87-1.59)	0.583
High school	1.05(0.71-1.57)	0.869	1.02(0.69-1.52)	0.944	1.05(0.76-1.46)	0.877
Superior and over	1		1		1	
Alcohol consumption						
None			1		1	
Low			1.38(1.10-1.73)	0.016	1.20(0.98-1.47)	0.426
Moderate/High			1.26(0.98-1.63)	0.348	1.16(0.94-1.43)	0.557
Smoking						
Never smoked			1		1	
Current smoker			0.99(0.76-1.31)	0.981	1.04(0.82-1.33)	0.858
Smoked and stopped			1.25(1.05-1.47)	0.010	1.11(0.96-1.28)	0.465
Physical activity						
Yes			1		-	-
No			1.15(0.97-1.35)	0.320	-	-
Treatment adherence						
High adhesion					1	
Low adhesion					2.41(1.96-2.97)	<0.001

PR = prevalence ratio; 95% CI = 95% Confidence Interval; Model 1: Inclusion of variables in the sociodemographic block; Model 2: Inclusion of variables in the behavior block; Model 3: Inclusion of the variable of adherence to drug treatment.

DISCUSSION

The results of the present study show a high prevalence of uncontrolled BP among hypertensive old people, estimated at 61.7%, comparable to that found in other studies[14,18]. As in this investigation, the International Study on Mobility in Aging (IMIAS) also showed that although more than 80% of older patients were undergoing treatment, control rates were low: 37.6% in Manizales (Colombia); 29.5% in Kingston (Jamaica); 26.5% in Saint-Hyacinthe (Canada); 24% in Tirana (Albania) and 22% in Natal (Brazil)[12].

Previous studies reveal that advanced age is an independent predictor of uncontrolled hypertension[19]. The high prevalence of uncontrolled BP in this population, at least in part, may suggest resistance to treatment. In addition, this result can be partially explained by the increase in arterial stiffness and the fact that age may reflect the time that other factors may take to influence the development of uncontrolled hypertension[20].

In addition, with advancing age, blood pressure levels tend to increase progressively, which makes it

difficult to control blood pressure levels even with the use of antihypertensive medication[21]. Firmo et al[22] also emphasize that older age is related to lower attendance at medical appointments and greater irregularity in the use of medications.

The results that express high rates of uncontrolled BP found in the participants can also be explained by socioeconomic and sociocultural factors of the population. Although low education[23] and low income[24] are recognized as factors that can influence BP control, in the present study no statistically significant associations were found with the outcome, which can be explained, among other aspects, by the homogeneity of the population in this study.

In the present study, the statistically significant associations observed in the multiple model between uncontrolled BP and being male, having low alcohol consumption and being a former smoker have also been found in other studies. The relationship between males and uncontrolled BP shows similar results to those of Sousa et al[25]. On the other hand, other authors found no differences between genders[26]. Although not fully understood, sex can affect both the prevalence and the rate of hypertension control[27]. The difference can be explained, among other aspects, by the higher level of attention to health care and adherence to the treatments proposed among women[28] or the concern with health[27].

With regard to alcohol consumption, recent epidemiological and clinical studies have shown that excessive alcohol consumption is associated with inadequate control of hypertension[29]. In contrast to this result, this study showed no association between inadequate control of BP levels and moderate/high alcohol consumption. It is important to note, however, that only 24 old people reported moderate/high alcohol consumption, which may not have been sufficient to show differences in the analyzes performed.

In fact, several reports have already shown that regular and moderate alcohol consumption is associated with a decrease in the overall risk of cardiovascular disease. This decrease is due to the beneficial effects of wine on lipoproteins and clotting factors. However, it is important to note that frequent alcohol consumption has no positive effect on BP values, but is associated with increased hypertension[30].

Regarding smoking, a study by Rajati et al.[31] also found a statistically significant association between smoking (ex-smokers) and uncontrolled BP. Evidence shows that the relationship between smoking and hypertension is more related to smoking time and cigarette consumption throughout life than being a current smoker[32]. In our study, the higher prevalence of uncontrolled BP among older ex-smokers in relation to smokers can be explained by the fact that these old people were instructed to adopt a healthier lifestyle. Due to medical advice, due to the damage caused by smoking, the group of ex-smokers may have given up smoking due to the treatment of hypertension. Thus, prevalent cases of uncontrolled BP have stopped smoking after medical advice, which represents a reverse causality.

In the present study, the loss of statistical significance in associations of uncontrolled BP with sex, alcohol consumption and smoking after the inclusion of the treatment adherence variable in the regression model reinforces the importance of this variable for the outcome. The statistically significant association between low adherence to antihypertensive medication and uncontrolled BP is consistent with estimates found in other studies[33]. This congruence is in accordance with the literature, where it is emphasized that good adherence to antihypertensive medication is essential to control hypertension and reduce BP[34].

An important finding in this study is that most participants reported that they need to buy antihypertensive drugs. In cases where drugs are not available on the SUS network, patients need to obtain them from other sources, which requires financial resources for direct payment for these drugs and further increases the possibility of non-adherence due to low income.

It is also known that old people with less financial, intellectual and social resources face old age with difficulties in daily activities, with conformism and

as being a phase associated with losses, which can also justify non-adherence to treatment, as this requires commitment and understanding on the part of the sick person[35].

The strength of this study is in the investigation of sociodemographic, economic and clinical factors, including assessment of adherence to drug treatment that allows addressing a greater variability of factors associated with uncontrolled BP and, thus, supporting health professionals for better management and control of the disease. In addition, blood pressure measurements were obtained by direct measurement, performed at the participants' homes, by a team of trained interviewers, aspects that contribute to the quality and greater reliability of the data.

The limitations of the study include its cross-sectional design that does not allow establishing cause and effect relationships, as well as the possibility of false response bias when collecting socioeconomic and lifestyle data, such as income per household, consumption of alcohol, tobacco and physical activity. Another limitation is related to the fact that the study was carried out with a specific sample of hypertensive old people, mostly with low education and income, attended in primary care in the central south of the state of Piauí, which may limit the generalization of results. In addition, other important factors of relevance for BP control, such as therapeutic inertia and resistant hypertension, were not evaluated in the present study.

CONCLUSION

In conclusion, it is highlighted that among the sociodemographic, behavioral and adherence-related factors, our results show that there is a strong association between uncontrolled BP and low adherence to drug treatment.

These results emphasize the need for efficient FHS interventions for better BP control in hypertensive old people. In the context of primary care, strategies for the proper management of hypertension, which include prevention and monitoring actions, as well as better management of the disease, with treatment plans adjusted and appropriate for each individual, are essential to obtain treatment benefits and harm reduction and health complications.

The data have implications for several important aspects to be addressed in future studies in order to understand the factors associated with inadequate BP control in this population. Thus, the study brings contributions that can support the improvement of strategies for monitoring hypertension and, therefore, adequate care for the health of old people. Future research to investigate risk factors for uncontrolled BP in hypertensive patients, considering an age-specific approach is essential to clarify many of the challenges related to public health, since hypertension is an important contributor to the global burden of diseases.

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Incidence and risk factors for hospitalization in institutionalized elderly people

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Abstract

Objective: To evaluate the incidence of hospitalization and its risk factors in institutionalized elderly people during a 12-month follow-up in the city of Natal, RN, Brazil. *Methods*: Concurrent cohort study composed of elderly people aged 60 years or over and residing in the 10 Long-term Care Institutions for the elderly participating in the study. Of the 320 participants, data regarding sociodemographic conditions (i.e., age, marital status, children, health insurance plan, type of institutions, length of institutionalization and if it was due to illness, the ratio of the number of elderly people per caregiver, and health conditions), nutritional status (MAN), functional capacity (KATZ index), cognitive status (Pfeiffer test), and muscle weakness (dynamometer) were collected. A significance level of 5% (p<0.05) and a 95% confidence interval (CI) were considered in the bivariate and multivariate analyses. *Results*: 20.6% (95%CI: 16.5-25.4) of the total number of participants were hospitalized, with an average length of stay of 16.1 days (SD: 17.1) at the end of the 12 months. The main cause of hospitalization was lung disease (30.3%). The presence of malnutrition or risk of malnutrition (p=0.016, 95%CI: 1.17-4.96) and use of drugs for the cardiovascular system (p=0.003; 95%CI: 1.43-5.77) were risk factors for hospitalization, after adjusting for sociodemographic and clinical variables. *Conclusion*: Hospitalization had a high incidence among the elderly. Also, malnutrition or risk of malnutrition and the use of cardiovascular drugs were considered risk factors for hospitalization in the 12 months.

Keywords: Hospitalization. Frail Elderly. Homes for the Aged.

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INTRODUCTION

The hospitalization of old people involves, in addition to the treatment of acute illness or the acute worsening of chronic illness, the risk of a series of age-specific complications, affected by the risk of falls, malnutrition, dehydration and pressure ulcers[1].

Residents in nursing homes often suffer from multimorbidity, polypharmacy, as well as functional and cognitive impairment, with this, a higher frequency of hospital admissions when compared with residents in the community[2].

Old people are major users of the health system in Brazil and both the public and private systems suffer from these demands for services[3]. To minimize this fact, a greater knowledge of the profile of the institutionalized old people and of the risk factors for hospitalization can provide governmental actions based on public health policies, the planning of institutional strategies that improve pre-hospital care, the organization of services and therefore, reducing these demands. Likewise, it can facilitate the identification of the old people who require priority care and the type of assistance they need, giving priority to preventive actions, early diagnosis, treatment of chronic diseases and associated disabilities[4]. Therefore, knowing these risk factors can guarantee health care, as recommended by the Unified Health System and the Old People Statute.

The study of the institutionalized old people population is important because these old people are more vulnerable compared to those who are not institutionalized. It has already been found that non-institutionalized old people have a better quality of life compared to institutionalized ones[5]. Thus, LTCFs represent a challenge, as the changes inherent to aging and pre-existing diseases can be aggravated by the difficulties of adapting the old people to new living conditions and by the lack of motivation and encouragement common in this environment, making the old person vulnerable to fragility and functional decline[6].

In addition, a growth of between 100% and 500% is expected in the number of old people in need of non-family care in the next decade; thus, institutions will have to absorb a large part of this demand[7]. Therefore, it is important to carry out studies, similar to this one, that investigate this population, since there are still few Brazilian studies that have investigated the risk factors for hospitalization in institutionalized old people, in view of the growth of this demand in the coming years, most of which are restricted to cross-sectional data[8].

Given the above, this study aims to assess the profile of institutionalized old people, as well as the incidence of hospitalization and its risk factors in the 12-month follow-up in the city of Natal, RN.

METHOD

Concurrent prospective study. Of the 14 LTCFs registered with the Health Surveillance (VISA) in the city of Natal, RN, 10 (71.4%) agreed to participate in the study. The 4 LTCFs that refused to participate in the study were for profit. All old people aged 60 or over, who lived in institutions, were included in the study. Those who were not at the LTCF at the beginning of the research for hospitalization, terminally ill, coma or palliative care were excluded from the study in order to avoid bias in the data analysis.

The initial assessment was carried out between October 2013 and January 2015, by filling out a form prepared by the researchers. Information was collected on sociodemographic conditions, sex, marital status, children, health plan, type of LTCF, length of institutionalization and whether it was due to illness, ratio of the number of old people per caregiver and health conditions.

Chronic diseases were classified according to the International Classification of Diseases and Related Health Problems (ICD-10)[9].

As for medication, the presence of drugs for daily use administered to the old people was recorded. The drugs were grouped according to the classification of the Anatomical Therapeutic Chemical classification system and the Defined Daily Dose (ATC/DDD) of the year 2013, recommended by the World Health Organization for studies on the use of medication, which are: Group A-medications for the alimentary and metabolic tract; Group B-medications for the

blood system; Group C-drugs for the cardiovascular system; Group M-drugs for the musculoskeletal system; N-group drugs for the nervous system[10].

Nutritional status was assessed using the Mini Nutritional Assessment (MNA), an instrument validated for the old people population[11]. BMI was calculated, an electronic scale was used to take the weight and the total height was obtained according to the average of two measurements, with a portable Exact Height stadiometer (precision of 1 mm). For bedridden, a scale with four weighing cells (Seca ®, model 985 - Bed scale and electronic dialysis with an equipment cart) was used, which were placed on each "foot" of the bed, with the weight of the old person being deduced by the pre-tare function. As for the height estimate, knee height was measured in duplicate with the aid of a 100 cm caliper, with the old person lying or sitting. The base of the equipment was positioned under the heel and the other base on the upper part of the patella[12]. The sum of the MNA scores allows classification in three different groups: individuals with adequate nutritional status (MNA ≥24 and ≤30), at risk of malnutrition (MNA ≥17 and ≤23.5); and with malnutrition (MNA <17)[13].

Functional capacity was assessed using the Katz Index, an instrument validated in Brazil, which contains 6 Basic Activities of Daily Living (BADL). The following classification categories were considered, which obey a hierarchy of complexity: grade A (independent), grade B (independent in all BADL, except one), grade C (dependent on bathing and in another function), grade D (dependent on bathing, dressing and another function), grade E (dependent on bathing, dressing, hygiene and another function), grade F (dependent on bathing, dressing, hygiene, transfer and another function), grade G (dependent on all 6 functions) and other (dependent on at least 2 functions, but not classified in C, D, E and F) [14].

Cognitive status was assessed using the Pfeiffer test, which assesses long and short-term memory, orientation, information about everyday deeds and mathematical ability. Such an instrument allows the classification of the old person in intact mental function, mild, moderate or severe cognitive decline, taking into account the education level of the subject (cut-off point 3 or more errors, in the case of people who know at least how to read and write, and 4 or more for illiterates)[15]. As for the assessment of mobility, the following states were considered: walking without assistance, walking with assistance, wheelchair users and bedridden. Old people with severe cognitive decline and/or inability to walk independently or being bedridden were already considered fragile and did not proceed to the next step.

For those with preserved cognitive ability (complete mental function, mild or moderate cognitive decline and who walked independently (without help), frailty was categorized considering the evaluation of the five criteria proposed by Fried et al.[16], with cut-off points for items that make up the frailty scale adapted to the studied population, since normative data are not yet available for the Brazilian population, according to the Brazilian consensus on frailty in old people[17]:

- Unintentional weight loss: identified by asking the following question: "In the last year, did you lose more than 4.5 kg unintentionally (ie, without diet or exercise)?".

- Muscle weakness: assessed by decreasing hand grip strength, using the Jamar® dynamometer, measured in kilograms-force (Kgf). Three measures were taken in the volunteer's dominant hand and the measure of greatest value was considered.

- Physical activity level: it was assessed using the short version of the International Physical Activity Questionnaire (IPAQ)[18]. The procedures described in the IPAQ Data Processing and Analysis Guidelines were used to calculate the physical activity scores, promoting the results in MET-minutes/week[19].

- Exhaustion: was assessed by self-reported fatigue according to questions 7 ("I feel that everything I did was very arduous") and 20 ("I feel discouraged") on the Center for Epidemiological Studies (CES-D) depression scale. The old people who answered "sometimes" or "almost always or always" in any of the two questions met the frailty criterion for this item.

- Slow gait speed: it was calculated by the gait time (in seconds) spent to cover a distance of 4.6 meters. The results for this item, transformed into the unit meter/second (m/s), were adjusted by the median height for men and women.

Thus, the old people received a point for each positive criterion, resulting in a frailty score that ranged from 0 to 5. Those with scores from 3 to 5 were classified as frail, 1 or 2 characterized pre-frail individuals and a score of zero, non-frail old person[16].

The occurrence of hospitalization was recorded for a minimum of 24 hours in the 12-month follow-up period for each participant, considering illness, days of hospitalization, total number of hospitalizations and occurrence of death. The observation time regarding the hospitalization outcome was started for each old person from their initial assessment. These data were collected monthly from the medical records or the team's record book.

Data on chronic diseases and medications were collected from medical records. The other information was verified directly with the old person and, if this was impossible, the data were collected with health professionals.

This study is part of a project entitled "Human aging and health - the reality of institutionalized old people in the city of Natal/RN", with approval number 308/2012, from the Research Ethics Committee (CEP) of the Federal University of Rio Grande do Norte (UFRN). The Informed Consent Form (ICF) was signed by the resident or legal guardian, the caregiver and the director of the LTCF, following the assumptions defined in the Declaration of Helsinki.

The research team consisted of two doctoral students from the Graduate Program in Collective Health at UFRN and students from the undergraduate course in Physiotherapy and Nutrition at UFRN, who were properly trained in the use of the instruments. The physical examinations that make up the classification of the frailty phenotype were applied only by one researcher. The assessment of nutritional status was carried out by researchers trained in Nutrition. For quality control in the application of the instruments, meetings were held to train the physical tests to be applied. In addition, 50 questionnaires were applied to active old people in a community, in order to standardize the application among researchers and resolve possible doubts, and meetings were held to train the physical tests to be applied. In order to calibrate the evaluators and measure the reliability of measures, the Intraclass Correlation Coefficient (ICC) was applied, obtaining ICC>0.90 results for all variables analyzed.

The data obtained were tabulated, stored and submitted to descriptive and analytical statistical analysis. In the descriptive approach, categorical variables were described using absolute and relative frequencies and quantitative variables, using means and respective standard deviations (SD).

Then, a bivariate analysis of all variables was performed using the chi-square test or Fisher's exact test. For that, the variables with more than three categories were dichotomized, with the aim of better adjusting them to the results, considering their distributions or similar models in the literature. Afterwards, the Odds Ratio (OR) was verified, which was converted into relative risk (RR) for each of the independent variables in relation to the dependent variable.

To identify the factors associated with the occurrence of hospitalization, multiple logistic regression analysis of variables with a p-value equal to or less than 0.20 was performed, using the Stepwise Forward method. The permanence of the variable in the multiple analysis occurred through the Likelihood Ratio Test, absence of multicollinearity, as well as its ability to improve the model through the Hosmer and Lemeshow test. A significance level of 5% ($p < 0.05$), a power of 80% ($\beta = 0.20$) and a confidence interval (CI) of 95% were considered in the bivariate and multivariate analysis.

RESULTS

Of the 326 old people eligible for the study, residing in the 10 participating LTCFs, 6 (1.9%) individuals were excluded from the study: 5 (1.6%) who were already hospitalized in the collection period and 1 (0.3%) in the terminal phase. Of the total number of participants (n=320), there was an

average age of 81.4 years (SD: ±9.0), mean time of institutionalization was 63.3 months (SD: ±62.1) with a mean 8.1 (SD: ±5.2) residents per caregiver. Other characteristics in Table 1.

As for nutritional status, the old people, in their majority, were at risk of malnutrition 118 (36.9%). It was observed that the majority of participants were considered fragile 256 (80.0%), and had severe cognitive decline 190 (59.4%). Regarding functional capacity, only 87 (27.2%) were considered independent in the ADL's (72.8%). Other information can be seen in Table 2.

Among the diseases, there was a higher frequency of systemic arterial hypertension (SAH) (48.8%), diabetes (25.3%), dementia (24.4%), other mental illnesses (22.2%), dyslipidemia (17.2%) and stroke (15.6%). The types of drugs most consumed were, in decreasing order: 76.9% for the nervous system (Group N); 58.2% for the cardiovascular system (Group C); and 54.1% for the alimentary and metabolic tract (Group A).

In the 12-month follow-up, 20.6% (95% CI: 16.5-25.4) of the old people were hospitalized and most residents were hospitalized only once (83.3%), with the average stay of 16.1 days (SD: ±16.1). The main causes of hospitalization were: respiratory diseases (30.3%); hospitalization for falls and/or fracture of the femur (15.2%), diseases of the cardiovascular system (13.6%) and diseases of the digestive system (10.6%). There was a high prevalence of hospitalizations that did not have their cause defined (16.7%). Of the total number of hospitalized old people, it was found that 30.3% died in the hospital.

Among the sociodemographic variables (table 1), it was found that the old people who did not have children and had no health insurance had 39.0 (95% CI:0.38-0.97) and 42.0% (95% CI:0.38-0.89), respectively, less incidence for hospitalization. As for the variables related to the institution, it was observed that the old people who lived in non-profit LTCF had 44.0% (95% CI: 0.37-0.87) less incidence for hospitalization (Tables 3 and 4).

Table 1. Sociodemographic characteristics of institutionalized old people, Natal, RN, 2016 (n = 320).

Variables	n (%)
Age (years)	
60-69	37 (11.6)
70-79	93 (29.0)
80-89	133 (41.6)
≥90	57 (17.8)
Sex	
Male	79 (24.7)
Female	241 (75.3)
Children	
Yes	154 (48.1)
No	158 (49.4)
Health plan	
Yes	118 (36.9)
No	201 (62.8)
Type of institution	
For-profit	116 (36.3)
Non-profit	204 (63.7)
Institutionalization due to illness	
Yes	36 (11.3)
No	284 (88.7)

Losses were not included.

Table 2. Characteristics related to the health conditions of institutionalized old people, Natal, RN, 2016 (n=320).

Variables	n (%)
Nutritional status	
Eutrophy	98 (22.5)
Risk of malnutrition	118 (36.9)
Malnutrition	72 (30.6)
Not applicable	32 (10.0)
Functional capacity	87 (27.2)
Grade A	24 (7.5)
Grade B	7 (2.2)
Grade C	9 (2.8)
Grade D	17 (5.3)
Grade E	72 (22.5)
Grade F	81 (25.3)
Grade G	23 (7.2)
Fragility	
Not fragile	10 (3.1)
Pre-fragile	54 (16.9)
Fragile	256 (80.0)
Cognitive state	
Intact	26 (8.1)
Slight decline	24 (7.5)
Moderate decline	64 (20.0)
Severe decline	190 (59.4)
Mobility	
Walks without help	124 (38.8)
Walks with help	65 (20.3)
Wheelchair	68 (21.2)
Bedridden	63 (19.7)
Fecal incontinence	
No	185 (57.8)
Yes	135 (42.2)
Falls in the previous 30 days	
No	299 (93.4)
Yes	21 (6.6)
Chronic diseases	
No	38 (11.9)
Yes	282 (88.1)
Medication	
No	17 (5.3)
Yes	303 (94.7)

Losses were not included.

Table 3. Bivariate analysis between the occurrence of hospitalization and the independent variables in institutionalized old people, Natal/RN, 2016 (n=320).

Variables	Hospitalization		*p*	RR (95%CI)
	Yes n (%)	No n (%)		
Children			0.036*	
No	24 (15.2)	134 (84.8)		0.61 (0.38-0.97)
Yes	38 (24.7)	116 (75.3)		1.00
Health plan				
No	33 (16.4)	168 (83.6)	0.014*	0.58 (0.38-0.89)
Yes	33 (28.0)	85 (72.0)		1.00
Cognitive state			0.037[a,*]	
Moderate or severe decline	60 (23.6)	194 (76.4)		2.36 (1.00-5.58)
Intact-Light Decline	5 (10.0)	45 (90.0)		1.00
Mobility				
Bedridden or wheelchair	35 (26.7)	96 (73.3)	0.025*	1.62 (1.06-2.50)
Walks with or without help	31 (16.4)	158 (83.6)		1.00
Fecal incontinence				
Yes	37 (27.4)	98 (72.6)	0.010*	1.74 (1.13-2.69)
No	29 (15.7)	156 (84.3)		1.00
Dyslipidemia				
Yes	18 (32.7)	37 (67.3)	0.015*	1.80 (1.14-2.85)
No	48 (18.1)	217 (81.9)		1.00
Group B: medication for the blood system				
Yes	25 (29.8)	59 (70.2)	0.011*	1.77 (1.15-2.74)
No	39 (16.7)	194 (83.3)		1.00

[a] Fisher's exact test;* $p < 0.05$

Regarding health conditions, it was identified that the old people with moderate or severe cognitive decline and malnutrition or risk of malnutrition, had, respectively, 136.0% (p=0.037; 95% CI: 1.00-5.58) and 89.0% (p=0.016; 95% CI: 1.04-3.41) higher incidence for hospitalization. Those who were bedridden or in wheelchairs and had fecal incontinence had 62.0% (p=0.025; 95% CI: 1.06-2.50) and 74.0% (p=0.010; 95% CI: 1.13-2.69) risk for hospitalization. Among chronic diseases, it was found that the old people with dyslipidemia had 80.0% (p=0.015; 95% CI: 1.14-2.85) risk for hospitalization. Specifically regarding continuous use medications, a risk for hospitalization increased by 77.0% (p=0.011; 95% CI: 1.15-2.74) and 94.0% (p=0.003; 95% CI: 1.17-3.23), respectively, was identified among those who used drugs for the blood and cardiovascular system (Tables 3 and 4).

In the final model for risk factors for hospitalization in institutionalized old people, it was found that the presence of malnutrition or risk of malnutrition and using drugs for the cardiovascular system increased, respectively, by 141.0% (p=0.016; 95% CI: 1.17-4.96) and 187.0% (p=0.003; 95% CI: 1.43-5.77) the risk for hospitalization, adjusted for age, sex and type of institution (Table 4). The Hosmer-Lemeshow test value was 0.996.

Table 4. Final model for risk factors for hospitalization in institutionalized old people, Natal/RN, 2016 (n=320).

Variables	Reference	*p*	$RR_{not\ adjusted}$ (95% CI)	$RR_{adjusted}$ (95% CI)
Age ≥83 years	60-82 anos	0.090	1.29 (0.83-1.99)	1.74 (0.91-3.33)
Sex Male	Female	0.381	1.23 (0.77-1.97)	1.37 (0.67-2.80)
Type of institution Non-profit	For-profit	0.403	0.56 (0.37-0.87)	0.73 (0.40-1.44)
Nutritional status Risk of malnutrition/malnutrition	Eutrophy	0.016*	1.89 (1.04-3.41)	2.41 (1.17-4.96)
Group C: medicines for the cardiovascular system Yes	No	0.003*	1.94 (1.17-3.23)	2.87 (1.43-5.77)

Hosmer-Lemeshow Test= 0.996; * $p< 0.05$

DISCUSSION

This study found a high incidence of hospitalization in a population that had severe cognitive decline and total functional dependence, also occurring a high rate of death among those hospitalized where the main risk factors for this hospitalization were malnutrition, risk of malnutrition and the use of medication for the cardiovascular system.

Our data were similar to those found by Duca et al.[20], noting that 23.9% of the old people residents in the LTCF of Pelotas-RS were hospitalized within 12 months, a higher rate of hospitalization when compared to community residents (14.5%).

Still in the same study, it was identified that, in the 24 LTCFs studied, the old people with functional incapacity to perform ADLs were 2.5 times more likely to be hospitalized than those without incapacity to perform these activities[20]. In the present study, 80% were considered fragile, thus, one can associate the high rate of hospitalization with the frailty of these old people.

These findings may also justify the longer-lasting stay among the old people hospitalized in this study, given the high proportion of participants with severe cognitive decline and total functional dependence, representing, respectively, 59.4% and 25.3% of the total.

A Portuguese study[21] pointed out that the rates and duration of hospital stay were higher in old people, when compared to other age groups. Some data indicated that more than a third of the total number of hospital discharges corresponded to people over 65 years of age, with approximately 53% having hospitalization periods longer than 20 days, where the main causes of hospitalization are due to decompensations of chronic diseases, such as those of the respiratory and circulatory systems, corroborating our findings, with lung diseases (30.3%) and circulatory system (13.6%) being the main causes.

Carvalho et al.[22], on the other hand, evaluated the functional capacity of hospitalized old people in Brazil, identified that the average length of stay was 5.3 (+3.2) days, which is less than the present study, as they did not include old people with total dependence. The main causes of hospitalization according to the ICD-10 were diseases of the circulatory system (23.2%).

In the present study, respiratory disease was identified as the main cause of hospitalization, due to changes in lung function being more pronounced in aging. According to Fernandes et al.[23], during aging, physiological and anatomical changes and reorientation of elastic fibers in the lung occur. Regarding respiratory activity, there is a weakening of the expiratory and inspiratory muscles and

changes in the cough reflex. In addition, old people have reduced pulmonary cilia and hypertrophy of the bronchial glands further complicating the ability to excrete. These losses can result in adverse clinical events that worsen quality of life and favor hospital admission[23].

A high rate of hospital death was identified in the present study, in which one in 3.3 institutionalized old people who were hospitalized died in the hospital, considering that the majority of the sample was considered fragile, an integrative review found in the main factors related to fragility the highest mortality rate, where higher values in fragility scores are able to predict in-hospital mortality[24].

Among the sociodemographic variables related to the institution and health conditions, only the presence of malnutrition or risk of malnutrition, and use of medication for the cardiovascular system remained with a strong association for the occurrence of hospitalization.

In relation to malnutrition and its risk, Lázaro et al.[25], identified a high number of dependent old people at risk of malnutrition in the institutionalized geriatric population. These authors[25] stated that weight loss is a factor inherent to age, favoring fragility, sarcopenia, low body mass index (BMI) and worsening chronic diseases, which led to deterioration in quality of life. Still in the same study[26], there was a significant relationship between the level of dependence and nutritional status, so that greater dependence increased the risk of malnutrition (p <0.0001).

However, often, those old people at risk of malnutrition are not diagnosed and treated and, as a result, receive nutritional support at a late stage. Therefore, the diagnosis and individualized treatment of this population becomes extremely important, especially in the LTCFs and hospitals, where there is a higher rate of frail old people[25].

As for the continuous use of medications, it was found in the present study that the old people who used medications for the cardiovascular system were at risk for hospitalization (RR: 2.87; 95% CI: 1.43-5.77; p=0.003). These medications are useful for controlling symptoms, preventing cardiovascular events or prolonging life[26]. For a healthy old person, all three objectives of these medications are applicable. However, symptom control may be the only goal for an old person with advanced age and severe cognitive decline[27].

In the old people population, the increase in the prevalence of chronic diseases, as an example of cardiovascular diseases, may explain the increase in the need for continuous use of medications, since this type of therapy is the main intervention. Therefore, the risks involved in the consumption of medications are greater among old people, especially those who are frail, due to the fact that they present different responses to medications compared to those presented by younger people. The situation arises from the pharmacokinetic and pharmacodynamic changes typical of aging, which make this population contingent more vulnerable to interactions between drugs, side effects and adverse drug reactions[27,28].

In addition, the use of such drugs may indicate a greater burden of chronic diseases, geriatric syndromes and frailty and, potentially, have a significant influence on the occurrence of hospitalization[27,28]. Therefore, in frail old people with multiple morbidities and functional limitations, it is important to prioritize the objectives of drug treatment, analyzing the possible interactions with other drugs in use[26].

Despite the present study pointing out the drugs for the cardiovascular system as a risk factor for hospitalization, it is known that the old people population uses other medications and that these combinations of drugs generate harmful effects to the body, which can cause hospitalization and death[29].

The representativeness of the sample, the longitudinal design of the study and the low percentage of refusals and data losses were positive points of the present study. In addition, frailty, which can be an important confounding factor for hospitalization in old people, was examined in this study. And, in order to avoid errors in classification of nutritional status, BMI, arm circumference, calf circumference and knee height were not self-reported, but measured by trained professionals.

Among the limitations, the collection of some data from medical records and through reports is

subject to a measurement bias. The Pfeiffer test is not yet validated in Brazil. Its choice was due to its easy and fast application, and due to the low difficulty and demand of the questions, thus presenting itself as an adequate tool to assess the cognitive capacity in this sample. In addition, some chronic diseases may have been underdiagnosed or underreported. However, medical records were researched and professionals from the institutions were interviewed to collect the maximum amount of information possible. Finally, it is important to carry out a multicenter study in order to investigate more institutionalized old people with broader characteristics and confirm our findings.

CONCLUSION

Hospitalization had a high incidence (20.6%) among institutionalized old people, with high rates of fragility and functional and cognitive decline also standing out. In addition, malnutrition or risk of malnutrition and the use of cardiovascular medications were considered risk factors for hospitalization in 12 months and, therefore, it is suggested to create action plans with greater attention to the nutritional level of this population, as also evaluative and preventive measures regarding the need to use cardiovascular medications. At the end of the study, the most important findings of the study were made available to the LTCF managers, as an aid to future action plans.

Therefore, it is considered extremely important to develop more research with the same approach, considering the few studies found and the need for data comparative with our findings.

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Factors associated with functional health literacy in old people undergoing pre-dialysis treatment

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Abstract

Objective: To evaluate the factors associated with functional health literacy in the elderly undergoing pre-dialysis treatment. *Method*: This is a cross-sectional study, carried out with 60 elderly people diagnosed with chronic kidney disease and assisted in the conservative treatment outpatient clinic of a public hospital in the city of Recife, Pernambuco, Brazil. Data were collected using the instrument of Test of Health Literacy in Adults, an abbreviated version and a structured questionnaire, which were subsequently analyzed using descriptive and inferential statistics. *Result*: Functional health literacy was insufficient 43(71.7%) and was associated with lower education (p-value=0.000) and non-white race (p-value=0.040). *Conclusion*: The educational level and race are factors that interfere in functional health literacy, serving as subsidies for the elaboration of educational actions adjusted to the reality of this public.

Keywords: Health Literacy.
Health of the Elderly.
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INTRODUCTION

With the growth of the older population, there was an increase in the prevalence of Chronic Noncommunicable Diseases (CNCDs), such as arterial hypertension and diabetes, which are the main causes of Chronic Kidney Disease (CKD)[1]. In Brazil, a survey conducted in 2018 found that 35% of dialysis patients were 65 years of age or older[2].

Several factors predispose the individual to the development of CKD, including social determinants, such as low family income and inadequate housing conditions; psychological determinants, such as anger, stress, cognitive decline and depression; behavioral determinants, such as smoking, alcoholism, use of illicit drugs, unhealthy diet and physical inactivity, as well as frequent risk factors, including: hypertension, diabetes mellitus, overweight/obesity and low medication adherence; and educational determinants, such as inadequate health literacy[3].

Functional Health Literacy (FHL) or Health Literacy refers to the skill required for functionality in the health environment, including the ability to perform basic reading and numeracy tasks[4]. It has implications for people's knowledge, motivation and competence to access, understand, evaluate and apply health information regarding the judgment and decision-making related to health care, disease prevention and health promotion, in order to maintain or improve quality of life[5].

The World Health Organization (WHO) identified FHL as one of the determinants of health, as this competence can help in the effectiveness of the communication process, which, through strategies, increases access to information, promotes individual and collective empowerment in health control and encourages the promotion of care[6].

In the pre-dialysis treatment of CKD, it is common for individuals to receive information about their condition, using unknown medical terminologies, such as laboratory results and even clinical procedures to which they will be submitted. This information requires basic reading and numbering skills, so that, in fact, the individual can understand its meaning[7].

In this context, in the senescence process there is a decrease in functional reserve in several organs and systems; this regression, associated with CKD, can interfere in the understanding of the guidelines provided by the health team and thus contribute to low adherence to treatment[8].

For the activities and actions developed by health professionals to be effective, health education is a tool that provides, mainly through consultation with the multiprofessional health team, the opportunity for guidance on self-care. However, it is necessary to know the level of understanding that individuals have about the orientations received. In this way, the FHL can directly influence the level of understanding, knowledge and change in life habits[7].

Currently, there are few instruments used to measure FHL, the most cited being: Rapid Estimate of Adult Literacy in Medicine (REALM) and Test of Functional Health Literacy in Adults (TOFHLA). However, they are not specific to the older public[9].

In addition to the absence of a specific instrument to assess FHL in old people, there is also a lack of educational interventions for this audience. Among these interventions, there is a lack of workshops, educational programs, courses and training. Associated with this, the need to use simple language, adaptation of the material based on the specificity of the old person, in order to facilitate the FHL[10].

Considering that old people undergoing pre-dialysis treatment are faced with the need for changes in their routine, such as complex medication regimens, an appropriate diet and frequent outpatient consultations, FHL emerges as a skill that can facilitate the understanding of the guidelines and contribute to their autonomy and self-care.

Thus, the evaluation of the factors associated with the FHL of the old person undergoing pre-dialysis treatment may signal, for professionals, important variables to be worked on in providing assistance to this population, in order to contribute to a better understanding of the guidelines and adoption of self-care measures. Given the above, the study aimed to evaluate the factors associated with FHL of old people undergoing pre-dialysis treatment.

METHOD

Sectional study carried out at the Chronic Kidney Disease outpatient clinic of a public hospital in the city of Recife, Pernambuco, Brazil.

The sample, of the census type, included 213 individuals, aged 60 years or over, of both sexes, under conservative treatment and assisted at the clinic between February and July 2019. Old people without reading and writing skills were excluded (67); with cognitive deficit (<3) assessed by the Minicog (11), an instrument that assesses immediate memory using three words spoken to the old person, which they must remember after drawing a clock, worth one point for each word remembered and two points for drawing right; decreased visual acuity (21): below the 20/50 line, using the Snellen visual acuity rating scale; low auditory acuity (5): not being able to hear and understand what was said, measured by the Whisper test and individuals with neurodegenerative disease recorded in health records (9). Refusals and losses counted 40 individuals. In the end, the sample resulted in 60 old people undergoing pre-dialysis treatment.

Data were collected through an interview with a structured questionnaire composed of socioeconomic and demographic variables (gender, age, self-declared race, income, marital status, years of education, place of residence and number of people in the residence) and health conditions: outpatient treatment time, Body Mass Index (BMI) (calculated according to the Quetelet equation (BMI=weight/height^2)[11] and classified according to Lipschitz[12], as: underweight, with BMI<22kg/m^2; eutrophy, BMI between 22kg/m^2 and 27kg/m^2, and overweight BMI>27kg/m^2), comorbidities; difficulties in following the treatment; satisfaction with medical appointments; knowledge about CKD assessed by means of a questionnaire, consisting of 21 questions including the knowledge of the old person about kidney function, cause and principles of CKD, and conservative treatment, with 70% or more correct answers being considered sufficient knowledge[13].

The FHL level was assessed by TOFHLA, in its brief version. The translation and validation of this instrument for the Brazilian population is in the process of being published with excellent results, covering individuals over 18 years old and with old people, in their sample. The instrument was chosen based on the result of a literature review, in which TOFHLA and B-TOFHLA were two of the most used instruments to assess functional health literacy in the old people population[9].

This instrument allows to capture the numeracy and reading comprehension skills. It consists of two subtests: one, consisting of two text passages integrated by 36 items, counting 2 points for each item that gets a correct answer and four more numbering items, counting 7 points for each correct answer. When adding the points related to reading and understanding with the numbering score, the total FHL score is obtained, classified as Adequate (67-100 scores), Marginal (54-66 scores) or Inappropriate (0-53 scores)[14]. In line with other studies[15,16], the last two classifications were grouped, considering that individuals with Inadequate or Marginal FHL have limitations both in reading and in understanding the health information presented in written form.

The survey data were entered into an Excel for Windows® spreadsheet, in double entry, verified with Validate, module of the Epi-info program version 6.04 (WHO/CDC/Atlanta, GE, USA), to check the consistency and validation. Then, the data were transferred to statistical software, and the descriptive analysis was carried out through the characterization of the sample regarding the sociodemographic, clinical and knowledge variables about CKD. In the association between FHL and the investigated variables, Pearson's chi-square test or Fisher's exact test was used. For all analyzes, $p<0.05$ was considered statistically significant.

The project was approved by the Research Ethics Committee of the Health Sciences Center (CCS) of the Federal University of Pernambuco (UFPE) under CAAE 01234918.0.0000.5208. All respondents were previously informed of the research objectives and after consent, the Free and Informed Consent Form was signed.

RESULTS

Of the 60 old people with CKD interviewed, 43 (71.7%) had inadequate FHL and 17 (28.3%) adequate FHL. Of the total, 38 (63.3%) were men, 36 (60%)

aged between 60 and 69 years old, 37 (61.7%) declared themselves to be non-white (brown and black), 43 (71.7%) earned up to a minimum wage, 36 (60%) reported having partners, 35 (58.3%) studied for less than 4 years, 45 (75%) lived in the Metropolitan Region of Recife and 37 (61.7%) lived with three or more people in the residence. Regarding the factors associated with FHL, a statistically significant relationship was observed with race and years of education (Table 1).

As for clinical conditions, all 60 (100%) old people were in advanced stages of CKD (three, four or five), 25 (41.7%) had been in outpatient treatment for more than five years, 34 (56.7%) were overweight, 33 (55%) had more than three comorbidities, 33 (55%) reported difficulties to follow the treatment, due to the distance to the health service and the use of medication, 34 (56.7%) understood the information shared during medical and/or nursing consultations. As for knowledge about the disease and treatment, for 38 (63.3%) it was insufficient and, of these, 27 (71%) had inadequate FHL (Table 2).

Table 1. Functional health literacy according to socioeconomic and demographic factors of individuals assisted at the CKD clinic undergoing pre-dialysis treatment. Recife-PE, Brazil, 2019.

Characteristics	Total	Functional Health Literacy		*p*-value
		Inadequate	Adequate	
	n (%)	43(71.7%)	17(28.3%)	
Sex				
Female	22 (36.7)	19(86.4%)	3(13.6%)	0.055[b]
Male	38 (63.3)	24(63.2%)	14(36.8%)	
Age (years)				
60-69	36(60.0)	14 (39%)	22(61%)	0.162[a]
70-79	21(35.0)	9(43%)	12(57%)	
80 and over	3(5.0)	3(100%)	0(0%)	
Self-declared race				
Non-white*	37 (61.7)	30(81.1%)	7(18.9%)	0.040[b]
White	23 (38.3)	13(56.5%)	10(43.5%)	
Income (MW)**				
≤ 1	43(71.7)	33(76.7%)	10(23.3%)	0.209[a]
> 1	17(28.3)	10(58.8%)	7(41.2%)	
Marital status				
With companion	36(60%)	13(36%)	23(64%)	0.264[b]
No companion	24(40%)	13(54.2%)	11(45.8%)	
Years of education				
≤ 4	35(58.3)	32(91.4%)	3(8.6%)	0.000[b]
>4	25(41.7)	11(44%)	14(56%)	
Place of residence				
Metropolitan region	45(75.0)	32(71.1%)	13(12.8%)	1.000[a]
Another location	15(25.0)	11(73.3%)	4(26.7%)	
Number of people in the residence				
≤ 2	23(38.3)	16(69.6%)	7(30.4%)	0.776[b]
≥ 3	37(61.7)	27(73%)	10(27%)	

*Non-white (old people who declared themselves black or brown);**minimum wage in force in 2019; [a]Pearson's Chi-Square Test; [b]Fisher's exact test. Source: Research data, 2020.

Table 2. Functional health literacy according to the health conditions of individuals assisted at the CKD clinic and undergoing pre-dialysis treatment. Recife, PE, Brazil, 2019.

Characteristics	Total	Functional Health Literacy		p-value
	n (%)	Inadequate 43(71.7%)	Adequate 17(28.3%)	
Outpatient treatment time (years)				
≤ 2	19(31.7)	12(63.2%)	7(36.8%)	0.608[b]
3-4	16(26.7)	12(75%)	4(25%)	
≥ 5 and over	25(41.7)	19(76%)	6(24%)	
Body Mass Index				
Low weight	3(5)	0(0%)	3(100%)	0.310[a]
Normal	23(38.3)	9(39%)	14(61%)	
Overweight	34(56.7)	17(50%)	17(50%)	
Comorbidities				
None	8(13.3)	3(37.5%)	5(62.5%)	0.126[b]
< 3	19(31.7)	5(26.3%)	14(73.7%)	
≥ 3	33(55)	18(54.5%)	15(45.5%)	
Difficulties in following treatment				
Distance to health service and medication use	33(55.0)	26(78.8%)	7(21.2%)	0.176[b]
Diet	27(45.0)	17(63%)	10(37%)	
Satisfaction with consultations				
Satisfied	34(56.7)	22(64.7)	12(35.3%)	0.171[b]
Partially satisfied/Not satisfied	26(43.3)	21(80.8)	5(19.2%)	
Knowledge in DRC				
Sufficient	22(36.7)	16 (72.7%)	6(27.3%)	1.000[a]
Insufficient	38(63.3)	27(71%)	11(29%)	

[a]Pearson's Chi-Square Test; [b]Fisher's exact test. Source: Research data, 2020.

DISCUSSION

The FHL assessment of old people with CKD is extremely important, to ensure health promotion through the reformulation of public policies and health interventions aimed at this public, the results of which can reduce health disparities attributed to low health literacy[17].

In this study, the FHL of the old person with CKD proved to be insufficient and its results corroborate with a previous Brazilian study, carried out with adults and old people with CKD and assisted on an outpatient basis, in the city in Goiás. Insufficient FHL interferes with the understanding of the information received about your health condition and can contribute to the evolution of renal replacement therapy, since, to follow the guidelines, cognitive reading and numeracy skills are needed[7].

In old people, the impact of insufficient FHL is even more significant, as these individuals are more susceptible to multiple health problems, more complex therapeutic regimens and frequent use of health services. The complexities associated with chronic disease management, low schooling and cognitive and sensory changes associated with aging aggravate communication challenges[18].

Several factors can influence the FHL. The results of this study are similar to the findings of a cohort investigated in the USA, with individuals with CKD undergoing hemodialysis and a median age of 62 (IQ 51.0; 72.0) years; where 32% of respondents

had inadequate FHL, which was associated with non-white race and less education[19].

Skin color is defined not only by biological factors, but also by geographic, cultural, economic, political and legal factors. Despite the SUS principles advocating equal, equitable and universal access to the entire population, racial inequalities are decisive for the access and use of health services. In this way, they can reflect on the illness process of non-white people and influence the level of FHL[20].

From the perspective of social determinants, it is observed that individuals belonging to ethnic groups who are victims of social adversity and with low schooling are more likely to have low levels of FHL and, consequently, are predisposed to worse health status[21]. In this sense, a study conducted with North American adults observed that non-white individuals were more likely to have low or limited FHL[22]. These results impose a reflection on health professionals, for a care practice adapted to the specificities of the assisted population, in order to minimize the barriers already imposed by society.

Low education is also frequent in the old people population with CKD and reverberates the precarious and less accessible educational situation of the 20th century, in which the priority for the population was work[23]. In this research, schooling was directly proportional to FHL, corroborating a study carried out with 72 old people, 31.94% said they had elementary school and had difficulty in understanding and textual interpretation and 37.25% had restricted conditions for reading[24].

In Brazil, despite the progress in accessibility to basic education, the heterogeneity of the population and the low level of education contribute for the FHL to remain practically untapped[25]. Thus, it is necessary to plan actions that seek to address the social inequalities perpetuated in the health system regarding FHL, through educational strategies aimed at old people with CKD[26,27], considering their characteristics and particularities, in order to minimize or exclude possible diseases[28].

Insufficient knowledge regarding the disease and treatment has also been shown in other studies[7,13]. Such results may contribute to unfavorable clinical outcomes, especially in CKD, and may be a reflection of inadequate FHL, constituting an obstacle to self-care management[15].

Literature review study on the FHL involving the old people population identified REALM and TOFHLA as the most used instruments for this audience, supporting the choice of TOFHLA in its brief version, for this research[9]. The use of an instrument for the evaluation of FHL in health can provide subsidies for planning health care for the old people population with CKD, with regard to the promotion of health education actions adapted to the needs and skills of this public[9,29].

As limitations, we point out the difficulty of understanding the issues addressed in the FHL assessment instrument, which was also highlighted in another study[7]. Thus, it is necessary to build specific instruments to evaluate FHL in the old people population, as well as multidisciplinary monitoring adapted to their particularities and the expansion of studies focused on this theme.

CONCLUSION

The FHL of the old people assisted in a pre-dialysis treatment clinic was inadequate and was associated with low education and non-white race. Insufficient knowledge about the disease and treatment was also present, but did not interfere with FHL levels.

Knowing the factors associated with the FHL of the old person undergoing pre-dialysis treatment can support the development of educational strategies adapted to the individual characteristics of this population and thus instrumentalize them for the adoption of health care and postponement of dialysis treatment.

It is expected that studies like this will sensitize health professionals in relation to the need to evaluate FHL and the associated factors in old people undergoing pre-dialysis treatment and the adoption of educational practices aimed at improving knowledge, especially for old people with low FHL.

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Factors related to adherence to treatment from the perspective of the old person

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Abstract

Adherence to treatment is essential for the success of pharmacotherapy for old people. Regarding this phenomenon, the objective of this study was to identify and understand the factors associated with adherence to drug treatment. For this, a qualitative study was carried out with the old people considered non-adherent by the instrument of Morisky, Green and Levine. The research scenario took place at the Hospital Universitário de Brasília from March to August 2015. The relationship between the old people and treatment adherence proved to be complex and included the following factors: changes in routine, access to medicines and health services health, polypharmacy, consequences of medication effects, medicalization and relationships with health professionals. For the old people considered non-adherent, intentions and conduct of adherence to treatment were observed. In other words, "adherence" and "non-adherence" are phenomena experienced by old people simultaneously, following the life dynamics of individuals. Nevertheless, the recognition and understanding of the factors discussed were important for the deepening of academic knowledge on the topic, in addition to supporting the gathering of crucial information for the qualification of local pharmaceutical assistance.

Keywords: Medication Adherence. Drug Utilization. Health of the elderly.

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INTRODUCTION

The increase in longevity is often associated with the increase in the number of chronic non-communicable diseases, physical, cognitive and mental disabilities, as well as the consumption of medicines[1]. Old people often need to use drugs chronically and, in this sense, the promotion of treatment adherence (TA) is a crucial element for therapeutic success[2,3].

TA reflects the extent to which the user follows and complies with the recommended treatment in relation to time, dosage and form of use[2]. In the context of drug treatment, complex therapeutic regimens are often necessary for the effective management of different associated comorbidities, requiring greater attention, memory and organization from the old person regarding administration times[3-5].

The literature points to some factors associated with non-adherence by old people, such as: polypharmacy, adverse effects, disappearance of symptoms, misperception about treatment, problems with access to medicines, difficulties in administration, social isolation, low educational level and memory deficit[3-9]. However, most recent studies discuss these aspects in the context of primary health care and, therefore, few Brazilian studies investigate the phenomenon of TA by old people in the hospital setting[10,11].

A qualitative study, carried out at the University Hospital of Brasília (HUB), argues that the forgetfulness, the lack or incompleteness of the information provided by health professionals and the difficulties of access to medicines were scored as factors that affect TA[12].

In view of the need for routine consumption of medicines by old people, the characterization of factors associated with TA in specific groups can contribute to improving the pharmaceutical assistance offered in health services, in addition to contributing to the production and updating of academic knowledge regarding the theme[13]. In this sense, this study aimed to identify and understand the factors associated with TA in old people treated at a hospital in the Federal District (DF), Brazil.

METHOD

This is a qualitative research developed at the Multidisciplinary Center for Old People (CMI), a reference service in geriatric and gerontological care in the Federal District, located at the University Hospital of Brasília (HUB).

The research was conducted by a researcher who, through an active search, approached the old people in the CMI waiting room before the start of consultations, for those who arrived earlier, or after medical care. All the old people who came to the clinic on Wednesday and Thursday mornings from March to August 2015 were approached. Although the researcher's approach took place in the collective space of the CMI, from the moment that the old person consented to participate in the study, both were directed to an office, to prevent interruptions and to ensure the confidentiality of information.

For the inclusion of participants, the following inclusion criteria were observed: old person under chronic medication use, responsible for conducting treatment and without prior diagnosis of dementia or psychiatric disorder.

The first part of the form adopted in the survey presented questions to identify the sociodemographic profile of the interviewees. Thus, information was gathered regarding gender, age, education and marital status.

Subsequently, the questionnaire had questions from the adhesion scale of Morisky, Green and Levine[14] (chart 1). This psychometric scale contains four questions, in which the old person answered dichotomously between the options "yes" or "no". The scale score ranged from zero to four points. One negative answer was assigned a point, while the positive answer received zero points. The patient was considered adherent who answered negatively to all questions and, therefore, acquired a score of 4 points. Patients who attributed at least one positive answer to the questions were considered non-adherent.

For the group of patients considered non-adherent, interviews were conducted with a script (chart 2). This questionnaire was structured based

on research in the scientific literature[3-9]. During the interview, if the participants showed doubts about any question, clarifications were provided at any time and as many times as necessary. The recording of this information was systematized through audio recordings and notes on printed forms.

Chart 1. Adherence measure to the treatment of the Morisky, Green and Levine instrument[14], Brasília, Federal District, Brazil.

Questions of the scale	Yes (0)	No (1)
Do you sometimes have trouble remembering to take your medication?		
Do you sometimes neglect your medication schedule?		
When you are feeling better, do you sometimes stop taking your medications?		
Sometimes, if you feel worse about taking the medication, do you stop taking it?		
Total		

Chart 2. Script used in interviews with old people considered non-adherent, Brasília, Distrito Federal, Brazil.

Interview Questions
Do you have difficulty taking your medications? If so, quote why.
Do you change the dose or form of use when you feel good or when you feel bad?
What do you do when you forget to take your medication?
Have you been without medication? Why? What do you do when you run out?
Do you think you take too much medicine? Why?
Do you have any concerns about the use of medications?
Do you realize the benefits of taking medication? Talk about it.
What makes it difficult for you to adhere to / follow the treatment?

Own authorship.

The search for participants took place until the theoretical saturation of the elements that emerged from the speeches of the old people. According to the literature, qualitative research aims to apprehend and understand the selected cases, without the need for generalization and, therefore, the samples are purposeful[15-17]. In this sense, there was no previous determination of the sample. In this way, "theoretical sampling" was considered.

Qualitative interviews were analyzed using the thematic content analysis technique[17]. The analysis was privileged from the "theme", because within an analytical field, here contextualized for the TA content, the theme is usually a reflection of trends, impulses and convictions expressed in the speeches. Thus, the speeches were organized by adopting the following stages of analysis[15-17]:

1st Initial reading - it was an exhaustive and comprehensive reading of the transcribed material. We sought to have a view of the whole, to develop initial assumptions, to organize a form of initial classification and analysis guidance[15-17].

2nd Material analysis - it consisted of the "exploration" phase of the transcriptions already organized initially. In this stage, excerpts, phrases and fragments of the texts were separated (material decomposition), considering the "themes" as a reference in the formation of the registration units themselves[15-17].

3rd Distribution of the decomposed material in the categories[15-17].

4th Writing of the texts: description of the categorization results, also considering the

inferences - logical deduction from the content with premises already accepted from other studies on the theme[15-17].

The research project was approved by the Research Ethics Committee (CEP) of the Faculty of Health Sciences (FS) of the University of Brasilia (UNB), with authorization under number 1.042.855. All participants signed the Free and Informed Consent Form (ICF).

RESULTS AND DISCUSSION

The study initially involved a total of 38 participants. From the application of the Morisky, Green and Levine instrument[14], 30 old people (79%) were classified as non-adherent. Of this group, 27 individuals went on to the next stage, as 3 refused to participate in the later stage. The main reason for the refusal was the unavailability of time.

The majority of the sample is composed of women (71%), aged 75 or over (63.2%). The age varied between 60 and 90 years, with an average of 76.6 years. In the total of participants, 44.7% have education> 8 years (table 1).

In group 2, from the application of the test by Morisky, Green and Levine[14], the most reported non-adherent behavior was carelessness regarding the medication administration time, being reported by 24 individuals (80%). Following, the second most cited problem was the difficulty of remembering to take the medication, which was present in the report of 27 old people (56%).

Based on the speeches of the old people considered non-adherent, the analysis of the content related to TA produced seven categories described below: "changes in routine", "access to medicines and health services", "polypharmacy", "unfolding of medicinal effects", "medicalization", "relationships with health professionals".

Table 1. Characterization of the profile of the old people interviewed at the Medicine Center for Old People, Brasília, Federal District, Brazil, 2015.

Variables	Group 1* n (%)	Group 2** n (%)
Gender		
Female	27 (71.0)	21 (78.0)
Male	11 (29.0)	06 (22.0)
Age (years)		
60-64	02 (5.3)	01 (3.7)
65-69	04 (10.5)	03 (11.2)
70-74	08 (21.0)	06 (22.2)
75-79	12 (31.6)	07 (25.9)
≥80	12 (31.6)	10 (37.0)
Education (years)		
< 4	05 (13.1)	04 (14.8)
4-8	14 (36.8)	12 (44.4)
> 8	17 (44.7)	10 (37.0)
NA	02 (5.4)	01 (3.8)
Marital status		
Married	20 (52.6)	12 (44.4)
Widowed	13 (34.2)	12 (44.4)
Single	03 (5.3)	03 (11.2)
Divorced or separated	02 (7.9)	00 (0.0)

*Refers to the total number of old people in the survey; ** Refers to old people detected as non-adherent.

Changes in routine

Despite not being constant in the content of the testimonials, the strong link between the administration of medications and the routine can interfere in TA:

> "[...] sometimes it's the rush, doctor [...] for example, today I didn't take the diuretic, because when I go out, I don't take it in the morning. Because it's difficult, right? We come by bus, so I don't take diuretics. But I take it when I get home [...] "(old person 11).

Given the above, in addition to individually investigating treatment preferences, the whole issue of the user's daily life must be explored. The literature demonstrates that administering medications does not seem to be a hindrance to TA when you have a well-established routine[3-9,18-20]. Thus, the management of drug treatment by the old person should be the result of an agreement in which the health professional and the user align how the incorporation of therapy will occur in the day-to-day health care[2,12,18-20].

Nevertheless, still in the wake of TA and its interface with the daily routine, oldy people also shared the strategies that are adopted when there are delays in the administration of medications:

> "[...] when I remember, like, sometimes, the time passes a little, about 10 or 15 minutes, I take it. I don't stop taking it, no. If many hours pass, then I don't take it, I leave it to take it the next day" (old person 05).

Thus, considering the use of medication as an important instrumental activity of daily living[12,18,19,21], the following reflection is also identified: following the dynamics of life, it is understandable that old people self-adjust the way of managing treatments. In this sense, challenges arise and, in parallel, strategies are developed, which despite being similar for some old people, such as administering medications at meals, at bedtime, among others, within the micro clinical, social and emotional reality of each individual, the consumption of pharmacotherapy is not identical and can have several outcomes[19]. Therefore, it is essential that the old person is instrumentalized in consolidating the practical and effective management of medicines in the routine, to guarantee the continuity of pharmacological care, as well as the therapeutic success of the treatment[2,12,18,19].

Access to medicines and health services

Failing to buy medicines for financial reasons was not a constant among respondents. However, despite the dedication to obtaining the medication, some old people reported greater financial difficulties:

> "Ah, without a doubt, lack is bad [...] Sometimes, some of these remedies I don't find at the health center. Some I don't buy because they are very expensive and others because sometimes I go to the clinic and they don't have it... "(old person 17).

> "Okay, we in the humble environment, we have difficulties in everything. We have difficulty getting to health, where we take care of our health... Sometimes we even have difficulties to buy medicines... We take them when we have them "(old person 14).

Although the discussion, a priori, focused on the difficulty of access to medicines, the reports also reveal that the inequalities affect not only the treatment, but reflect a scenario of general precariousness in accessibility in health[22]. For Barreto[23], most of the inequalities observed in the health field are directly related to those observed in other social life planes.

The inequalities now displayed, even though they have an impact on the different groups of users of health services, are manifested in a dramatic way in the life of old people. The accelerated aging of the population, whose pace is not accompanied by the implementation of public health policies, may collide with a network of services that is not prepared to attend the health of old people in their entirety[3-6]. Thus, when investigating access to medicines by old people, this theme should not be dissociated from the itinerary adopted by the group in relation to global accessibility to health care[24].

Polypharmacy

When asked about the concern about treatment, the speeches highlighted as the main expression the amount of drugs to be administered:

> "[...] ah! It is because it is a bunch, look there. See it in the prescription, right? Too much medicine. 6 or 8 pills! "(old person 11).

> "I don't know, every day, every day it piles up, other things appear, there is more than those, right? [...] it's the need, right. Worse, different problems appear and you will have to take it [...] I would prefer not to take it"(old person 04).

Although taking medication is a common health intervention, its long-term use has repercussions for individuals, especially when therapeutic schemes are complex and framed in the context of polypharmacy[12,18-20].

The adoption of health care habits is taught early in an individual's life, such as hygiene practice, healthy eating, active lifestyle[25]. However, the need for routine medication consumption usually emerges with the aging process, resulting in yet another demand for self-care that, from the perception of a new habit to be developed, can provoke resistance on the part of the old person, especially when pharmacotherapy administration is complex and frequent[12,18-20].

Unfolding of medicinal effects

The experience in self-care allows the old person to perceive autonomy to manage their therapy:

> "[...] I have had asthma for many years, you know? So I already learned to live with my disease and that's why I have this autonomy, this freedom to sometimes interrupt a medication or to decrease ... weaning, right? From cortisone... We take high cortisone and wean it off [...] I, for example, I know how far I am going to solve the problem at home or run to the hospital"(old person 01).

Scientific production already points out that non-TA is experienced by different audiences and this is often a reflection of the medication effects[16,20]. In this sense, it is evident in the reports above that experiences with pharmacotherapy can lead to feelings of security and autonomy to adjust treatment by the old person, even though this compromises TA[12,18-20]. However, part of the reported adjustments were listed as therapeutic strategies, itineraries adopted by users aiming at health and well-being[12,18-20]. Thus, reports that would apparently be framed only as non-adherent behaviors, in the practice of caring for the old person, are reinterpreted by individuals as protection and zeal in the face of some harmful responses triggered by treatments[26-29].

Negative effects arising from treatment, such as adverse reactions to medications, lead to discontinued use and/or interruption of therapy by the old person:

> "[...] I took it and it gave me a softness, a weakness... Dry mouth, drousiness.... It seems that it ended me. Boy, it gave me everything. No the courage to even walk, the medicine was so bad. [...] I stopped" (old person 30).

In this context, it is important that the old person's view of the therapeutic response is constantly investigated by health professionals, even to assess the relevance and the need to maintain or not the proposed intervention[18-20]. However, it is also known that some classes of drugs, even though they result in undesirable adverse reactions, are the best therapeutic options to treat certain cases[18-20]. Therefore, adverse reactions and the respective managements must be addressed in periodic health care, to estimate the risk-benefit ratio of the instituted therapy and, in parallel, to identify the impact of these effects on TA[26-29].

However, regarding the topic of effectiveness, it is also necessary to report to the old person that some pharmacological groups require some time to produce their effects and that TA is strategic to achieve therapeutic success[26-29].

The reduction or impairment of functionality perceived by the old person was also cited as a limiting aspect of TA:

> "[...] Well, I have some tranquilizers that I sometimes stop [...]. Because I work with scissors and stuff, and I get a little soft, you know? That

> hand... lets the scissors fall, everything falls. Then I stop taking for a moment. Then when I get really nervous, I start taking it again. That's it!" (old person 26).

The functionality of the old person is an essential aspect and is linked to autonomy and quality of life[27]. Medicines are elementary instruments in the practice of care, but because they precipitate debilitating adverse effects, in some cases, they reduce the functionality of the old person[18-20, 27]. Thus, when evaluating treatment, the impact of pharmacotherapy on functionality should also be considered by professionals, as well as old people should be encouraged to report these data in health care[27].

Medicalization

In addition to their clinical and therapeutic functions, medications can acquire other meanings in the lives of old people, and many of these go beyond their therapeutic role. Thus, some interviews reveal that health care is also understood by the act of "using medicines":

> "It is because the doctor had taken all the medicines away from me. I was out of medicine. Until that time, I was not taking any medication. I ordered that omega 3 for me to take, because it says that it is good..." (old person 20).

> "I don't sleep, it's no use, without the medication I don't sleep" (old person 07).

Medicalization can be defined as the translation or transformation of human conditions and behaviors into opportunities for health interventions[30-31]. This phenomenon proclaims the idea that "having a problem is the same as having a medication", which, in addition to being an overly reductionist view, contributes to the disregard of other dimensions involved in the illness process, such as the subjects' historicity, the psychological component, eco-social aspects, among others[31]. In addition, some disorders experienced by old people correspond to the physiological changes resulting from aging, which often does not imply the use of pharmaceutical interventions as the only resolution proposal[18-19].

Relationships with health professionals

It can be seen from the analysis of the interviews that the old person's appreciation of doctors contributes to TA:

> "I trust the doctor. They know it, right? If they give and explain how it is, it certainly doesn't hurt, I take it "(old person 12).

> "[...] I think that since doctors give that medicine, it's reliable, right? " (old person 16).

In this context, it is necessary to reflect the different concepts of adhesion. Used in works published in the English language, there is a differentiation between the concepts of compliance and adherence. Compliance "[...] suggests that the user passively follows the 'orders' of the health professional and that the treatment plan is not based on the alliance or contract established between them"[32]. It may even represent a user's agreement to his prescription, but, preliminarily, there was no consultation regarding his will[32]. Adherence, in practice, should be understood as a process that considers the participation and wishes of users in relation to their own treatments[2,32]. Therefore, it derives from this concept that adherence presupposes the active participation of the subjects who use the medications[2-6,18,19].

Still on the theme of the relationship between health professionals and old people, some aspects reinforce compliance instead of adherence itself[32]. The confidence in the prescription, the low knowledge about the therapy itself, the reduced clarity about the health-disease process and the number of medications translated as health care lead old people to obey the instructions they are given[30-32]. In this way, compliance is evident, even though these old people have autonomy in their lives[33].

In addition, it should be noted that adherence is an advanced stage in relation to the concept of compliance. In addition to discipline and routine consumption of medicines as a habit, which are

inherent to compliance, self-awareness and autonomy of the old person in relation to treatment are also necessary, elements that allow users to achieve a new dimension, that of adherence[4-6,32,33].

When asked about concerns about pharmacotherapy, old person 15 complained about the lack of guidance on medications:

> "If you ask, they explain, but if you don't ask..."(old person 15).

According to WHO[34], health literacy is the ability to obtain, assimilate and understand information in order to use it to maintain health effectively, being essential for the individual's empowerment. If there is no knowledge about the disease and its treatment, there is no possibility to reflect on gains (benefits) or losses in health independently.

However, it is also noteworthy that this type of education, despite being a fundamental component in health knowledge, is not yet fully incorporated into care practice[20]. Thus, in addition to the guidance given to the old person in response to spontaneous demands, it is essential that the health professional actively incorporates dialogues that promote health education, raising awareness of the importance of TA and self-care[18-20].

The fact that the interviews take place within the service's routine may have facilitated the recruitment of old people for the study. However, the concern and anxiety about medical consultations, which is the objective of old people going to the CMI, may have impacted the quality of the reports, which constitutes a possible limitation of this investigation.

CONCLUSION

For several reasons discussed in this article, it is notable that TA has multifactorial dimensions for old people. In general, it was possible to identify and understand the following factors associated with TA: changes in routine, difficulties in accessing medicines and health services, polypharmacy, effects produced by medicines, medicalization and relationships with health professionals.

While non-TA behaviors are verified, to some degree, intentionalities and adherence behaviors coexist. That is, "adherence" and "non-adherence" are phenomena experienced by old people simultaneously and that manifest themselves according to the life dynamics of individuals. Therefore, there are no "compliant/obedient" and "non-compliant/disobedient", but moments when the old person has a greater tendency towards one or the other behavior.

Regarding the reasoning about the care of old people and their medications, it is worth emphasizing the importance of understanding TA in a broad and comprehensive sense, since the simple categorization of old people into adherent and non-adherent does not offer enough inputs for care in health is resolute and singular. In this sense, recognition and understanding of the factors discussed above are important. In addition, the information collected contributes to academic production by deepening the theoretical discussions on the topic, improving debates from the perspective of those who best experience the phenomenon: users of medicines.

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Use of potentially inappropriate medications by old people in a retiree's association

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Abstract

Objective: to verify the prevalence of the use of potentially inappropriate medications and polypharmacy by old people. *Methods*: observational, cross-sectional, analytical, quantitative, population-based study in a retirees association. The data were collected from a questionnaire structured and created by the researchers and applied to the household. The association has 2,902 associates and underwent a stratified proportional sampling by gender, delimiting a sample of 203 old people, being 129 women and 76 men. *Results*: the mean age of study participants was 73.1+8.13 years (90%CI:72.2-74.0), ranging from 60 to 95 years. The majority declared being married 110 (54.2%), with elementary education 145 (71.4%) and family income between 2 and 4 minimum wages 100 (49.3%). The most frequent comorbidities were: diabetes *mellitus* 33 (16.26%), systemic arterial hypertension 137 (67.49%), hypercholesterolemia 24 (11.8%), arthritis/arthrosis 62 (30.54%), osteoporosis 41 (20.2%), depression 27 (13.3%), among others with non-significant values. When analyzing the use of continuous and occasional medications, a median of 6 drugs used by participants was found, with 1 being the minimum number and 18 being the maximum number. The use of polypharmacy was identified in 131 (64.5%) old people and the use of potentially inappropriate medications in 160 (78.8%). Regarding the use of polypharmacy, a significant association was found with: female gender (p=0.004); and having low education (p=0.017), and single marital status (0.027). *Conclusions*: in the context of pharmacoepidemiology, knowledge of the factors associated with the use of medicines may be useful to alert health professionals to the importance of identifying and monitoring the most vulnerable groups of old people in order to avoid the use of potentially inappropriate medications for the age group.

Keywords: Potentially Inappropriate Medication List. Health of the Elderly. Polypharmacy. Pharmacoepidemiology.

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INTRODUCTION

Although necessary, some medications have their use problems superior to their benefit and, in some cases, due to changes in pharmacokinetic and pharmacodynamic responses resulting from the physiology of the older person. Thus, some medications are considered inappropriate for this age group, either due to lack of evidence about therapeutic efficacy, whose risk is greater than the clinical benefits provided, while safer and more effective alternatives are available, or when the use of the medication may aggravate preexisting diseases[1].

It was thinking about the clinical improvement of older patients and with the objective of increasing safety in the prescription of medicines that the American geriatrician Mark Beers (1991), published the list of Potentially Inappropriate Medicines for the Older Person (PIMs), initially focused on the practice of medicalization in institutionalized old people[2]. This list was drawn up and established by experts who determined which drugs should be avoided and which should be prescribed with caution, or in reduced doses, and their use constantly monitored[3].

New updates to the Beers criteria were made in 1997 and 2003, which now include all levels of geriatric care. More recently, the American Geriatric Society (AGS) updated the criteria in 2012, also in 2015, which added two topics: a) medications that require dose adjustment, according to the patient's renal function; b) medication interactions that should be avoided in the older person due to the increased risk of adverse reactions[4].

The prevalence of inappropriate medication in old people depends on the year the criterion was used and the place where the study was carried out. For example, in a hospital environment, prevalence rates tend to be very high, such as 81.9% in a medium and high complexity hospital in western Paraná[2]. However, in Ribeirão Preto (SP), in interviews with old people in pharmacies in Basic Health Units, the prevalence was 59.2% using the 2012 criterion, while using the Beers criterion of 2003 it was 48%[5]. Following the Beers criteria of 2012, in the municipality of Viçosa (MG), with non-institutionalized old people approached by home interviews, a prevalence of 43.8% was observed[6].

The presence of polypharmacy among old people is very common due to the different pathologies that they present. A recently published study, part of the fragility research in Brazilian Old People (FIBRA), carried out in seven Brazilian municipalities, found a prevalence of polypharmacy in 18.4% of people over 65 years of age[7]. Also in nationwide research, PNAUM (national research on use and promotion of rational use) the prevalence of polypharmacy was 18.0%[8]. Some studies, such as the SABE study, in São Paulo (SP), found use of five or more medications in 36% of old people[9].

Following the list of criteria by Beers (2015)[4], the present study aimed to verify the prevalence of the use of potentially inappropriate medications and polypharmacy by old people.

METHOD

This is an observational, cross-sectional, analytical, quantitative, population-based study.

Considering the inclusion criteria, individuals aged 60 years or over, both sexes, participating in a retiree association, located in the municipality of Santo Ângelo, state of Rio Grande do Sul, Brazil, participated in the research. All participants signed the Free and Informed Consent Form. Bedridden patients, without physical and psychological capacity, who had a caregiver for more than 30 days were also included in the survey, but the interview was conducted with the caregiver.

The sample size was estimated through a sample calculation that defined a tolerable sample error of 5% and a confidence interval of 90%, considering a frequency of inappropriate medications of 30%, based on the study by Santos et al. (2013)[10]. Considering that the number of active members was 2,902 people, of which 1,724 are women and 1,178 are men, a sample size of 211 old people was determined, representing close to 7% of the number of members.

The selection of the old people was carried out using the stratified sampling technique proportional to sex. Thus, the number of 125 women and 86 men was obtained, but with some negatives of participation and substitutions, the final sample was 203 participants,

being 129 women and 74 men. The study sample was taken from the population, as the associates are identified and numbered in a list, so the selection of respondents was carried out by means of a simple online drawing of a number, using the site "sorteador.com", from the list provided by the association.

The research data were collected during home visits, through interviews, using a research instrument composed of a questionnaire of the sociodemographic profile (age, sex, marital status, education and income) and a questionnaire, modified from the Dáder[11] method, to characterize the pharmacotherapeutic profile of the study population. Comorbidities were computed based on self-reported diseases and reconciliation by the medications used in the review of the therapy used by the patient. During the interview, the patient's medication box or bag was requested and each medication present in the bag was reviewed, in addition to the medical prescriptions available at home.

For the purposes of analysis, some independent variables were grouped, among them: marital status was grouped in such a way that all individuals who had a partner were considered married and those who were separated/widowed were considered single; education was grouped into high and low education, and those with low education comprise individuals who have education ranging from illiterate to complete elementary school, and high education includes individuals who have incomplete high school education onwards.

For the classification of medications, Anatomical Therapeutic Chemical (ATC) was used in its first and second level[12]. And for potentially inappropriate medications, the Beers criteria updated by the American Geriatrics Society (AGS), version 2015[4] were used. The polypharmacy variable was defined as the use of five or more medications. Polypharmacy was determined based on the question: Could you show me the medicines you are currently using or taking?, as carried out in the Health, Wellness and Aging study (SABE)[9].

For statistical analysis of the intergroup data, the chi-square test was used, and Odds Ratio (OR) was used to calculate the risk. To test the association of dependent and independent variables, the analysis of the Poisson regression model was used. Prevalence ratios (PR) were estimated with their respective 95% confidence intervals (95% CI). The inclusion criterion was $p < 0.20$ in the adjusted analysis and the variables with a final model of $p < 0.05$ were considered maintenance, as having a statistically significant association.

In accordance with resolution 466/2012 of the National Health Council, this study was approved by the Ethics and Research Committee of the Integrated Regional University of Alto Uruguai e das Missões (URI), Santo Ângelo Campus (RS), under substantiated opinion no. 2,550,745. The research participants were informed about the work and the questionnaire, and signed the free and informed consent form.

RESULTS

The average age of the study participants was 73.1 + 8.13 years (CI90%: 72.2-74.0). Most were female (63.5%), married (54.2%), with elementary education (71.4%) and family income between two and four minimum wages (49.3%). Table 1 shows these characteristics.

As for the existing comorbidities, 94.6% (192/203) of the interviewees reported having at least one health problem diagnosed by the doctor. Among which, the most present were: systemic arterial hypertension 67.5% (137/203), arthritis/arthrosis 30.5% (62/203), osteoporosis 20.2% (41/203), diabetes mellitus 16.3% (33/203), among others with lower proportional values.

When analyzing the use of continuous and occasional medications, a median of six medications used by the participants was found, with 1 being the minimum number and 18 being the maximum number. The use of polypharmacy was identified in 64.5% (131/203) of the old people and the use of potentially inappropriate medications in 78.8% (160/203). Table 1 shows these characteristics.

Regarding the use of polypharmacy, a statistically significant association was found with: female gender ($p=0.004$); married ($p=0.027$) and having low education ($p=0.017$). It was also possible to identify that female individuals are 2.4 times more likely to

be polymedicated, as well as those who have low education are 2.3 times more likely to use five or more medications, characterizing polypharmacy, whereas the married marital status reduced polypharmacy with 0.5 PR (0.3-0.9). As noted in table 2.

Still, when doing the multivariate analysis by analyzing variable by variable, and what is its impact on the dependent variable. It is observed that the variable "use of potentially inappropriate medication" for old people is associated with polypharmacy, as described in table 3.

Table 4 shows the association between sociodemographic characteristics and the use of inappropriate medications, with no statistically significant association between them.

More than half of the sample uses medications considered potentially inappropriate, with 30.0% (61/203) of these individuals using at least one inappropriate medication and 48.8% (99/203) using two or more inappropriate medications, reaching the maximum number of six inappropriate medications used by a single person.

Table 1. Profile of patients (n=203) from a group of members of a retiree association in the municipality of Santo Ângelo, RS.

Variables	Total n (%)
Sex	
Female	129 (63.5)
Male	74 (36.5)
Marital status	
Married	102 (50.2)
Widower	55 (27.1)
Single	24(11.8)
Divorced	14 (6.9)
Stable union	8 (3.9)
Education	
Ensino Fundamental Incompleto	64.8 (359)
Incomplete Elementary School	129 (63.5)
Complete high school	31 (15.3)
Complete primary education	16 (7.9)
Incomplete high school	9 (4.4)
Illiterate	8 (3.9)
Complete Higher Education	6 (3)
Incomplete Higher Education	4 (2)
Family Arrangement	
Companion	81 (39.9)
Alone	39 (19.2)
Companion and Children	31 (15.3)
Children	27 (13.3)
Others	25 (12.3)
Income (in minimum wage)	
Cônjuge	63.4 (351)
2 to 4	100 (49.3)
< 2	81 (39.9)
4 to 10	21 (10.3)
>10	1 (0.5)

Table 2. Relationship between sociodemographic characteristics and the occurrence of polypharmacy among old people in a retiree association in the municipality of Santo Ângelo, RS.

Variable	Polypharmacy		p	OR (95%CI)
	Yes n (%)	No n (%)		
Sex				
Female	93 (72.1)	36 (27.9)	0.004	2.4 (1.3 - 4.4)
Male	38 (51.4)	36 (48.6)		
Marital Status				
Married*	63 (57.3)	47 (42.7)	0.027	0.5 (0.3 – 0.9)
Single **	68 (73.1)	25 (26.9)		
Education				
Low***	106 (69.3)	47 (30.7)	0.017	2.3 (1.2 – 4.3)
High****	25 (50)	25 (50)		
Family Arrangement				
Alone	29 (74.4)	10 (25.6)	1.000	1.7 (0.8 – 3.7)
With companion	101 (63.1)	59 (36.9)		
Income (in minimum wage)				
≤ 4	117 (64.6)	64(35.4)	0.260	1.0 (0.4 – 2.6)
> 4	14 (63.6)	8 (36.4)		
Inappropriate Medications				
Yes	118 (90.1)	13 (9.9)	0.00	6.5 (3.1 – 13.6)
No	13 (30.2)	30 (69.8)		

*Married groups all those individuals who have a partner regardless of marital status; **Single groups all those individuals who are single, widowed or separated; ***Low education comprises individuals who have education ranging from illiterate to complete elementary school; ****High education comprises individuals who have incomplete high school education onwards.

Table 3. Multivariate analysis between sociodemographic characteristics and the use of inappropriate medications and the occurrence of polypharmacy among old people in a retiree association in the municipality of Santo Ângelo.

Variable	Wald's chi-square	df	*p*
(Interception)	2.140	1	0.143
Sex	0.554	1	0.457
marital status	0.611	4	0.962
Education	1.429	6	0.964
Family arrangement	0.679	7	0.998
Income	0.920	3	0.820
Has inappropriate	4.611	1	0.032
Age	0.553	1	0.457

Dependent variable: polypharmacy; model: (interception), sex, marital status, education, family arrangement, income, have inappropriate, age.

Table 4. Relationship between sociodemographic characteristics and the use of potentially inappropriate medications by old people in a retiree association in the municipality of Santo Ângelo, RS.

Variable	Inappropriate Medications		*p*	OR (95%CI)
	Yes n (%)	No n (%)		
Sex				
Female	99 (76.7)	30 (23.2)	0.377	0.7 (0.3 – 1.5)
Male	61 (82.4)	13 (21.3)		
Marital status				
Married*	84 (76.4)	26 (23.6)	0.392	0.7 (0.3 – 1.4)
Single**	76 (81.7)	17 (18.3)		
Education				
Low***	123 (80.4)	30 (29.6)	0.328	1.4 (0.7 – 3.0)
High****	37(74.0)	13 (26.0)		
Family Arrangement				
Alone	32 (82.1)	7 (17.9)	0.666	1.3 (0.5 – 3.3)
With companion	124 (77.5)	36 (22.5)		
Income (minimum wage)				
<or equal to 4	143 (79.0)	38 (21.0)	0.789	1.1 (0.4 – 3.2)
> 4	17 (77.3)	5 (22.7)		

*Married groups all those individuals who have a partner regardless of marital status; **Single groups all those individuals who are single, widowed or separated; ***Low education comprises individuals who have education ranging from illiterate to complete elementary school; ****High education comprises individuals who have incomplete high school education onwards.

Table 5 describes and quantifies the inappropriate medications reported most frequently by the study population. In which the most found were those who work on the musculoskeletal system (76.1%), followed by those who work on the central nervous system (36.2%). Among the medications that act on the musculoskeletal system, there was a greater frequency in the use of the medication orphenadrine (20.3%). In addition, 26.6% of patients use proton pump inhibitors, with more than 90% of these, omeprazole.

Table 5. Proportional distribution of potentially inappropriate medications according to the anatomical group of the Anatomical Therapeutic Clinical (ATC) system used by the old people interviewed.

Potentially inappropriate system/medications	n (%)
Musculoskeletal	*155 (76.1)*
Orphenadrine, Citrate	41 (20.3)
Diclofenac	37 (18.2)
Carisoprodol	28 (13.8)
Ibuprofen	19 (9.3)
Cyclobenzaprine	8 (4.0)
Ketorolac	5 (2.5)
Etodolac	5 (2.5)
Central Nervous	*74 (36.2)*
Benzodiazepines	*32 (13.9)*
Acetyl salicylic acid> 325mg	12 (5.9)

to be continued

Continuation of Table 5

Potentially inappropriate system/medications	n (%)
2nd generation antipsychotics	9 (4.4)
Paroxetine	7 (3.5)
Zolpidem	7 (3.5)
Amitriptyline	7 (3.5)
Digestive and Metabolism	*69 (34.1)*
Proton pump inhibitors	54 (26.6)
Glibenclamide	6 (3.0)
Cardiovascular	*23 (11.5)*
Doxazosin	6 (3.0)
Amiodarone	5 (2.5)
Digoxin	5 (2.5)
Respiratory	17 (8.5)
Promethazine	6 (3.0)
Antibacterials for systemic use–Nitrofurantoin	*1 (0.5)*

DISCUSSION

The results of the present study point to the predominance of female participants, because in addition to the association having a much higher percentage of female members, some male members were not receptive to home visits, nor to the application of previously structured questionnaires.

In a study by Cassoni et al.[3], in São Paulo, the prevalence of female individuals was also observed, totaling 62.6% among the interviewees, thus showing that aging is female, which is related to higher life expectancy of the female population. One of the causes of this prevalence, possibly occurs due to the concern with health and the demand for medical assistance on the part of women, which leads to greater survival in relation to men[7,13,14].

In the study in São Paulo, the authors observed a predominance of participants with low education[3], and among the 1,254 respondents, 1,043 studied only up to the 7th grade, the present study identified that most participants had only elementary education, both complete and incomplete, characterizing low education among the old people. Regarding marital status, there was a predominance of married individuals. This data is frequent in the most developed regions of the country, as mentioned in the research by Neri et al[15].

As for the health condition of the participants, there was a predominance of systemic arterial hypertension, followed by arthritis/arthrosis, osteoporosis and diabetes mellitus. The prevalence of systemic arterial hypertension can also be observed in a study by Lopes et al.[16] in the city of Belo Horizonte (MG) that among 190 old people participating in the research, 65.8% reported being hypertensive, while 25.8% reported having diabetes mellitus.

With the biological aging process, there is also a greater vulnerability of old people, which generates a tendency to a higher frequency of medical interventions and, consequently, they become the age group that uses more pharmacological treatment as a therapeutic option[8,17].

It was estimated that 23% of the Brazilian population consumes approximately 60% of the medications available on the market[17], with old people being the main users of these medications. In the present study, we found a median use of six drugs per interviewee, which differs in comparison to the study carried out by Lopes et al.[16], in which a median of four medications was found. Possibly because Lopes et al.[16] analyzed hospital records of medications used at home, unlike the present study, a home visit was carried out including non-prescribed medications, which may have increased the detection of medication use. Another study carried out in São

Paulo found an average of 3.5 medications by old person belonging to a private plan[18], however the count was based only on the prescribed medications, unlike the current study.

To improve therapy, the use of multiple medications is commonplace, and many older people use five or more medications, which characterizes polypharmacy. In the present study, polymedication is an alarming data, which was found in most of the participants, which justifies the fact that many have potentially inappropriate medications.

Studies have observed polypharmacy in 27% of outpatients living in the South Region[19] and 33% in old people (over 60 years) in the city of São Paulo (SP)[3], and 36% in individuals over 65 years also in São Paulo[6]. However, some studies, such as the one conducted by Hanlon et al.[20], demonstrated up to 74% of polypharmacy, which is compatible with the present study.

In the present study, variables such as: female gender, single marital status and low education are directly associated with the use of polypharmacy. A study by Carvalho et al.[9], in the city of São Paulo (SP), also showed a strong relationship between the variable female gender and polypharmacy, as well as another study conducted in the city of Aiquara (Bahia)[13]. Low education has been presented in some studies as a criterion for polypharmacy and may also be associated with socioeconomic status[7,10,17].

The use of polypharmacy was statistically associated with the use of inappropriate medications, since polymedicated individuals are more likely to use medications whose harm is greater than the benefits. Some studies have already obtained results that demonstrate a strong relationship between polypharmacy and use of inappropriate medications[3,5].

The use of potentially inappropriate medications following the criteria of Beers (2015)[4] was evidenced in most cases, being a very worrying fact, since the use of these medications causes considerable damage to the health of the old person.

The prevalence of inappropriate medications is higher than that found in some studies using the 2003 Beers criteria as performed in Goiânia, which found a prevalence of 24.6%[10]. Other Brazilian studies using the 2012 updated criteria have shown higher prevalences. In one of them, carried out in Ribeirão Preto (SP), the prevalence found was 59.2% using the 2012 criteria, but when using the 2003 Beers criteria the same study found 48%[5]. Another study carried out by Martins et al.[6], following also the 2012 Beers' criteria, with 621 non-institutionalized old people, approached by home interviews, in the municipality of Viçosa (MG) showed a prevalence of 43.8%. What appeals to us in the variation of these cases presented is that the Beers list of 2003 and 2012 were taken into consideration, while the present research is based on the 2015 Beers criteria[4], which included the class of pump inhibitors. protons, a therapeutic class widely used by old people. The difference in prevalence can also be explained due to the choice of samples and the type of design used in each study, as some studies used patients from hospitals or outpatient clinics, only prescription medications, in addition to the number of research participants.

The inappropriate medication most used by the population of the present study was orphenadrine, a muscle relaxant belonging to the class of the musculoskeletal system, used in combination with dipyrone and caffeine. The presence of this medication, together with others belonging to the group of medications that act on the musculoskeletal system, may explain the fact of the second highest prevalence of individuals with arthritis/arthrosis, followed by the third highest prevalence, osteoporosis. Old people with these conditions tend to look for more medications that act to relieve pain immediately. Most muscle relaxants are poorly tolerated by old people because some have adverse anticholinergic effects, sedation, increased risk of fractures, and efficacy in doses tolerated by old people is still questionable[4]. These medications are marketed in Brazil without the need for a prescription, which allows their use by self-medication[3].

A survey carried out by Manso et al.[18] with 2,500 older patients linked to a private health plan, all with chronic degenerative diseases and accompanied by doctors of different specialties, in the city of São Paulo, during the years 2012 and 2013, obtained the prevalence of potentially inappropriate medications was 33.4%, and the most

prescribed inappropriate medications were those related to the musculoskeletal system, a fact that is similar to the present study.

The second class of medications most found among respondents were benzodiazepines, medications that act on the Central Nervous System. It is known that older people have increased sensitivity to benzodiazepines and decreased metabolism for long-acting agents. In general, all benzodiazepines increase the risk of cognitive loss, delirium, falls, leading to fractures[4], which consequently lead to hospitalization, leading to clinical complications that lead to death. Other studies[1,22] identified benzodiazepines as the most used among the interviewed participants.

The list of medications potentially inappropriate for old people is a strategy to reduce the number of adverse effects related to the patient's age, such as mental confusion, frailty and mortality. It is also a way of causing fewer medication interactions to occur that can cause long-term damage[4].

The main limitation of this study was the design that did not allow the participants to be monitored, in order to assess and study possible clinical outcomes related to the use of polypharmacy and inappropriate medications for old people, the interview in a single moment, ends up bringing limitations to greater knowledge of the patient's reality and symptoms, in addition to not creating a bond.

Since then, several studies have been developed based on these criteria, taking into account that the frequency of inappropriate medication prescription can serve as quality indicators of the services offered in establishments focused on the health of older patients[6,7].

Based on the realization of this study, it is extremely important to highlight that professionals are aware of the possible consequences of the use of inappropriate medicines in the old people age group, in view of the aging process of the population that has become increasingly evident in recent years. We also lack the elaboration of national prescription criteria that include the medications available in Brazil. Special attention should be paid to old people who use polypharmacy. We also highlight the need to include in the RENAME (National List of Essential Medicines) specific lists of medicines more suitable for use in old people in SUS, as well as expanding the availability of such medications for SUS users[17].

CONCLUSION

Potentially inappropriate medications are widely used by the old people people studied. There is an association between polypharmacy and the use of inappropriate medications. Polypharmacy, in turn, is associated with females, low education and single people, however, the use of potentially inappropriate medications did not show any relationship.

The need for further studies related to factors related to the use of polypharmacy and medications potentially inappropriate for old people in other populations is suggested, as well as follow-up studies (longitudinal), in order to assist professionals about the care for old people.

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Contributions of art therapy to promoting the health and quality of life of older adults

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Abstract

Objective: to analyze the contributions of art therapy in promoting the health and quality of life of older adults. *Method:* an integrative review was carried out using the health descriptors: "health promotion", "art therapy", "quality of life" and "aged". Complete original articles were selected, in Portuguese, English and Spanish, and the period of publication of the articles was not defined to obtain a greater number of articles published. The search and selection of the articles included were carried out by two reviewers from November 2019 to April 2020. *Results*: of the four articles selected to compose the sample, two were written in English and two in Portuguese. The articles included were published between 2007 and 2014, with two indexed in Scopus, one in the Scopus / PubMed / BVS databases and one in the CINAHL database. The expressive resources used in the art therapy process were varied: painting, drawing, modeling, body expression, among others. *Conclusion:* the use of art therapy for health promotion in older adults demonstrated benefits in reducing negative factors of an affective, emotional and social nature. The articles analyzed suggest the positive effect of art therapy on quality of life in older adults.

Keywords: Health Promotion. Art Therapy. Quality of life. Health of the Elderly.

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INTRODUCTION

In recent years, the global growth of the older population has highlighted the importance of guaranteeing a better quality of life for this group. To do so, it is important to consider the various changes that arise from the aging process, such as physical, psychological and social alterations. These changes may directly affect cognitive and motor functions and, thus, interfere with the quality of life of this population[1].

The quality of life of the older population is associated with the preservation of their functional capacity and autonomy. Therefore, the decline of such capacities is a risk for dependency, morbidity and mortality in this population[2].

In order to improve the quality of life of the older population, the World Health Organization (WHO) suggests that policies and programs for active aging are implemented, aimed at improving the health, participation and safety of older citizens[3].

Thus, health promotion initiatives are important for controlling common health problems in this age group. Such actions allow older adults to live with the limitations or diseases they may experience, as they enable a more positive perspective on one's personal and social life[4].

Activities that stimulate the sensory, cognitive and motor functions of older adults are important to protect the intellect and reduce its deterioration. These activities enable the maintenance of the individual's cognitive abilities, ensuring a better quality of life in old age[5].

In this context, art therapy is a tool that can be used to promote the health of older adults, since its potential for stimulation contributes to improving social relationships and the self-esteem of this population[6].

Art therapy is defined as a therapeutic process that uses art as an expressive process for self-knowledge and the expression of conflicts and internal emotions. It is a therapeutic resource that absorbs knowledge from different areas, and is therefore a transdisciplinary practice, which seeks to recuperate the individual in their entirety through processes of self-knowledge and transformation[7].

The images produced through the expressive processes in art therapy are internal projections and personal representations. They allow the individual to express themselves in their own way, giving new meaning to their existence. It can be said that art therapy, when combined with expressive processes, represents a revealing and inspiring pathway. Such a therapeutic pathway helps individuals to believe, challenge, reconstruct, create and express emotions and feelings, which are often repressed in older adults[8].

Given the above, the important role that art therapy can play in the quality of life of older adults is clear. Understanding the scientific production on the benefits and contributions of art therapy in aging will allow the identification of possible gaps in knowledge and guide new research that contributes to the subject. Thus, this literature review aimed to analyze the contribution of art therapy to promoting health and quality of life for older adults.

METHOD

An integrative literature review was performed, with the purpose of systematizing knowledge about the contributions of art therapy to the quality of life of older adults. This study followed the recommendations of Galvão[9], which establish six stages: 1) Identification of the theme and selection of the hypothesis or guiding question; 2) Construction of inclusion/exclusion criteria for studies and sampling and literature search; 3) Categorization of studies defining the information to be extracted from those selected; 4) Full reading of the selected studies; 5) Interpretation of results; 6) Presentation of the review.

The guiding question of this review was: *what contribution does art therapy make to promoting the health and quality of life of older adults?*

The inclusion criteria established were: complete original articles that responded to the research question, published in Portuguese, English and Spanish. The period of publication of the articles

was not defined, with the goal of identifying a greater quantity of articles and, thus, verifying the number of publications over time. The exclusion criteria were: theses, dissertations, books or book chapters, editorials, newspaper articles, integrative or systematic reviews of literature, reflective studies, reports of experiences and reviews.

The research was carried out in the following databases: VHL (Virtual Health Library); SciELO; CINAHL (Cumulative Index to Nursing and Allied Health Literature); LILACS (Latin American and Caribbean Literature in Health Sciences); BDENF (Nursing Database); MEDLINE/PUBMED (Medical Literature Analysis and Retrieval System Online); IBECS (Spanish Bibliographic Index of Health Sciences); SCOPUS; CUIDEN (Bibliographic Database of the Fundación Index); COCHRANE (Cochrane Library).

The search and selection of articles included in this review was carried out by two reviewers and was performed independently, from November 2019 to April 2020. Descriptors indexed in Health Sciences Descriptors (DeCS) and Medical Subject Headings (MESH) were used, with the following descriptors selected: in Portuguese, *promoção da saúde, terapia pela arte, qualidade de vida, idoso*; in English, health promotion, art therapy, quality of life, aged; and in Spanish, *promoción de la salud, terapia con arte, calidad de vida, anciano*.

Table 1 shows the search strategy applied with the descriptors, using the Boolean operator "AND". Using the four descriptors "health promotion" AND "art therapy" AND "quality of life" AND "older adults", 28 articles were found.

After reading the titles and respective abstracts of the 28 articles found, ten were selected and responded to the research question. Of these ten articles, five were duplicated in the databases and were excluded, resulting in a final sample of five articles, which were read in full.

Chart 1. Search strategy for articles in data bases. Recife, Pernambuco, Brazil, 2020.

Descriptors	Health promotion AND Art therapy	Health promotion AND Art therapy AND Quality of life	Health promotion AND Art therapy AND Quality of life AND Older Adult
Database			
SciELO	5	1	1
CINAHL	49	2	1
LILACS	2	0	0
BDENF	1	0	0
MEDLINE/PUBMED	240	23	8
IBECS	1	0	0
SCOPUS	270	45	13
CUIDEN	53	8	0
COCHRANE	1	1	1
TOTAL	669	87	28

Source: the author.

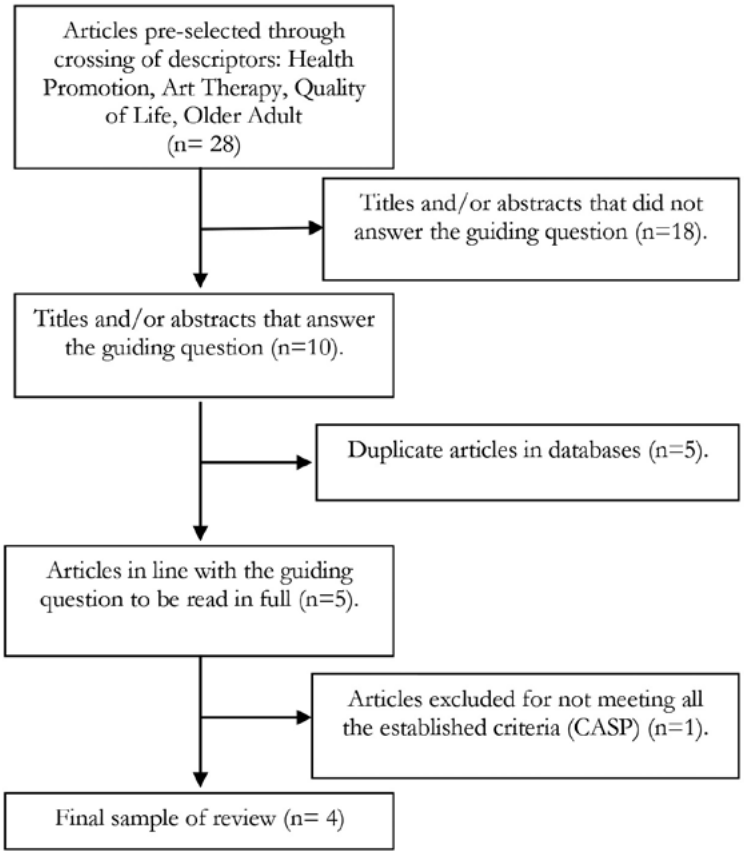

Figure 1. Flowchart of article selection. Recife, Pernambuco, Brazil, 2020.

The articles were evaluated for methodological rigor, using the standardized form of the Critical Appraisal Skills Program (CASP)[10]. This instrument was chosen due to its effectiveness in assessing the quality of articles with both a quantitative and qualitative approach. The form has a checklist with ten questions, each of which can be assigned a score (1 point), giving a total score of between zero to ten. A score equal to or greater than six (classification A) indicates that the study should be included in the review, while a score equal to or less than five (classification B) represents low methodological rigor, and recommends that the study should be excluded. At this stage, one study was excluded, since it did not meet all the criteria established for level A, giving a final sample of four articles.

To gather and synthesize information regarding the contribution of art therapy to promoting the health and quality of life of older adults, the instrument constructed and validated by Ursi[11] was used, in which the following information was recorded: name of study; authorship; institution; year of publication; study objectives; methodological design, sample characteristics; level of evidence, results and conclusions.

The selected articles were evaluated for level of evidence, according to the hierarchical classification adopted by Stillwell et al[12], as follows: Level I (systematic review or meta-analysis); Level II (randomized clinical trial); Level III (clinical trial without randomization); Level IV (cohort or case-control study); Level V (systematic review of descriptive and qualitative studies); Level VI (descriptive or qualitative studies) and Level VII (opinions of authorities and/or reports from specialist committees).

RESULTS

Table 2 shows the selected studies, categorized as follows: Author/Year, Objective, Method/Level of Evidence, Art Therapy Used and Results.

Of the four articles analyzed in the final sample, two were in English[13,14] and two in Portuguese[15,16.] One article was published in each of the following years: 2014[13], 2013[14], 2010[15] and 2007[16]. In relation to the databases, two were indexed in Scopus[14,16], one in Scopus/PubMed/BVS[13] and one in CINAHL[15]. No articles were found in the LILACS, BDENF, IBECS, SCIELO, CHOCHRANE or CUIDEN databases.

In terms of methodological design, two articles used a quantitative approach[14,16], one a quantitative-qualitative approach[13] and one a qualitative approach[15]. In relation to level of evidence, three articles were classified as level VI[13,15,16] and one as level II[14].

In relation to the expressive resources used in the art therapy, three articles described the use of painting, drawing, collage, modelling and weaving[13-15]. Body expression was used in two articles[14,16]. The resources of active imagination, tales, myths, body awareness, dramatization and creative writing were reported in one article[15] and music and the performing arts appeared in another[16]. The results are shown in Table 2.

Chart 2. Synthesis of publications on "Contribution of Art Therapy to the Promotion of Health and Quality of Life of Older Adults". Recife, Pernambuco, Brazil, 2020.

Author/Year	Objective	Method/Evidence	Art Therapy Used	Results
Oepen R, Gruber H[13]. 2014	Analyze the contribution of Art Therapy to the well-being of self-help groups with Burnout syndrome.	Qualitative quantitative exploratory study. 26 older adults (2 men and 24 women) VI	Painting, drawing, collage, modelling and weaving.	Quantitative analysis: 83% increase in current and habitual well-being. Qualitative analysis: better acceptance of environment, increased self-esteem and greater motivation for work.
Kim SK[14]. 2013	Analyze the effects of Art Therapy on healthy aging.	Randomized controlled study. 50 older adults (3 men and 47 women) II	Painting, drawing, collage, modelling, weaving and body expression.	Intervention using Art Therapy positively promotes healthy aging, with a reduction in negative emotions, improved self-esteem and decreased anxiety.
Aguiar AP, Macri R[15]. 2010	Describe the contribution of Art Therapy to the quality of life of older adults.	Qualitative Intervention study. 14 older adults (women) VI	Painting, drawing, collage, modelling, weaving, active imagination, tales, myths, body awareness, dramatization and creative writing.	The interventions carried out allowed the reduction of the frequency or intensity of depressive symptoms, contributing to self-knowledge, the recovery of self-esteem and confidence in older adults, as well as increasing their familial and social integration.
Castro PC, Tahara N, Rebelatto JR, Driusso P, Aveiro MC, Oishi J[16]. 2007	To evaluate the influence of the arts programs of the Open University of the Third Age and the Geriatric Revitalization Project (or REVT) on the quality of life of older adults.	Quantitative Intervention study. 70 older adults (4 men and 67 women) VI	Body expression, music and performing arts.	Statistically significant improvement (p= 0.004) in the level of quality of life, according to the WHOQoL-Bref. Statistically significant improvement in the psychological (p= 0.003) and environment (p= 0.0001) domains. Significant increase (p= 0.013) in the score for the domain of general health.

DISCUSSION

The expressive languages used in the art therapy interventions, described in the articles of this review[13-16], were diverse and involved as resources: painting, drawing, collage, modelling, weaving, body expression, active imagination, tales, myths, body awareness, creative writing, music and performing arts. Thus, there is a wealth of resources that can be used in the art therapy process so that older adults are able to express feelings and emotions that interfere with their physical, mental, social and spiritual well-being.

The expressive resources of painting, drawing, collage, modelling and weaving were used in different interventions to assist in the well-being of self-help groups with Burnout syndrome[13], the effects of art therapy on healthy aging[14] and to analyze the contribution of art therapy to the quality of life of older adults[15]. The results suggest positive effects from the use of these therapeutic resources in three studies in this review.

According to Silva[17], painting has a liberating and cathartic function, due to the fluidity of the paint and its subtlety, through which emotions and feelings are addressed therapeutically, as it is in the energetic movement of painting that the unblocking, freeing and expansion of consciousness occurs. This expressive resource allows older adults to work on motor coordination, awakening sensitivity, intuition and the creative and imaginative spirit, providing greater knowledge of themselves and the world. This favors the development of a greater perception of the limits and potentialities that are present in the aging process.

In the art-therapeutic process, collage is an expressive organizing, structuring and integrating resource, as it allows cutting, breaking down and assembling, favoring the act of recreating. This resource makes it possible to work on transformation, death and rebirth; the end of one stage and the beginning of a new stage, issues present in the life of the older adult. Loiola and Andriola[18] describe how collage is a technique that favors starting from already familiar things that then open up to new possibilities, resulting in the creation of a new scenario – the portrait of an existential moment of possibilities – that can be accessed and brought into the reality of each older adult. This possibility of openness allows older adults to resignify emotions that improve their quality of life.

Moraes et al.[19] state that modelling is an activity that stimulates sensory function, which is often impaired in old age, and works with three-dimensional organization. When older adults touch clay, they establish an intimate contact with the material and stimulate their creativity, which allow them to create forms and enlarge the imaginary world. The materials used in this expressive modality can be: clay, papier-mâché, plaster, plasticine, colored modeling clay, craft dough. These resources enable the individual to get in touch with their emotions and feelings, promoting self-knowledge.

The study by Araujo[20] describes how weaving is another resource used in art therapy that helps to re-signify life situations, as when mistakes are made with fabric, the older adult must redo his or her movements. The recognition of error and the desire to correct it makes one reflect on life and leads to the awareness that there is always time to start over in an attempt to get something right. It is another possible manner of finding the thread in the tangles of the internal contents of life[20]. This resource can allow the older adults to recognize themselves in the aging process as the integral beings that they are.

Body expression, as a therapeutic resource, was used in a study[14] that analyzed the effect of art therapy on healthy aging and in a study[16] which evaluated the influence of the arts programs of the Open University to the Third Age and the geriatric revitalization project on the quality of life of older adults. The authors concluded that body expression and the influence of art programs were resources that improved the quality of life of older adults, reducing negative emotions, improving self-esteem and decreasing anxiety.

When working with the body, the older adult directly connects with their affective memories, bringing remembrances of sensations and forgotten content. Body expression is one of the expressive channels of art therapy, as it favors experiences that lead to body awareness and seeks the organization and reorganization of movement through creativity[21].

In addition to the use of resources such as: painting, drawing, collage, modelling, weaving and body expression, activities such as active imagining, tales, myths, body awareness, dramatization and creative writing were used as contributions of art therapy to the quality of life of the older adult[15]. Music and the performing arts were also used to assess the influence of arts programs on the quality of life of such adults[16]. In both studies[15,16], the benefits of these resources for promoting the health of older adults were observed.

The use of music and performing arts allows older adults to experience verbal, non-verbal and bodily experiences that permit them to recover affective memories and express emotions[22]. The relationship between music and therapeutic goals is sustained by making older adults relive their memories, giving them the opportunity to experience a catharsis. In this process of awareness, there will be an opportunity to remake themselves, promoting their quality of life.[23].

All the studies[13-16] pointed out the satisfactory effects of the use of art therapy, regardless of the types of expressive resource employed. These results corroborate the findings of the study by Assunção et al.[24], showing that this form of therapy can be developed through different expressive modalities such as: theater, dance, poetry, music, literature and visual arts. Through these resources, it is possible to work with non-verbal languages – such as sound, body and materials – in older adults.

The multiple expressive modalities that art therapy uses facilitate the search for self-knowledge that helps to awaken sensoriality and perception in older adults[25]. It is important to stimulate cognitive, sensory and motor functions, aiming to preserve, in older adults, a degree of autonomy and independence, promoting a better quality of life.

In relation to the positive contributions of art therapy in promoting the quality of life of older adults, two of the studies analyzed[14,16] concluded that there was a statistically significant improvement in the psychological domains and those related to the environment, according to the WHOQoL-Bref.

Among the benefits of using art therapy, a study[13] revealed a significant increase in current and habitual well-being among older adults, reported from the participants' narratives about improved acceptance of the environment, increased self-esteem and motivation to work. In two studies[14,15], a reduction in the frequency and/or intensity of depressive symptoms and anxiety, improvement of self-knowledge and the recovery of self-esteem and self-confidence in was noted.

Thus, the benefits of art therapy to promote the well-being of older adults was observed, since it results in changes in the affective, interpersonal and relational fields; demonstrating improvement in emotional balance[26].

Art therapy contributes to the improvement of the understanding of emotions and feelings experienced in the face of life's challenges. This statement was evidenced in the results of the studies[13-16] through the narratives of the participants, who highlighted an improvement in their self-esteem, their interpersonal relationships and their way of seeing life, thus resulting in a feeling of general well-being.

The studies[13-16] revealed that, through the use of art therapy, participants experienced their difficulties, conflicts, fears and anxieties with less suffering, influencing the improvement of their quality of life.

Through artistic expression, the power of the self-knowledge that art therapy provides to older adults was demonstrated[13,15,16]. Valladares[27] emphasizes that art therapy is a therapeutic process that aims to salvage the integrality of older adults, through self-knowledge and transformation processes. It is through the process of creation that older adults can expand knowledge of themselves and others, increase their self-esteem and deal better with the changes of the aging process[28].

Thus, the creative processes constitute a revealing and inspiring pathway that allow older adults to get in touch with their possibilities of believing, challenging, reconstructing, creating and expressing emotions, feelings and life stories.

The results of the studies[15,16] revealed an improvement in the interpersonal and family relationships of older adults, preventing social isolation. In old age, it is common to lose one's social role, which leads to feelings of incapacity and isolation for older adults. Group experiences, through artistic expression, help such adults with a sense of belonging and acceptance of their own history

Art therapy enhances the individual's uniqueness, as it allows older adults to follow a path of expression, communication and synthesis of their personal experience. By representing both conscious and unconscious content, artistic expression contributes to integrating the affective and cognitive aspects of health and disease, and is therefore beneficial in expanding the understanding of the self and, in the same way, improving the quality of life of older adults[29].

A limitation of this study is that few studies published in indexed journals investigating the theme of the effects of art therapy on the quality of life of older adults were found, resulting in a small final sample. Thus, it is suggested that further investigations on the benefits of art therapy for promoting the quality of life of older adults are carried out.

CONCLUSION

A small number of publications with the subject of the use of art therapy to promote the quality of life of older adults were found on the databases searched, demonstrating the need to explore the theme further, as the benefits of art therapy for the older population were evidenced.

The interventions involving art therapy revealed the unfolding of the intrapsychic processes present in older adults and demonstrated how their use favored the acceptance of the changes that occur during the aging process, contributing to well-being and quality of life.

It was found that the expressive resources employed: painting, drawing, collage, modelling, weaving, active imagining, tales, myths, body awareness, dramatization, creative writing, body expression, music and performing arts, constituted an approach in which older people were able to express themselves and talk about their feelings and how they experience and perceive the world in imagery. This results in moments of profound reflection that will often only be noticed when a therapist requests that the individual talks about the image created. At that moment, the conscious level is reached and the transformation begins, as the older adult appropriates their own internal contents, coming to know themselves and become an active subject in the art therapy process.

Therefore, it is important to expand studies on the subject, as such ludic, recreational interventions can lead to moments of catharsis, resulting in the recreating of the subject and a better quality of life.

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Influence of the level of education in older women on gains in executive function after dual task training

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Abstract

Objective: Investigate the influence of education levels on gains in executive function after dual-task (DT) training. *Method:* Exploratory study carried-out with 31 old women, who had ≥3 years of education and without cognitive deficits, as screened by the Mini-Mental State (MMS). The participants were distributed in two groups: group 1: 3 to 7 years of education (n=17) and group 2: ≥8 years of education (n=14). Measures of executive function (*Stroop, Addenbrooke's Cognitive Examination* - Revised (*ACE-R*), and Trail Making Test – B (B-Trails)) were obtained before and after training. The intervention protocol consisted of three weekly sessions of 50 minutes each and included cognitive and motor DT training, associated with walking, over 12 weeks. *Results:* ANOVA indicates that DT training improved the performance of Stroop (F=5.95; p=0.02) and ACE-R (F=18.33; p<0.0001) tests, regardless of the education level. The effect of the ACE-R test group (F=14.65; p<0.001) and B-Trails (F=18.74; p<0.001) was verified. In none of the investigated tests, the interaction effects between groups and time (0.04<F<2.14; 0.15<p<0.95) was observed. *Conclusion:* DT training has the potential to generate effects and can positively improve the executive function of older women, regardless of educational level and may be used within clinical practice, aiming at improving executive function.

Keywords: Dual task training. Executive Function. Health of the Elderly. Educational Status.

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INTRODUCTION

The aging process occurs in a dynamic, irreversible and natural way, which can generate cognitive, motor and functional losses. The way in which the individual will age and go through this process of change depends on the basic skills acquired during the years and also on the environment in which he is inserted[1], thus relating to the cognitive reserve acquired throughout life. Such reserve consists of the junction of innate intelligence with the aspects acquired through the educational and occupational processes, generating functionally more efficient cognitive networks[2].

The educational level can be related to the level of cognitive decline considered normal from the aging process, so that the higher the individual's education, the slower the cognitive aging, due to his greater cognitive reserve[3]. Therefore, the cognitive reserve seems to have a neuroprotective function to age-related cognitive decline[3]. In addition to the educational level, individuals with a pre-morbid intelligence coefficient, more challenging occupational activity and leisure activities in old age have a lower risk of developing dementia and may also mitigate cognitive decline related to increasing age[2].

The activities of spatial and working memory, sustained visual attention, episodic memory and learning, reaction time, and processing speed, which are most affected by aging, can be stimulated and thus protected by greater education, making the processing of executive functions more effective[2,3]. The lower level of education can be associated with lower performance in tasks of sustained visual attention, learning, episodic memory, reaction time and working memory demonstrated in a study with older Brazilians[4]. Therefore, it is expected that individuals with a higher level of education obtain better test scores compared to those with less level of education.

Executive functions include a series of cognitive processes, such as planning, self-monitoring, flexibility, inhibitory control and sequencing of actions, favoring a good performance of activities of daily living (ADL), whether simple or complex[5]. Executive functions are made up of more complex cognitive functions that are directly related to goal-directed behavior and the solution of new problems, in addition to time-scale planning, cost and benefit analysis in the decision-making process and behavioral self-regulation[6]. Furthermore, they depend on the existing connections between the prefrontal cortex and subcortical structures, and the main circuits[7] involved are: the dorsolateral prefrontal cortex, responsible for planning, problem solving, self-regulation, cognitive flexibility and operational memory; the anterior cingulate cortex, responsible for controlled attentional processes, selection of responses and motivation; and the frontal orbit cortex that is directly linked to social behaviors[7,8]. The cognitive aging process can generate a progressive decline in the efficiency of these circuits and, consequently, in the ability to perform tasks related to executive functions, causing, in some cases, functional impairment[9].

The sedentary lifestyle in conjunction with cognitive inactivity has been associated with an increased risk of aging-related cognitive decline[10]. Therefore, regular physical activity and active lifestyle are considered neuroprotective and important for reducing or slowing cognitive decline, since they generate biochemical and structural changes in the brain through brain neuroplasticity[11].

Among the intervention possibilities to be adopted in clinical practice, the Dual Task (DT) training, which consists of the simultaneous performance of two tasks, one of which may be cognitive and the other motor or two motor tasks[12], can be an interesting and beneficial approach for old people[13]. Training studies using DT have shown a relationship with mechanisms for improving gait characteristics that can lead to falls, such as gait variability in activities with divided attention and balance, and in preventing falls[9,13]. In addition, there are studies that show the influence of this training in cases related to mild cognitive decline, cases of moderate dementia, neurological conditions such as Parkinson's and Stroke, osteoarthritis and depression[13-15]. DT is normally used in the evaluation and training of executive and gait functions in the old people population[13]. However, the literature is still scarce when relating DT training to executive function in older women. Cognitive training has positive effects

on issues related to memory and measures of quality of life, being transferable and beneficial for ADL[16]. The systematic review by Kahya et al.[17] supports the fact that neurodegenerative changes resulting from normal aging or those with disease are associated with changes in the activation of the neural network that result in increased brain activity specifically in the prefrontal cortex. These activation changes were demonstrated in DT and balance activities[17]. This fact demonstrates that it may be through this stimulation route, through the use of DT, the optimization of rehabilitation interventions for cases of normal and pathological cognitive decline, along with changes in gait and balance.

Given the above, through this study, we sought to investigate the influence of education on executive function gains after training with DT. The hypothesis was that different levels of schooling could influence executive function gains after an intervention using DT training. The observation of executive function in older women, in the two levels of education analyzed (high and low), can contribute to the assessment of whether a gain in these functions would be identified in both groups and whether any of them would show better results after DT training. This would imply the most appropriate use of this intervention, identifying the public that would benefit from this training, in addition to presenting the validity of DT in improving executive functions, minimizing cognitive decline related to aging.

METHOD

This is an exploratory study of secondary data from a prospective randomized clinical trial, entitled Effects of aerobic and dual-task training on mobility, gait, balance and cognition in older women in the community: a controlled clinical trial[18]. This was approved in October 2011 by the UFMG Ethics and Research Committee (ETIC0448.203.000-11), and protocol registered with the National Clinical Trials (registration number: NCT02185157; available at: www.clinicaltrials.gov). All research participants read and signed the Free and Informed Consent Form. The research was conducted at the Physiotherapy Department of the School of Physical Education, Physiotherapy and Occupational Therapy (EEFFTO) of the Federal University of Minas Gerais, in the period between October 2011 and October 2013.

The inclusion criteria of the study were old age (female), between 69 and 79 years, with the aim of addressing individuals with a higher probability of physiological neurodegeneration, education equal to or greater than three years and without alterations in the cognitive functions tracked by the Mini Mental State Examination(MMSE), considering the scores: ≥23 for older women with 3 years of education, ≥25 for the educational stratum of 4 to 7 years and ≥26 for participants with 8 years or more of education[19].

The sample consisted of 31 older women, members of the intervention group of the clinical trial that gave rise to this study, recruited from the community through advertisements on public transport and lists of participants in previous works carried out at the Physiotherapy Department. Considering that this study is a secondary analysis, an analysis of the power reached for each of the analyzes presented was performed. We chose not to include male participants, since they tend to show less interest and adherence to group activity programs. Participants were divided into two groups based on the educational criteria, with group 1 having low education (3-7 years; n=17), and group 2 with high education (≥8 years; n=14). The cutoff range chosen for schooling was eight years from the Brazilian average for this age group, according to IBGE data in 2016[20].

The old women who presented involvement of the musculoskeletal system, to the point of interfering in the performance of physical activities; uncorrected auditory and visual changes, which prevented the identification of commands; factors that could compromise the functioning of the central nervous system, such as administration of medications with action on the central nervous system that interfere with memory and motor performance, such as benzodiazepines, hypnotics and anticonvulsants, or that were diagnosed with chronic-degenerative neurological diseases, were excluded from the study.

Clinical, demographic and functional characteristics were collected by the physiotherapy and psychology team through a semi-structured questionnaire, with open questions, prepared by the authors, observing social aspects (age in years,

address, education, marital status, number of children, occupation, income, who lives with), use of regular medications in the last 3 months, comorbidities present, supervised physical activity (which type of activity and how many hours per week), occurrence of falls in the last 6 months (number of falls, need to seek a health service and be hospitalized, occurrence or not of fractures, in addition to functional disability after the fall), subjective perception of memory (difficulty remembering recent facts), aspects related to sleep (makes use of medication to sleep, wake up in the middle of the night and do not sleep anymore, stay awake most of the night, delay to sleep, sleep poorly at night and if it is necessary to sleep during the day to recover, in cases of positive response it was asked how many hours of sleep) and subjective perception of the current state of health (excellent, very good, good, fair, very poor or none of the above).

In order to characterize the sample, the Falls Efficacy Scale - International (FES-I-BRAZIL)[21] instruments were also used, related to self-efficacy related to falls, with the cut-off point ≥23 points and the Geriatric Depression Scale (GDS)[22], to track mood changes in the last week, with the cutoff point for mood changes equal to or greater than six[22]. Older women were assessed at baseline (pre-intervention) and between days 1 and 7 after the 12th week of intervention (post-intervention). The 12-week interval enabled the learning effect not to occur, as recommended by the literature[23]. The instruments used in the study to identify executive functions in older women were the Stroop, the Addenbrooke Cognitive Exam - Revised (ACE-R), and the Trail Making Test – B (B-Trails). Each of these tests, validated for the Brazilian older population[24-27], evaluate different components of the executive function. These instruments were applied in printed form and the tests were not familiarized. Each evaluator was responsible for accompanying an older woman, delivering the printed tests, providing guidance on how each test should be performed, also timing the total time spent for each block within the test and the accuracy of the responses.

The Stroop test assesses executive function through inhibitory control and memory processes, in addition to fluency in reading and naming colors. The participants were instructed to speak, as quickly as possible, the colors observed, while the evaluator timed and evaluated the answers, as correct or wrong. This instrument, formed by three stages, consists of three printed cards that have 100 items arranged in five columns. The first card is called Word, and consists of reading the words red, blue and green written at random. The second is named Color, and the word colors must be nominated. The third is called Color and Word and consists of speaking the color that the word is printed on (font color)[24]. The final score is obtained from the time spent to perform each phase of the test, applying the formula: Final score= Color and Word Time - [(Word Time+ Color Time) / 2]. The total time for each phase of the test was timed regardless of the accuracy of the response. However, in the event of wrong answers, the older women were asked to reconsider their answers until the correct answer was provided. That way, the less time it takes to perform the test, the better the performance (e.g., faster responses and/or less errors)[24].

ACE-R is a global cognitive assessment tool responsible for identifying changes in the performance of executive functions, related to memory, verbal fluency, orientation, attention, visual-spatial ability and language. The test was translated and adapted for the Brazilian population and can be applied in an average time of 15 minutes, together with the MMSE[25]. The total ACE-R score is 100 points, 30 of which are related to MMSE, 26 to memory, 14 to verbal fluency, 18 to attention and orientation, 16 to visual-spatial ability and 26 to language. The higher score at the end of the test, the better the performance in the analyzed domains[25].

The B-Trails assesses the components of sequencing and inhibitory control, present in the executive function, since it is necessary to alternate the numerical and alphabetic sequence. Each participant was instructed, after the command, to connect the numbers from 1 to 12 and letters from A to L in ascending and alphabetical order alternately, such as 1A-2B-3C, while the time was measured by the evaluator. This part is considered more complex and is more directly related to executive function and cognitive flexibility[26]. The total score is determined from the time taken to perform the test, and the shorter the time, the better the performance[27].

An intervention protocol composed of 18 sessions, with 15 exercises each, of cognitive DT (motor-cognitive) and 12 sessions, with 35 exercises each, of motor DT (motor-motor) was developed. The number of sessions was elaborated in an attempt to minimize the effect of learning the exercises, since throughout the training, 36 sessions, each session of motor-cognitive exercise was only repeated once and the sessions of motor-motor activities were repeated only twice.

The protocol with the cognitive DT exercises was developed with the objective of training cognitive abilities such as immediate, recent, episodic, spatial, semantic memories, in addition to mathematical, logical reasoning and chaining of actions. As examples of proposed activities: tell me about your day yesterday; walking two steps to one side and two steps to the other, saying names of people; what number is formed with the number of months that have a year plus the days of the week plus the number of days of the months. The examiners participated in the reasoning and response process of the cognitive task, showing interest and, if necessary, making the necessary corrections, thus forcing the reasoning and the elaboration of appropriate responses. It was not allowed to stop to reason, understand the questions better or respond to the command requested.

The motor DT protocol covered exercises of laterality, reasoning, execution of the motor act, memorization of consecutive acts, coordination and balance. Some instruments, such as sticks, rubber and Styrofoam balls, were used for the participant to perform exercises with the upper limbs while walking. Examples of proposed activities: zigzag on the sticks walking sideways; throw the ball up high and at the same time bring the tip of your right foot forward, side and back; walk bouncing the ball once on the floor and pick it up again.

36 training sessions were held, which took place three times a week, for 12 weeks, being held in free external areas of EEFFTO. Each session lasted 50 minutes, divided into three moments: a) 10 minutes of fast walking in pairs; b) 10 minutes of activities related to cognitive DT, with each participant being accompanied by an applicator; c) 30 minutes of motor DT, being carried out in groups of a maximum of four participants. The command of each exercise was repeated twice for a better understanding. The cognitive and motor DT activities were performed in a way associated with walking and the applicators were responsible for giving the command for the old women to change the walking speed to fast, slow or usual speed, at least three times between exercises and in a random way. The order of the session was not determined, varying according to the number of participants and applicators at the time of training. The training had at least three applicators for up to eight participants per hour, with six applicators in total. However, all participants performed 50 minutes of exercise and went through the three proposed moments.

Descriptive analysis of the data was performed, using mean and standard deviation, and absolute and relative frequency. The normality of data distribution for continuous variables was verified using the Shapiro-Wilk test. The t test for independent groups and the Chi-square test were used to verify differences in clinical and demographic measurements between groups with different educational levels in the pre-intervention phase.

The analysis of homogeneity of variances was performed using the Levene test. Two-way analysis of variance (ANOVA) 2x2 with repeated measures was used to evaluate the effect of the intervention on performance in the Stroop, ACE-R and B-Track test. The comparison factor between groups was time (pre vs. post) and the group (high vs. low education). Bonferroni's post hoc was used for paired comparisons. To evaluate the effect size, the partial eta-square (η^2p) will be presented, the effect size being considered small (0.0099), medium (0.0588) and large (0.1379). In addition, the power, related to the power reached in each analysis, will be presented. The sphericity of the data was verified using the Mauchly test. All analyzes were performed using the SPSS program (version 21) with a significance level of 5%.

RESULTS

Among the 31 study participants, 17 had 3 to 7 years of education (4±1.2) and 14 had education of 8 years or more (12±4.2; p<0.0001). There were no significant adverse effects associated with participation in the program, such as cardiovascular problems, tendon or musculoskeletal system injuries. Adherence to the program was 100% of sessions in both groups, and all the old women completed all 36 weeks of training. At the baseline (pre-intervention), the groups were similar in terms of clinical and functional characteristics, with the exception of education and salary income (Table 1).

Table 2 presents the results of ANOVA for the three measures of executive function evaluated. Regarding the Stroop test, main effects were observed before and after intervention (η^2p=0.17, power=0.66), with no significant effects from the interaction group (pre and post and groups) (F=2.14, p=0.15), demonstrating that the groups had a similar behavior, that is, improvements were observed in the Stroop test for both groups after the DT. Similar results were found for ACE-R. Main effects were observed (η^2p=0.39; power=0.99), with effect of the group and without significant interaction effects, demonstrating that the groups had similar behavior, that is, improvements were observed in the ACE-R test for the two groups. For the B-Trails test, no significant main effects were found (η^2p=0.30; power=0.15), but an effect of the group was identified, without interaction.

Table 1. Initial clinical characteristics of the participants and comparison between the low (1) and high (2) education groups. Belo Horizonte, MG, 2013.

Variable	Group 1 (n=17)	Group 2 (n=14)	Statistical test and p
Age (years), mean (SD)	72.4 (±3.4)	73.5 (±3.5)	t=1.47; *p*=0.388
Years of study, mean (SD)	4.0 (±1.2)	12.1 (±4.2)	t=-6.0; *p* <0.0001
Income (minimum wage), average (SD)	1.5 (±0.7)	12.1 (±4.2)	t=-3.92; *p* <0.0001
Medicines (n), mean (SD)	3.0 (±2.5)	3.8 (±2.6)	t=1.33; *p*=0.405
Comorbidities (n), mean (SD)	2.2 (±1.5)	1.9 (±1.0)	t=1.38; *p*=0.466
Physical activity (weekly hours), mean (SD)	2.3 (±1.6)	1.9 (±1.6)	t=0.35; *p*=0.169
Falls (n), mean (SD)	0.4 (±0.8)	0.3 (±0.5)	t=0.55; *p*=0.781
FES-I-BRASIL (score), mean (SD)	23.9 (±4.6)	23.0 (±8.3)	t=5.57; *p*=0.692
GDS (score), mean (SD)	5.1 (±2.1)	3.9 (±1.6)	t=2.54; *p*=0.116
MMSE (score), mean (SD)	25.5 (±2.1)	27.1 (±1.9)	t=-2.10; *p*=0.530
Perception of subjective memory (yes), n (%)	12.0 (70.6)	8.0 (57.1)	χ^2=0.60; *p*=0.477
Sleeps poorly (yes), n (%)	5.0 (29.4)	2.0 (14.2)	χ^2=1.00; *p*=0.412

FES-I-BRASIL=Self-efficacy scale for falls; GDS=Geriatric depression scale; MMSE=Mini-Mental State Examination, t=t test; χ^2=Chi-square test.

Table 2. Cognitive performance in older women with low (G1) and high (G2) education before and after dual task training. Belo Horizonte, MG, 2013.

Variables	Group 1[#]			Group 2[#]			ΔG1-G2[$]	ANOVA: F (*p*)		
	Pre	Post	ΔG1	Pre	Post	ΔG2		Effects of time	Effects of group	Effects of interaction
Stroop (s)	23,4±15,8	18,8±12,6	-10,7±14,8	12,7±7,7[a]	16,3±7,12[a]	-2,6±15,7	-8,1 (-19 a 3)	5,95* (0,02**)	0,023 (0,881)	2,14 (0,15)
ACE-R (points)	74,5±12,1	86,0±6,91	5,0±7,9	79,5±8,5[a]	91,1±6,73[a]	5,1±4,4	-0,1 (-5 a 5)	18.33* (<0.0001**)	14,65* (<0,001**)	0,04 (0,95)
B-Trails (s)	5,1±2,2	2,0±0,9	-0,9±1,6	4,2±1,8[a]	2,4±1,6	-0,4±1,1	-0,5 (-2 a -0,1)	0,88* (0,36*)	18,74 (<0,001**)	5,37 (0,28)

Note: ACE-R=Addenbrooke's Cognitive Exam - Revised; [a] Difference between pre and post intragroup moments; * Result of the Bonferroni post hoc test; ** Significant results of the Bonferroni post hoc test; [#] mean ± standard deviation; [$] average (95% CI); Δ=post - pre; ΔG1-G2=(post - pre G1) - (post - pre G2).

DISCUSSION

The present study aimed to evaluate the influence of education on the gains in executive function of older women after DT training. The sample showed homogeneity between the groups with low and high education, presenting clinical characteristics without statistical difference in factors that could influence the test results. Education and income were the factors that showed significant differences between groups. However, these differences were expected since education was one of the variables selected for the selection of groups and that this influence directly on income, that is, a higher education enables a higher income[28]. The performance in the executive function after DT training showed improvement when analyzing the pre and post intervention moments, in the Stroop and ACE-R tests, in both groups. However, in the B-Trail test, no significant gain was identified after training in any of the groups. In the Stroop test, DT training reduced the time for the test, consequently demonstrating a better performance in inhibitory control, memory, reading fluency and color naming at both educational levels. This result may be related to training, since the test is specific to assess executive function[29]. The level of education influences the results of the Stroop test since education acts directly on the ability to read, to name colors, as well as to act in the inhibition and flexibility necessary to perform the test[30]. In view of this, it was expected that the subjects of both groups presented a reduction in the test execution time in the pre and post-intervention, a hypothesis that was confirmed from the results found, being important to evaluate the magnitude of the gain. The improvement identified in both groups can be explained by the DT training that was sufficient to generate a greater stimulus related to the executive function.

It is important to point out that both in the Stroop test and in the ACE-R it was possible to notice that the training with DT had a positive effect in older women from both groups, and this can be justified, probably, by the greater cognitive and motor stimulus offered to them in the training period. When carrying out specific DT training, the older women have a greater challenge to fulfill the tasks and, therefore, are more stimulated and, consequently, present important gains in the performance of executive functions[31]. Thus, this was a relevant finding of the present study that demonstrates that, when challenged, the brain of older women responded positively to the challenge, improving the result in a more challenging test.

All old women were stimulated both in cognitive tasks, associated with walking, and motor, associated with cognitive activities, which may also have contributed to the findings of the present study. The level of activity that the old women practiced, per week, did not present a significant difference in the study, which eliminates a possible confounding factor related to other extra activities to that performed in training. Therefore, since the older women were stimulated in an equivalent way during training, it is believed that the results found in the tests corroborate the fact that DT training may have generated beneficial effects on the executive function of these women.

DT training is effective for the global cognition of healthy old people[32], and the combination of physical exercise, sensorimotor stimulation and cognitive involvement can facilitate neurophysiological changes responsible for the process of cognitive improvement[33]. These improvements in executive function were identified through the test results in the pre and post-intervention moments, thus corroborating the findings of the present study. In the B-Trail test, no significant difference was found between the moments before and after DT training. This result may be due to the simplicity of the test, which does not allow significant changes to be observed after the intervention[31]. Education is a variable that influences the results of the B-Trail[34] test and this can be seen in the time spent to perform the test, considering the two groups, in which the group with the highest level of education had less time spent completing the test when compared to the group with less education in the initial assessment. We believe that the old women already had high results at the beginning of the training, showing a ceiling effect on the test. It was observed, in the ACE-R and B-Trail tests, a significant effect on the groups. Therefore, regardless of the time, the groups presented different values, therefore, the education influenced the performance of these tests, but not the gains with DT training.

No interaction effect between education and test results was observed in any of the tests. Therefore, the effects of DT training do not depend on the different levels of education analyzed. The training was effective in improving executive function in both groups, regardless of education. Being an important contribution of the present study, since the literature shows the effects of education on the performance of executive functions, but they did not assess whether such gains with certain interventions could be influenced by education.

The absence of a control group, which has not performed any other type of activity, and the sample composed only of the older female population can be considered limitations of the present study. The control group, without performing another activity that could influence the results of the executive function, would be a way to minimize the potential confounding factors of the results, ensuring that the effects found were related only to the training performed. In addition, the sample analyzed does not allow generalization of the results for the older male population. Considering the results found, which indicate that DT training is beneficial for the better performance of executive functions in the older and female population, it is necessary to investigate whether in the male population the results are similar. In addition, new studies will be interesting to investigate whether people with different cognitive deficits will have benefits in executive function with DT training and whether education will interfere in this population.

CONCLUSION

Dual task training (DT) resulted in improved performance of executive functions regardless of education in most tests used in this study. In only one test, B Trails, no significant difference was found after DT training in any of the groups, probably because it is a very simple test with low requisition of executive functions. These results suggest that interventions that use DT can be used in clinical practice, aiming at improving the performance of executive functions in old women, regardless of education, expanding its use.

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