VOLUME 25 NUMBER 1

Revista Brasileira de Geriatria e Gerontologia

Brazilian Journal of Geriatrics and Gerontology

UnATI
Universidade Aberta da Terceira Idade

UERJ
UNIVERSIDADE DO ESTADO DO RIO DE JANEIRO

ISSN 1981-2256

Vaccination against COVID-19 as a social right and protection for the older population in Brazil

The promoting of health and quality of life of the older population is intrinsically linked with the social protection system a country can provide its citizens. The notion of the welfare state which emerged in 19th century Europe holds that the State is responsible for guaranteeing the rights and services deemed essential for survival and quality of life. In Brazil, the 1988 Federal Constitution legally guarantees a social protection system comprising the 3 components health, social welfare and social security. The Brazilian social protection system thus consists of the National Health System (SUS), the Social Welfare System (SUAS) and Social Security Institute (INSS). Although representing a major legal landmark with a direct impact on health promotion and increased life expectancy, there are many challenges to achieving full implementation of social protection for the older population in Brazil[1].

Part of the right and unfettered access to health, as enshrined under the SUS and social protection paradigm, immunization constitutes one of the key national programs since its introduction in the 1970s. The Brazilian National Immunization Program (PNI) has been pivotal in reducing the rate of child mortality, increasing expected lifespan and preventing a range of illnesses, allowing the Brazilian demographic pyramid to evolve to one more closely resembling that of developed countries [2].

Older adults, who number an estimated 30 million in Brazil, belong to a group more vulnerable to illness and death from COVID-19 and are therefore a priority in the vaccination schedule. This vulnerability is associated with the fact that severe and fatal cases predominantly affected individuals aged 60 or over both at the initial outbreak of the virus within the community in March 2020 and throughout most of the ensuing pandemic. After commencement of vaccination in the first few months of 2021 and slow rollout due to shortages of immunizing agents, together with disparities in age groups and different stages of immunization across Brazil´s regions, states and cities, the age profile of severe cases and deaths shifted, showing that the prioritizing of the vaccine schedule yielded positive results. Thus, in June 2021, there was a decline in the age of infected individuals who died or were hospitalized (severe cases) which coincided with broader vaccine coverage of the older population[3].

Currently, debate centers on the application of the third jab, also referred to as the booster. With the onset of winter in the Northern Hemisphere (December to February), many European countries have invested in boosters jabs and child vaccination to strengthen their defences against fresh waves and variants of the SARS-CoV-2 virus. While concerns in Europe center on the seasonality of respiratory infections, fears in Brazil involve large gatherings during end of year parties and carnival.

http://dx.doi.org/10.1590/1981-22562022025.210250

Brazil´s Ministry of Health announced in September 2021 that individuals aged 18 or older who had received their second jab at least 5 months earlier would be eligible for a booster jab. At the time, 93% of older adults had been fully vaccinated and were the first contingent of the population to be offered a third jab[4]. The number of deaths and severe cases of the disease in the older population again decreased, providing a strong indication of the benefits of the vaccination protocol in place[3].

However, it has proven difficult to determine which individuals failed to return for their second jab and also whether the third jab will enjoy the same uptake as the first. Therefore, an investigation into vaccination hesitancy among the older population should be conducted. Whereas safety of the vaccine was initially one of the main drivers of hesitancy, this has now given way to low level of fear associated with the virus. Similarly, studies assessing the scope and coverage of vaccination, and also measuring the impacts of the vaccine schedules are needed.

Health managers and clinicians should press for dissemination of the importance of immunization as a strategy for mitigating the pandemic. This is especially true for the application of the third jab which, allied with the personal protection and social distancing measures, can help curb the spread of the virus and impact of COVID-19 in the older population. Thus, it is crucial to press ahead with the vaccine jabs planned and make way for a likely second round of a full vaccination protocol that goes beyond the booster jab. Major pharmaceutical companies, both public and private, are already in the process of developing more specific vaccines to combat mutations of the virus which undermine the efficacy of available vaccines. The current scenario points to the need for clarity and ongoing incentive via specific vaccination campaigns targeting different populations, particularly older groups, which address doubts and concerns using appropriate language and communication channels.

At this time (December 2021), we are witnessing a longer-term decline and stabilizing of cases, amid a more favorable pandemic scenario than seen throughout the course of the pandemic in Brazil. However, a new wave and emergence of the omicron variant is giving rise to further uncertainties for science, governments, populations and the markets, possibly having a direct impact on the 2022 elections in Brazil. Unfortunately, the debate over vaccination has been used as a tool for ideological disputes, detracting from the debate on rights to social protection, health, vaccines and their excellent cost benefit as a public health strategy. In this respect, we believe that immunization of the population should be incorporated into State policy and aligned with the goals of the SUS and Brazilian social protection system.

Juliana Kabad[1]

Ester Paiva Souto[2]

REFERENCES

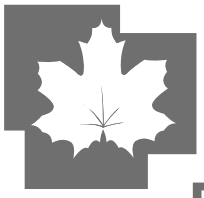
1. Souza MS. Proteção social aos idosos no Brasil de 1988 a 2016: trajetória e características [Tese na Internet]. Rio de Janeiro: Fundação Oswaldo Cruz, Escola Nacional de Saúde Pública Sergio Arouca; 2018 [cited 2021 Dec. 09]. Available from: https://www.arca.fiocruz.br/bitstream/icict/30880/2/ve_Michele_Souza_ENSP_2018.pdf
2. Domingues CMAS, Maranhão AGK, Teixeira MA, Fantinato FFS, Domingues RAS. 46 anos do Programa Nacional de Imunizações: uma história repleta de conquistas e desafios a serem superados. Cad Saúde Pública [Internet]. 2020;36(Suppl2):e00222919. Available from: https://doi.org/10.1590/0102-311X00222919.

[1] Socióloga, Doutora em Saúde Pública e pesquisadora colaboradora da Fundação Oswaldo Cruz (ORCID - 0000-0002-9471-6418)

[2] Psicóloga, Doutora em Epidemiologia e pesquisadora colaboradora da Fundação Oswaldo Cruz. (ORCID - 0000-0002-8168-8585)

3. Fundação Oswaldo Cruz, Observatório COVID-19. Boletim Observatório Covid-19: Semana Epidemiológica 47 [Internet] . Brasília, DF; FIOCRUZ; 2020 [cited 2021 Dec. 04].Available from:https://portal.fiocruz.br/documento/boletim-do-observatorio-covid-19-semana-47

4. Brasil. Ministério da Saúde. LocalizaSUS. Informe Covid-19 Vacinação: Doses Aplicadas. Brasília, DF: MS; 2021 [cited 2021 Dec. 05]. Available from: https://infoms.saude.gov.br/extensions/DEMAS_C19_Vacina_v2/DEMAS_C19_Vacina_v2.html



Revista Brasileira de Geriatria e Gerontologia

Brazilian Journal of Geriatrics and Gerontology

VOLUME 25, NUMBER 1, 2022

Revista Brasileira de Geriatria e Gerontologia é continuação do título *Textos sobre Envelhecimento*, fundado em 1998. Tem por objetivo publicar e disseminar a produção científica no âmbito da Geriatria e Gerontologia, e contribuir para o aprofundamento das questões atinentes ao envelhecimento humano. Categorias de publicação: Artigos originais, Revisões, Relatos, Atualizações e Comunicações breves. Outras categorias podem ser avaliadas, se consideradas relevantes.

The Brazilian Journal of Geriatrics and Gerontology (BJGG) *succeeds the publication Texts on Ageing, created in 1998. It aims to publish and spread the scientific production in Geriatrics and Gerontology and to contribute to the deepening of issues related to the human aging. Manuscripts categories: Original articles, Reviews, Case reports, Updates and Short reports. Other categories can be evaluated if considered relevant.*

Colaborações / *Contributions*
Os manuscritos devem ser encaminhados ao Editor Executivo e seguir as "Instruções aos Autores" publicadas no site www.rbgg.com.br

All manuscripts should be sent to the Editor and should comply with the "Instructions for Authors", published in www.rbgg.com.br

Correspondência / *Correspondence*
Toda correspondência deve ser encaminhada à Revista Brasileira de Geriatria e Gerontologia por meio do e-mail revistabgg@gmail.com

All correspondence should be sent to Revista Brasileira de Geriatria e Gerontologia using the email revistabgg@gmail.com

Revista Brasileira de Geriatria e Gerontologia
UERJ/UnATI/CRDE
Rua São Francisco Xavier, 524 – 10º andar - bloco F - Maracanã
20 559-900 – Rio de Janeiro – RJ, Brasil
Telefones: (21) 2334-0168 / 2334-0131 r. 229
E-mail: revistabgg@gmail.com - crderbgg@uerj.br
Web: www.scielo.br/rbgg
Site: www.rbgg.com.br

Indexação / *Indexes*
SciELO – Scientific Electronic Library Online

LILACS – Literatura Latino-Americana e do Caribe em Ciências da Saúde

LATINDEX – Sistema Regional de Información em Línea para Revistas Científicas de América Latina, el Caribe, Espana y Portugal

DOAJ – Directory of Open Acess Journals

REDALYC - Red de Revistas Científicas de América Latina y el Caribe, España y Portugal

Free Medical Journals

Cabell´s Directory of Publishing Opportunities

The Open Access Digital Library

UBC Library Journals

Sumário

Cross-cultural adaptation of the Team Member Perspectives of Person-Centered Care (TM-PCC) in institutionalized older adults

Valadares, Victor Fernandes[1]
Clara Paula Gonçalves Mendes[1]
Júlia Ferreira Alves[1]
Júlia Guimarães Bernardes[1]
Beatriz Aparecida Ozello Gutierrez[2]
Henrique Salmazo da Silva[3]

Abstract

Objective: To carry out the translation and back-translation into Brazilian Portuguese, and the cross-cultural adaptation of the instrument called Team Member Perspectives of Person-Centered Care (TM-PCC), as well as its construct validity. The objective of the TM-PCC is to assess the frequency of behaviors and care practices centered on the individual according to professionals who work in Long-Term Care Facilities for Older Adults (ILPIs). *Method:* The process of translation, back-translation, and cross-cultural adaptation was followed through semantic, idiomatic, experiential, and conceptual equivalence carried out by five expert judges in the field of Geriatrics and Gerontology, with the pilot instrument being administered to 49 professionals from four ILPIs in three Brazilian states. *Results:* After the assessment was conducted by the expert judges, disagreement was found regarding the terms "previous associations," "fulfilling relationships," and "incorporate this caring into my daily routine," which were replaced by"histórias pregressas" (past stories), "relações satisfatórias" (satisfactory relationships), and "incorporar esse cuidado na minha rotina diária" (incorporate this care into my daily routine). After these corrections and revisions, the questionnaire was sent back to the judges, who were in total agreement. Good understanding of the questions was observed during the pilot application and good internal consistency through Cronbach's alpha (0.78). *Conclusion*: The TM-PCC can be a useful tool for assessing individual-centered care in ILPIs in Brazil, according to the assessment of professionals. This will enable patient care managers or supervisors to plan and develop educational and management interventions aimed at promoting individual-centered care in ILPIs.

Keywords: Long Term Care Facility for the Elderly. Health Service for the Elderly. Humanization of Assistance. Patient Assistance Team. Validation Study.

[1] Universidade Católica de Brasília, Curso de graduação em medicina. Taguatinga, DF, Brasil.
[2] Universidade de São Paulo, Escola de Artes, Ciência e Humanidades, São Paulo, SP, Brasil
[3] Universidade Católica de Brasília, Pós-Graduação em Gerontologia, Taguatinga, DF, Brasil.

Funding: Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq). Nº do processo: 420859/2018-7. Chamada MCTIC/CNPq Nº 28/2018.

The authors declare that there is no conflict in the conception of this work.

Correspondence
Henrique Salmazo da Silva
henriquesalmazo@yahoo.com.br

Received: May 10, 2022
Approved: September 19, 2022

http://dx.doi.org/10.1590/1981-22562022025.220082en

INTRODUCTION

The humanization of long-term care for older adults represents one of the greatest challenges of the 21st century[1,2]. Professionals, public managers, and scholars are faced with the accelerated aging of the population and, at the same time, with the need to plan interventions aimed at the living and health conditions of the long-lived population[3,4]. Within the alternatives of long-term care in Brazil, *Instituições de Longa Permanência para Idosos* (ILPIs, Long-Term Care Facilities for Older Adults) represent the most prevalent care model, after domiciliary care[5].

ILPIs have a residential character, in the form of collective home for people aged 60 years or older, with or without family support, housing residents with different health characteristics[6]. Until 2010, according to the *Instituto de Pesquisa Econômica Aplicada* (IPEA, Institute of Applied Economic Research), there were 3,548 institutions in the Brazilian territory, which encompassed only 0.5% of the total number of older adults in Brazil[5]. After the proliferation of SARS COV 2 in Brazilian institutions and the high mortality rates among institutionalized older adults, the National Front for the Strengthening of ILPIs (an organized civil society group composed of experts, scholars, and professionals) has strived to follow up, support, guide, and gather information from Brazilian ILPIs in order to have a more up-to-date overview of how care is organized in these institutions[7]. According to a survey carried out by the group, Brazil has 7,029 institutions, of which 4,232 are located in the Southeast, 1,874 in the South, 493 in the Northeast, 351 in the Midwest, and 79 in the North of Brazil[7]. Most of these institutions are private non-profit/philanthropic companies, followed by private and public institutions (a small number) [7].

Among the observed needs, there is a shortage of instruments to measure care practices centered on the individual in the Brazilian reality, especially to measure care practices according to the view of professionals working in ILPIs. Care centered on the individual comprises a set of initiatives aimed at promoting decent and quality care, whose targets are: the autonomy of residents in care and activities; team training; shared decision-making; shared choice; meaningful social interactions; and home spaces, based on the relationships between older adults and the environment, as well as with professionals, residents, and the community[8-10].

In the study conducted by Boscart et al.[8], it was observed that the literature has 20 instruments for the assessment of care centered on the individual, but most of them have not yet been validated. Among these instruments, only two are the most used, the Person-Centered Care Assessment tool (PCCA-t) and the Person-Directed Care Measure (PDCM). However, the PDCM was adapted because it has high internal consistency, reliability, and has already been used in the North American context. Thus, from the 64 original items, in a panel that brought together experts, managers, administrators, family members, and residents, the 11 most important items were chosen based on the relevance to measure care centered on the individual and on the individual psychometric performance of each item. Additionally, based on the literature review and the assessment conducted by the panelists, the authors included three other domains to capture the subjective assessment of relationships between staff and residents. After the adjustments, the Team Member Perspectives of Person-Centered Care (TM-PCC) was proposed. The questionnaire was applied to 461 Canadian professionals and the existence of three components was observed: Support for social relationships; Familiarity with the residents' preferences; and Significant relationships between residents and staff.

The TM-PCC, compared to the original survey, had fewer components (i.e., it did not address the resident's autonomy, personality, or comfort, the work with the residents, their personal environment, and the administrative structure), but included a new component (Relationships with staff). The TM-PCC had an internal consistency similar to the original PDCM (Cronbach's alpha coefficient 0.82 vs. 0.74-0.91). Based on these findings, Boscart et al.[8] concluded that the TM-PCC can be used to assess the PCC from the perspective of the team of professionals working in ILPIs. The advantage of this version is the speed of application and completion (5 to 10 minutes) and for detecting items that are sensitive to the humanization of care, such as communication, relationships, knowledge about residents, and emotional support.

In view of the above, this study aims to carry out a cross-cultural adaptation of the TM-PCC instrument, which was proposed by Boscart et al.[8], in order to assess the practices of the team of professionals working in ILPI regarding individual-centered care[11].

METHOD

This is a cross-cultural adaptation study of the Team Member Perspectives of Person-Centered Care (TM-PCC) instrument developed by Boscart et al.[3]. It is a questionnaire composed of 11 questions that ask professionals to assess, using a Likert scale from 1 to 5, how much they practice or not items related to individual-centered care, including knowledge about residents' habits, foods, and favorite music, their availability to help residents when they need to go to the toilet (with and without the residents' request), support in case they get agitated, social support, interaction with families, and relationships with residents. Altogether, the questions are organized into three domains: *Support for social relationships* (items 1, 2, 3, and 4); *Familiarity with residents' preferences* (items 5, 6, 7, and 8); and *Meaningful relationships between resident and staff* (items 9, 10, and 11).

First stage - adaptation

In this study, the cultural adaptation processes already described in the literature by Beaton, Bombardier, Guillemin, and Ferraz[11], and Guillemin[12] were followed, which included obtaining semantic, idiomatic, experiential, and conceptual equivalence in the translation through back-translation techniques (from Portuguese to English, with subsequent assessment by a native English-speaking translator); and assessment by expert judges on the matter for semantic and construct adequacy; and, finally, pilot application.

In this approach, semantic equivalence refers to the assessment of grammatical and vocabulary similarities between languages since there are some words in languages that do not have the equivalent translation in another language. The idiomatic equivalence identifies the existence of difficulties in translating colloquial expressions used in different countries. Experimental equivalence, also defined as cultural equivalence, assesses the consistency of translated terms with the experiences of the target population. Finally, conceptual equivalence verifies the adequacy of the concepts before the terms or expressions used, since the terms or expressions can have different meanings[12].

The cultural adaptation process consisted of obtaining semantic equivalence through translation, synthesis, and back-translation techniques. Initially, an independent translation into Portuguese of the original English-language questionnaire was prepared with the participation of two independent and qualified English translators with proficiency in the English language and culture, and only one of the translators knew the purpose of the study. At the end of this phase, there was translation 1 (T1) and translation 2 (T2). Then, the synthesis between T1 and T2 was performed by three researchers of this study and the translators, resulting in a version called T12 after adjustments and consensus.

Subsequently, in order to verify whether the T12 version was similar to the original version, a back-translation was performed by two other English translators with fluent Brazilian Portuguese.

After the back-translation, the original version of the scale and the translated version were again compared and discussed between the three researchers and the translators to eliminate flaws that could compromise the meanings and consistency of the instrument.

Finally, the judgment of conceptual and item, semantic, idiomatic, and cultural equivalence between the versions was carried out by a panel of judges.

This panel of judges was made up of five experts working in the areas of Geriatrics and Gerontology, with clinical, technical and research experience in the context of caring for institutionalized older adults. The sample was obtained by convenience and based on their expertise related to the topic. Initially, 15 researchers working in the Southeastern, Southern, and Northeastern regions of Brazil were invited by e-mail. The inclusion criterion of the judges was being a health professional, researching or working in the field of long-term care and having experience with the adaptation of instruments. The exclusion criterion

was unavailability to respond to the assessment sheet in a timely manner. Five judges agreed to participate in this study. After acceptance, the assessors received a letter with the instrument questions.

For each expert, the necessary material for the content validation process was available in Google Form. Thus, the judges received the research project of this study, the original instrument manual, the adapted instrument, and instructions for filling out the form for later calculation of the Content Validity Index (CVI). For each question of the instrument, the judges should assess, using a scale: "-1 disagree"; "0 neither disagree nor approve"; "+1 approve"; and others". This configuration was chosen in order to encompass all suggestions and adjustment possibilities, according to the study of Zukeran et al.[13]. A scale from -1 to 1 was assigned to assess the agreement index between the assessors. A score of -1 was assigned to "others."

The agreement was calculated using the frequency of agreement regarding the items of the questionnaire. The CVI, corresponding to an accuracy rate of ≥80% for each item, was considered as a criterion for adequacy[14]. Questions with CVI scores lower than 80% were reviewed, following possible suggestions from the judges, and sent again for assessment, in order to obtain the maximum agreement between the examiners and the final consensus. After this consensus, the final and adapted version of the scale was created. Finally, after the assessment of the judges and the verification of the CVI, changes were made to the questions and, at the end, the judges received the amended questionnaire to obtain the final agreement.

Second step - Pilot application

Sample

To complete the cultural adaptation process, completing the pre-test phase, the instrument was applied to a convenience sample composed of 49 professionals who worked in direct care of older adults (caregivers, nursing staff, technical staff professionals, and professionals who offered care to institutionalized older adults) from four ILPIs, located in the cities of Brasília (FD), Pontalina (GO), and two in São Paulo (SP). All institutions were philanthropic with subsidies from the *Sistema Único de Assistência Social* (SUAS, Unified Social Assistance System), had been operating for more than three years and were registered with the city's *Supervisão de Vigilância Sanitária* (SUVIS, Health Surveillance Supervision). The professionals who were assessed had worked at the institution for at least six months and were available to answer the questions via an online form. Exclusion criteria were being temporarily away from work, being on vacation and/or health conditions that made participation unfeasible, such as self-reported mental disorders without treatment and/or medical follow-up.

Data collection took place from December 2021 to January 2022 and was carried out using a Google Forms questionnaire. The questionnaire link and the invitation letter were sent by e-mail to the managers of the institutions and, later, retransmitted to their staff via online form. In the invitation letters, all participants were clarified about the objectives of the study and, later, oriented about signing the Informed Consent Form (ICF), respecting the ethical principles of research according to Ordinance 466/2012 of the *Ministério da Saúde* (MS, Ministry of Health).

To characterize the sociodemographic profile of the residents, data were collected regarding age (years), length of service (years), gender (male and female), occupation (caregiver, technical, higher education or support professional), and educational level (elementary or high school, technical or higher education). Data were analyzed quantitatively through descriptive analysis (frequency, mean, standard deviation) and description of Cronbach's Alpha to assess the internal consistency of the questionnaire.

The Ethics Committee of the Catholic University of Brasília approved this study (Opinion Number: 3.621.190), in accordance with the attributions defined in Resolution 466/2012 of the National Health Council.

RESULTS

Adaptation of the questionnaire

After using the stages of translation, back-translation and assessment by the judges, a detailed analysis of the suggestions for semantic adequacy was performed, as shown in Chart 1.

Chart 1. Translation and cross-cultural adaptation of the TM-PCC, 2022.

Original version	Initial Agreement Index	Final version: Portuguese language	Suggestions
I know the preferred habits for __ of my residents	75%	*Eu __ (nunca/ quase nunca / às vezes / quase sempre /sempre) conheço os hábitos preferidos dos meus residentes*	Insert alternatives in a Likert scale: never, sometimes, almost always, and always.
I know __ of my residents' favorite foods	100%	*Eu __ (nunca/ quase nunca / às vezes / quase sempre /sempre) conheço a comida favorita dos meus residentes*	No suggestions
I know ___ of my residents' favorite music	100%	*Eu__ (nunca/ quase nunca / às vezes / quase sempre /sempre) conheço a música favorita dos meus residentes*	No suggestions
I quickly help __ of my residents to the toilet when they request or need help	50%	*Eu __ (nunca/ quase nunca / às vezes /quase sempre /sempre) ajudo meus residentes com rapidez, quando pedem minha ajuda ao banheiro*	Replace the verb "request" with "ask".
I help __ of my residents stay connected to their families	75%	*Eu__ (nunca/ quase nunca / às vezes /quase sempre /sempre) ajudo meus residentes a manterem contato com seus familiares*	Replace "stay connected" with "keep in touch."
I help __ of my residents stay connected to previous associations	75%	*Eu __ (nunca/ quase nunca / às vezes /quase sempre /sempre) ajudo meus residentes a manterem contato com suas histórias pregressas*	Translate "previous associations" as "past stories"
I help __ of my residents keep family members as part of their life	100%	*Eu __ (nunca/ quase nunca / às vezes /quase sempre /sempre) ajudo meus residentes a manterem os membros da família como parte da sua vida*	No suggestions.
I help __ of my residents spend time with people they like	100%	*Eu __ (nunca/ quase nunca / às vezes /quase sempre /sempre) ajudo meus residentes a passarem tempo com as pessoas que eles gostam*	No suggestions.
I __ look after the same residents from day to day	100%	*Eu __ (nunca/ quase nunca / às vezes / quase sempre /sempre) cuido dos mesmos residentes todos os dias*	no suggestions
I am __ able to build fulfilling relationships with residents	75%	*Sou __ (nunca/ quase nunca / às vezes / quase sempre /sempre) capaz de construir relações satisfatórias com os residentes*	Translate "fulfilling relationships" as "satisfying relationships"
I __ can learn from residents and their family members and incorporate this caring into my daily routine	50%	*Posso __ (nunca/ quase nunca / às vezes /quase sempre /sempre) aprender com os residentes e suas famílias e incorporar esse cuidado na minha rotina diária*	Translate "incorporate this caring into my daily routine" as "incorporate this care into my daily routine"

The assessment of the back-translation showed that, of the total of 11 items, two showed good correspondence between the original and the back-translated versions. In the others, different degrees of divergence were identified by at least one (six items) and two judges (three items). Most of the suggestions corresponded to problems of agreement and/or verb conjugation, followed by difficulties in understanding the original question and problems involved in the translation or back-translation. In item 6, one of the judges suggested translating "previous associations" as "past stories." In item 10, one of the judges suggested that the term "fulfilling relationships" be translated as "deep relationships." After discussions between the authors, it was decided to translate the term as "satisfying relationships."

In item 11, we chose to translate "incorporate this caring into my daily routine" as "incorporate this care into my daily routine." After these corrections and revisions, the questionnaire was sent back to the judges, obtaining 100% agreement after the necessary adjustments. The final version of the questionnaire corresponds to the right-hand column of Table 1.

Pilot application

Of the 49 participants in the pilot application, 40 were female and 9 were male. Their mean age was 40.2 years (+9.81), with a mean length of service of 5.37 years (+4.82). As for the cities in which they are located, 20 participants work in the Brasília (FD) ILPI, 14 in the Pontalina (GO) ILPI, and 15 participants in the São Paulo (SP) ILPI. The most common occupation was caregiver (n=37), followed by professionals with technical certification or college degree (n=9), and supporting staff (n=3). Only three participants studied up to elementary school, with the others having completed high school or higher education.

The pilot application of the instrument indicated that the participants had a good understanding of the questions. Most participants reported that the instrument was easy to understand (77.6%), with others reporting it was okay (20.4%) or difficult to understand (2%).

According to Table 1, of the TM-PCC items, the highest frequencies of "Always" were questions 10 "building satisfying relationships with residents" (75.5%), 9 "I take care of my residents every day" (69, 4%), and 11 "I can learn from residents and their families and incorporate this care into my daily routine" related to the *Meaningful relationships* domain; question 4 "I help my residents quickly when they ask me for help when they need to go to the toilet" (65.3%) concerning the *Familiarity with residents' preferences* domain. The lowest prevalence of "Always" were questions 6 "I help my residents to keep in touch with past stories" (6.1%) regarding *Support for Social Relationships* and question 3 "I know my residents' favorite music" (16.3%) regarding the *Familiarity with residents' preferences* domain.

The instrument's internal consistency, the overall Cronbach's alpha, was 0.78, which indicates good internal consistency. The consistency values for each domain ranged from 0.65 to 0.72 as shown in Table 2.

Table 1. Results of the pilot application of the TM-PCC (cross-culturally adapted to Brazil) to 49 ILPI professionals, 2022.

TM_PCC questions	Never	Almost never	Sometimes	Almost always	Always
	N (%)				
I know my residents' favorite habits	0	2 (4.1)	5 10.2)	19 (38.8)	23 (46.9)
I know my residents' favorite food	0	2 (4.1)	14(28.6)	12 (24.5)	21 (42.9)
I know my residents' favorite music	2 (4.1)	2 (4.1)	14 (28.6)	23 (46.9)	8 (16.3)
I help my residents quickly when they ask me for help when they need to go to the toilet	1 (2.0)	2 (4.1)	5 (10.2)	9 (18.4)	32 (65.3)
I help my residents keep in touch with their families	3 (6.1)	1 (2.0)	12 (24.5)	10 (20.4)	23 (46.9)
I help my residents keep in touch with past stories*	22 (44.9)	7 (14.3)	10 (20.4)	7 (14.3)	3 (6.1)
I help my residents keep family members a part of their lives	2 (4.1)	2 (4.1)	12 (24.5)	11 (22.4)	22 (44.9)
I help my residents spend time with people they like	4 (8.2)	2 (4.1)	8 (16.3)	18 (36.7)	17 (34.7)
I take care of my residents every day	1 (2.0)	1 (2.0)	0	13 (26.5)	34 (69.4)
I can build satisfying relationships with residents	0	0	3 (6.1)	9 (18.4)	37 (75.5)
I can learn from residents and their families and incorporate this care into my daily routine	2 (4.1)	1 (2.0)	6 (12.2)	13 (26.5)	27 (55.1)

* Although the judges chose the term "previous stories," it is suggested to add the word "relationships" to the term in order to encompass the semantic aspects of the term "previous associations," referring to the relational aspects associated with reminiscences and autobiographical stories. Therefore, the final question would be "Do I help my residents keep in touch with past relationships and stories?"

Table 2. Cronbach's alpha values for each domain of the TM-PCC questionnaire, 2022.

Domain	Number of questions	Mean	Standard deviation	Cronbach's alpha
Familiarity with residents' preferences	4	3.91	0.780	0.672
Support for social relationships	4	3.52	0.892	0.726
Meaningful relationships between resident and staff	3	4.52	0.767	0.652

DISCUSSION

In the present study, the process of translating and transcultural adaptation of the TM-PCC instrument into Brazilian Portuguese is described, considering the methodological rigor recommended in the international literature[11,12]. At this stage, health professionals working in the areas of Geriatrics and Gerontology participated as expert judges, who were essential for the success of this research. Also, in the pilot application of the instrument, evidence was presented to support the adequacy of the psychometric properties of this version of the instrument to be used with professionals from Brazilian ILPIs, as recommended by its creators[8].

In the present study, there was good internal consistency of the questionnaire, with values similar to those observed in the study by Boscart et al.[8] (Cronbach's alpha of 0.78 versus 0.82 in the scale construction study). Cronbach's alpha values for each domain were also similar to the original study (0.65 to 0.72 in the present study versus 0.62 to 0.83 in the study by Boscart et al.8). In both studies, the lowest consistency was observed in the *Meaningful relationships between resident and staff* domain (0.65 versus 0.62) and the highest in the *Support for social relationships* domain (0.72 versus 0.83). The lower consistency in this last domain may have been mediated by the sample size, which was smaller in the present study, or by cultural, socioeconomic, and educational issues that can be better elucidated in other studies.

With regard to the adaptation of the instrument, adaptations were developed in item 6 in the item "previous associations," translated as "past stories," in item 10 in relation to the term "fulfilling relationships" translated as "satisfying relationships," and in item 11 in relation to the term "incorporate this caring into my daily routine" translated by "incorporate this care into my daily routine." It is observed that the adaptation involved adjustments that considered idiomatic, semantic, and grammatical aspects, necessary for the understanding of the instrument. After the final adjustments, there was 100% agreement with the proposed changes. In this context, the TM-PCC can be a useful tool for assessing individual-centered care.

However, as discussed by Boscart et al.[8], the domains of management and autonomy of residents were removed from the original PDCM to prepare the TM-PCC, which can be considered one of the main limitations of the scale. On the other hand, the authors' strategy was to choose items that were more sensitive to individual-centered care and compose a leaner scale that could be answered quickly. The domains assessed using the TM-PCC comprise *Familiarity with the Residents' Preference* (item 1, 2, 3, and 4), *Support for Social Relationships* (items 5, 6, 7, and 8), and *Meaningful Relationships between Staff and Older adults* (Item 9, 10, and 11).

The cross-cultural adaptation of the TM-PCC proved to be successful. Given the scarcity of standardized assessments to measure individual-centered care in Brazil, the TM-PCC offers professionals, scholars, and experts the opportunity to assess the adoption of humanized practices in the context of professionals working in ILPIs. The instrument focuses on aspects related to the relationships between professionals and older adults, as well as the interaction, communication, and knowledge that professionals have regarding the residents' preferences[8].

The results of the pilot application indicated that the questionnaire was well understood by the

participants. Of the questions analyzed, the following items had the lowest scores: item 3 "I know my residents' favorite music," relative to the *Familiarity with the residents' preferences* domain; and item 6 "I help my residents to keep in touch with past stories" of the *Support for social relationships* domain. Item 6 stands out in the responses, indicating that maintaining contact with past stories is a challenge in the context of care, as it highlights the exchange between living in a collective space and keeping in touch with contacts and the previous stories.

Another aspect that may have supported the low frequency of professionals in question 6 is a possible difficulty in understanding the question. Despite the agreement of the judges on the term "previous stories," the English term "previous associations" carries with it a greater semantic range, related both to reminiscences and autobiographical memory as well as to relational, personal issues and related to the social contacts that older people accumulated throughout their lifespan. Therefore, it is suggested to complement the question with terms that can help the understanding of this semantic variety in the context of the Portuguese language, such as "previous/preceding/antecedent relationships and stories." Respect for the residents' uniqueness and life story is a sensitive issue that should be further explored by studies, in order to instrumentalize the technical and social work of ILPIs and workers.

Oliveira and Rozendo[15] in a qualitative study with institutionalized older adults highlighted that the institution is seen as an ambiguous place by them, because while it welcomes, shelters, and meets their needs, it is an environment that can make independent and autonomous life impossible due to routines or daily care. Michel[16], when interviewing the meanings of the experience of older adults in ILPIs, observed that for residents, the institution means the possibility of care as a way of maintaining life and optimizing their well-being, and given the norms and routines of the institution, they develop their own strategies against the mortification of the self. Thus, it is possible that these results are supported by the confluence of the context in which older adults were institutionalized, often marked by broken homes and the absence of long-term care alternatives that keep older adults in their households, to the development of technical work that dialogues between the challenges of maintaining individuality, privacy and active social life even in the presence of a collective space such as ILPIs.

In this context, care centered on the individual is aimed at improving the quality of life and care, in an integral way, anchored in a biopsychosocial approach, with individualized and humanized treatment, since the focus is on the person[17-19].

It was observed, in the present study, that the investigated professionals had high scores in the questions related to *Meaningful Relationships with Residents* (items 9, 10, and 11), which indicates that the operationalization of care that meets the domains of *Support for Social Relationships* and *Familiarity with Residents' Preferences* could be more easily operationalized through educational actions, sensitization of professionals and survey of internal and external resources related to work, in order to promote structural and organizational changes necessary for the well-being of older adults and the staff. Thus, it is essential to have professionals who work in ILPIs in dimensions such as family distance, the functional decline of older adults and the resistance of older adults on these issues[20].

One of the limitations of the present study is the need to verify all the psychometric properties of the instrument so that it can be used with professionals. It is necessary to design studies to adjust the internal structure, reliability, and accuracy as a situational diagnosis instrument. In addition, it is suggested to compare the findings of the TM-PCC with studies that use observational techniques or other assessment scales in professionals working in ILPIs regarding care focused on individuals.

CONCLUSION

The TM-PCC can be a useful tool for assessing individual-centered care in the context of care for older adults in ILPIs in Brazil. It proves to be successful, both for the acceptance of expert judges and to facilitate the understanding of professionals, as well as for the adequate assessment of the analysis

of *Familiarity with Residents' Preference*, *Support for Social Relations*, and *Meaningful Relationships between Staff and Older Adults*. The instrument, when validated, will make it possible to identify the situational diagnosis on how familiar these professionals are with the residents' preferences and to verify the social work and the relationships that are established between older adults and staff. The translated and cross-culturally adapted proposal presented in the present study may support future studies aimed at validating and analyzing the psychometric components of the instrument.

Edited by: Yan Nogueira Leite de Freitas

REFERENCES

1. IPEA. Infraestrutura Social e Urbana no Brasil: subsídios para uma agenda de pesquisa e formulação de políticas públicas. [Internet] Brasília: Instituto de Pesquisa Econômica Aplicada, 2010 [cited 2020 Oct 26]. Available from: https://www.ipea.gov.br/portal/images/stories/PDFs/livros/livros/42543_Livro_InfraestruturaSocial_vol2.pdf
2. Thompson G, Shindruk CL, Adekoya AA, Demczuk L, McClement S. Meanings of "centredness" in long-term care facilities: A scoping review protocol. BMJ Open. 2018;8(8):1–5
3. Veras, R. P. e Oliveira, M. Envelhecer no Brasil: a construção de um modelo de cuidado. Ciência & Saúde Coletiva [online]. 2018, v. 23, n. 6, p. 1929-1936. Disponível em: <https://doi.org/10.1590/1413-81232018236.04722018>.
4. Silva HS da, Gutierrez BAO. A educação como instrumento de mudança na prestação de cuidados para idosos. Educ em Rev. 2018;34(67):283–96.
5. Camarano AA, Barbosa P. Instituições de longa permanência para idosos no Brasil: do que está se falando. In: Alcântara AO, Camarano AA, Giacomin KC, editores. Política Nacional do Idoso: velhas e novas questões. Rio de Janeiro: Ipea; 2016. p. 479-514
6. Brasil. Resolução de Diretoria Colegiada – RDC nº 283 (2005, 26 de setembro). Brasília: Agência Nacional de Vigilância Sanitária. Disponível em: http://portal.anvisa.gov.br/documents/10181/2718376/ RDC_283_2005_COMP.pdf/a38f2055-c23a-4eca-94ed76fa43acb1df. Acessado em Mar 19, 2019
7. Fernandes DS, Taveira RC, Silva LM, Kusumota L, Giacomin KC, Rodrigues RAP. Atuação de movimentos sociais e entidades na pandemia da COVID-19 no Brasil: O cuidado à pessoa idosa em Instituições de Longa Permanência. Ver Bras Geriatr Gerontol 2021; 24(2):e210048.
8. Boscart V, Davey M, Ploeg J, Heckman G, Dupuis S, Sheiban, et al. Psychometric Evaluation of the Team Member Perspectives of Person-Centered Care (TM-PCC) Survey for Long-Term Care Homes. Healthcare. 2018;6(2):59
9. Doll GA. et al. Actualizing culture change: The Promoting Excellent Alternatives in Kansas Nursing Homes (PEAK 2.0) program. Psychol Serv. 2017 Aug;14(3):307-315.
10. Scales K, Lepore M, Anderson RA, McConnell ES, Song Y, Kang B, et al. Person-Directed Care Planning in Nursing Homes: Resident, Family, and Staff Perspectives. J Appl Gerontol. 2019;38(2):183–206
11. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the Process of Cross-Cultural Adaptation of Self-Report Measures. Spine. 2000; 25(24): 3186-91.
12. Guillemin F. Cross-cultural adaptation and validation of health status measures. Scand J Rheumatol. 1995;24(2):61–3.
13. Zukeran MS, Aprahamian I, Vicente BM, Ribeiro SML. Portuguese version of the snaq questionnaire: translation and cultural adaptation. Arq Gastroenterol. 2020;57(2):178-81. https://doi.org/10.1590/ S0004-2803.202000000-33
14. Alexandre NMC, Coluci MZO. Validade de conteúdo nos processos de construção e adaptação de instrumentos de medidas. Cienc e Saude Coletiva. 2011;16(7):3061–8
15. Oliveira JM de, Rozendo CA. Instituição de longa permanência para idosos: um lugar de cuidado para quem não tem opção? Rev Bras Enferm. 2014;67(5):773–9.
16. Michel T, Lenardt MH, Betiolli SE, Neu DKM. Significado atribuído pelos idosos à vivência em uma Instituição de Longa Permanência: Contribuições para o cuidado de enfermagem. Texto Contexto Enferm, Florianópolis, 2012 Jul-Set; 21(3): 495-504.

17. Poey JL, Hermer L, Cornelison L, Kaup ML, Drake P, Stone RI, et al. Does Person-Centered Care Improve Residents' Satisfaction With Nursing Home Quality? J Am Med Dir Assoc. 2017;18(11):974–9.

18. Fagundes, K. V. D. L. et al. Instituições de longa permanência como alternativa no acolhimento das pessoas idosas. Revista de Salud Pública [online]. 2017, v. 19, n. 2 p. 210-214. Disponível em: <https://doi.org/10.15446/rsap.v19n2.41541>.

19. Zahra Ebrahimi Z, Patel H, Wijk H, Ekman I, Olaya-Contreras P. A systematic review on implementation of person-centered care interventions for older people in out-of-hospital settings. Geriatric Nursing 42 (2021) 213-224. https://www.sciencedirect.com/science/article/pii/S0197457220302482?via%3Dihub

20. Tomaselli G. et al. Person-centered care from a relational ethics perspective for the delivery of high quality and safe healthcare: A Scoping Review. Front. Public Health, 06 March 2020 Sec. Health Economics https://doi.org/10.3389/fpubh.2020.00044

Self-perceived health in older adults with low education: demographic, social and health-related behavior factors

Andressa Carine Kretschmer[1]
Mathias Roberto Loch[2]

Abstract

Objective: To verify the relationship between positive self-perception of health (positive SPH) in less-educated older adults and demographic, social participation, and behavioral variables. *Methods:* This was a cross-sectional study (n=12,367), with elderly people over 60 years old of both sexes, with up to four years of study from several cities in Brazil, interviewed by the National Health Survey of the year 2019. For the analysis of data, the prevalence was initially described, and later, three Poisson regression models with robust adjustment for variance were constructed, with the analyzes being stratified by sex. *Results:* The prevalence of positive SPH was 38.8% in men and 34.8% in women. The last regression model built revealed associations with a lower positive SPH prevalence in black or brown women. In contrast, higher prevalence levels were found in single women, with higher income, participating in some associations, engaged in religious activities, visiting the doctor more often, physically active, and regularly consuming fruits and vegetables. In men, relationships with lower prevalence were found in blacks or browns and widowers, and higher prevalence levels were found in those engaging in religious activities and visiting the doctor more often. *Conclusions:* The study reinforces the importance of policies aimed at improving income, promoting healthy behaviors and encouraging social participation.

Keywords: Lifestyle. Perception. Elderly Health. Population Surveys.

[1] Universidade Estadual de Londrina, Departamento de Saúde Coletiva, Programa de Pós-graduação em Saúde Coletiva, Londrina, PR, Brasil.

[2] Universidade Estadual de Londrina, Departamento de Saúde Coletiva, Programa de Pós-graduação em Saúde Coletiva, Londrina, PR, Brasil.

The authors declare that there is no conflict in the conception of this work.

Funding: Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES).

Correspondence
Andressa Carine Kretschmer
kretschmerandressa@gmail.com

Received: June 12, 2022
Approved: October 7, 2022

http://dx.doi.org/10.1590/1981-22562022025.220102.en

INTRODUCTION

Self-perceived health (SPH) is an epidemiological measure commonly used in gerontological studies and can be considered a good predictor of morbidity and mortality[1-4]. It is an easily applied healthcare measure to contemplate aspects of health in general with a single question.[1,5].

Older people have particularities regarding health because this is the time of life in which chronic diseases, limitations, and frailty generally emerge[6]. Studies involving SPH with the older population have used this measure to understand the factors related to healthy aging and well-being[1,3,5]. These studies have observed important associations between SPH and the presence of morbidities[7,8], lifestyle,[8,9] and social participation[10,11].

Studies also indicate that more educated individuals tend to report more frequently a positive perception of health[9,12], as well as a lower prevalence of chronic diseases and degenerative diseases[4,7,13]. In part, this is due to individuals with higher educational level in general having lower unemployment rates, higher income, more access to healthcare services, and higher health literacy when compared to individuals with fewer years of education[14,15].

In the Brazilian context, the number of years of education is related to the age group, with low-income older people having the lowest level of education and representing the highest amount of illiterates in Brazil[16,17]. Currently, it is estimated that 18% of the older people aged 60 and older are illiterate[16,17], despite the fact that most public policies for literacy are still focused on young people and adults[16-18].

Due to the increase in life expectancy, older people represent the fastest growing population group in Brazil and the one requiring a higher level of healthcare due to the natural decline they face[6,16,17]. Therefore, the objective of the present study is to identify factors associated with positive self-perceived health (positive SPH) in older Brazilians with lower education.

METHOD

This is a cross-sectional study from a larger database, the database of Pesquisa Nacional de Saúde (the National Health Survey - PNS) of 2019.

The PNS 2019 was sampled by conglomerate. Initially, a random master sample of 8,036 primary sampling units was selected from the database of Sistema Integrado de Pesquisas Domiciliares (the Integrated System of Household Surveys - SIPD) of IBGE (the Brazilian Institute of Geography and Statistics), which also gives rise to other national surveys[19,20].

The PNS sample was selected by excluding households located in hard-to-reach locations and institutions such as hospitals, barracks and convents, which resulted in 94,114 eligible households, and in 90,846 at least one resident answered the questionnaire, resulting in a sample of 293,731 individuals aged 15 years or older[19,20].

Of the 293,731 individuals who participated in the PNS 2019, 12,467 were 60 years or older, had low education (none to four years of study), and answered the question about SPH. Of these, 99 individuals were excluded for declaring themselves indigenous (due to the small number) and one of whom did not answer the question about race/color. Thus, the present study comprises a sample of 12,367 individuals.

Data were collected by presential interviews with the interviewers being duly identified and trained for this work via smartphone with the app for the analysis of variables already installed[19,20]. More information about the PNS 2019 method and sampling can be found in the document "Pesquisa Nacional de Saúde, 2019 - Informações sobre domicílios, acesso e utilização dos serviços de saúde"[19,20].

The dependent variable was the SPH, which was obtained with the question "In general, how do you perceive your health?". The response options were: very good, good, regular, bad, and very

bad. Subsequently, this variable was dichotomized considering as positive SPH those who answered very good and good, and as negative self-perceived health those who answered regular, bad, and very bad.

The independent variables and their respective classification criteria (information below that are in parentheses) were:

- **Sociodemographic variables:** gender (female; male); color (white, yellow; black and brown); age group (in years: 60-64; 65-69; 70-74; 75-79; 80 or older); family income*per capita* in minimum wages (MW), (0 to 1MW more than 1MW to 3MW; more than 3MW); marital status (married; separated or divorced; widowed; single).

- **Variables on health behavior:** last medical appointment (more than 3 years, from one to three years, up to one year), sufficient physical activity during leisure time ≥150 minutes/week (yes, no), tobacco consumption (yes, no), regular fruit consumption (≤ 5 days a week, ≥5 days a week), regular vegetable consumption (≤ 5 days a week, ≥5 days a week).

- **Social participation variables:** social participation in the community (associations), (sometimes during the year, rarely or no participation, monthly, weekly), participation in religious activities (sometimes during the year, rarely or no participation, monthly, weekly).

Initially, the sample distribution of older people aged 60 years or older interviewed by the PNS 2019 was described according to the education group (0-4; 5-8; 9-11; 12 years or more).

Then, an analytical analysis of the sample of older individuals with 0 to 4 years of education was performed. To this end, a prevalence ratio (PR) was used, and the calculation was performed using the Wald method, considering the 95% confidence interval (95% CI). Then, two adjusted prevalence ratio (aPR) models were developed using the Poisson regression with robust adjustment for variance. The first included social and demographic variables (gender, color, income, marital status); the other, in addition to these, also included variables related to health (presence of health morbidity, diabetes, hypertension). These three analyses were stratified by gender. The data analysis of the present study was performed using SPSS vs. 19.0.

The team responsible for the PNS was trained to collect data. The research was only initiated after the free and informed consent form was signed by the respondents[19,20]. The PNS was approved by Comissão Nacional de Ética em Pesquisa (the National Research Ethics Commission - CONEP) of Conselho Nacional de Saúde (the Brazilian National Health Council - CNS) in 2019[19,20].

RESULTS

The PNS 2019 included 21,179 older adults aged 60 years or older who answered the questions related to SPH and the years of education. Of these, 12,367 had from 0 to 4 years of education, 2,538, from 5 to 8 years of education, 3,588 from 9 to 11 years, 2,686 had 12 years or more of education (Table 1).

It is possible to verify in Table 1 important variations in the prevalence of positive SPH and income according to the education group. The prevalence of positive SPH reports and higher per capita income increases as the education years increase. The prevalence of SPH reports as "very good" and "good" in individuals with 0 to 4 years of education is 4.5% and 32.2% respectively, in those with 12 years of education or more it is 20% and 54.9%. The same occurred with income, in which only 5% of individuals with 0 to 4 years of education had a per capita income of more than three minimum wages, while those with 12 years or more represented 65.8% (Table 1).

Table 1. Distribution of the sample of older people aged 60 years or older interviewed by the PNS, Brazil, 2019. (N=21,179).

	Total (N=21,179)	0 to 4 years of education (n=12,367)	5 to 8 years of education (n=2,538)	9 to 11 years of education (n=3,588)	12 years or more of education (n=2,686)
Variables	N (%)	N (%)	N (%)	N (%)	N (%)
Gender					
Male	9.449 (44,6)	5.729 (46,3)	1.089 (42,9)	1.486 (41,4)	1.145 (42,6)
Female	11.730 (55,4)	6.638 (46,3)	1.449 (57,1)	2.102 (58,6)	1.541 (57,4)
Age group (years)					
60-64	6.407 (30,3)	2.998 (24,3)	1.002 (39,5)	1.401 (39,0)	1.006 (37,5)
65-69	5.364 (25,3)	2.925 (23,7)	679 (26,8)	1.001 (27,9)	759 (28,3)
70-74	3.915 (18,5)	2.486 (20,1)	381 (15,0)	567 (15,8)	481 (17,9)
75-79	2.707 (12,8)	1.906 (15,4)	235 (9,3)	316 (8,8)	250 (9,3)
80 and older	2.786 (13,2)	2.052 (16,6)	241 (9,5)	303 (8,4)	190 (7,1)
Color					
White and yellow	9.634 (45,5)	4.702 (38,0)	1.131 (44,1)	1.909 (53,2)	1.892 (70,4)
Blacks and browns	11.545 (54,5)	7.665 (62,0)	1.407 (56,0)	1.679 (46,8)	794 (29,6)
Per capita income (MW)					
0 to 1	9.291 (43,9)	7.100 (57,4)	1.088 (42,9)	935 (26,1)	168 (6,3)
more than 1 to 3	8.380 (39,6)	4.649 (37,6)	1.213 (47,8)	1751 (48,8)	767 (28,6)
More than 3	3.505 (16,6)	618 (5)	237 (9,3)	899 (25,1)	1.751 (65,2)
Marital Status					
Single	3.871 (18,3)	2.229 (18,0)	479 (18,9)	665 (18,5)	498 (18,5)
Married or common-law marriage	9.312 (44,0)	5.309 (42,9)	1.106 (43,6)	1.613 (45,0)	1.284 (47,8)
Widowed	5.638 (26,6)	3.784 (30,6)	645 (25,4)	776 (21,6)	433 (16,1)
Separated or Divorced	2.358 (11,1)	1.045 (8,4)	308 (12,1)	534 (14,9)	471 (17,5)
Positive self-perceived health					
Very good	1.596 (7,5)	555 (4,5)	135 (5,3)	368 (10,3)	538 (20,0)
Good	8.079 (38,1)	3.976 (32,2)	970 (38,2)	1.658 (46,2)	1.475 (54,9)
Regular	9.030 (42,6)	5.963 (48,2)	1.148 (45,2)	1.319 (36,8)	600 (22,3)
Bad	1.977 (9,3)	1.506 (12,2)	219 (8,6)	190 (5,3)	62 (2,3)
Very bad	497 (23)	367 (3,0)	66 (2,6)	53 (1,5)	11 (0,4)

Of the 12,367 older people with 0 to 4 years of esducation who were part of this group, most were female (53.7%), 62% referred themselves as black or brown, 42.9% lived with a partner, more than half (57.4%) had a per capita income of up to 1 minimum wage. Regarding SPH, 4.5% reported their health as "very good", 32.2% as "good", 48.2% as "regular", 12.2% as "bad", and 3% as "very bad" (Table 1).

The prevalence of positive SPH was found to be 36.7% in both genders, and of 34.8% in women and 38.8% in men, and the following associations were found in the last regression model developed, adjusted for socia, demographic and health variables.

Regarding the sociodemographic variables, the study showed lower prevalence of positive SPH in individuals who self-reported to be black or brown when compared to whites and yellows (PRaj=0.96; 95%CI 0.94-0.99 in women vs aPR=0 .94; 95%CI 0.91–0.96 in men); regarding the marital status, associations were found with higher prevalence in single women (aPR=1.04; 95%CI 1.01-1.08) and with lower prevalence in widowed men (PRaj=0.93; 95%CI 0.88-0.98). Higher prevalences were observed in those who had an income of 3 or more minimum wages (PRaj=1.18; 95%CI 1.11-1.24 in women vs. aPR=1.29; 95%CI 1.22–1.37 in men), from 1 to 3 minimum wages (aPR=1.09; 95%CI 1.03-1.15 in women vs. aPR=1.18; 95%CI 1.12-1.26 in men) compared to those who received 0 to 1 minimum wages. Regarding the age group variable, relationships were found only in men aged 70 to 74 years (PRaj=0.96; 95%CI 0.91–1.0).

As for the variables related to health behaviors, relationships were found in those who had at least one medical appointment in the last year (aPR=1.25; 95%CI 1.16–1.35 in women vs. aPR=1.22; 95%CI 1.16–1.28 in men), or had the last medical appointment from one to three years before (aPR=1.14; 95%CI 1.04-1.24 in women vs aPR=1.16; 95%CI 1.09-1.23 in men), when compared to those who had not had any medical appointments for more than three years. Regarding the regular consumption of fruits and vegetables, only women had an association with this behavior (PRaj=1.07; 95%CI 1.05-1.10). Associations were also found in women who practiced sufficient physical activity during leisure time (PRaj=1.13; 95%CI 1.08-1.19).

Regarding the variables of social support, associations were found in those who went to church weekly when compared to those who went once a year, rarely, or did not go (PRaj=1.25; 95%CI 1.16-1.35 in women vs. aPR=1.22; 95%CI 1.16–1.28 in men) and in women who participated weekly in some community association when compared to those who did not participate or rarely participated (PRaj=1.08; 95%CI 1.0-1.18).

Of the variables studied, there was a greater number of associations in women, which were generally stronger, except for the income variable, which showed a more explicit relationship in men.

Table 2. Association between socioeconomic and behavioral variables and positive self-perceived health in older women aged 60 years and older with 0 to 4 years of education, Brazil, PNS, Brazil, 2019, (n=6,638).

Variable	PR*	Rpaj**	Rpaj***
Color			
White and yellow	1	1	1
Blacks and browns	0,94(0,92; 0,96)	0,96(0,93;0,98)	0,96(0,94; 0,99)
Age group (years)			
60-64	1	1	1
65-69	1,0(0,96;1,04)	0,99(0,95; 1,03)	0,98(0,94;1,02)
70-74	1,01(0,98;1,05)	0,99(0,95; 1,03)	0,98(0,94;1,01)
75-79	1,03(0,99;1,06)	1,0(0,96; 1,04)	0,99(0,96;1,03)
80 ou mais	1,0(0,97; 1,04)	0,97(0,93; 1,01)	0,98(0,94;1,02)
Marital Status			
Married	1	1	1
Divorced	0,99(0,96; 1,02)	1,01(0,98; 1,05)	1,0(0,97; 1,03)
Widowed	1,01(0,96; 1,06)	1,02(0,98; 1,07)	1,01(0,97; 1,06)
Single	1,04(1,0; 1,07)	1,05(1,01; 1,09)	1,04(1,01; 1,08)
Per capita income (MW)			
0 to 1	1	1	1
more than 1 to 3	1,09(1,03; 1,16)	1,08(1,02; 1,15)	1,09(1,03; 1,15)
More than 3	1,19(1,13; 1,26)	1,17(1,11; 1,24)	1,18(1,11; 1,24)
Social participation in the community (associations)			
A few times a year, rarely, or does not participate	1	1	1
Monthly	1,03(0,89; 1,19)	1,02(0,88; 1,18)	0,99(0,86; 1,15)
Weekly	1,11(1,02; 1,20)	1,09(1,01; 1,18)	1,08(1,0; 1,18)
Participation in religious activities			
A few times a year, rarely, or does not participate	1	1	1
Monthly	1,04(1,01; 1,09)	1,04(1,01; 1,09)	1,04(1,0; 1,08)
Weekly	1,05(1,02; 1,08)	1,05(1,02; 1,07)	1,05(1,03; 1,08)
Last Medical Appointment			
More than 3 years ago	1	1	1
From 1 to 3 years ago	1,17(1,08; 1,26)	1,17(1,08; 1,27)	1,14(1,04; 1,24)
Up to 1 year ago	1,36(1,26; 1,44)	1,36(1,28; 1,46)	1,25(1,16; 1,35)
Sufficient physical activity during leisure time (≥150 minutes/week)			
No	1	1	1
Yes	1,11(1,05; 1,16)	1,13(1,07; 1,18)	1,13(1,08; 1,19)
Tobacco Consumption			
Yes	1	1	1
No	1,06(0,91; 1,23)	1,07(0,92; 1,24)	1,06(0,91; 1,23)
Regular Consumption of Fruits and Vegetables			
≤ 5 days a week	1	1	1
≥ 5 days a week	1,09(1,07; 1,12)	1,07(1,04; 1,09)	1,07(1,05; 1,10)

95%CI: 95% confidence interval; *Gross Prevalence Ratios (PR); **Adjusted Prevalence Ratios (aPR) by social and demographic variables (gender, color, income, marital status); ***Adjusted Prevalence Ratios (aPR) by social variables (gender, color, income, marital status) and demographic and health variables (presence of health morbidity; diabetes, arterial hypertension).

Table 3. Association between socioeconomic and behavioral variables and positive self-perceived health in older men aged 60 years and older with 0 to 4 years of education, Brazil, PNS, Brazil, 2019, (n=5.729).

Variable	PR*	aPR**	aPR***
Color			
White and yellow	1	1	1
Blacks and browns	0,93(0,90; 0,95)	0,94(0,92; 0,97)	0,94(0,91; 0,96)
Age group (years)			
60-64	1	1	1
65-69	1,01(0,97;1,06)	1,0(0,96; 1,05)	0,99(0,94;1,04)
70-74	0,97(0,93;1,01)	0,96(0,92; 1,01)	0,96(0,91;1,0)
75-79	0,99(0,95;1,03)	0,98(0,94; 1,02)	0,98(0,94; 1,02)
80 and older	0,95(0,91;0,99)	0,94(0,90; 0,98)	0,96(0,92; 1,0)
Marital Status			
Married	1	1	1
Divorced	0,94(0,90; 0,99)	0,97(0,93; 1,02)	0,96(0,91; 1,0)
Widowed	0,92(0,87; 0,97)	0,95(0,90; 1,0)	0,93(0,88; 0,98)
Single	0,98(0,95; 1,02)	1,01(0,97; 1,04)	0,98(0,94; 1,01)
Per capita income (MW)			
0 to 1	1	1	1
more than 1 to 3	1,19(1,12; 1,26)	1,17(1,11; 1,25)	1,18(1,12; 1,26)
More than 3	1,30(1,22; 1,38)	1,27(1,19; 1,34)	1,29(1,22; 1,37)
Social participation in the community (associations)			
A few times a year, rarely, or does not participate	1	1	1
Monthly	0,93(0,79; 1,09)	0,90(0,77; 1,06)	0,89(0,77; 1,04)
Weekly	1,13(1,0; 1,28)	1,09(0,97;1,23)	1,10(0,98; 1,24)
Participation in religious activities			
A few times a year, rarely, or does not participate	1	1	1
Monthly	0,99(0,95; 1,04)	1,0(0,95; 1,05)	1,0(0,96; 1,05)
Weekly	1,06(1,02; 1,09)	1,05(1,02; 1,08)	1,05(1,02; 1,08)
Last Medical Appointment			
More than 3 years ago	1	1	1
From 1 to 3 years ago	1,15(1,09; 1,22)	1,17(1,10; 1,24)	1,16(1,09; 1,23)
Up to 1 year ago	1,29(1,24; 1,35)	1,31(1,26; 1,37)	1,22(1,16; 1,28)
Sufficient physical activity during leisure time (≥150 minutes/week)			
No	1	1	1
Yes	1,03(0,97; 1,10)	1,03(0,98; 1,10)	1,03(0,98; 1,10)
Tobacco Consumption			
Yes	1	1	1
No	1,08(0,95; 1,24)	1,09(0,96; 1,25)	1,08(0,94; 1,24)
Regular Consumption of Fruits and Vegetables			
≤ 5 days a week	1	1	1
≥ 5 days a week	1,04(1,01; 1,07)	1,01(0,98; 1,04)	1,03(1,0; 1,06)

95%CI: 95% confidence interval; *Gross Prevalence Ratios (PR); **Adjusted Prevalence Ratios (aPR) by social and demographic variables (gender, color, income, marital status); ***Adjusted Prevalence Ratios (aPR) by social variables (gender, color, income, marital status) and demographic and health variables (presence of health morbidity; diabetes, arterial hypertension).

DISCUSSION

Among the main findings of the present study, the following stand out: 1) Higher prevalence of positive SPH in men (38.8%) than in women (34.8%); 2) Higher number of associations observed in women; 3) Regarding sociodemographic variables, relationships were found in both genders, with lower prevalence of positive SPH in those who self-reported as black and brown, whereas higher prevalence of the outcome was found in those who had higher income. In the variable marital status, lower prevalence was found in widowed men, and higher prevalence in single women; 4) As for the variables related to health and lifestyle, associations were observed with the practice of sufficient physical activity during leisure time and consumption of fruits and vegetables only in women. On the other hand, having more frequent medical appointments was associated with both genders; 5) Regarding the social participation, associations were found with social participation in community associations in women, and participation in religious activities in both genders.

Higher prevalences of positive SPH were found in other studies carried out in Brazil in the older population aged 60 years and older. Confortin et al.,[21] found a prevalence of 51.2% when studying a sample from the southern region; Silva et al.[22], 50.4% with a sample of three municipalities in the countryside of Brazil in the Northeast, Southeast and South regions; and Borim et al.,[3] found a prevalence of 80.9% in Campinas, São Paulo. These differences are possibly explained by the range of education of the sample, since in the present study only older people with low education were included. Studies on the topic showed that individuals with fewer years of education have worse SPH when compared to more educated individuals, and they also tend to have less healthy behaviors[12,15].

Research on the topic showed that men tend to report positive health more often.[21,23]. Barata[14] argues that this occurs, in part, due to the historical and social role given to women of having relative care and which is related to a more accentuated perception of possible health problems, while men sometimes end up neglecting such care due to the social construction that still persists in the male gender of not showing weaknesses.

As other studies[8,24], the present one also found lower prevalences of positive SPH in those who self-reportedas blacks or browns, with plausible results due to the historical and social inequalities that still persist between black and white people in the Brazilian context, and it is more evident in the population with fewer years of education.

Few differences were found between the age groups studied, which is also attributed to the homogeneity of the sample. However, it should be noted that part of the literature portrays that as age grows, the prevalence of positive health reports is lower because the number of pathologies and limitations tends to increase with aging[5,9].

The relationship between SPH and income is already known in the literature.[12,14,25]. Some authors argue that individuals who have a higher income tend to have better health conditions as they age.[12,26]because they have better financial conditions and can spend more on health-related issues[12,26].

A lower prevalence of positive SPH was found in widowers, and a higher one in single women. Similar findings were found by Jesus & Aguiar[27] with older widowers in Brazilian capitals and the Federal District. A possible hypothesis would be the difficulty of widowed men to deal with daily routine activities when compared to married men (food, organization, health-related aspects), while single older women would have more time for daily activities related to leisure when compared to the married ones.

Important associations were found with variables related to social support, such as the participation of women in community associations, a relationship also observed by other authors.[10,28]. Beiing part of a social support network is related to better cognitive and psychological health, as noted by Uchino[28] in a review study on the topic.

Other authors[8,11] also observed associations in a more frequent participation in religious activities. In addition to religious participation representing

an important social support, it should be noted that participating in religious activities is related to higher prevalence of other positive health behaviors such as less consumption of tobacco, alcoholic beverages, and optimism to deal with life's adversities.

Contrary to some studies carried out[8,29] no associations were found with smoking, but associations were found between the regular consumption of fruits and vegetables and the sufficient practice of physical activity during leisure time in women, behavioral variables whose importance and relationship with SPH are already well presented in the literature.[21,30-32]. Avoiding tobacco, consuming fruits and vegetables, as well as practicing physical activity is related to a delay in the onset of chronic non-communicable diseases. (NCD)[33].

The relationship between the frequency of medical appointments and SPH seems to be little explored in the literature, but a possible explanation for the association is that having more frequent appointments or having greater access to healthcare services is related to easier treatment and diagnosis. of diseases and safety regarding their own health condition.

The results presented by the study contribute to the knowledge of factors related to positive SPH in the older population with low education, reinforce the importance of promoting public policies to encourage healthy behaviors and to stimulate social participation. They show the relevance of policies to improve the quality of life of the population with fewer years of education or less access to economic/ social subsidies to facilitate the adoption of healthy behaviors in this population.

The present study has limitations such as the cross-sectional design, which prevents the establishment of the relationship between cause and effect of the variables studied, the weighting method was not used in the analysis and the limited number of variables available and used in the database of PNS, 2019. As positive points, we point out the statistical power that the sample presents and the contribution that the study brings to the literature when relating SPH in the older population with low education.

CONCLUSIONS

The study foundassociations with marital status (higher prevalence in single women and lower in widowed men), higher income, more frequent visits to the doctor and church. Relationships were found only in females who practice sufficient physical activity during leisure time, consume fruits and vegetables and participate in community associations.

The findings reveal the importance of policies to promote healthy behaviors, encourage social participation and more frequent search for healthcare services. Likewise, they demonstrate the importance of public policies to improve the income of the population with lower education, as this variable is intrinsically linked to social inequalities in health.

Edited by: Tamires Carneiro de Oliveira Mendes

REFERENCES

1. Wuorela M, Lavonius S, Salminen, M, Vahlberg T, Viitanen M, Viikar L. Self-rated health and objective health status as predictors of all-cause mortality among older people: a prospective study with a 5, 10, and 27-year follow-up. BMC Geriatr. 2020;20(120).
2. Szybalska A, Broczek K, Puzianowska-Kuznicka M, Slusarczyk P, Chudek J, Skalska A, Mossakowska M. Self-rated health and its association with all-cause mortality of older adults in Poland: The PolSenior project. Arch Gerontol Geriatr. 2018;7913-20.
3. Borim FS, Neri AL, Francisco PM, Barros MB. Dimensions of self-rated health in older adults. Rev Saude Publica. 2014;48(5):714-722.
4. Silva TR, Menezes PR. Autopercepção de saúde: um estudo com idosos de baixa renda de São Paulo. Rev Med (São Paulo). 2007;86(1):28-38.
5. Bombak AE. Self-rated health and public health: a critical perspective. Front Public Health. 2013;1-15.
6. Veras PR, Oliveira M. Envelhecer no Brasil: a construção de um modelo de cuidado. Ciênc Saúde Colet. 2018;23(6):1929-36.

7. Camargo-Casas S, Suarez-Monsalve S, Zepeda MUP, García-Pena C, Cano-Gutierrez CA. Multimorbidity, Depressive Symptoms, and Self-Reported Health in Older Adults: a Secondary Analysis of the Sabe Bogota Study. Rev Inves Clin. 2018;70(4):192-197.
8. Gomes MM, Paixão LA, Faustino AM, Cruz RC, Moura LB. Marcadores da autopercepção positiva de saúde de pessoas idosas no Brasil. Acta Paul Enferm. 2021;34:eAPE02851.
9. Reichert FF, Loch MR, Capilheira MF. Autopercepcão de saúde em adolescentes, adultos e idosos. Cien Saude Colet. 2012;17(12):3353-3362.
10. Machón M, Vergara I Dorronsoro M, Vrotsou K, Larrañga I. Self-perceived health in functionally independent older people: associated factors. BMC Geriatr. 2016;16(66).
11. Reyes-Ortiz C, Payan C, Altamar G, Gómez F, Koenig H. Religiosity and self-rated health among older adults in Colombia. Colomb Med North America. 2019;50(2);67-76.
12. Andrade FCD, Mehta JD. Increasing educational inequalities in self-rated health in Brazil, 1998-2013. Plos One. 2018;13(4):e0196494.
13. Carneiro JA, Gomes CAD, Durães W, Jesus DR, Chaves KLL, Lima CA, Costa FM, Caldeira AP. Autopercepção negativa da saúde: Prevalência e fatores associados entre idosos assistidos em centro de referência. Cien Saude Colet. 2020;25(3):909-918.
14. Barata RB. Ser rico faz bem à saúde? In: Como e por que as desigualdades sociais fazem mal à saúde. Rio de Janeiro: Editora FIOCRUZ, 2009.
15. Zajacova A, Lawrence E. The Relationship Between Education and Health: Reducing Disparities Through a Contextual Approach. Annu Rev Public Health. 2018;39:273-289.
16. Instituto Brasileiro de Geografia e Estatística/IBGE. Coordenação de Trabalho e Rendimento. Pesquisa Nacional por Amostra de Domicílios Contínua: Educação 2018a – Rio de Janeiro: Instituto Brasileiro de Geografia e Estatística, 2018a.
17. Instituto Brasileiro de Geografia e Estatística/ IBGE. Projeções da População 2018b. Disponível em: <https://www,ibge,gov,br/estatisticas/sociais/populacao/9109-projecao-da-populacao,html?=&t=o-que-e>. Acesso em: 08 set 2021.
18. Peres MAC. Velhice e analfabetismo, uma relação paradoxal: a exclusão educacional em contextos rurais da região Nordeste. Soc Estado. 2011;26(3).
19. Instituto Brasileiro de Geografia e Estatística/ IBGE. Coordenação de Trabalho e Rendimento. Pesquisa nacional de saúde 2019: atenção primária à saúde e informações antropométricas – Rio de Janeiro: Instituto Brasileiro de Geografia e Estatística, 2019.
20. Stopa SR, Szwarcwald CL, Oliveira MM, Govea ECDP, Vieira MLFP, Freitas MPS, Sardinha LMV, Macário EM. Pesquisa Nacional de Saúde 2019: histórico, métodos e perspectiva. Epidemiol Serv Saude. 2020;29(5).
21. Confortin SC, Giehl MWC, Antes DL, Schneider IJC, d'Orsi E. Autopercepção positive de saúde em idosos: estudo populacional no Sul do Brasil. Cad de Saúde Pública. 2015;32(5).
22. Silva RJ, Smith-Menezes A, Tribess S, Romo-Perez V, Virtuoso JS. Prevalência e fatores associados a percepção negativa da saúde em pessoas idosas do Brasil. Rev Bras Epidemiol. 2012;15(1):49-62.
23. Lindemann IL, Reis NR, Mintem GC, Mensonza-Sassi RA. Autopercepção da saúde entre adultos e idosos usuários da Atenção Básica de Saúde. Cien Saude Colet. 2019;24(1):45-52.
24. Chiavegatto Filho ADP, Laurenti R. Disparidades étnico raciais em saúde autoavaliada: análise multinível de 2,697 indivíduos residentes em 145 municípios brasileiros. Cad Saúde Pública. 2013:29(8):1572-1582.
25. Brasil CH, Maia LC, Caldeira AP, Figueiredo MFS, Pinho L. Autopercepção positiva de saúde entre idosos não longevos e longevos e fatores associados. Cien Saude Colet. 2020;26(suppl 3):5157-5170.
26. Santos AMA, Jacinto PA, Tejada CAO. Causalidade entre Renda e Saúde: Uma Análise Através da Abordagem de Dados em Painel com os Estados do Brasil. Estud Econ. 2012;42(2):229-61.
27. Jesus SR, Aguiar HJR. Autopercepção positiva de saúde entre idosos na região Nordeste do Brasil. BJHR. 2021;4(5):20025-41.
28. Uchino BN. Suport and Health: A Review of Physiological Processes Potentially Underlying Links to Disease Outcomes. J Behav Med. 2006;29:377-387.
29. Feenstra M, van Munster BC, MacNeil Vroomen JL, de Rooij SE, Smidt N. Trajectories of self-rated health in an older general population and their determinants: the Lifelines Cohort Study. BMJ Open. 2020;10(2):e035012.

30. Babo M, Poinhos R, Franchini B, Afonso C, Oliveira BMPM, Almeida MDV. The relationship between health self-perception, food consumption, and nutritional status among Portuguese older adults. Eur J Clin Ntr. 2019; 73(12):1613-1617.

31. Han J. Physical activity and self-rated health: role of contexts. Psychol Health Med. 2021;26(3):347-358.

32. Andrade GF, Loch MR, Silva AMR. Mudanças de comportamentos relacionados à saúde como preditores de mudanças na autopercepção de saúde: estudo longitudinal (2011-2015). Cad. Saúde Pública. 2019;35(4): e00151418.

33. World Health Organization/WHO. Non communicable diseases 2021. Disponível em: <https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>. Acesso em: 20 set 2021.

Multimorbidity in community-dwelling older adults: prevalence and associated factors

Maria Suely Fernandes Gusmão[1]
Pâmela de Oliveira Cunha[2]
Brenda Gomes dos Santos[2]
Fernanda Marques da Costa[3]
Antônio Prates Caldeira[3]
Jair Almeida Carneiro[3]

Abstract

Objective: to analyze the prevalence of multimorbidity in the elderly and its associated factors. *Method*: cross-sectional study, part of a population-based cohort, carried out in Montes Claros, Minas Gerais, Brazil. A probabilistic sampling was carried out, by conglomerates, in two stages: by census sector and by households, according to the population density of the elderly. The dependent variable was multimorbidity, considering the simultaneous accumulation of two or more and three or more chronic diseases in community-dwelling elderly. Prevalence ratios were estimated using Poisson regression, with robust variance. *Result*: the prevalence of multimorbidity in the elderly, considering two or more and three or more chronic diseases, was 67.8% and 43.4%, respectively. After multiple analysis, the female sex (PRaj=1.15; 95%CI 1.04-126)/(PRaj=1.19; 95%CI108-1.31), frailty (PRaj=1.15; 95%CI 1.05-1.27)/(PRaj= 1.28; 95%CI 1.16-1.41) and medical consultation in the last 12 months (PRaj=1.25; 95%CI 1.06-1 .47)/(PRaj=1.22; 95%CI 1.06-1.41) were associated with multimorbidity, both with two or more and with three or more chronic diseases, respectively. Poor self-perception of health (PRaj=1.20; 95%CI1.09-1.32) was associated with multimorbidity with two or more chronic diseases, while not having a private health plan (PRaj=1.14; 95%CI1.04-1.25) was associated with multimorbidity with three or more chronic diseases. *Conclusion*: The prevalence of multimorbidity was high in community-dwelling elderly, considering two or more and three or more chronic diseases. Knowledge of these conditions can help in health promotion, prevention and surveillance actions for community-dwelling elderly people.

Keywords: Aging. Multimorbidity. Chronic diseases. Elderly. Epidemiology. Risk Factors.

[1] Universidade Estadual de Montes Claros, Programa de Pós-Graduação em Cuidado Primário em Saúde. Montes Claros, MG, Brasil.

[2] Universidade Estadual de Montes Claros, Centro de Ciências Biológicas e da Saúde (CCBS). Montes Claros, MG, Brasil.

[3] Universidade Estadual de Montes Claros, Programa de Pós-Graduação em Cuidado Primário em Saúde da Unimontes, Centro Universitário FIPMoc/Afya (UNIFIPMoc/Afya). Montes Claros, MG, Brasil.

No funding was received in relation to the present study.

The authors declare that there is no conflict in the conception of this work.

Correspondence
Maria Suely Fernandes Gusmão
suelyfergusmao@gmail.com

Received: June 28, 2022
Approved: November 11, 2022

http://dx.doi.org/10.1590/1981-22562022025.220115en

INTRODUCTION

Population aging, driven by a decline in fecundity and reduction in mortality, has promoted a shift in the epidemiologic profile[1]. However, this longer life expectancy has been accompanied by a rise in the burden of non-communicable diseases (NCD), leading to multimorbidity in the older population and, consequently, greater demand for health services[2].

Multimorbidity can be defined as the occurrence of 2 or more chronic diseases concomitantly in the same individual[3,4]. However, other authors define multimorbidity as the presence of 3 or more chronic conditions. Currently, there is no consensus on the number of chronic diseases which should define this condition. This methodological difference and lack of consensus on the conceptual definition has led to disparities in prevalence statistics[5,6].

Multimorbidity is associated with poorer quality of life, higher risk of death and poses a challenge for health services in the form of higher costs with medical consultations and longer hospital stays[7]. The high rates and severity of multimorbidity have made it a public health priority[3,4]. The prevalence of this condition in older people is high, with rates exceeding 50% for ≥2 chronic diseases, a prevalence that tends to increase as the population ages[8].

Given this major public health challenge, particularly multimorbidity in older people, further studies investigating this issue are needed to allow improvements in health care for this population. The aspects associated with multimorbidity are deemed key indicators of the health status of older people, providing vital information for devising public policies and helping to inform health planning and elucidate the magnitude of multimorbidity on a national scale[9]. Moreover, the results of the present study can shed light on the sociodemographic characteristics of the older adults with multimorbidity and their health issues, thereby allowing the devising of strategies for prevention and surveillance of these conditions among community-dwelling older adults. Lastly, this study can add to the body of scientific knowledge, in as far as most previous investigations on the topic have involved only small samples. This study sought to answer the following research question: What is the prevalence of multimorbidity in older adults and its determinants? This question provided the basis for a broader discussion on multimorbidity, defined here as the co-occurrence of ≥2 or ≥3 diseases. This approach allowed a more rounded in-depth analysis of the subject.

Therefore, the objective of this study was to analyze the prevalence of multimorbidity in older adults and its associated factors.

METHOD

A cross-sectional analytical study involving a population-based cohort of households was conducted. The present study involved community-dwelling older adults from the city of Montes Claros, Minas Gerais state, Brazil. In 2021, the city had an estimated population of approximately 417,478 and represents the main urban center of the region[10].

The sample size at baseline was calculated to estimate the prevalence of each health outcome investigated in the epidemiological survey, based on an estimated population of 30,790 older people residing in the urban region, according to data from the Brazilian Institute of Geography and Statistics (IBGE), with a 95% confidence interval, conservative prevalence of 50% for unknown outcomes and 5% sampling error. Given cluster sampling was employed, the number identified was multiplied by a correction factor and design effect (*deff*) of 1.5% plus 15% for losses. The minimum sample size was thus calculated as 656 individuals.

At study base-line (May-July 2013), a 2-stage clustering probabilistic sampling process was performed. In stage 1, census sectors were used as the sampling unit. For stage 2, the number of households was defined, according to the density of the population of older adults (≥60 years).

As a follow-up for this health investigation, the first wave was carried out between November 2016 and February 2017, constituting stage 2 of the study. During this stage, households of all older adults included at baseline were considered eligible for further interview.

Therefore, the population of the present investigation comprised participants who remained in the study for the first-wave follow-up. The present study drew on the population from the first wave to yield more recent data. In order to ensure similar representativeness of the base-line and first-wave populations, a differential loss analysis was performed using Pearson´s chi-squared test.

Notably, by analyzing older adults who remained in the study, the statistical power was unaffected, given the number of individuals who continued in the investigation exceeded the minimum sample size for prevalence studies. This can be demonstrated by the following sample parameter for cross-sectional studies: population 30,790 older adults, conservative prevalence 50%, sampling error 5% and 95% confidence interval, giving a minimum sample size of 380 participants.

Multimorbidity was the outcome variable, defined as the presence of ≥2 and ≥3 concomitant chronic diseases in community-dwelling older people. The comorbidities included were: stroke, asthma, pulmonary embolism, diabetes mellitus, cardiovascular disease, chronic obstructive pulmonary disease, systemic arterial hypertension, cancer and osteoporosis. Thus, the dependent variable was dichotomized into 2 levels: absence of multimorbidity (defined as ≤1 self-reported chronic disease) and presence of multimorbidity (≥2 self-reported chronic diseases); and absence of multimorbidity (defined as ≤2 self-reported chronic diseases) and presence of multimorbidity (≥3 self-reported chronic diseases).

The exposure variables analyzed were dichotomized equally: Sex (male or female), age (≤79 or ≥80 years), marital status (with or without partner), living arrangements (lives alone or with others), education (≤4 or >4 years), literacy (can read or otherwise), own income (yes or no), monthly family income (≤1 or >1 minimum wage), religiosity (yes or no), tobacco use (yes or no), polypharmacy (yes or no), weight loss in last 3 months (yes or no), presence of carer (yes or no), fall in last 12 months (yes or no), medical consultation in last 12 months (yes or no), hospitalization in last 12 months (yes or no), difficulty accessing health services (yes or no) and holding private health plan (yes or no).

Frailty and self-rated health were independent variables. Self-rated heath was measured by the question "How do you rate your state of health?", with possible responses of "very good", "good", "fair", "poor" or "very poor". Responses of "very good" or "good" were considered a positive health rating, whereas "fair", "poor" and "very poor" were classified as a negative health rating[11]. Frailty was determined using the Edmonton Frail Scale - EFS[12], a tool which can be easily administered by health professionals. The EFS comprises 9 domains: cognition, general health status, functional independence, social support, medication use, nutrition, mood, urinary continence and functional performance, evaluating 11 items scored from 0-17. A final score of 0-4 indicates not frail (non-frail); 5-6 vulnerable (pre-frail); 7-8 mild frailty; 9-10 moderate frailty; while a score ≥11 points defines the individual as exhibiting severe frailty[12,13]. The results of this independent variable were dichotomized into 2 levels: non-frail (final score ≤6) and frail (final score >6).

Bivariate analyses were carried out to identify the factors associated with the response variable using Pearson´s chi-square test. Factors associated up to a level of 20% ($p \leq 0.20$) were selected for inclusion in the analyses of multiple associations between the exposure variables and outcome variable using multivariate Poisson regression with robust variance. The magnitude of the associations was estimated using prevalence ratios (PR), followed by their respective 95% Confidence Intervals (95%CI), with the adoption of a 5% level of significance ($p<0.05$) for the final model. The model with the best fit was determined using the Deviance and Pearson goodness-of-fit tests, and values and changes of Log Likelihood were also analyzed. Residuals analysis was performed using adjusted R^2. Multicollinearity was assessed to identify correlated variables for subsequent exclusion and improvement of fit of the final model. All statistical treatment was carried out using the Statistical Package for the Social Sciences (SPSS), version 20.0.

All participants were informed about the study and agreed to take part by signing the free and informed consent form. The research project was approved by the Research Ethics Committee of the Pitagoras Integrated Colleges of Montes Claros,

under permit no. 1.629.395, in conformance with Resolution no. 466/2012 of the National Board of Health/Ministry of Health.

RESULTS

A total of 394 community-dwelling older adults, out of the initial 685 individuals assessed at baseline, were included in this study. Reasons for non-inclusion in the follow-up were: 67 not found at address after 3 visits; 78 not located after change of address; 92 refusals to participate in stage 2; and 54 had died.

The characteristics of the groups of older adults included in the follow-up and lost to follow-up are given in Table 1. No significant group differences were evident for the main variables, indicating that losses were not skewed.

Table 1. Characteristics of participants included in follow-up and lost to follow-up, Montes Claros, Minas Gerais, 2013-2017.

Variables	Included in follow-up n (%)	Lost to follow-up n (%)	*p*-value
Sex			0,163
Male	130 (33.0)	111 (38.1)	
Female	264 (67.0)	180 (61.9)	
Age			0.089
< 80 years	341(86.5)	238 (81.8)	
≥ 80 years	53 (13.5)	53 (18.2)	
Education			0.964
≤ 4 years	300 (76.1)	222 (76.3)	
> 4 years	94 (23.9)	69 (23.7)	
Monthly family income			0.158
≤ 1 minimum wage	121 (30.7)	75 (25.8)	
> 1 minimum wage	273 (69.3)	216 (74.2)	
Arterial hypertension			0.937
Yes	280 (71.1)	206 (70.8)	
No	114 (28.0)	85 (29.2)	
Diabetes Mellitus			0.137
Yes	80 (20.3)	73 (25.1)	
No	314 (79.7)	218 (74.9)	
Depressive symptoms			0.870
Yes	116 (29.4)	84 (28.9)	
No	278 (70.6)	207 (71.1)	
Polypharmacy			0.229
Yes	86 (21.8)	75 (25.8)	
No	308 (78.2)	216 (74.2)	
Frailty			0.209
Frail	132 (33.5)	111 (38.1)	
Non-frail	262 (66.5)	180 (61.9)	

The prevalence of multimorbidity among the participants, for ≥2, ≥3, ≥4 and ≥5 chronic diseases was 67.8%, 43.4%, 23.1% and 9.6%, respectively.

On bivariate analysis, the variables exhibiting a statistical association with multimorbidity involving ≥2 chronic Non-Communicable Diseases (NCDs) (self-reported) were female gender (67%), having a carer (12%), occurrence of fall in last 12 months (31%), poor self-rated health (53%), presence of frailty (37%) and undergoing consultation in last 12 months (91%)(Table 2).

On bivariate analysis, the variables female gender (67%), age (92%), fall in last 12 months (31%), poor self-rated health (53%), presence of frailty (37%) and consultation in last 12 months (91%) remained associated with multimorbidity in participants with ≥3 NCDs (self-reported)(Table 3). Regarding marital status just over half of participants stated having no partner (51%), the majority (75%) had educational level of ≤4 years, while 24% of individuals were illiterate. Overall, 62% of participants reported not having a private health plan.

Variables associated up to a level of 20% (p≤0.20) were selected for inclusion in the analyses of multiple association between the exposure variables and outcome variable using multivariate Poisson regression with robust variance. The magnitude of associations was estimated based on prevalence ratios (PR), followed by their respective confidence intervals (95% CI), with the adoption of a 5% level of significance (p<0.05) for the final model.

After multivariate analysis, the following variables remained statistically associated with multimorbidity in community-dwelling older adults with ≥2 chronic diseases: female gender (PRaj=1.15; 95%CI 1.04-1.26), poor self-rated health (PRaj=1.20; 95%CI 1.09-1.32), frailty (PRaj=1.15; 95%CI 1.05-1.27) and having medical consultation in last 12 months (PRaj=1.25; 95%CI 1.06-1.47). For individuals exhibiting ≥3 chronic diseases, the following variables were statistically associated with multimorbidity: female gender (PRaj=1.19; 95%CI 1.08-1.31), not holding a private health plan (PRaj=1.14; 95%CI 1.04-1.25), presence of frailty (PRaj= 1.28; 95%CI 1.16-1.41) and undergoing a medical consultation in last 12 months (PRaj=1.22; 95%CI 1.06-1.41) (Table 4).

Table 2. Demographic, social, economic and health-related care characteristics of community-dwelling older adults and factors associated with multimorbidity involving ≥2 NCDs (bivariate analysis). Montes Claros, MG, 2017.

Independent variables	Multimorbidity involving ≥2 NCDs			PR	95% CI	*p*
	Total sample	Yes	No			
	n (%)	n (%)	n (%)			
Sex						0,005
Male	131(33.0)	76 (58.0)	55 (42.0)	1		
Female	263(67.0)	191(72.6)	72 (27.4)	1.09	1.03-1.16	
Age						0.669
< 79 years	302(76.0)	203(67.2)	99 (32.8)	1		
≥ 80 years	92 (23.0)	64 (69.6)	28 (30.4)	1.01	0.95-1.08	
Marital status						0.185
With partner	195(49.0)	126(64.6)	69 (35.4)	1		
Without partner	199(51.0)	141(70.9)	58 (29.1)	1.04	0.98-1.10	
Living arrangement						0.143
Lives with others	344(87.0)	229(66.6)	115(33.4)	1		
Lives alone	50 (13.0)	38 (76.0)	12 (24.0)	1.06	0.98-1.14	
Education						0.092
> 5 years	99 (25.0)	60 (60.6)	39 (39.4)	1		
≤ 4 years	295(75.0)	207(70.2)	88 (29.8)	1.06	0.991-1.13	

to be continued

Continuation of Table 2

Independent variables	Multimorbidity involving ≥2 NCDs			PR	95% CI	*p*
	Total sample	Yes	No			
	n (%)	n (%)	n (%)			
Can read						0.978
Yes	300(76.0)	206(68.7)	94 (31.3)	1		
No	94 (24.0)	61 (64.9)	33 (35.1)	0.98	0.91-1.04	
Religiosity						0.326
Yes	381(97.0)	260(68.2)	121(31.8)	1		
No	13 (3.0)	7 (53.8)	6 (46.2)	0.91	0.76-1.09	
Own income						0.316
Yes	355(90.0)	238(67.0)	117(33.0)	1		
No	39 (10.0)	29 (74.4)	10 (25.6)	1.04	0.96-1.13	
Monthly family income						0.212
> 1 minimum wage	292(74.0)	193(66.1)	99 (33.9)	1		
≤ 1 minimum wage	102(26.0)	74 (72.5)	28 (27.5)	1.04	0.98-1.10	
Smoking						0.998
No	363(92.0)	246(67.8)	117(32.2)	1		
Yes	31 (8.0)	21 (67.7)	10 (32.3)	1.00	0.90-1.11	
Has carer						0.005
No	348(88.0)	229(65.8)	119(34.2)	1		
Yes	46 (12.0)	38 (82.6)	8 (17.4)	1.10	1.03-1.18	
Falls in last 12 months						0.063
No	271(69.0)	176(64.9)	95 (35.1)	1		
Yes	123(31.0)	91 (74.0)	32 (26.0)	1.05	1.00-1.11	
Self-rated health						<0.001
Good	187(47.0)	104(55.6)	83 (44.4)	1		
Poor	207(53.0)1	163(78.7) 1	44 (21.3) 22	1.15 1	1.09-1.21	
Frailty						<0.001
Non-frail	249(63.0)	150(60.2)	99 (39.8)	1		
Frail	145(37.0)	117(80.7)	28 (19.3)	1.13	1.07-1.19	
Consultation in last 12 months						0.007
No	34 (9.0)	15 (44.1)	19 (55.9)	1		
Yes	360(91.0)	252(70.0)	108(30.0)	1.18	1.05-1.33	
Hospitalization in last 12 months						0.627
No	337(86.0)	230(68.2)	107(31.8)	1		
Yes	57 (14.0)	37 (64.9)	20 (35.1)	0.98	0.90-1.06	
Difficulty accessing health services						0.080
No	214(54.3)	137(64.0)	77 (36.0)	1		
Yes	180(45.7)	130(72.2)	50 (27.8)	1.05	0.99-1.11	
Private health plan						0.276
Yes	149(38.0)	96 (64.4)	53 (35.6)	1		
No	245(62.0)	171(69.8)	74 (30.2)	1.03	0.97-1.09	

Table 3. Demographic, social, economic and health-related care characteristics of community-dwelling older adults and factors associated with multimorbidity involving ≥3 NCDs (bivariate analysis). Montes Claros, MG, 2017.

Independent variables	Total sample	Multimorbidity involving ≥3 NCDs		PR	95% CI	*p*
	n (%)	Yes n (%)	No n (%)			
Sex						<0,001
Male	131(33.0)	41 (31.3)	90 (68.7)	1		
Female	263(67.0)	130(49.4)	133(50.6)	1.14	1.06–1.22	
Age						0.049
< 79 years	302(76.0)	123(40.7)	179(59.3)	1		
≥ 80 years	92 (23.0)	48 (52.2)	44 (47.8)	1.08	1.00–1.17	
Marital status						0.030
With partner	195(49.0)	74 (37.9)	121(62.1)	1		
Without partner	199(51.0)	97 (48.7)	102(51.3)	1.08	1.01–1.15	
Living arrangement						0.927
Lives with others	344(87.0)	149(43.3)	195(56.7)	1		
Lives alone	50 (13.0)	22 (44.0)	28 (56.0)	1.00	0.91–1.11	
Education						0.004
>5 years	99 (25.0)	68 (68.7)	31 (31.3)	1		
≤ 4 years	295(75.0)	155(52.5)	140(47.5)	1.12	1.04–1.22	
Can read						0.025
Yes	300(76.0)	121(40.3)	179(59.7)	1		
No	94 (24.0)	50 (53.2)	44 (46.8)	1.09	1.01–1.18	
Religiosity						0.338
Yes	381(97.0)	167(43.8)	214(56.2)	1		
No	13 (3.0)	4 (30.8)	9 (69.2)	0.91	0.75–1.10	
Own income						0.155
Yes	355(90.0)	150(42.3)	205(57.7)	1		
No	39 (10.0)	21 (53.8)	18 (46.2)	1.08	0.97–1.20	
Monthly family income						0.525
> 1 minimum wage	292(74.0)	124(42.5)	168(57.5)	1		
≤ 1 minimum wage	102(26.0)	47 (46.1)	55 (53.9)	1.02	0.95–1.11	
Smoking						0.030
No	363(92.0)	163(44.9)	200(55.1)	1		
Yes	31 (8.0)	8 (25.8)	23 (74.2)	0.87	0.76–0.99	
Has carer						0.101
No	348(88.0)	146(42.0)	202(58.0)	1		
Yes	46 (12.0)	25 (54.3)	21 (45.7)	1.09	0.98–1.20	
Falls in last 12 months						0.010
No	271(69.0)	106(39.1)	165(60.9)	1		
Yes	123(31.0)	65 (52.8)	58 (47.2)	1.10	1.02–1.18	
Self-rated health						<0.001
Good	187(47.0)	64 (34.2)	123(65.8)	1		
Poor	207(53.0)	107(51.7)	100(48.3)	1.13	1.06–1.21	

to be continued

Continuation of Table 3

Independent variables	Total sample	Multimorbidity involving ≥3 NCDs				
		Yes	No	PR	95% CI	*p*
	n (%)	n (%)	n (%)			
Frailty						<0.001
Non-frail	249(63.0)	85 (34.1)	164(65.9)	1		
Frail	145(37.0)	86 (59.3)	59 (40.7)	1.19	1.11–1.27	
Consultation in last 12 months						0.008
No	34 (9.0)	8 (23.5)	26 (76.5)	1		
Yes	360(91.0)	163(45.3)	197(54.7)	1.18	1.04–1.33	
Hospitalization in last 12 months						0.278
No	337(86.0)	150(44.5)	187(55.5)	1		
Yes	57 (14.0)	21 (36.8)	36 (63.2)	0.95	0.86–1.04	
Difficulty accessing health services						0.665
No	214(54.3)	95 (44.4)	119(55.6)	1		
Yes	180(45.7)	76 (42.2)	104(57.8)	0.98	0.92–1.05	
Private health plan						0.007
Yes	149(38.0)	52 (34.9)	97 (65.1)	1		
No	245(62.0)	119(48.6)	126(51.4)	1.10	1.07–1.18	

Table 4. Factors associated with multimorbidity in community-dwelling older adults (multivariate analysis). Montes Claros, MG, 2017.

Independent variables	Multimorbidity involving ≥2 NCDs			Multimorbidity involving ≥3 NCDs		
	PRaj	95%CI	*p*	PRaj	95%CI	*p*
Sex						
Male	1		0.005	1		<0.001
Female	1.15	1.04 – 1.26		1.19	1.08 - 1.31	
Self-rated health						-
Good	1		<0.001	-	-	
Poor	1.20	1.09 – 1.32		-	-	
Frailty						
No	1		0.002	1		<0.001
Yes	1.15	1.05 – 1.27		1.28	1.16 - 1.41	
Consultation in last 12 months						
No	1		0.008	1		0.005
Yes	1.25	1.06 – 1.47		1.22	1.06 - 1.41	
Private health plan						
Yes	-	-	-	1		0.006
No	-	-		1.14	1.04 - 1.25	

Final model fit: with ≥2 NCDs - Deviance goodness-of-fit (50.085), Pearson goodness-of-fit (46.723), Log Likelihood (-500.972), R^2 (0.185). with ≥3 NCDs - Deviance goodness-of-fit (58.782), Pearson goodness-of-fit (59.520), Log Likelihood (-475.873), R^2 (0.324), Collinearity Statistic between variables of final model, all those retained had values within recommended limits (Tolerance > 0.1 and VIF <10).

DISCUSSION

The present study analyzed the prevalence of multimorbidity in community-dwelling older adults and explored some associated factors. The prevalence of multimorbidity found for ≥2 and ≥3 chronic diseases was 67.8% and 43.4%, respectively. Multimorbidity was higher among participants who were female, frail, had a medical consultation in last 12 months, reported poor self-rated health, and held no health plan. A difference in prevalence and associated factors was evident according to the number of concomitant chronic diseases included in the definition of multimorbidity.

The prevalence of multimorbidity among older adults reported in the previous studies reviewed varies greatly. A literature review of older adults from high-income countries found a prevalence of 66.1%, 44.2% and 12.3% for multimorbidity ≥2, ≥3 and ≥5 chronic diseases, respectively[9]. These results are similar to the rates found in the present study of 394 community-dwelling older adults for ≥2 and ≥3 chronic diseases of 67.8% and 43.4%, respectively.

In a systematic review of 70 studies, whose samples ranged from 264 to 162,464 participants, and involved global and stratified analyses and a cut-off for defining multimorbidity of ≥ 2 chronic diseases in the meta-analysis, revealed a multimorbidity prevalence of 37.9% in high-income countries and 29.7% in low-to-middle income countries[3].

In another international study, the prevalence of multimorbidity in older adults was 30.7% in India[14], 39.2% in Vietnam[15], 45.0% in Kosovo[16] and 55.0% in Sweden[17]. Brazilian studies drawing on the National Health Survey (PNS) database found a multimorbidity prevalence of 53.1% in the older population[8] and 57.1% in the oldest old[18]. An integrative review identified a multimorbidity prevalence ranging from 30.7% to 57.0% in older adults[5]. In another study, conducted in Pelotas, Rio Grande do Sul state[2], the prevalence of ≥2, ≥3, ≥4 and ≥5 health conditions in older adults was 93.4%, 85.9%, 76.2% and 64.7%, respectively.

These results suggest a tendency toward lower prevalence of chronic disease multimorbidity in older adults with low income or from developing countries. Also, in the Southern region of Brazil, which generally has better development indices, the prevalence of multimorbidity proved higher than the rates seen in the present study. Indeed, the prevalence found was more akin to those in European countries that likely have better social and health conditions. Several theories might explain these findings, such as the possibility that, among individuals with a higher income who live in places with better social and health conditions, access to diagnostic services is perhaps greater, thereby facilitating the confirmation of a higher number and range of different chronic conditions. Moreover, access to processed foods by populations that enjoy better socioeconomic conditions, deemed healthier by the food industry but are typically high in salt and artificial preservatives, may be associated with greater development of chronic diseases. However, these are mere theories, requiring longitudinal studies to confirm or refute them.

According to Salive[7], the high rate of multimorbidity with ≥2 or ≥3 diseases in community-dwelling older adults might be explained by the longer life expectancy and inherent higher propensity for developing concomitant chronic diseases.

The high rate of occurrence of multimorbidity calls for vigilance regarding the factors associated with the phenomenon. In addition, this finding suggests that multimorbidity triggers a high demand for hospital visits which, in turn, increases costs with health care and treatment[8]. This creates the need to devise strategies for health prevention and surveillance to improve care of these individuals.

The results of the present multivariate analysis revealed that the variables female gender, frailty and medical consultation in the last 12 months were associated with multimorbidity in community-dwelling older adults for both ≥2 and ≥3 concomitant chronic diseases. Also, the results showed that poor self-rated health was associated with multimorbidity involving ≥2 chronic diseases, whereas not having a private health plan was associated with multimorbidity with ≥3 chronic diseases.

The outcome of a number of studies point to an association between female gender and multimorbidity in community-dwelling older

adults[3,5,8,14,16,19]. This relationship might be explained by the fact that women have a higher life expectancy compared to men, even in the presence of chronic diseases[8]. In addition, women make greater use of health services, enabling earlier diagnosis of health conditions[20]. Another important point related to gender is the increased participation of women in the job market which, together with household responsibilities, can result in a burden that is 3 times greater than that of men. The biological aspect may also play a role, since women experience a decline in estrogen levels post-menopause, a period when they are more susceptible to NCDs[8].

Frailty was also found to be associated with multimorbidity in the present study participants. Multimorbidity and frailty are complex conditions associated with age-related decline[21]. Frailty is characterized by a depletion in energy reserves due to the changes involved in the aging process, including sarcopenia, neuroendocrine dysregulation and immunological dysfunction[22,23]. Frailty in older adults represents a state of physiological vulnerability and should not to be confused with multimorbidity[21], given it can be detected in physiologically debilitated older people with poor resolution of homeostasis after a stressor event[23].

In a literature review including cross-sectional and longitudinal studies, multimorbidity was associated with frailty in pooled analyses showing a prevalence of multimorbidity in frail individuals of 72% and a frailty rate in individuals with multimorbidity of 16%. Although the study suggested a bidirectional association between multimorbidity and frailty, it concluded the findings were too inconclusive to support a causal link between the two conditions. Further longitudinal studies with robust designs should be conducted to shed light on the relationship between frailty and multimorbidity[24].

The present study found an association between undergoing a medical consultation in the last 12 months and multimorbidity in community-dwelling older adults. Multimorbidity is common in the older population and associated with the use of health services[15,25,26]. Patients with multiple chronic diseases seek more clinical consultations and have a greater number of referrals to specialized care and more drug prescriptions than patients with only one or no chronic diseases[25]. In this respect, population aging requires efforts directed towards the provision of health services for community-dwelling older adults and for the training of primary care professionals to tackle the burden of chronic diseases present in the older population[14].

Cross-sectional population-based studies with cluster sampling, as well as analyses of prevalence ratios using Poisson regression and systematic review, have shown an association of multimorbidity in community-dwelling older adults who report poor self-rated health[18,21,27]. Self-rated health status encompasses physical, cognitive and emotional components of the individual, besides aspects related to well-being and satisfaction with life. This rating is a subjective indicator of an individual´s perception of their health[11].

Older people with multimorbidity can face limitations, self-care difficulties, make use of more drugs to control chronic diseases, and also require more frequent medical consultations and complementary exams to assess their state of health[5,28]. Thus, it follows that events such as multiple NCDs would contribute to a negative perception of one´s health[29]. A previous study showed that the presence of chronic diseases exerts an influence on self-rated health in general, and revealed a strong association between worse perceived health and greater number of diseases[21].

With regard to the variable of not holding a private health plan, the present results contradict the findings of other studies in the literature[8,21] showing that oldest old with a health plan had a larger number of concomitant chronic diseases[21]. Holding a health plan can facilitate access to health services, medical consultations and, hence, offer more opportunity to diagnose chronic diseases. Nevertheless, older individuals who are more debilitated acquire private health plans to improve access to secondary and tertiary health services[8,21]. A study carried out in Vietnam reiterates the importance of access to health services by showing the association of multimorbidity with the inability of older adults to obtain medical care[16].

Several factors shown to be associated with multimorbidity in other investigations[5,8,28] were not found in the present study: smoking, alcohol use, living in rural areas, low educational level, low family income, oldest old[5], being widowed[8] and polypharmacy[28]. These disparities likely reflect the particularities of the specific population groups investigated[30].

Knowledge on these conditions can help inform actions for health promotion and chronic NCD prevention in community-dwelling older adults. Primary Care is the most adequate level of care for managing multimorbidity in this group, given its generalist focus and broad complex characteristics which span various disciplines of medical knowledge.

This study had some limitations, including the fact that multimorbidity was limited to self-reported diagnosis of NCDs, with inherent risk of underreporting due to memory bias by the older individual or carer interviewed.

CONCLUSION

The study results revealed a prevalence of multimorbidity among the 394 community-dwelling older adults for ≥2 and ≥3 chronic diseases of 67.8% and 43.4%, respectively.

Being female, frail and having undergone a medical consultation in the last 12 months were associated with multimorbidity involving both ≥2 and ≥3 chronic NCDs in community-dwelling older adults, Poor self-rated health was associated with multimorbidity involving ≥2 concomitant chronic diseases, whereas having no private health plan was associated with multimorbidity involving ≥3 chronic diseases.

These results can help pave the way for future studies in the area of research, clinical care and public health. The findings can also contribute toward promoting autonomy and independence in this population. Moreover, the evidence from this study can serve to better monitor and attenuate the profile of more susceptible individuals through practices focused on functional rehabilitation and prevention of multimorbidity in this population.

Lastly, the study findings can support the devising of screening protocols for identifying the functional profile of community-dwelling older adults, aiding the implementation of measures promoting healthy aging and a lower prevalence of multimorbidity.

Edited by: Marquiony Marques dos Santos

REFERENCES

1. Guimarães RM, Andrade FCD. Expectativa de vida com e sem multimorbidade entre idosos brasileiros: Pesquisa Nacional de Saúde 2013. Rev bras estud pop. 2020; 37. doi: 10.20947/S0102-3098a0117
2. Costa CS, Flores TR, Wendt A, Neves RG, Tomasi E, Cesar JA et al. Inequalities in multimorbidity among elderly: a population- based study in a city in Southern Brazil. Cad Saúde Pública. 2018 34(11):e00040718. doi: 10.1590/0102-311X00040718
3. Nguyen H, Manolova G, Daskalopoulou C, Vitoratou S, Prince M, Prina AM. Prevalence of multimorbidity in community settings: A systematic review and meta-analysis of observational studies. J Comorb. 2019;9:2235042X19870934. doi: 10.1177/2235042X19870934
4. Christofoletti M, Duca GFD, Gerage AM, Malta DC. Simultaneidade de doenças crônicas não transmissíveis em 2013 nas capitais brasileiras: prevalência e perfil sociodemográfico. Epidemiol. Serv. Saúde. 2020;29(1):e2018487.
5. Melo LA, Braga LC, Leite FPP, Bittar BF, Oséas JMF, Lima KC. Factors associated with multimorbidity in the elderly: an integrative literature review. Rev bras geriat gerontol. 2019;22(1). doi: 10.1590/1981-22562019022.180154
6. Romana QG, Kislaya I, Salvador MR, Gonçalves SC, Nunes B, Dias C. Multimorbilidade em Portugal:dados do primeiro inquérito nacional de saúde com exame físico. Acta Med Port. 2019;32(1):30-37. doi: 10.20344/amp.11227

7. Salive, ME. Multimorbidity in older adults. Epidemiol Rev. 2013;35(1): 75-83. doi: 10.1093/epirev/mxs009

8. Melo LA, Braga LC, Leite FPP, Bittar BF, Oséas JMF, Lima KC. Prevalência e fatores associados a multimorbidades em idosos brasileiros. Cien Saúde Coletiva. 2020;25(10):3869-3877. doi: 10.1590/1413-812320202510.34492018

9. Ofori-Asenso R, Chin KL, Curtis AJ, Zomer E, Zoungas S, Liew D. Recent patterns of multimorbidity among older adults in high- income countries. Popul Health Manag. 2019;22(2):127-137. doi: 10.1089/pop.2018.0069

10. IBGE- Instituto Brasileiro de Geografia e Estatística. Montes Claros. 2021. Disponível em: https://cidades.ibge.gov.br/brasil/mg/montes-claros/panorama. Acesso em: 22 set. 2022.

11. Carneiro JA, Lima CA, Costa FM, Caldeira AP. Cuidados em saúde estão associados à piora da fragilidade em idosos comunitários. Rev Saúde Pública. 2019;53:32. doi: 10.11606/S1518-8787.2019053000829

12. Rolfson DB, Majumdar SR, Tsuyuki RT, Tahir A, Rockwood K. Validity and reliability of the Edmonton Frail Scale. Age ageing. 2006;35(5):526-529, 2006. doi: 10.1093/ageing/afl041

13. Fabrício-Wehbe SCC, Schiaveto FV, Vendrusculo TRP, Haas VJ, Dantas RAS, Rodrigues RAP. Cross-cultural adaptation and validity of the" Edmonton Frail Scale-EFS" in a Brazilian elderly sample. Revista latino-am enfermagem. 2009;17(6):1043-1049. doi: 10.1590/S0104-11692009000600018

14. Mini GK, Thankappan KR. Pattern, correlates and implications of non-communicable disease multimorbidity among older adults in selected Indian states: a cross-sectional study. BMJ open. 2017;7(3):e013529. doi: 10.1136/bmjopen-2016-013529

15. Ha NT, Le NH, Khanal V, Moorin R. Multimorbidity and its social determinants among older people in southern provinces, Vietnam. Int j equity health. 2015;14(1):1-7. doi: 10.1186/s12939-015-0177-8

16. Jerliu N, Toçi E, Burazeri G, Ramadani N, Brand H. Prevalence and socioeconomic correlates of chronic morbidity among elderly people in Kosovo: a population-based survey. BMC geriatrics. 2013;13(1):1-9. doi: 10.1186/1471-2318-13-22

17. Marengoni A, Winblad B, Karp A, Fratiglioni L. Prevalence of chronic diseases and multimorbidity among the elderly population in Sweden. Am J Public Health. 2008;98(7):1198-1200. doi: 10.2105/AJPH.2007.121137

18. Francisco PMSB, Assumpção D, Bacurau AGM, Silva DSM, Malta DC, Borim FSA. Multimorbidade e uso de serviços de saúde em idosos muito idosos no Brasil. Rev bras Epidemiol. 2021;24(suppl2). doi: 10.1590/1980-549720210014.supl.2

19. Leite BC, Oliveira-Figueiredo DST, Rocha FL, Nogueira MF. Multimorbidade por doenças crônicas não transmissíveis em idosos: estudo de base populacional. Rev bras Geriatr Gerontol. 2020;22(6):e190253. doi: 10.1590/1981-22562019022.190253

20. Barreto-Santos L, Vanconcelos-Rocha S, Souza-Lessa R, Alves-Vilela AB. Multimorbidade em idosos de um município do nordeste brasileiro: prevalência e fatores associados. Rev salud pública. 2019;21(5):1-7. doi: 10.15446/rsap.v21n5.77775

21. Lourenço RA, Moreira VG, Mello RGB, Santos IS, Lin SM, Pinto ALF et al. Consenso brasileiro de fragilidade em idosos: conceitos, epidemiologia e instrumentos de avaliação. Geriatr., Gerontol. Aging (Impr.). 2018;12(2):121-135. doi: 10.5327/Z2447-211520181800023

22. Lacas A, Rockwood K. Frailty in primary care: a review of its conceptualization and implications for practice. BMC med. 2012;10(1): 1-9. doi: 10.1093/gerona/gly110

23. Clegg A, Young J, IIiffe S, Rikkert MO, Rockwood K. Frailty in elderly people. Lancet. 2013;381(9868):752-762. doi: 10.1016/S0140-6736(12)62167-9

24. Vetrano DL, Palmer K, Marengoni A, Marzetti E, Lattanzio F, Roller-Wirnsberger R et al. Frailty and multimorbidity: a systematic review and meta- analysis. J Gerontol A Biol Sci Med Sci. 2019;74(5):659-666. doi: 10.1093/gerona/gly110

25. Van Oostrom SH, Picavet HS, Bruin SR, Stirbu I, Korevaar JC, chellevis FG, Baan CA. Multimorbidity of chronic diseases and health care utilization in general practice. BMC Fam Pract. 2014;15(1):1-9. doi: 10.1186/1471-2296-15-61

26. Violán C, Foguet-Boreu Q, Roso-Llorach A, Rodriguez-Blanco T, Pons-Vigués M, Pujol-Ribera E et al. Burden of multimorbidity, socioeconomic status and use of health services across stages of life in urban areas: a cross-sectional study. BMC Public Health. 2014;14(1):1-13. doi: 10.1186/1471-2458-14-530

27. Pagotto V, Bachion MM, Silveira EAS. Autoavaliação da saúde por idosos brasileiros: revisão sistemática da literatura. Rev Panam Salud Publica. 2013;33(4): 302-310.

28. Cavalcanti G, Doring M, Portella MR, Bortoluzzi EC, Marcarelo A, Dellani MP. Multimorbidade associado à polifarmácia e autopercepção negativa de saúde. Rev bras Geriatr Gerontol. 2017;20(5):634-642. doi: 10.1590/1981-22562017020.170059

29. Medeiros SM, Silva LSR, Carneiro JA, Ramos GCF, Barbosa ATF, Caldeira AP. Fatores associados à autopercepção negativa da saúde entre idosos não institucionalizados de Montes Claros, Brasil. Cien Saude Coletiva. 2016;21(11):3377-3386. doi: 10.1590/1413-812320152111.18752015

30. Carneiro JA, Gomes CAD, Durães W, Jesus DR, Chaves KLL, Lima CA et al. Autopercepção negativa da saúde: prevalência e fatores associados entre idosos assistidos em centro de referência. Ciênc Saúde Coletiva. 2020;25(3):909-918. doi:10.1590/1413-81232020253.16402018

Coping strategies adopted by elderly people with HIV in Brazil

Rosane Paula Nierotka[1]
Fátima Ferretti[2]

Abstract

Objective: It aims at unveiling the coping strategies adopted by the elderly people in the course of their lives to overcome the difficulties experienced by the condition of being a person with HIV. *Methods*: Qualitative study based on the oral history method. Six older adults with HIV from a city in the great west mesoregion of Santa Catarina took participated in it. Data was collected through in-depth interviews at the Specialized Care Service (SAE) and the elderly people's homes. Data analysis was performed through thematic content analysis. *Results*: The coping strategies adopted were centered on the support of health care professionals (formal network) and the part of relatives and friends (informal network). Some adopt the confidentiality of the diagnosis as a way of facing discriminatory acts and prejudice, while spirituality strengthened resilience and faith in treatment and recovery. *Conclusion*: The coping strategies adopted by the elderly patients contributed to living more adapted to this reality, with less suffering and greater resilience.

Keywords: Elderly. Human Immunodeficiency Virus. Coping Strategies. Acquired Immunodeficiency Syndrome. HIV.

[1] Universidade Comunitária da Região de Chapecó (Unochapecó), Área de Ciências da Saúde, Curso de Graduação de Fisioterapia. Chapecó, SC, Brasil.

[2] Universidade Comunitária da Região de Chapecó (Unochapecó), Área de Ciências da Saúde, Programa de Pós-Graduação em Ciências da Saúde. Chapecó, SC, Brasil.

Research funding: Coordination for the Improvement of Higher Education Personnel – CAPES. Full dedication scholarship.

The authors declare that there is no conflict in the design of this work.

Correspondence
Rosane Paula Nierotka
rosanenier@hotmail.com

Received: June 25, 2022
Approved: November 17, 2022

http://dx.doi.org/10.1590/1981-22562022025.220111.en

INTRODUCTION

In Brazil, the number of elderly people with HIV (Human Immunodeficiency Virus) has increased throughout recent years. Only in 2020, until June, there were 528 new cases of HIV in the elderly and 666 cases of AIDS[1]. Living with HIV, even today, is permeated by prejudice and social discrimination[2]. A sexual life without information or care makes the elderly individual more exposed to HIV, which, after infection, becomes a stressful event[3], which leads him/her to adopt various strategies to cope with the adversities of being an elderly person with HIV.

Folkman and Lazarus' coping theory emphasizes that, among these strategies, one can find a set of cognitive and behavioral actions taken by people to cope with and adapt to adverse or stressful life circumstances in an attempt to increase psychological well-being and reduce distress. The coping model assumes that, when an individual is faced with a stressful event, evaluative thinking is triggered to analyze whether or not it is a threat to him/her well-being, after which choices are made in an attempt to control this event[3].

Coping strategies are configured in an adaptive response that the individual builds to better adapt to stressful situations, which may be due to illness or loss of a person, or that emerge in situations of prejudice and discrimination[4,5]. Accordingly, the question that guided this research was: What were the coping strategies adopted by the elderly individuals, throughout their lives, to overcome the difficulties experienced by the condition of being a person with HIV?

Systematic integrative review, which systematized the production on HIV in the elderly population, concluded that most research brings data related to the clinical profile, with epidemiological studies, of a quantitative nature, with few studies focused on the experiences or the more subjective and qualitative elements of living with HIV as an elderly person, which is an epistemological gap that needs to be investigated[6].

It is also considered that, by identifying these strategies and the main stressful factors of living and coexisting with this disease, important information will be compiled for planning care actions in the care services, as well as for empowering the elderly individuals in their trajectories of living with HIV, in order to better live and coexist with this chronic disease[7,8].

By giving voice to the elderly people with HIV to report the coping strategies adopted, it is possible to better portray this reality of life and give visibility to the demands of this group. In this perspective, it is proposed to unveil the coping strategies adopted by the elderly citizens with HIV in the course of their lives to overcome difficulties.

METHODOLOGY

This is a study with a qualitative approach, which took thematic oral history as a research method[9]. Oral history records individual memories and experiences, by listening to multiple and different storytellers, who, when brought together, give visibility to a group, since the memory of one person can represent the memory of a collective[10].

Oral history makes it possible for a social segment to be heard, for a certain group to move and speak for itself, it is not just a documental record or a technique to capture interviews, it involves the knowledge of what is experienced on a daily basis[9].

The population of this study was constituted by convenience. Six elderly people with HIV living in a city in the west mesoregion of Santa Catarina, Brazil, were part of the research. Three were women and three men, with an average age of 70 years (65-83 years) and a diagnosis of 18 years (12-25 years). Elderly people aged 65 years or older, who had lived with HIV/Aids for more than five years, with a longer time of diagnosis, males and females, and who had previous knowledge about their diagnosis were included. They should also present preserved cognitive function, as tested by the Mini-Mental State Examination (MMSE)[11].

The number of collaborators was defined according to the theoretical saturation criterion, which suspends the inclusion of new participants when the obtained data begins to present, in the researcher's evaluation, a certain redundancy or repetition[12].

After approval by the ethics committee, following all health standards and recommendations regarding the risks of infection by COVID-19, the approach to the research field was started in the Specialized Care Service (SAE, as per its Portuguese acronym). Data collection took place from November 2020 to January 2021.

The first contact with the elderly person was made by the SAE professional. He explained the objectives and intentionality of the project and identified which elders agreed to have their identity and serology revealed, after which they were put in contact with the researcher, who was already in another room. Among the 16 consulted elderly citizens, 10 did not agree to participate because they had no time available or did not want their serology to be revealed.

The researcher was a professional physiotherapist and, at the time of the interview, a doctoral student in Health Sciences, with experience in qualitative research with the elderly population. In the first contact, the research objectives, the form of data collection and use, the use of the audio recorder, and the guarantee of anonymity and freedom of choice as to whether or not to participate in the study were explained. Those who agreed to participate signed the free and informed consent form in two copies.

Firstly, the MMSE was applied, and for those who had their cognitive functioning preserved, the next meeting was organized, which could be at home or at the SAE, according to the elderly person's choice. Of the six collaborators, four carried out the interviews at home and two at the SAE, because they had an open diagnosis with their relatives. There was no other person present at the data collection, only the participants and the researcher.

The next meeting sought to establish a closer bond with the elderly person. An observation/conversation was made about his/her home, his/her social networks, his/her family group, his/her socioeconomic conditions, his/her medication use, among other information, recorded in a field diary.

The in-depth interview was conducted based on a pre-designed script and previously verified by a pilot test, conducted in the semester prior to data collection, in order to test the script and make changes. The script contained questions about the experiences of the elderly person with HIV and about the coping strategies adopted in the process of living and coexisting with this syndrome. The duration of each interview was from two to four hours, carried out in an average of three visits. At the end of each meeting with the elderly person, immediately after ending the interview, the researcher recorded the field observation notes in a Word file.

After the recorded version, it was transcribed in full and delivered on the second visit in printed form, and read in full to the collaborator, so that he/she could validate it, add new information, or exclude unwanted lines. In each step of the interview, this organization was respected: recording, transcription and validation.

After concluding all the interview stages, a complete version of each collaborator's oral history was given to him/her, and after reading it in its entirety, the elderly person authorized its publication by signing the Letter of Authorization and Use of Interviews. The passage from oral to written was divided into three moments: transcription, textualization and transcription[9], and data analysis followed Minayo's proposition[12], using the thematic content analysis technique. All were identified with tree names (In Portuguese), according to their choice. The project was approved by the Ethics Committee on Research Involving Human Beings of the University under number 4,379,290.

RESULTS AND DISCUSSION

After analyzing the oral histories, five analytical categories emerged that represent the coping strategies adopted by the elderly person who participated in the study, as displayed in chart 1.

Chart 1. Categories of analysis of the coping strategies adopted by the elderly person to live and coexist with HIV, Chapecó, 2022.

Analytical Categories	Number of elderly people who have adopted this strategy
Maintaining the confidentiality of HIV diagnosis in order to avoid discrimination/prejudice	Six
Relying on friends and relatives to (co)exist with HIV	Four
Anchoring yourself in formal support networks after HIV	Six
Strengthening spirituality and religiosity to overcome this phase	Five
Nurturing optimism about life and recovery	Four

Source: Designed by the authors.

Maintaining the confidentiality of HIV diagnosis in order to avoid discrimination/prejudice

In an attempt to reduce suffering and increase psychological well-being after the discovery of HIV, all collaborators in this study firstly preferred to keep the diagnosis confidential in order to avoid prejudice and discrimination, an aspect still present in society. The reports below highlight this issue:

> "[...] even today, there is a lot of prejudice, if people know about the diagnosis of the other, they already look at it differently, move away, feel afraid to sit down or pass by [...] that's why I'm very careful not to tell anyone, so I don't have to go through this discrimination and/or isolation. [...]" (Ipê-roxo, 18 years with HIV, emphasis mine)

> "Because, unfortunately, there is still a lot of prejudice today; for this reason, few people know about my diagnosis, [...], because if they did, they would probably look at me with another gaze, especially people who have a very closed mind, they will be moving away for fear of being contaminated or even avoiding hugging, so to face it better, just talk to the right people [...]" (Ipê-amarelo, 12 years with HIV, emphasis mine)

The HIV diagnosis in the lives of the elderly citizens may be accompanied by feelings, such as fear and shame, which generates apprehension about living with this condition. Studies have shown that prejudice against HIV is still present in society today because the disease is stigmatized, which sometimes makes the elderly person face embarrassing and discriminatory situations alone[13,14,8].

This silencing around the diagnosis interferes with the elderly's person ability to structure, together with his/her family and friends, strategies to face this reality of life[15,7]. The elderly people in this study emphasized this concern with the disclosure of the diagnosis; for some, the silence was maintained only for a while; for others, the secrecy remains:

> "After the discovery of my diagnosis, it took me six years to tell my family, I thought they would reject me or get very angry with me if they knew, I was also ashamed, feeling bad about that [...]" (Laranjeira, 12 years with HIV, emphasis mine)

> "Nowadays, few people know that I have HIV, because I never spoke for fear of rejection, maybe it's my children, daughters-in-law, grandchildren and a few other people [...]" (Kiwizeiro, 20 years with HIV, emphasis mine)

> "[...] I [...] know of some people in the neighborhood where I live who also have the disease, but they don't manifest it with anyone for fear of suffering prejudice, of not being accepted or being isolated [...]" (Palmeira, 19 years with HIV, emphasis mine)

The fear of being judged and rejected by people after disclosing the HIV diagnosis is strong, mainly due to historically built prejudices[16]. How to face this situation? It seems to us that a comprehensive model of health care for the elderly person with HIV, which does not focus only on the disease[17] and ensures the inclusion of actions that consider the social, cultural, religious, educational, and economic aspects to which the individual is exposed, is a more assertive alternative. It requires a network model

that does not fragment the care of the elderly people with HIV, but rather integrates the health teams and sectors, their relatives and society in general.

In this study, the elderly people who were able to disclose their diagnosis, even if only to a few people, such as some family members and friends, had a greater support base, which made it easier for them to face the care demands that this chronic condition requires, as observed in the following category.

Relying on friends and relatives to (co)exist with HIV

Elderly people, who shared their diagnosis with relatives and friends, when welcomed and supported, became stronger and more resistant to face this chronic condition, as mentioned in their speeches:

> "Other people who later found out about my diagnosis were my sister, who came with us here, and one of her daughters, they were very supportive. [...]" (Ipê-amarelo, 12 years with HIV, emphasis mine)

> "[...] My family supported me and helped me a lot, my wife worked at a family home and ended up stopping to dedicate herself to provide my care, I have memories of her and a 12-year-old daughter at the time, carrying me on her lap to the bathroom, they bathed me, they did everything for me." (Palmeira, 19 years with HIV, emphasis mine)

> "[...] There was also a great friend of mine there, we met by chance, he lived in the same building, we started talking, as he was alone, we had lunch together and we got to know each other, by identifying ourselves, so I got more freedom and told him of my diagnosis and it was pretty good, because he took care of himself, we talked about everything openly." (Kiwizeiro, 20 years with HIV, emphasis mine)

In this study, the support and closeness of relatives and friends was a strategy that promoted well-being and understanding of what it means to be an elderly person with HIV[18,19,8]. International studies conducted in China, with elderly citizens living with HIV, confirm that the family is the main source of support and contributes to a greater adaptability of life after the diagnosis[20,21].

The family, as a support network, is configured as the key basis in this health-disease process, thus acting as a safe haven, a comfort in critical moments, which contributes to the promotion of resilience, so important for a life with quality[22,23].

The respect, support and solidarity of the closest people, such as friends, are elements that can contribute to the redefinition of life in this phase, despite the experienced adversities. Thus, when reflecting on a comprehensive care model for the elderly person with HIV, it is considered the importance of the involvement of the interdisciplinary team to map the family context of this person, and thus promote approaches to facilitate these relationships throughout life, as well as inform the elderly individuals and their families about the possibilities of access to care in the lines of assistance. Besides the informal networks, the formal ones are also essential in this process of dealing with HIV.

Anchoring yourself in formal support networks after HIV

Another coping strategy adopted by the collaborators of the study was the anchoring in formal support networks to overcome the challenges imposed by HIV in their lives. In this network, the collaborators underline the role of health team professionals, from the moment of diagnosis, with a qualified listening, the passing on of guidelines about HIV and the care actions to be followed.

> "[...] From the first moment [...] of the discovery of HIV, the doctors and the entire health care team welcomed me very well, explained everything to me; and, after I left the hospital, they directed me to the service that would follow-up me with HIV, there was a nurse from the health center who came to my house and made me walk, so I have a strong affection for them. [...]" (Palmeira, 19 years with HIV, emphasis mine)

> "[...] at the health center, where I started to be cared for, I had psychological follow-up, I talked to the nurses, with the doctors and received a lot of guidance, whenever I took my husband to the consultations there at the center, they helped me [...] In the first moment at the health center, they guided me about everything, it was pretty

> nice, they talked about how to behave in society, not to pay attention to the gossip of others, they explained that it was a normal disease, they encouraged me to be strong, to face it and take care, care for each other, not to pass on the virus." (Videira, 23 years with HIV, emphasis mine)

> "[...] the day hospital, there they cared for me very well and always gave me a lot of strength, courage and stability to keep on living [...]" (Laranjeira, 12 years with HIV, emphasis mine)

The conversation, commitment and welcoming offered by health teams, both in the discovery, as in the course of life after HIV, contributes to the elderly people feel valued, confident and respected, which helps them to face, accept their condition and adhere to treatment. The involvement of teams in health care for the elderly individuals favors the adoption of self-care actions and lifestyle changes, which enables a healthier aging process[24,8].

Positive experiences in health services favor the return, engagement and greater adherence of the elderly person to health care after HIV. Therefore, a contemporary health model that efficiently cares for the elderly citizen will advocate actions focused on health education and promotion, prevention of preventable diseases, as well as postponement of diseases[25]. Still, according to the author, it is essential that the line of care for the elderly person integrate specialized services with primary health care, which is the gateway to the system.

An elderly person in this study adopted as a coping strategy to live in a support group, formed by People Living with HIV (PLHIV) of all ages, with different times of diagnosis. Some had already gone through the acceptance process, others were in the stage of insecurities and fears related to life after HIV. The group represented a place for socializing, exchanging experiences and listening, which promoted a new meaning to the negative experience of living with HIV.

> "This female doctor and another male doctor, who treated people with HIV in this city, formed a support center where, every 3 months, people who had HIV gathered in a room at the regional hospital [...] there was a moment of listening where we placed ourselves 'Look! We are here, you are alive: Oh my God! It is in order to make the person revive a little and forget about the pathology [...]" (Kiwizeiro, 20 years with HIV, emphasis mine)

When faced with a stressor agent, considered HIV in this study, another service that promoted psychological well-being and reduced suffering was the AIDS Support and Prevention Group (GAPA, as per its Portuguese acronym), as observed in the report below:

> "[...] the doctor who was accompanying me referred me to the GAPA, and this service helped me a lot, they gave guidance, showed how to keep on living after HIV, they were very attentive to us [...]" (Ipê-roxo, 18 years with HIV, emphasis mine).

In light of the foregoing, it is argued in the direction of strengthening formal support networks, which can be integrated by different services and professionals, in order to know this reality of life and enable the development of bonds with the diagnosed person, thus ensuring the longitudinal follow-up of this person in a quality care pathway. For this care to be effective, it is required to have a look free from prejudice, where the individual is perceived in an comprehensive way, with respect and appreciation.

Strengthening spirituality and religiosity to overcome this phase

In this study, the coping was also anchored in the strengthening of spirituality and religiosity. Spirituality had a strong presence in the lives of the elderly patients, configured as a cornerstone after HIV, as contemplated in the following speeches:

> "[...] In turn, what helped me face life after HIV was my own faith [...]" (Laranjeira, 12 years with HIV, emphasis mine)

> "[...] One of my siblings, with whom I had a lot of affinity helped me, and we went to seek spiritual help, we sought in every way, to have strength, I sought a lot of prayers, because what to do? I had to accept [...]" (Videira, 23 years with HIV, emphasis mine)

> "[...] I believe that what helped me to face this pathology and move on with my life is very much related [...] spiritism and the words of a spiritist medium that I hear daily, and he brings me many teachings of life and peace [...]" (Ipê-amarelo, 12 years with HIV, emphasis mine)

Spirituality, understood as an existential domain, is a vital and universal force, an intimate presence, an inner movement that assigns meaning and significance to life, occupies a place in the essence of all human beings, and can positively influence the aging process[26]. In older people with HIV, faith contributes to increasing resilience and a person's ability to manage negative emotions, pain and sorrows – whether emotional or physical[24].

In order to adapt to the various daily circumstances, they also try to strengthen their religiosity and union with the churches, as observed in the reports:

> "[...] Religion and faith in God changed everything in my life, and the church really welcomed me after the stroke and the discovery of the virus [...]" (Palmeira, 19 years with HIV, emphasis mine).

> "Near where I lived, there were two Catholic churches [...] I always went there, so they said: 'Ah, he is a saint, he is always in church", but since I lived alone, why would I stay at home? I liked to go there [...]" (Kiwizeiro, 20 years with HIV, emphasis mine)

> "I was always a woman with great faith and I sought the churches and God a lot, after HIV, with a view to getting strength [...]" (Videira, 23 years with HIV, emphasis mine)

Religiosity refers to the way a person expresses his/her faith and spirituality, anchored in their values, beliefs, cults and rituals, which may or may not have a connection to a religion[26,27]. Religiosity and spirituality are a source of psycho-emotional support for people with HIV. Spiritual beliefs and practices, such as prayer and meditation, as well as religious activities, are resources that contribute to coping with the adversities that HIV produces[28,8].

It should be highlighted the importance of welcoming, which integrates the dimension of spirituality and religiosity as elements of this expanded look at the life of the elderly person. This can nurture optimism in life and in recovery, a category presented below.

Nurturing optimism about life and recovery

In this study, nurturing optimism also helped the older people to face and overcome the difficulties they experienced after HIV, as can be underlined in the following reports:

> "[...] I believe that what helped me to face this pathology and move on with my life is very much related to my willpower to live, my positive thinking [...]." (Ipê-amarelo, 12 years with HIV, emphasis mine)

> "[...] I started to accept and get used to the HIV diagnosis, always with positive thinking and believing that I'd live and that happened [...]" (Palmeira, 19 years with HIV, emphasis mine)

> "[...] I'm a person who is always in a good mood [...] I see many people complaining about various things and I always think 'if only they knew what I had to fight with it; and, even so, I'm here, always seeing the positive side of everything." (Videira, 23 years with HIV, emphasis mine)

The adoption of positive thoughts, with maintenance of optimism in relation to life after HIV, was another way that the elderly people in this study took over to maintain a normal life. The elderly individual, after the HIV diagnosis need to be encouraged, either by family members, friends and health professionals to keep on living, thus leaving negative thoughts aside[29,30].

International studies have emphasized that facing life with HIV goes through ups and downs, but remaining optimistic about life and recovery, especially accepting this new chronic condition, is closely related to psychological well-being and hope for a long life[31,32]. It is thought that adopting optimistic behavioral attitudes make people more resilient and able to adapt to stressful factors, such as diagnosis and coexisting with HIV. This fact reinforces the need to develop care strategies that integrate actions aimed at preserving the cognitive status and the psychological

and emotional well-being, within logic of humanized care and longitudinal and comprehensive care.

CONCLUSION

The coping strategies most used by the collaborators of this study were centered on the support coming from health care professionals (formal network) and from relatives and friends (informal network). Nonetheless, for fear of suffering discrimination and prejudice, some tended to keep the diagnosis hidden, as a way of facing and protecting them from this reality. Spirituality was configured as a strategy that strengthened resilience and faith in treatment and recovery, as well as in the prospect of living a good life.

It is hoped that the results of this research will contribute to the improvement and expansion of knowledge about this reality of life, especially for health professionals who provide care to HIV-positive older people.

The study presented as a limitation the data collection period, which took place in pandemic times, when the elderly people were not regularly attending the SAE, which reduced the audience for the survey.

Finally, it should be underlined that the research did not seek to establish generalizations in relation to the researched situation, nor did it intend to exhaust the possibilities of debate around this theme. Nonetheless, the results described and problematized in this study can contribute to the reorganization of work processes and professional practices, with a view to sustaining actions welcoming, caring for and empowering the elderly individuals who experience this reality. It is emphasized the need for further research to deepen the analysis of the coping mechanisms and the ways of implementing effective actions to overcome the stereotypes, stigmas and prejudices about HIV in an attempt to humanize this reality of life.

Edited by: Maria Helena Rodrigues Galvão

REFERENCES

1. Ministério da Saúde (BR). Secretaria de Vigilância em Saúde. Boletim Epidemiológico HIV/Aids 2020. [Brasília]: Ministério da Saúde; Número especial, 2020. [Acesso em 12 dez. 2021]. Disponível em: http://www.aids.gov.br/pt-br/pub/2020/boletim-epidemiologico-hivaids-2020. Acesso em 12 dez 2021.
2. Martins ERC, Caminha ELG, Costa CMA, Correia BPS, Spindola T, Figueiredo RAR, et al. Comportamento sexual de idosos e as vulnerabilidades às infecções sexualmente transmissíveis. Res. Soc. Dev. 2020; 9(11): e1569119641. DOI: http://dx.doi.org/10.33448/rsd-v9i11.9641
3. Dias EM, Pais-Ribeiro JL. O modelo de coping de Folkman e Lazarus: aspectos históricos e conceituais. Rev. Psicol. Saúde [Internet]. 2019; 11(2): 55-66. DOI: http://dx.doi.org/10.20435/pssa.v11i2.642
4. Nunes CMNS. O conceito de enfrentamento e a sua relevância na prática da psiconcologia. Encontro, Rev. psicol. 2010; 13(19): 91-102. Disponível em: https://seer.pgsskroton.com/renc/article/view/2519
5. Pereira TB, Branco VLR. As estratégias de coping na promoção à saúde mental de pacientes oncológicos: uma revisão bibliográfica. Rev. Psicol. Saúde [Internet]. 2016; 8(1):24-31. DOI: http://dx.doi.org/10.20435/2177093X2016104
6. Nierotka RP, Ferretti F. Idosos com HIV/Aids: uma revisão integrativa. Rev. Estud. Interdiscipl. envelhec. 2021; 26(2): 333-56. DOI: https://doi.org/10.22456/2316-2171.98707
7. Silva LC, Felício EEAA, Cassétte JB, Soares LA, Morais RA, Prado TS, et al. Impacto psicossocial do diagnóstico de HIV/aids em idosos atendidos em um serviço público de saúde. Rev. Bras. Geriatr. Gerontol. 2015; 18(4): 821-33. DOI: https://doi.org/10.1590/1809-9823.2015.14156
8. Brandão BMGM, Angelim RCM, Marques SC, Oliveira RC, Abrão FMS. Living with HIV: coping strategies of seropositive older adults. Rev Esc Enferm USP. 2020; 54: e03576. DOI: https://doi.org/10.1590/S1980-220X2018027603576

9. Meihy JCSB, Holanda F. História oral: como fazer, como pensar. 2.ed. São Paulo: Contexto; 2018.

10. Thompson P. A voz do passado: história oral. Tradução de Lólio Lourenço de Oliveira. 3.ed. Rio de Janeiro: Paz e Terra, 2002.

11. Bertolucci PHF, Brucki SMD, Campacci SR, Juliano Y. O mini-exame do estado mental em uma população geral: impacto da escolaridade. Arq. e Neuropsiquiatr. 1994; 52(1): 1-7. Disponível em: https://www.scielo.br/j/anp/a/Sv3WMxHYxDkkgmcN4kNfVTv/?lang=pt&format=pdf

12. Minayo MCS. O desafio do conhecimento: pesquisa qualitativa em saúde. 14.ed. São Paulo: Hucitec; 2014.

13. Villarinho MV, Padilha MI. Sentimentos relatados pelos trabalhadores da saúde frente à epidemia da Aids (1986-2006). Texto contexto - enferm. 2016; 25(1): e0010013,1-9. DOI: https://doi.org/10.1590/0104-07072016000010013

14. Silva AO, Loreto MDS, Mafra SCT. HIV na terceira idade: repercussões nos domínios da vida e funcionamento familiar. Rev. Em Pauta. 2017; 15(39): 129-54. DOI: https://doi.org/10.12957/rep.2017.30380

15. Warren-Jeanpiere L, Dillaway H, Hamilton P, Young M, Goparaju L. Life begins at 60: Identifying the social support needs of African American women aging with HIV. J Health Care Poor Underserved. 2017; 28(1): 389-405. DOI: https://doi.org/10.1353/hpu.2017.0030

16. Salvadori M, Hahn GV. Confidencialidade médica no cuidado ao paciente com HIV/aids. Rev. Bioét. 2019; 27(1): 153-63. DOI: http://dx.doi.org/10.1590/1983-80422019271298

17. Veras RP, Oliveira M. Envelhecer no Brasil: a construção de um modelo de cuidado. Cien Saúde Colet. 2018; 23(6): 1929-36. Disponível em: http://www.cienciaesaudecoletiva.com.br/artigos/envelhecer-no-brasil-a-construcao-de-um-modelo-de-cuidado/16670?id=16670

18. Furlotte C, Schwartz K. Mental health experiences of older adults living with HIV: Uncertainty, Stigma, and Approaches to Resilience. Can J Aging. 2017; 36(2):125-40. DOI: https://doi.org/10.1017/S0714980817000022

19. Bestard CM, Torres, VMM, Muñoz NMM, Luna LL. Aspectos metodológicos y psicológicos para asesorar y acompañar a las personas con VIH/sida. Rev. inf. Cient. 2019; 98(5): 659-72. Disponível em: http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S1028-99332019000500659

20. Xu Y, Lin X, Chen S, Liu Y, Liu H. Ageism, resilience, coping, family support, and quality of life among older people living with HIV/AIDS in Nanning, China. Glob Public Health. 2018; 13(5): 612-25. DOI: https://doi.org/10.1080/17441692.2016.1240822

21. Chen D, Duan L, Chen X, Zhang Q, Chen Y, Yuan Z, et al. Coping strategies and associated factors among older Chinese people living with HIV/AIDS. Psychol Health Med. 2020; 25(7): 898-907. DOI: https://doi.org/10.1080/13548506.2019.1659983

22. Lemos APF, Ribeiro C, Fernandes J, Bernardes K, Fernandes R. Saúde do homem: os motivos da procura dos homens pelos serviços de saúde. Rev. enferm. UFPE on line. 2017; 11(supl.11): 4546-53. DOI: https://doi.org/10.5205/reuol.11138-99362-1-SM.1111sup201714

23. Hlongwane N, Madiba S. Navigating Life with HIV as an Older Adult in South African Communities: A Phenomenological Study. Int J Environ Res Public Health. 2020; 17(16): 5797, 1-14. DOI: https://doi.org/10.3390/ijerph17165797

24. Emlet CA, Harris L, Furlotte C, Brennan DJ, Pierpaoli CM. 'I'm happy in my life now, I'm a positive person': approaches to successful ageing in older adults living with HIV in Ontario, Canada. Ageing Soc. 2016; 37(10): 1-24. DOI: https://doi.org/10.1017/S0144686X16000878

25. Veras R. Linha de cuidado para o idoso: detalhando o modelo. Rev. Bras. Geriatr. Gerontol. 2016; 19(6): 887-905. DOI: https://doi.org/10.1590/1981-22562016019.160205

26. Tavares CQ, Valente TCO, Cavalcanti APR, Carmos HO. Espiritualidade, religiosidade e saúde: velhos debates, novas perspectivas. Interações [Internet]. 2016; 11(20): 85-97. DOI: https://doi.org/10.5752/P.1983-2478.2016v11n20p85

27. Inoue TM, Vecina MVA. Espiritualidade e/ou religiosidade e saúde: uma revisão de literatura. J Health Sci Inst. 2017; 35(2): 127-30. Disponível em: http://www.espiritualidades.com.br/Artigos/i_autores/INOUE_Thais_et_VECINA_Marion_tit_Espiritualidade_e-ou_religiosidade_e_saude_revisao_de_literatura.pdf

28. Arrey AE, Bilsen J, Lacor P, Deschepper R. Spirituality/Religiosity: A Cultural and Psychological Resource among Sub-Saharan African Migrant Women with HIV/AIDS in Belgium. PLoS One. 2016; 11(7): e0159488. DOI: http://dx.doi.org/10.1371/journal.pone.0159488

29. Domingues JP, Oliveira DC, Marques SC. Representações sociais da qualidade de vida de pessoas que vivem com HIV/AIDS. Texto contexto - enferm. 2018; 27 (2): 01-11. DOI: https://doi.org/10.1590/0104-070720180001460017

30. Santana PPC, Andrade M, Almeida VS, Menezes HF, Teixeira PA. Fatores que interferem na qualidade de vida de idosos com HIV/Aids: uma revisão integrativa. Cogitare Enferm. 2018; (23)4: e59117. DOI: http://dx.doi.org/10.5380/ce.v23i4.59117

31. Nixon SA, Bond V, Solomon P, Cameron C, Mwamba C, Hanass-Hancock J, et al. Optimism alongside new challenges: using a rehabilitation framework to explore experiences of a qualitative longitudinal cohort of people living with HIV on antiretroviral treatment in Lusaka, Zambia. AIDS Care. 2018; 30(3): 312-317. DOI: https://doi.org/10.1080/09540121.2017.1363365

32. Ammirati RJ, Lamis DA, Campos PE, Farber EW. Optimism, well-being, and perceived stigma in individuals living with HIV. AIDS Care. 2015; 27(7): 926-33. DOI: http://dx.doi.org/10.1080/09540121.2015.1018863

Frailty syndrome among oldest old individuals in a health macro-region of Minas Gerais

Ana Claudia Moreira dos Santos[1]
Nayara Gomes Nunes Oliveira[2]
Gianna Fiori Marchiori[3]
Darlene Mara dos Santos Tavares[4]

Abstract

Objective: to identify frailty conditions and their associated factors among oldest old individuals living in the urban area of a health macro-region of Minas Gerais state. *Methods:* a cross-sectional study of 314 oldest old from a health macro-region in Minas Gerais state, Brazil, was conducted. Data were collected from households by applying instruments validated for use in Brazil. Descriptive and multinomial logistic regression analyses ($p<0.05$) were carried out. *Results:* In the sample assessed, 44.3% of the oldest old were frail, 44.3% pre-frail and 11.4% non-frail. The pre-frail condition was associated with living alone ($p=0.047$) and very poor/poor physical performance ($p=0.026$), while frailty was associated with very poor/poor physical performance ($p<0.001$), the presence of depressive symptomatology ($p=0.029$) and of ≥5 morbidities ($p=0.003$). *Conclusion:* pre-frail and frail conditions predominated among the oldest old assessed. Maintaining physical performance is an aspect that can be targeted by health professionals in oldest old to delay pre-frailty and frailty.

Keywords: Aged, 80 and over. Frail Elderly. Frailty. Geriatric Nursing.

[1] Universidade Federal do Triângulo Mineiro, Curso de Graduação em Enfermagem. Uberaba, MG, Brasil.

[2] Hospital de Clínicas da Universidade Federal de Uberlândia. Uberlândia, MG, Brasil.

[3] Universidade Federal do Triângulo Mineiro, Programa de Pós-Graduação stricto sensu em Atenção à Saúde. Uberaba, MG, Brasil.

[4] Universidade Federal do Triângulo Mineiro, Departamento de Enfermagem em Educação e Saúde Comunitária. Uberaba, MG, Brasil.

Research funding: the present study was supported financially by the funding bodies the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) and the Fundação de Amparo à Pesquisa do Estado de Minas Gerais (FAPEMIG).

The authors declare no conflict in the conception of the study.

Correspondence
Darlene Mara dos Santos Tavares
darlenetavares@enfermagem.uftm.edu.br

Received: July 18, 2022
Approved: November 18, 2022

http://dx.doi.org/10.1590/1981-22562022025.220120en

INTRODUCTION

Greater life expectancy is accompanied by an increasing relative importance of older adults and more advanced age groups, which are growing at a rapid pace[1]. Oldest old, defined as individuals aged ≥80 years, currently represent 2.0% of the Brazilian population, a proportion set to rise to an estimated 8.8% by 2060[1,2].

During the aging process, there is often a decline in physiological reserves, e.g. muscle mass, whose decrease is a strong predictor of adverse health outcomes in the older population, such as frailty syndrome[3]. This multifactorial biological syndrome is characterized by a reduction in muscle strength and resistance and in physiological function, leading to increased vulnerability of the individual and risk for developing functional dependence and/or death[4].

The prevalence of frailty syndrome is significantly greater in the oldest old, with rates of 11.2-84.7%[5-7] reported in the international literature and 14.8-58.0%[8-10] in national studies. However, investigations in oldest old reveal that, besides more advanced age[6,9], frailty syndrome is associated with being female [6,11]; having no partner[12]; high number of morbidities[13]; presence of depressive symptoms[5,14,15], poor physical performance[5,16] and with functional disability for performing activities of daily living (ADLs)[7,15].

Identifying the presence of clinical factors that negatively impact the health of older people associated with rigorous assessment of frailty markers can allow proper management of the syndrome by devising effective care interventions for this age group[8-10]. To this end, studies analyzing frailty conditions and their associated factors in oldest old are vital to inform health priorities and interventions.

With an emphasis on the growing population of oldest old[1,2], a group more vulnerable to frailty syndrome[5-10], the current investigation sought to help further the knowledge on this subject. There is a dearth of studies addressing the sociodemographic and health factors associated with frailty conditions in oldest old individuals[14] and, hence, the study findings can support improvements in the healthcare service for the older population.

Therefore, the study objective was to identify frailty conditions and their associated factors among oldest old individuals from an urban area of a health macro-region of Minas Gerais state, Brazil.

METHOD

A cross-sectional analytical investigation, guided by the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) tool, was carried out in a health macro-region of Minas Gerais state. This macroregion comprises 3 health microregions encompassing 27 cities with a population of 806,172 individuals. Of this population, 15.6% are aged ≥ 60 years and, within this subgroup,14.8% are oldest old individuals[2].

The study sample consisted of oldest old living in an urban area of the 27 cities making up the health macroregion of Minas Gerais state (MG), Brazil. The calculation of sample size was based on the prevalence of frailty in oldest old of 14.8%[9], an accuracy of 5% and a 95.0% confidence interval, giving a sample of 277 oldest old individuals. Allowing for sample loss of 20.0%, the maximum number of attempted interviews was 332.

The sample of oldest old was selected using multi-stage cluster sampling. In the first stage, randomization of 50% of census sectors of each city of the health macroregion was performed using systematic sampling. Subsequently, for each city, the number of households to be selected, proportional to the total number of older residents in the 27 cities of the health macroregion, was calculated. The number of households was then divided by the number of census sectors, yielding a similar number of older people to be interviewed in each census sector. Lastly, in each census sector, the first household was randomly selected, while the rest of the households were selected in a standardized clockwise fashion until the sample for the sector was saturated.

The inclusion criteria were: participant age ≥80 years; and living in the health macro-region of Minas Gerais state (MG). Exclusion criteria were: being institutionalized; presenting cognitive decline, as measured by the Mini-Mental State Exam (MMSE)[17]; severe stroke complications involving loss of muscle

strength in upper and lower limbs and aphasia; advanced stage or unstable Parkinson´s disease and impaired movement, speech and/or affectivity.

A total of 320 oldest old individuals were interviewed, of which 6 had cognitive impairment. Thus, the final study sample comprised 314 oldest old participants.

Data collection was carried out at the households of participants between May 2017 and June 2018 through direct interview. The interviews were conducted by 10 interviewers from the health area who underwent training and education including awareness of the ethical aspects of the study.

Sociodemographic data and morbidities were collected by applying a structured questionnaire devised by members of the Public Health Research Group.

Physical performance was measured using the Brazilian version of the Short Physical Performance Battery (SPPB) according to the sum of points on tests of balance, gait speed and repeated chair stand test (5 times). Total score ranges from 0-12 points, classified as: very poor performance (0-3 points); poor performance (4-6 points), moderate performance (7-9 points) and good performance (10-12 points)[18].

Depressive symptoms were assessed using the short form of the Geriatric Depression Scale, validated for use in Brazil, comprising 15 items and scored on a scale ranging from 0 to 15 points[19]. A score greater than 5 on the scale indicated the presence depressive symptoms[19].

Functional capacity was measured using basic activities of daily living (BADLs)[20] and instrumental activities of daily living (IADLs)[21]. The Katz Index, adapted for the Brazilian context, was used to assess BADLs, a 6-item scale measuring the subject´s performance for self-care activities[20]. Lawton & Brody´s scale, validated for use in Brazil, was used to assess IADLs. Scores on the scale range from 7 (greater level of dependence) to 21 (full independence), rating the individual as totally dependent (7 points), partially dependent (8-20 points) or independent (21 points)[21].

The frailty syndrome was identified based on the 5 components of the frailty phenotype: (1) unintentional weight loss; (2) self-reported exhaustion and/or fatigue; (3) reduced muscle strength; (4) slow gait speed; (5) low level of physical activity[3]. The first component was assessed by the question: "In the past year, have you unintentionally lost more than 4.5kg or 5% of your body weight?". The second component was measured by 2 questions from the Brazilian version of the Center for Epidemiological Studies Depression Scale, items 7 ("I felt that everything I did was an effort") and 20 ("I could not get "going")[22]. For the third component, hand-grip strength was measured using a Jamar Saehan® (SH5001 – 973) hydraulic hand dynamometer. Three measures were obtained, expressed in kilograms/force (kgf), with a 1-minute interval between tries. The mean value was recorded and cut-offs were applied according to gender and body mass index[3]. Regarding the fourth component, timed gait (seconds) was performed. The participant walked a total distance of 8.6 meters, where the first and last 2 meters were disregarded for the calculation of gait time. Three measurements were made, with the average time recorded and cut-off points adjusted by gender and height[3]. The fifth component was measured using the long form of the International Physical Activity Questionnaire (IPAQ), adapted for use in older adults[23]. Individuals engaging in physical activity for ≥150 minutes a week were classified as active, and those performing 0-149 minutes as inactive[24]. Participants exhibiting impaired performance for ≥ 3 items were classified as frail, 1-2 items as pre-frail and no impairments as non-frail[24].

The sociodemographic variables studied included sex (male, female), age group in full years (80-89; ≥90). marital status [with/without partner], living arrangement [living alone; living with others], education, in full years of formal study (0-4; ≥5), monthly individual income, in minimum wages (≤1; >1); health variables: physical performance (very poor/poor; moderate/good), presence of depressive symptoms (yes; no), functional capacity for BADLs (independence; dependence) and IADLs (independence; partial/total dependence); number of morbidities (0-4; ≥5); and outcome variable: frailty conditions (non-frail, pre-frail and frail).

The data were keyed into a database using the Excel® program and double data entry was used. The two resultant databases were cross-referenced for inconsistencies, with subsequent correction where applicable.

After checking for completeness, the data were submitted to analyses of absolute and relative frequencies. Multinomial logistic regression was performed to determine factors associated with frailty conditions, preceded by bivariate analysis, using the chi-square test. Variables that met the established criteria ($p \leq 0.10$) were included in the multinomial logistics regression model, with frailty conditions as the outcome. The independent variables studies included sex, age group, marital status, education, living arrangement, individual monthly income, physical performance, depressive symptomatology, functional capacity for BADLs and IADLs, and number of morbidities. A 95% confidence interval and 5% level of significance of $p<0.05$ were adopted.

The project was approved by the Ethics Committee for Research involving Humans under permit no. 2.053.520. The participants received the study objectives and signed the Free and Informed Consent Form, and were provided with all pertinent information. The interviews were conducted after participants had agreed to take part and signed the consent form.

RESULTS

The mean age of participants (n=314) was 84.81 (±4.12; min. 80 and max. 101) years. The sample comprised predominantly individuals who were female, aged 80-89 years, without a partner, living with others, 0-4 years of education, individual monthly income of ≤1 minimum wage, good/moderate physical performance, no depressive symptomatology, independence for BADLs, total/partial dependence for IADLs, and ≥5 morbidities (Table 1).

The distribution of sociodemographic and health variables of the oldest old from a health macro-region (MG) is presented in Table 1.

With regard to frailty conditions, most participants were classified as either frail (44.3%) or pre-frail (44.3%), and the remainder as non-frail (11.4%).

Preliminary bivariate analysis was performed to identify factors associated with frailty conditions. Variables that met the established criteria ($p \leq 0.10$) were included in the final multinomial logistics regression model, namely: age group ($p=0.090$); living arrangement ($p=0.047$); physical performance ($p<0.001$); presence of depressive symptoms ($p<0.001$); IADLs ($p=0.010$), and number of morbidities ($p<0.001$) (Table 2).

The distribution of sociodemographic and health variables according to frailty conditions of the oldest old from a health macro-region (MG) is presented in Table 2.

The final multinomial logistic regression model for the variables associated with frailty conditions of the oldest old from a health macro-region (MG) is presented in Table 3.

The pre-frail condition was associated with living arrangement, living alone ($p=0.047$), and very poor/poor physical performance ($p=0.026$. The frail condition was associated with very poor/poor physical performance ($p<0.001$), the presence of depressive symptoms ($p=0.029$) and of ≥5 morbidities ($p=0.003$) (Table 3).

Table 1. Distribution of sociodemographic and health variables of oldest old from a health macro-region, Minas Gerais state, Brazil, 2021.

Variables	n (%)
Sex	
Female	205 (65.3)
Male	109 (34.7)
Age group (in full years)	
80-89	272 (86.6)
≥90 years	42 (13.4)
Marital status	
With partner	78 (24.8)
Without partner	236 (75.2)
Living arrangement	
Living with others	239 (76.1)
Living alone	75 (16.9)
Education (full years of formal study)	
0-4	261 (83.1)
≥5	53 (16.9)
Individual monthly income (in minimum wages)	
≤ 1	179 (57.0)
>1	135 (43.0)
Physical performance	
Moderate/Good	179 (56.1)
Very poor/poor	135 (43.9)
Presence of depressive symptomatology	
No	234 (74.5)
Yes	80 (25.5)
Basic activities of daily living	
Independence	275 (87.6)
Dependence	39 (12.4)
Instrumental activities of daily living	
Independence	48 (15.3)
Partial/total dependence	266 (84.7)
Number of morbidities	
0-4	116 (12.4)
≥5	198 (87.6)

Table 2. Distribution of sociodemographic and health variables according to frailty conditions of oldest old from a health macro-region, Minas Gerais state, Brazil, 2021.

Variables	Non-frail	Pre-frail	Frail	
	n (%)	n (%)	n (%)	*p**
Sex				
Female	25 (12.2)	83 (40.5)	97 (47.3)	0.181
Male	11 (10.1)	56 (51.4)	42 (38.5)	
Age group (in full years)				
80-89	31 (11.4)	126 (46.3)	115 (42.3)	0.090
≥90	5 (11.9)	13 (31.0)	24 (57.1)	
Marital status				
With partner	9 (11.5)	35 (44.9)	34 (43.6)	0.990
Without partner	27 (11.4)	104 (44.1)	105 (44.5)	
Living arrangement				
Living with others	31 (13.0)	97 (40.6)	111 (46.4)	0.047
Living alone	5 (6.7)	42 (56.0)	28 (37.3)	
Education (full years of formal study)				
0-4	27 (10.3)	114 (43.7)	120 (46.0)	0.242
≥5	9 (17.0)	25 (47.2)	19 (35.8)	
Individual monthly income (in minimum wages)				
≤ 1	18 (10.1)	74 (41.9)	86 (48.0)	0.274
>1	18 (13.3)	64 (47.9)	53 (39.3)	
Physical performance				
Moderate/Good	33 (18.8)	95 (54.0)	48 (27.3)	<0.001
Very poor/poor	3 (2.2)	44 (31.9)	91(65.9)	
Presence of depressive symptomatology				
No	35 (15.0)	112 (47.9)	87 (37.2)	<0.001
Yes	1 (1.3)	27 (33.8)	52 (65.0)	
Basic activities of daily living				
Independence	34 (12.4)	125 (45.5)	116 (42.2)	0.109
Dependence	2 (5.1)	14 (35.9)	23 (59.0)	
Instrumental activities of daily living				
Independence	9 (18.8)	27 (56.3)	12 (25.0)	0.010
Partial/total dependence	27 (10.2)	112 (42.1)	127 (47.7)	
Number of morbidities				
0-4	22 (19.0)	57 (49.1)	37 (31.9)	<0.001
≥5	14 (7.1)	82 (41.4)	102 (51.5)	

Table 3. Final multinomial logistic regression model for variables associated with frailty conditions of oldest old from a health macro-region, Minas Gerais state, Brazil, 2021.

Variables	Pre-frail			Frail		
	OR*	(CI)**	*p***	OR*	(CI)**	*p***
Age group (in full years)						
80-89	1			1		
≥90	0.49	(0.15-1.61)	0.244	0.84	(0.25-2.78)	0.781
Living arrangement						
Living with others	1			1		
Living alone	2.89	(1.01-8.28)	**0.047**	1.53	(0.49-4.79)	0.458
Physical performance						
Moderate/Good	1			1		
Very poor/poor	2.94	(2.25-3.84)	**0.026**	2.54	(1.75-3.68)	**<0.001**
Presence of depressive symptomatology						
No	1			1		
Yes	1.80	(1.37-2.34)	0.102	1.93	(1.45-2.55)	**0.029**
Instrumental activities of daily living						
Independence	1			1		
Partial/total dependence	1.07	(0.42-2.71)	0.875	1.48	(0.51-4.27)	0.467
Number of morbidities						
0-4	1			1		
≥5	2.13	(0.96-4.71)	0.060	3.57	(1.52-8.40)	0.003

1 – reference category; *OR: Odds Ratio; **CI: Confidence interval (95%); ***p<0.05.

DISCUSSION

In the present study, the pre-frail and frail conditions predominated among the oldest old participants. The pre-frail condition was associated with living arrangement, living alone and very poor/poor physical performance, whereas the frail condition was associated with very poor/poor physical performance, the presence of depressive symptoms and of ≥5 morbidities.

Regarding frailty conditions, both national[8,9,25] and international[7] studies of community-dwelling older adults[7-9] and patients enrolled at Primary Care services[25] reported a higher prevalence of pre-frail and non-frail[7-9,25] status compared with the rates found in the present study. Notably, pre-frail participants represented almost half of the study sample and, according to the scientific literature, this condition has a greater chance of improving than frailty[26]. In addition, the characteristics of the pre-frail participants, such as living alone[9,12] and the presence of morbidity[13], may also negatively impact the components of the frailty phenotype.

With regard to the prevalence of frail participants, higher rates were reported in studies conducted in Erval Seco city (Rio Grande do Sul state) (58%)[8], India (84.7%)[5] and in Portugal (71.8%)[6], whereas lower rates were found in Curitiba city (Parana state)[9] and Vietnam (11.2%)[7]. In a national survey, a higher rate of frailty was observed in oldest old individuals, particularly among more senior age groups, such as nonagenarians and centenarians[10], consistent with the results of the current study. In this context, it is vital to devise care plans for frail and pre-frail older adults that involve a multi-professional team, early screening by Primary Care nurses, and interventions that attenuate the adverse effects of frailty[7].

Nurses, particularly those in Primary Care, when assessing and classifying older people according to their frailty status[8], can adapt the care prescribed according to the specific traits and needs of oldest old

patients[25]. During nursing visits, the identification of sociodemographic and health characteristics which represent the greatest risk, besides detection of impairment of components of the frailty phenotype, can provide the basis for an individualized care plan incorporating effective interventions. These health actions, at all levels of care, should guarantee integrality of care and social support for the older patient and their family[25]. Such initiatives can help identify priorities, maintain and/or recuperate functional capacity and prevent frailty[8].

The current finding of an association between pre-frail status and living arrangements contradicts a national study in oldest old[9] but corroborates others. Older individuals that live alone can have lower social interaction and levels of engagement in everyday and physical tasks, activities which help maintain muscle strength[9,12]. This lower activity can result in greater risk of impairment of the components of the frailty phenotype and development of pre-frail status[9,12]. Therefore, older individuals should develop or maintain social ties and support networks[9], even when living alone, as these help maintain health and facilitate the adoption of adaptive behaviors in situations of adverse advents[9].

Akin to the current investigation, studies among oldest old in India[5] and China[16] found an association of pre-frail and frail conditions with very poor/poor physical performance. Specifically among frail individuals, a study found that this group exhibited low physical and muscular performance[5], negatively impacting performance of lower limbs, as measured by the SPPB. Moreover, the oldest old have a greater likelihood of developing sarcopenia compared with younger old and thus can have worse physical performance and frailty[5]. These findings, backed by evidence in the scientific literature[5,16], highlight the need for assessing physical performance to help implement health actions that can improve clinical condition.

The association between frailty and presence of depressive symptoms is consistent with studies of oldest old in India[5] and centenarians in Portgual[27]. Conversely, a study of Chinese older adults observed that frail individuals had less chance of developing depressive symptoms[28]. It is noteworthy that the relationship between depressive symptoms and frailty may be bidirectional in nature[14]. Exhaustion and/or fatigue are often seen in frail older adults, whereby depressive symptoms can worsen with progression of frailty[14]. Additionally, depressive symptoms may serve to worsen the negative impact on frailty syndrome components, such as slowed gait speed, unintentional weight loss, fatigue and declines in physical activity and muscle strength[3], predisposing these individuals to pre-frailty and frailty[5,27]. In this context, the assessment and identification of factors associated with the condition of frailty becomes vital in clinical practice, given that both depressive symptoms and frailty negatively impact quality of life, increase demand for health services, as well as the number of morbidities and mortality[13]. Co-occurrence of these factors can exacerbate the adverse effects on health[5,27].

The association between frailty and multimorbidity was also identified in a systematic review with meta-analysls[13], although conflicting results were found in a Brazilian study of oldest old [8]. Another investigation identified a bidirectional relationship between frailty and the presence of multimorbidities[29]. During the human aging process, morbidities often occur in older individuals due to the accumulation of specific biological deficits[30]. Also, chronic diseases interact with each other potentializing the negative effects and/or development of further clinical signs and symptoms[17]. Concomitant with the presence of multimorbidity[13,29-30] and accumulation of deficits[29], there can be both an increase in stressors exacerbating decline in physiological reserves across multiple systems, as well as homeostatic imbalance[3,29]. In this clinical state, older individuals can become locked into a negative cycle of adverse outcomes with difficulty recovering homeostasis, increased risk of developing further morbidities, and worsening of frailty status[29].

Few guidelines are available providing a broad global analysis of multimorbidity for the development of interventions in clinical practice that embrace the individual needs of older adults according to frailty status [29]. Most guidelines involve actions centered on specific diseases and fail to address frail or pre-frail conditions[29]. This can lead to ineffective treatment of patients with comorbidities [29] *and/or those who are frail.*

This study has the limitation of self-reporting of morbidities. However, strengths of the study include its representative sample from a health macroregion of Minas Gerais and the findings which add to the scientific knowledge on conditions of frailty and their associated factors in oldest old individuals. Finally, these results help pave the way for future research, such as multi-center and national cohort studies involving representative samples of the older population age ≥80 years from different Brazilian states, in an effort to enhance the quality of healthcare delivered to the oldest old population.

CONCLUSION

The pre-frail and frail conditions predominated among the oldest old individuals assessed. The pre-frail condition was associated with living arrangement, living alone and with very poor/poor physical performance, whereas the frail condition was associated with very poor/poor physical performance, the presence of depressive symptoms and of ≥5 morbidities.

Physical performance is an aspect which can be targeted by health professionals and should be addressed in oldest old patients with the aim of delaying pre-frailty and frailty. Furthermore, the findings elucidate the factors associated with the conditions of frailty, results which can inform actions of both the multiprofessional team and nursing team for the assesment and delivery of care to oldest old in primary health, as well as help devise public policies governing health care for older adults.

Edited by: Maria Luiza Diniz de Sousa Lopes

REFERENCES

1. Instituto Brasileiro de Geografia e Estatística. Projeção da população por sexo e idade - Indicadores implícitos na projeção - 2020/2060. [Internet]. 2020 [acesso em 22 set 2021]. Disponível em: https://www.ibge.gov.br/apps/populacao/projecao/index.html.
2. Departamento de Informática do Sistema Único de Saúde – DATASUS. Projeção da população das unidades federação por sexo e grupos de idade: 2000-2030. [Internet]. 2021 [acesso em 22 set 2021]. Disponível em: http://tabnet.datasus.gov.br/cgi/deftohtm.exe?ibge/cnv/projpopuf.def.
3. Fried LP, Tangen CM, Walston J, Newman AB, Hirsch C, Gottdiener J, et al. Frailty in Older Adults: Evidence for a Phenotype. The Journals of Gerontology Series A: Biological Sciences and Medical Sciences [Internet]. 2001 [citado 28 out 2022]; 56(3):146-157. Disponível em: https://doi.org/10.1093/gerona/56.3.m146
4. Morley JE, Vellas B, Van Kan A, Anker SD, Bauer JM, Bernabei R, et al. Frailty consensus: a call to action. J Am Med Dir Assoc. [Internet]. 2013 [citado 28 out 2022]; 14(6):392-97. Disponível em: : https://doi.org/10.1016/j. jamda.2013.03.022
5. Sharma PK, Reddy BM, Ganguly E. Frailty Syndrome among oldest old Individuals, aged ≥80 years: Prevalence & Correlates. Journal of Frailty, Sarcopenia and Falls [Internet]. 2020 [citado 28 out 2022]; 5(4):92-101. Disponível em: https://doi.org/10.22540/jfsf-05-092
6. Alves S, Teixeira L, Ribeiro O, Paúl C. Examining Frailty Phenotype Dimensions in the Oldest Old. Frontiers in Psychology [Internet]. 2020 [citado 28 out 2022]; 11. Disponível em: https://doi.org/10.3389/fpsyg.2020.00434
7. Nguyen TT, Nguyen AT, Vu TH, Dau NT, Nguyen PQ, Nguyen TX, et al. Association of Frailty Status and Functional Disability among Community-Dwelling People Aged 80 and Older in Vietnam. BioMed Research International [Internet]. 2021 [citado 28 out 2022]; 1-6. Disponível em: https://doi.org/10.1155/2021/7109452
8. Liberalesso TE, Dallazen F, Bandeira VA, Berlezi EM. Prevalência de fragilidade em uma população de longevos na região Sul do Brasil. Saúde em Debate [Internet]. 2017 [citado 28 out 2022]; 41(113):553-62. Disponível em: https://doi.org/10.1590/0103-1104201711316
9. Grden CRB, Lenardt MH, de Sousa JAV, Kusomota L, Dellaroza MSG, Betiolli SE. Associação da síndrome da fragilidade física às características sociodemográficas de idosos longevos da comunidade. Revista Latino-Americana de Enfermagem [Internet]. 2017 [acesso em 05 out. 2021]; 25:1-8. Disponível em: https://doi.org/10.1590/1518-8345.1770.2886

10. Duarte YADO, Nunes DP, Andrade FBD, Corona LP, Brito TRPD, Santos JLFD, et al. Fragilidade em idosos no município de São Paulo: prevalência e fatores associados. Revista Brasileira de Epidemiologia [Internet]. 2019 [acesso em 05 out. 2021]; 21:e180021. Disponível em: https://doi.org/10.1590/1980-549720180021.supl.2

11. Mota JP, Alves VP, Moraes CF, Gomes LD, Soares CIP, Vilaça SKH. Fragilidade, sarcopenia e caraterísticas sociodemográficas de idosos longevos. Estudos Interdisciplinares sobre o Envelhecimento. [Internet]. 2021 [citado 28 out 2022]; 25(3):97-114. Disponível em: https://doi.org/10.22456/2316-2171.94980

12. Klinpudtan N, Kabayama M, Gondo Y, Masui Y, Akagi Y, Srithumsuk W, et al. Association between heart diseases, social factors and physical frailty in community-dwelling older populations: The septuagenarians, octogenarians, nonagenarians investigation with centenarians study. Geriatrics & Gerontology International [Internet]. 2021 [acesso em 05 out. 2021]; 20(10):974-979. Disponível em: https://doi.org/10.1111/ggi.14002

13. Vetrano DL, Palmer K, Marengoni A, Marzetti E, Lattanzio F, Roller-Wirnsberger R, et al. Joint Action ADVANTAGE WP4 Group. Frailty and multimorbidity: a systematic review and meta-analysis. The Journals of Gerontology: Series A [Internet]. 2019 [acesso em 05 out. 2021]; 74(5):659-666. Disponível em: https://doi.org/10.1093/gerona/glx178

14. Soysal P, Veronese N, Thompson T, Kahl KG, Fernandes BS, Prina AM, et al. Relationship between depression and frailty in older adults: a systematic review and meta-analysis. Ageing research reviews [Internet]. 2017 [acesso em 05 out. 2021]; 36:78-87. Disponível em: https://doi.org/10.1016/j.arr.2017.03.005

15. Coventry PA, McMillan D, Clegg A, Brown L, Van Der Feltz-Cornelis C, Gilbody S, et al. Frailty and depression predict instrumental activities of daily living in older adults: A population-based longitudinal study using the CARE75+ cohort. PLOS ONE [Internet]. 2020 [citado 28 out 2022]; 15(12):e0243972. Disponível em: https://doi.org/10.1371/journal.pone.0243972

16. Wang HY, Lv X, Du J, Kong G, Zhang L. Age- and Gender-Specific Prevalence of Frailty and Its Outcomes in the Longevous Population: The Chinese Longitudinal Healthy Longevity Study. Frontiers in Medicine [Internet]. 2021 [citado 28 out 2022]; 8. Disponível em: https://doi.org/10.3389/fmed.2021.719806

17. Bertolucci PHF, Brucki SMD, Campacci SR, Juliano Y. O miniexame do estado mental em uma população geral: impacto da escolaridade. Arquivos de Neuro-psiquiatria. [Internet]. 1994 [acesso em 16 jun 2020]; 52(1): 1-7. Disponível em: https://doi.org/10.1590/S0004-282X1994000100001

18. Nakano MM. Versão brasileira da Short Physical Performance Battery SPPB: adaptação cultural e estudo da confiabilidade [dissertação]. Campinas (SP): Faculdade de Educação, Universidade Estadual de Campinas; 2007. 163 p. Disponível em: http://repositorio.unicamp.br/jspui/handle/REPOSIP/252485.

19. Almeida OP, Almeida SA. Confiabilidade da versão brasileira da Escala de Depressão em Geriatria (GDS) versão reduzida. Arq Neuropsiquiatr. [Internet]. 1999 [acesso em 16 jun 2020]; 57(2):421-6. Disponível em: 10.1590/S0004-282X1999000300013

20. Lino VTS, Pereira SRM, Camacho LAB, Ribeiro Filho ST, Buksman S. Cross-cultural adaptation of the Independence in Activities of Daily Living Index (Katz Index). Cad. Saúde Pública. [Internet]. 2008 [acesso em 16 jun 2020]; 24(1):103-12. Disponível em: https://doi.org/10.1590/S0102-311X2008000100010.

21. Lawton MP, Brody EM. Assessment of older people: self-maintaining and instrumental activities of daily living. Gerontologist. [Internet]. 1969 [acesso em 16 jun 2020]; 9(3):179-186. Disponível em: https://doi.org/10.1093/geront/9.3_Part_1.179

22. Bastitoni SST, Neri AL, Cupertino APFB. Validity of the Center for Epidemiological Studies Depression Scale among Brazilian elderly. Revista de Saúde Pública. [Internet]. 2007 [acesso em 16 jun 2020]; 41(4): 598-605. Disponível em: https://doi.org/10.1590/S0034-89102007000400014

23. Benedetti TRB, Mazo GZ, Barros MVG. Application of the International Physical Activity Questionnaire (IPAQ) for evaluation of elderly women: concurrent validity and test-retest reprodutibility. Revista Brasileira de Ciência do Movimento. [Internet]. 2004 [acesso em 16 jun 2020]; 12(1): 25-33. Disponível em: http://dx.doi.org/10.18511/rbcm.v12i1.538

24. World Health Organization. Global recommendations on physical activity for health [Internet]. Geneva: WHO, 2020. Available from: https://www.who.int/dietphysicalactivity/publications/9789241599979/en/. –

25. Sousa JAVD, Lenardt MH, Grden CRB, Kusomota L, Dellaroza MSG, Betiolli SE. Modelo preditivo de fragilidade física em idosos longevos. Revista Latino-Americana de Enfermagem [Internet]. 2018 [acesso em 05 out. 2021]; 26:1-9. Disponível em: https://doi.org/10.1590/1518-8345.2346.3023

26. Gené Huguet LG, González MN, Kostov B, Carmona MO, Francia CC, Nieto MC, et al. Pre frail 80: multifactorial intervention to prevent progression of pre-frailty to frailty in the elderly. The journal of nutrition, health & aging [Internet]. 2018 [acesso em 05 out. 2021]; 22(10):1266-1274. Disponível em: https://doi.org/10.1007/s12603-018-1089-2

27. Ribeiro O, Duarte N, Teixeira L, Paúl C. Frailty and depression in centenarians. International psychogeriatrics [Internet]. 2018 [acesso em 05 out. 2021]; 30(1):115-124. Disponível em: https://doi.org/10.1017/S1041610217001910

28. Liu X, Wang C, Qiao X, Si H, Jin Y. Sleep quality, depression and frailty among Chinese community-dwelling older adults. Geriatric Nursing [Internet]. 2021 [citado 28 out 2022]; 42(3):714-20. Disponível em: https://doi.org/10.1016/j.gerinurse.2021.02.020

29. Villacampa-Fernández P, Navarro-Pardo E, Tarín JJ, Cano A. Frailty and multimorbidity: Two related yet different concepts. Maturitas [Internet]. 2017 [acesso em 05 out. 2021]; 95:31-35. Disponível em: https://doi.org/10.1016/j.maturitas.2016.10.008

30. Vetrano DL, Calderón-Larrañaga A, Marengoni A, Onder G, Bauer JM, Cesari M, et al. An international perspective on chronic multimorbidity: approaching the elephant in the room. The Journals of Gerontology: Series A [Internet]. 2018 [acesso em 05 out. 2021]; 73(10): 1350-1356. Disponível em: https://doi.org/10.1093/gerona/glx178

Use of specialized public health services by older people in southern Brazil

Karen Chisini Coutinho Lütz[1]
Carla Cristiane Becker Kottwitz Bierhals[1]
Idiane Rosset[1]
Lisiane Manganelli Girardi Paskulin[1]

Abstract

Objective: To analyze the use of specialized public health services by older adults, by sex and age group, in the city of Porto Alegre. *Methods*: A cross-sectional study with secondary data from the city's outpatient and inpatient consultation systems. All records from 2019 were used, and Pearson's chi-square test was applied. *Results*: In total, 64,888 older people sought specialized services, generating 113.694 visits (82,8% outpatient visits and 17.2% hospitalizations). It was found that 74.7% of the older adults were referred by primary care for specialized care, with higher percentages of young older people and women (p<0.001). On the other hand, men and older adults aged 80 years or older were referred more frequently for care from hospitals and emergency rooms (p<0.001). Women and older adults between 60 and 79 years old used outpatient centers, physical therapy, rehabilitation centers, dentistry and mental health in greater proportion (p<0.001). The main reasons for using specialized services were diseases of the circulatory system, being more expressive among older adults aged 80 years or older and men (p<0.001). Musculoskeletal diseases (22.5%) were the main reasons for outpatient consultations and, in emergency hospitalizations, diseases of the circulatory system (37.9%). Older adults with a history of outpatient consultations had fewer hospital admissions (p<0.001). *Conclusion*: The need for articulated actions by health services is highlighted, prioritizing the male and long-lived population, focusing on the prevention/control of non-communicable chronic diseases and the vulnerabilities of this stage of life.

Keywords: Health Services Accessibility. Comprehensive Health Care. Health Services Research. Aged.

[1] Universidade Federal do Rio Grande do Sul, Escola de Enfermagem, Programa de Pós-Graduação em Enfermagem. Porto Alegre, RS, Brasil.

The authors declare that there is no conflict in the conception of this work.

No funding was received in relation to the present study.

Correspondence
Karen Chisini Coutinho Lütz
karenchisini@gmail.com

Received: June 26, 2022
Approved: December 22, 2022

http://dx.doi.org/101590/1981-22562022025.220183.en

INTRODUCTION

The Brazilian older population accounts for a large use of health services, which is also due to the higher frequency of chronic diseases, weaknesses and functional losses, in addition to less social and financial resources found in this age group[1]. The use of health services comprises the user's effective contact with institutions and professionals to obtain care[2]. Information about these contacts is available in the national information systems of the Ministry of Health, which generate data for the analysis of the population's health situation, but which are not yet integrated.

In the international context, health systems with integrated care models[3] are consolidated and evidence[4,5] has shown that continuity of care prevents hospital admissions, reduces the use of specialized services and the need for tests, in addition to positively impacting the quality of life of the older people, especially in cases of Chronic Noncommunicable Diseases (CNCD). In a survey of national investigations on the use of public health services in this age group, it was found that most studies explore the points of care in the network in isolation, that is, they analyze a specific level of care[1,6,7].

In the international context, studies on the subject examine different levels of care together more frequently, in addition to pointing out the determinants of the use of these services by the older population[8-10]. In addition, details on the use of health services by sex or age subgroups among older people were scarcely found, both in the national[2] and international literature[8,10]. Although some studies show data on the use of some types of health services by sex, or age subgroups of older people, such differences are not clear in the literature[2,8,10], especially with regard to different levels of complexity. As for the reasons for using the services, studies that have already been carried out analyze the frequency of access and identify the NCDs as the main responsible for the assistance, but do not carry out other comparisons based on these results[1,2,6,7].

Knowing more about the subject, investigating outpatient and hospital services in an integrated approach, used by this population, brings subsidies to fill this knowledge gap. Exploring the interfaces of these points of care can help identify weaknesses and strengths in the care and management of the health of the Brazilian older population, supporting the planning and direction of actions, in addition to improving the services provided to older people. Therefore, the present study aimed to analyze the use of specialized public health services by older people, according to gender and age group, in the city of Porto Alegre (RS).

METHODS

Analytical cross-sectional study with secondary data from outpatient and hospital care of older people residents in the city of Porto Alegre (RS), regulated by the Consultation Management Systems (GERCON) and Hospitalization Management Systems (GERINT), of the Municipal Health Secretariat (SMS), in 2019. The data used are from the use of SMS and were made available by it for use in the present investigation.

In 2019, the older population of the municipality was estimated at 287,022 (19.66%), of which 237,011 (82.58%) were between 60 and 79 years old and 50,011 (17.42%) were 80 years old or older and 110,444 (38%) men and 176,578 (62%) women[11]. In the same period, the Municipal Human Development Index (IDHM) was 0.805 (very high)[12].

The municipal network of health services was formed by Primary Health Care (PHC), specialized outpatient care (medical specialties, dentistry, occupational health, tuberculosis, rehabilitation and stomatotherapy center, clinical pharmacy, renal clinics and physiotherapy), by mental health services, by the urgency and emergency network and by hospital care, presented in Chart 1. In 2019, the municipality had 140 Health Units (HU) in the PHC (including prison health), six specialty outpatient centers and 16 hospital providers, two of which are own and 14 are contracted[13]. Some of the hospitals, in addition to inpatient care, also provided outpatient care. In the municipality, patients can be referred for specialized care from various points of care in the area of health and social assistance and all referrals are registered in the aforementioned management systems[14].

In the present study, outpatient care and hospital care were included for older people aged 60 years and over, residing in the municipality in the year of the study and regulated in the systems, and return and duplicate records were excluded. Users aged up to 79 years were considered as young older people, and long-lived aged 80 years or older. From the users, the following data were obtained: sex, age and number of the National Health Card, with the first five digits replaced by "ABCDE" (respecting the General Data Protection Law), making it possible to cross-reference information from users from the two systems and the grouping of records individually. From the consultations, the dates of request and scheduling/hospitalization were obtained, main reason according to the International Classification of Diseases 10th edition (ICD-10), specialty, type of hospitalization (elective or urgent), requesting and executing health unit.

The ICD-10 codes were categorized by their chapters, excluding XV and XVI, as they did not involve the study population. The 197 specialties and subspecialties available in the system were grouped into 59 categories. The categories were defined according to the main specialty, such as, for example, cardiology, which has subspecialties such as arrhythmia, ischemic heart disease, heart failure, among others. Chart 1 describes the composition of the municipal network, the organization of requesting and executing units into 16 categories and the type of service provided to the population.

Chart 1. Description of the composition of the municipal network of Porto Alegre, units that can request or perform assistance and type of assistance provided. Porto Alegre, RS, 2019.

Municipal Network	Requesting/performing unit	Type of service
PHC	Primary Care and Prison Health	Primary Care proper services
Specialized Outpatient Care	Outpatient Centers	Consultations in medical specialties and subspecialties
	Dentistry	Specialized dental services
	Occupational Health	Specialized assistance to workers affected by work-related illnesses and/or injuries
	Tuberculosis Reference Center	Assistance to users with Tuberculosis
	Rehabilitation	Assistance to users who need physical, auditory, visual and/or intellectual rehabilitation
	Stomatherapy	Assistance to users with stomas, wounds, micturition and evacuation dysfunctions
	Clinical Pharmacy	Supply of inputs and guidance for users with diabetes
	Renal Clinics	Assistance to users with Acute and Chronic Renal Failure, with peritoneal dialysis, hemodialysis and clinical treatment services
	Physiotherapy	Physiotherapy service
	Social assistance	Mobile Ophthalmology Unit for examinations and delivery of eyeglasses (frames and lenses) and referrals for cataract surgery, when necessary
Urgent and emergency network	Emergency Care Unit (UPA)	Intermediate complexity emergency care
Hospital care	Hospital	Elective and urgent hospital admissions and outpatient consultations
	Regulation	Internal regulation of patients already receiving outpatient care at the hospital institution, but who had not been regulated via the computerized municipal system
Mental health	Mental health	Assistance to users with severe and persistent mental disorders
	Addiction Unit	Inpatient unit for substance use detox and rehabilitation

Source: Prepared by the authors.

The sample calculation was based on data from the older population of the 2010 Census[12], resulting in a minimum of 2,960 older people, 2,517 young and 443 long-lived, with a confidence level of 95% and a margin of error of 5%. Due to the representativeness of this population in the municipality, after excluding data that did not meet the objectives of the study, it was decided to use all records, totaling 64,888 older people. The system databases were made available by SMS in spreadsheet format.

Quantitative variables were described by mean and standard deviation or median and interquartile range, and categorical variables by absolute and relative frequencies. Pearson's chi-square test was used, complemented by the analysis of the adjusted residuals to verify the associations of the use of services and reasons for attendance according to sex and age group and reasons for attendance with the types of service.

Some variables were multiple choice, that is, the patient could fit into more than one category. The percentage that each category represents was calculated on the number of patients and not on the number of consultations, thus representing more than 100% in the sum of the categories. The significance level adopted was 5% ($p<0.05$).

The research complies with Resolution nº 466/2012[15] and the project was approved by the Research Ethics Committee of the Porto Alegre SMS with opinion number 4,022,279.

RESULTS

Records of 64,888 users with a total of 113,694 visits were analyzed, of which 81,760 were outpatients and 31,934 were hospitalized. Table 1 presents the characteristics of the older people and the care received at the points of care under study.

As shown in Table 2, 74.7% of the older people with specialized care were referred by the PHC. The highest percentages of referrals to specialized services by the PHC were young older people (76.9%) and women (77%) ($p<0.001$).

Table 1. Demographic characteristics of the older people and of outpatient and hospital care and type of care (N=64,888). Porto Alegre, RS, 2019.

Variables	n (%)
Age (years) – median ± SD	71.0 ± 8.2
Age group (in years)	
60 – 79	53,984 (83.2)
≥ 80	10,904 (16.8)
Sex	
Female	40,033 (61.7)
Male	24,855 (38.3)
Number of consultations - median (P25-P75) [min-max.]	1 (1 – 2) [1 – 23]
1	37,001 (57.0)
2	15,889 (24.5)
3 or more	11,998 (18.5)
Type of service (multiple choice question)	
Outpatient clinic	53,719 (82.8)
Elective hospitalization	6,766 (10.4)
Urgent hospitalization	15,976 (24.6)
Outpatient + Elective hospitalization	4,377 (6.7)
Outpatient + Urgent hospitalization	6,754 (10.4)

Source: GERCON and GERINT Systems.

Table 2. Types of health units requesting and performing care for older people, according to gender and age group. Porto Alegre, RS, 2019.

Variables (Multiple choice question)	Total sample	60-79 years	≥80 years	*p*	Male	Female	*p*
	n (%)	n (%)	n (%)		n (%)	n (%)	
Requesting unit							
Primary Care	48,464 (74.7)	41,512 (76.9)	6,952 (63.8)	<0.001	17,619 (70.9)	30,845 (77.0)	<0.001
Hospital*	20,823 (32.1)	16,214 (30.0)	4,609 (42.3)	<0.001	9,217 (37.1)	11,606 (29.0)	<0.001
Outpatient centers	4,770 (7.4)	4,070 (7.5)	700 (6.4)	<0.001	2,022 (8.1)	2,748 (6.9)	<0.001
Emergency care unit	3,107 (4.8)	2,161 (4.0)	946 (8.7)	<0.001	1,393 (5.6)	1,714 (4.3)	<0.001
Mental health	1,332 (2.1)	1,281 (2.4)	51 (0.5)	<0.001	418 (1.7)	914 (2.3)	<0.001
Stomatotherapy	329 (0.5)	269 (0.5)	60 (0.6)	0.533	161 (0.6)	168 (0.4)	<0.001
Renal Clinics	249 (0.4)	214 (0.4)	35 (0.3)	0.281	152 (0.6)	97 (0.2)	<0.001
Rehabilitation	195 (0.3)	156 (0.3)	39 (0.4)	0.272	61 (0.2)	134 (0.3)	0.052
Dentistry	174 (0.3)	152 (0.3)	22 (0.2)	0.171	82 (0.3)	92 (0.2)	0.02
Regulation	169 (0.3)	119 (0.2)	50 (0.5)	<0.001	58 (0.2)	111 (0.3)	0.323
Tuberculosis Reference Center	20 (0.0)	20 (0.0)	0 (0.0)	0.037	11 (0.0)	9 (0.0)	0.192
Addiction Unit	23 (0.0)	23 (0.04)	0 (0.0)	0.024	6 (0.0)	17 (0.0)	0.322
Social assistance	17 (0.0)	11 (0.0)	6 (0.1)	0.052	4 (0.0)	13 (0.0)	0.315
Occupational Health	15 (0.0)	15 (0.0)	0 (0.0)	0.092	10 (0.04)	5 (0.01)	0.046
Physiotherapy	12 (0.0)	9 (0.0)	3 (0.0)	0.437	4 (0.0)	8 (0.0)	1
Clinical Pharmacy	3 (0.0)	3 (0.0)	0 (0.0)	1	0 (0.0)	3 (0.0)	0.291
Performing Unit							
Hospital*	64,887 (99.9)	53,983 (99.9)	10,904 (100)	1	24,854 (99.9)	40,033 (100)	0.383
Outpatient centers	12,852 (19.8)	10,774 (20.0)	2,078 (19.1)	0.032	5,035 (20.3)	7,817 (19.5)	0.024
Physiotherapy	9,157 (14.1)	8,098 (15.0)	1,059 (9.7)	<0.001	2,518 (10.1)	6,639 (16.6)	<0.001
Rehabilitation	1,913 (2.9)	1,606 (3.0)	307 (2.8)	0.386	563 (2.3)	1,350 (3.4)	<0.001
Dentistry	1,266 (2.0)	1,164 (2.2)	102 (0.9)	<0.001	555 (2.2)	711 (1.8)	<0.001
Mental health	1,211 (1.9)	1,168 (2.2)	43 (0.4)	<0.001	345 (1.4)	866 (2.2)	<0.001
Renal Clinics	890 (1.4)	691 (1.3)	199 (1.8)	<0.001	470 (1.9)	420 (1.0)	<0.001
Clinical Pharmacy	493 (0.8)	426 (0.8)	67 (0.6)	0.064	205 (0.8)	288 (0.7)	0.145
Stomatotherapy	370 (0.6)	301 (0.6)	69 (0.6)	0.378	181 (0.7)	189 (0.5)	<0.001
Social assistance	211 (0.3)	194 (0.4)	17 (0.2)	0.001	68 (0.3)	143 (0.4)	0.08
Addiction Unit	26 (0.0)	26 (0.05)	0 (0.0)	0.015	6 (0.0)	20 (0.0)	0.163

Source: GERCON and GERINT systems. *Services performed in hospitals for outpatient consultation or hospitalization.

Men were referred in a greater proportion than women by hospitals (37.1%), outpatient clinics (8.1%), PHC (5.6%), stomatotherapy (0.6%) and renal clinics (0.6%) (p<0.001). Long-lived older people had more referrals by hospitals (42.3%) and PHC (8.7%) than younger older people (p<0.001).

As for the performing units, all older people had at least one specialized service in a hospital, either for outpatient consultation or hospitalization, with no statistically significant association with age group and gender (p=1 and p=0.383). In the outpatient centers, there was a significant difference for age group (p=0.032) and sex (p=0.024), with more frequent services among younger older people and women. Services in physiotherapy, rehabilitation, dentistry and mental health were also higher among young older people and women (p<0,001).

As for the reasons for using the services, by chapter of the ICD-10, the main ones were diseases of the circulatory system (chapter IX) (21.4%), being more expressive among older people aged 80 years or more (25.6%) and in men (23.7%) (p<0.001) (Table 3).

Comparing the types of care, diseases of the musculoskeletal system and connective tissue (Chapter XIII) were the main causes of outpatient consultations (22.5%) (Table 4). In elective hospitalizations, it was neoplasms (chapter II) (35.2%) and in emergency hospitalizations, diseases of the circulatory system (chapter IX) (37.9%). The same causes remained among those with outpatient care and hospitalization, with 37.1% and 47.5%, respectively.

As for the association between the types of hospitalization with the history of outpatient care records in 2019 (Table 5), it was found that, among the older people who had consultations, 19.1% required some type of hospitalization, while in the group without outpatient care, all hospitalized, 82.6% of which were urgent care. Only elective hospitalizations among long-lived older people did not show a statistically significant association (p=0.054).

Table 3. Main reason for using outpatient and hospital health services by older people, according to ICD-10 chapters, gender and age group. Porto Alegre, RS, 2019.

ICD-10 chapters (Multiple choice question)	Total sample n (%)	60-79 years n (%)	≥80 years n (%)	*p*	Male n (%)	Female n (%)	*p*
I. Infectious and parasitic	2,856(4.4)	2,200(4.1)	656(6.0)	<0.001	1,326(5.3)	1,530(3.8)	<0.001
II. Neoplasms (tumors)	6,489(10.0)	5,434(10.1)	1,055(9.7)	0.221	2,855(11.5)	3,634(9.1)	<0.001
III. Blood and hematopoietic organs	2,601(4.0)	2,220(4.1)	381(3.5)	0.003	963(3.9)	1,638(4.1)	0.177
IV. Endocrine. nutritional and metabolic	2,790(4.3)	2,393(4.4)	397(3.6)	<0.001	1,045(4.2)	1,745(4.4)	0.356
V. Mental and behavioral disorders	1,509(2.3)	1,220(2.3)	289(2.7)	0.015	622(2.5)	887(2.2)	0.02
VI. Nervous system	2,176(3.4)	1,819(3.4)	357(3.3)	0.634	845(3.4)	1,331(3.3)	0.622
VII. Eye and appendages	12,115(18.7)	10,303(19.1)	1,812(16.6)	<0.001	3,988(16.0)	8,127(20.3)	<0.001
VIII. Ear and mastoid process	2,385(3.7)	1,867(3.5)	518(4.8)	<0.001	852(3.4)	1,533(3.8)	0.009
IX. Circulatory system	13,917(21.4)	11,131(20.6)	2,786(25.6)	<0.001	5,883(23.7)	8,034(20.1)	<0.001
X. Respiratory system	3,907(6.0)	2,710(5.0)	1,197(11.0)	<0.001	1,630(6.6)	2,277(5.7)	<0.001
XI. Digestive tract	7,838(12.1)	6,879(12.7)	959(8.8)	<0.001	3,543(14.3)	4,295(10.7)	<0.001
XII. Skin and subcutaneous tissue	2,202(3.4)	1,891(3.5)	311(2.9)	0.001	805(3.2)	1,397(3.5)	0.09
XIII. Musculoskeletal and connective tissue	12,320(19.0)	10,922(20.2)	1,398(12.8)	<0.001	3,133(12.6)	9,187(22.9)	<0.001
XIV. Genitourinary system	6,391(9.8)	5,296(9.8)	1,095(10.0)	0.469	3,098(12.5)	3,293(8.2)	<0.001
XVII. Birth defects	276(0.4)	245(0.5)	31(0.3)	0.016	83(0.3)	193(0.5)	0.006
XVIII. Symptoms, signs and abnormal findings	6,761(10.4)	5,535 (10.3)	1,226(11.2)	0.002	2,329(9.4)	4,432(11.1)	<0.001
XIX. Injuries and poisoning	4,013(6.2)	3,107 (5.8)	906(8.3)	<0.001	1,372(5.5)	2,641(6.6)	<0.001
XX. External causes	41(0.1)	33 (0.1)	8(0.1)	0.799	14(0.1)	27 (0.1)	0.699
XXI. Factors influencing health status	2,148(3.3)	1,787 (3.3)	361(3.3)	1	874(3.5)	1,274(3.2)	0.022
No CID	4,446(6.9)	3,866 (7.2)	580(5.3)	<0.001	1,736(7.0)	2,710(6.8)	0.299

Source: GERCON and GERINT Systems.

Table 4. Main reason for using outpatient and hospital health services by older people, according to ICD-10 chapters and type of care. Porto Alegre, RS, 2019.

ICD-10 chapters (Multiple choice question)	Outpatient n (%)	Elective Hospitalization n (%)	Emergency hospitalization n (%)	Outp. + Elec. H. n (%)	Outp. + Urg. H. n (%)	Outp. + H. n (%)
I. Infectious and parasitic	1,605(3.0)	273(4.0)	2,127(13.3)*	186(4.2)	884(13.1)*	928(9.0)*
II. Neoplasms (tumors)	5,197(9.7)	2,383 (35.2)*	2,144 (13.4)*	1,622 (37.1)*	1,410(20.9)*	2,603(25.3)*
III. Blood and hematopoietic organs	2,238(4.2)*	154(2.3)	797(5.0)*	129(2.9)	453(6.7)*	534(5.2)*
IV. Endocrine. nutritional and metabolic	2,393 (4.5)*	199(2.9)	934 (5.8)*	165 (3.8)	556 (8.2)*	665(6.5)*
V. Mental and behavioral disorders	1,234(2.3)	59(0.9)	616(3.9)*	54(1.2)	343 (5.1)*	378(3.7)*
VI. Nervous system	1,847 (3.4)*	229(3.4)	705 (4.4)*	174 (4.0)*	418 (6.2)*	553(5.4)*
VII. Eye and appendages	11,949(22.2)*	998(14.8)	963(6.0)	842 (19.2)	939 (13.9)	1,664 (16.2)
VIII. Ear and mastoid process	2,370 (4.4)*	148(2.2)	200(1.3)	137 (3.1)	195(2.9)	313(3.0)
IX. Circulatory system	10,770 (20.0)	1,609(23.8)*	6,051(37.9)*	1,169(26.7)*	3,209(47.5)*	4,051(39.4)*
X. Respiratory system	2,040 (3.8)	298(4.4)	3,065(19.2)*	224 (5.1)	1,220(18.1)*	1,324(12.9)*
XI. Digestive tract	6,756(12.6)*	1,260(18.6)*	1,998(12.5)	909(20.8)*	1,195(17.7)*	1,913(18.6)*
XII. Skin and subcutaneous tissue	1,998 (3.7)*	238(3.5)	448(2.8)	204 (4.7)*	267 (4.0)*	430(4.2)*
XIII. Musculoskeletal and connective tissue	12,080(22.5)*	1,022 (15.1)	928(5.8)	862 (19.7)	833 (12.3)	1,598 (15.5)
XIV. Genitourinary system	5,173 (9.6)	1,142 (16.9)*	2,223 (13.9)*	763 (17.4)*	1,269(18.8)*	1,827(17.8)*
XVII. Birth defects	261 (0.5)*	55(0.8)*	42(0.3)	44 (1.0)*	37(0.5)	71(0.7)*
XVIII. Symptoms, signs and abnormal findings	6,159 (11.5)*	786 (11.6)*	1,599 (10.0)	655 (15.0)*	1,087(16.1)*	1,574(15.3)*
XIX. Injuries and poisoning	2,868 (5.3)	646 (9.5)*	1,818 (11.4)*	540 (12.3)*	738 (10.9)*	1,152(11.2)*
XX. External causes	30 (0.1)	8(0.1)	19(0.1)*	6(0.1)	10(0.1)*	14(0.1)*
XXI. Factors influencing health status	2,059 (3.8)*	269 (4.0)*	331(2.1)	227 (5.2)*	266 (3.9)*	457(4.4)*
No CID	4,446 (8.3)*	266(3.9)	385(2.4)	266 (6.1)	385(5.7)	603(5.9)

Outp. = Outpatient; H. = Hospitalization; * statistically significant association by the test of residuals adjusted to 5% of significance. Source: GERCON and GERINT systems.

Table 5. Association between outpatient visits and type of hospitalization in older people, according to gender and age group. Porto Alegre, RS, 2019.

Variables	Consulted in an outpatient clinic (N=53,719) n (%)	Not consulted in an outpatient clinic (N=11,169) n (%)	*p*
Total sample			
Elective hospitalization	4,377 (8.1)	2,389 (21.4)	<0.001
Urgent hospitalization	6,754 (12.6)	9,222 (82.6)	<0.001
General hospitalization	10,287 (19.1)	11,169 (100)	<0.001
Age 60 to 79 years			
Elective hospitalization	3,874 (8.4)	2,155 (26.8)	<0.001
Urgent hospitalization	5,285 (11.5)	6,282 (78.0)	<0.001
General hospitalization	8,431 (18.4)	8,052 (100)	<0.001
Age ≥ 80 years			
Elective hospitalization	503 (6.5)	234 (7.5)	0.054
Urgent hospitalization	1,469 (18.9)	2,940 (94.3)	<0.001
General hospitalization	1,856 (23.8)	3,117 (100)	<0.001
Male			
Elective hospitalization	1,910 (9.6)	1,082 (22.0)	<0.001
Urgent hospitalization	3,106 (15.6)	4,082 (82.9)	<0.001
General hospitalization	4,599 (23.1)	4,923 (100)	<0.001
Female			
Elective hospitalization	2,467 (7.3)	1,307 (20.9)	<0.001
Urgent hospitalization	3,648 (10.8)	5,140 (82.3)	<0.001
General hospitalization	5,688 (16.8)	6,246 (100)	<0.001

Source: GERCON and GERINT Systems.

Among the older people who consulted, 8.1% were hospitalized electively, while among those who did not consult, this number reached 21.4%. It is noteworthy that emergency admissions were more prevalent among users aged 80 years or older (94.3%) (p<0.001). In both sexes, more than 80% of those who did not consult medical specialties were hospitalized urgently (p<0,001).

DISCUSSION

The higher prevalence of older people aged between 60 and 79 years and females who used specialized health services found in this study, corroborates the results of national and international research on the subject[1,8,16]. Considering that the estimated older population of the municipality for 2019 was close to 287,000, it is noteworthy that approximately 22% of the older people resorted to specialized public services and, among these, almost half needed more than one specialized, outpatient health care or hospital, which may indicate the proportion of older people in this population with greater vulnerabilities and who depend on the public health system. Although the PHC has sought some advances covering care for older people, such as the expansion of Home Care and the encouragement of multidimensional assessment, it is often faced with important challenges, especially with regard to accelerated population aging and the growing number of demands of this population[14], in relation to the offer of care, in addition to the implementation of the line of care for older people in the national context.

Outpatient consultation was the most used type of care, which was expected, and may be related to the greater number of chronic diseases, occurrence

of comorbidities and other vulnerabilities in this age group that PHC often fails to resolve. A national baseline study by Meier et al.[17] identified that 64% of the older people had up to four medical consultations during the previous year and that the use of these consultations is associated with functional decline, chronic diseases and comorbidities, without specifying the level of care in which they occurred.

As for hospital care, it was observed that more than a third of the older people were hospitalized and that the percentage that required urgent hospitalization was more than double the number of electives. Although no studies were identified with results stratified by type of hospitalization, national surveys show that between 11% and 18% of the older people reported the occurrence of at least one hospitalization in a year. Similar values were also found in studies carried out in developed countries such as England (10%) and the United States (19%) and in emerging ones, such as Colombia (13%)[1,8-10,18,19]. Although the previous history of the patients in the present investigation is not known, it is possible that a greater focus on preventive activities, monitoring of vulnerabilities and coordination of care between PHC and specialized care may influence in the reduction in the use of hospitalizations[1,7].

The identification of units requesting outpatient and hospital care makes it possible to know the type of care used by users to access other specialized services in the year under study. Although the use of PHC has not been directly evaluated, the significant number of referrals made by older people between 60 and 79 years of age and female may indicate that older people from these groups have accessed PHC more, reinforcing its important role as a gateway into the Health Care Network (RAS) and care coordinator[19]. The 2019 National Health Survey (PNS) identified that 70% of people who used PHC services in Brazil were women[20]. The long-lived and men, on the other hand, had most of their referrals made by hospitals and ECU to another specialized service, which may be related to the need to use more complex services when the diseases are already installed and even in advanced stages and by the occurrence of frailty.

Considering the composition of the RAS in Porto Alegre, it is possible that the long-lived have more difficulty in accessing the PHC services due to physical mobility problems for commuting to the health units, which are not always located close to their homes, requiring large displacements by foot or need to use public or private transport. In addition, many older people live alone, often requiring home care, which is not always able to cover their care needs. Thus, health conditions sensitive to PHC often end up becoming more acute, requiring recourse to more complex places.

This inference is based on the identification that in the regions with the highest proportion of older people in the municipality, there are PHC services with a much higher number of people registered than recommended and requiring large displacements, as in the central region, which has only three health units and where 22% of the population is aged 60 or over[21]. In international health systems, such as the National Health Service (NHS) in the United Kingdom, the profile of older people using services differs from that found in this study, with regard to age group, with a higher prevalence of care for the long-lived in PHC (55.8%) in relation to the total population over 60 years old[22].

Hospital services in the municipality concentrate the highest number of consultations, regardless of gender or age group of users, whether for consultation or hospitalization and, possibly, for this reason, there was no statistical difference in its use for these variables. Outpatient centers were more used by younger older people and women. It is possible that the regulation of cases in the municipality will refer more complex patients to outpatient consultations in hospitals to facilitate diagnostic and therapeutic support.

Also noteworthy is the higher prevalence of men treated at renal clinics. Results of studies that address patients with chronic kidney disease, already on dialysis, identified that most of the sample was male and older people in the age group of 60 to 79 years[23,24]. This fact may be related to a lower preventive culture adopted by men, since the late search for health services contributes to the

diagnosis being made in more advanced stages of the disease[25].

As for the executing units, the greater use of physiotherapy, rehabilitation, mental health and dentistry services by women and young older people stands out. Studies were identified in which women also sought mental health care and preventive care more frequently and that related mobility difficulties in the long-lived with the lack of adherence to rehabilitation treatments, which may justify the results found[26-28]. The feminization of old age can also explain this finding, since, by using health services more frequently, even for reasons related to their own gender, women are diagnosed and treated for conditions with potential risk to health earlier, which ends up raising their life expectancy compared to men[17].

The impact of NCDs on old age and the use of health services can also be observed when analyzing the main reasons for outpatient and hospital care by groups of causes. The greater presence of diseases of the circulatory system in the long-lived corroborates the result of a study carried out in São Paulo, in which the authors pointed out that the average age increased according to the degree of risk[29].

Diseases of the circulatory system were the main causes of emergency hospital admissions for older people. A study carried out with data on hospitalizations of older people for these diseases in the Southeast region showed that 90.3% of them were admitted to the institution on an urgent basis[30]. This may result from the lack of actions to control cardiovascular risk factors in PHC, such as arterial hypertension, dyslipidemia and obesity[6,17]. Such actions should be developed at this level of attention from the young adult population, mainly on modifiable factors, such as sedentary lifestyle, inadequate diets and smoking, promoting changes in the lifestyle of future older people and preventing NCDs and their complications.

According to a nationally based study on the prevalence of cancer in older Brazilians carried out by Francisco et al.[31], 54.3% of the reported diagnoses were in males. The authors relate this to the fact that the average age of the first diagnosis in women is before 60 years of age, as well as male behavioral characteristics in relation to their health. Women, due to the preventive culture, consulted more at outpatient clinics, while men needed more urgent care, inferring that the finding is linked to a pattern of search for health services by the male population when the problem is already aggravated.

Long-lived older people, on the other hand, had fewer specialized consultations and had more emergency hospitalizations, which may be related, as already mentioned, to the difficulty of traveling to health services for PHC or outpatient follow-up, causing a worsening of their health condition and increasing the hospitalization rates in this age group[32].

In the analysis between the types of care, the results of this study showed that the older people who had at least one outpatient visit needed less urgent hospitalization, both in relation to age and gender, which is a positive finding, since they passed, previously, through evaluation in their health unit[1]. The highest number of elective hospitalizations among those with an outpatient history was predicted, since these procedures are scheduled after the specialist's evaluation and are not of an emergency nature.

Specialized care is necessary to provide continuity and support to PHC and should be included in care for older people to ensure comprehensive care, with referral and counter-referral flows and access to the hospital network when necessary[33]. For comparison purposes, no studies were found that integratedly assess which RAS points this population used before outpatient and hospital care. Research on the subject is limited to describing the profile and characteristics of these users in a given type of service, mostly PHC units[32-35], ECU[6,32] or hospitals[17], without demonstrating the previous relationship with other levels of care.

Some limitations of this study are related to the method employed and the type of data used. As this is a cross-sectional study, it is not possible to measure variations over time or establish cause and effect relationships. In addition, the use of secondary data can generate losses and misunderstandings, as it depends on the quality of the health professionals' records, which were not collected directly by the researcher and were

not produced for a specific research. Variables referring to other aging vulnerabilities, such as functional capacity, which would allow for a broader understanding of the use of these services, were not available.

CONCLUSION

The results of this study provide subsidies for managers in the development of actions related to the health of the older people, prioritizing the male population, the long-lived and the control and prevention of complications from NCDs. Strengthening the PHC in the multidimensional assessment of these users, monitoring their health conditions and identifying individual priorities is essential so that referrals to specialized care are qualified, not generating queues and avoidable hospital admissions.

The use of specialized health services by older people in the second capital with the highest proportion of this group in the country shows that, despite advances in public policies aimed at this population, the RAS still needs to evolve to meet their needs. Other health care points in the network are important, such as day centers and home care programs, which would complement care for the older people and facilitate their access.

It was found that the older people with a history of outpatient consultations had a lower percentage of hospitalizations than those who did not, especially in urgent cases. The proportions of long-lived older people and men who required hospitalization were higher, regardless of having had a previous outpatient consultation, pointing to the need to review policies aimed at men's health and home care for those with limited mobility.

The findings of this study demonstrate the importance of strengthening integrated care models in order to qualify the approach to the health of older men. New studies exploring the use of PHC units and specialized services are suggested.

Edited by: Maria Luiza Diniz de Sousa Lopes

REFERENCES

1. Almeida APSC, Nunes BP, Duro SMS, Lima RCD, Facchini LA. Falta de acesso e trajetória de utilização de serviços de saúde por idosos brasileiros. Ciênc Saúde Coletiva. 2020 jun;25(6):2213-26. Available from: https://doi.org/10.1590/1413-81232020256.27792018
2. Sória GS, Nunes BP, Bavaresco CS, Vieira LS, Facchini LA. Acesso e utilização dos serviços de saúde bucal por idosos de Pelotas, Rio Grande do Sul, Brasil. Cad Saúde Pública. 2019;35(4):1-12. Available from: https://doi.org/10.1590/0102-311x00191718
3. David HMSL, Riera JRM, Mallebrera AH, Costa MFL. A enfermeira gestora de casos na Espanha: enfrentando o desafio da cronicidade por meio de uma prática integral. Ciên Saúde Coletiva. 2020 Jan;25(1):315-24. Available from: http://dx.doi.org/10.1590/1413-81232020251.29272019
4. Giebel C, Harvey D, Akpan A et al. Reducing hospital admissions in older care home residents: a 4-year evaluation of the care home innovation Programme (CHIP). BMC Health Serv Res 2020;20(1):94. Available from: https://doi.org/10.1186/s12913-020-4945-9
5. Herberg S, Teuteberg F. Reducing hospital admissions and transfers to long-term inpatient care: A systematic literature review. Health Services Management Research. 2022;0(0). Available from: https://doi.org/10.1177/09514848211068620
6. Antunes BCS, Crozeta K, Assis F, Paganini MC. Rede de atenção às urgências e emergências: perfil, demanda e itinerário de atendimento de idosos. Cogitare Enferm. 2018 Abr-Jun;23(2):e53766. Available from: http://dx.doi.org/10.5380/ce.v23i2.53766
7. Macinko J, Andrade FB, Souza Junior PRBS. Primary care and healthcare utilization among older Brazilians (ELSI-Brazil). Rev Saúde Pública. 2018;52 Suppl 2:6s. Available from: http://dx.doi.org/10.11606/s1518-8787.2018052000595
8. Dreyer K, Steventon A, Fisher R, Deeny AR. The association between living alone and health care utilisation in older adults: a retrospective cohort study of electronic health records from a London general practice. BMC Geriatrics. 2018 Dec;18(1):269. Available from: https://doi.org/10.1186/s12877-018-0939-4

9. Lavelle TA, Rose AJ, Timbie JW, Setodji CM, Wensky SG, Giuriceo KD. Utilization of health care services among Medicare beneficiaries who visit federally qualified health centers. BMC Health Serv Res. 2018;18:41. Available from: https://doi.org/10.1186/s12913-018-2847-x

10. Garcia-Ramirez J, Nikoloski Z, Mossialos E. Inequality in healthcare use among older people in Colombia. Int J Equity Health. 2020;19:168. Available from: https://doi.org/10.1186/s12939-020-01241-0

11. Instituto Brasileiro de Geografia e Estatística. Projeções da População do Brasil e Unidades da Federação por sexo e idade: 2010-2060 [Internet]. Rio de Janeiro: IBGE; 2020 [cited 2021 Jan.17]. Available from: https://www.ibge.gov.br/estatisticas novoportal/sociais/populacao/9109-projecao-da-populacao.html?=&t=resultados.

12. Instituto Brasileiro de Geografia e Estatística. Censo 2010 [Internet]. Rio de Janeiro: IBGE; 2010. Available from: http://censo2010.ibge.gov.br

13. Porto Alegre. Secretaria Municipal da Saúde. Relatório Anual de Gestão 2019 [Internet]. Porto Alegre: SMS, 2019 [cited 2020 Oct. 17]. Available from: http://lproweb.procempa.com.br/pmpa/prefpoa/sms/usu_doc/sms_relatorio_anual_gestao2019.pdf.

14. Porto Alegre. Secretaria Municipal da Saúde. Plano Municipal de Saúde 2022-2025 [Internet]. Porto Alegre: SMS, 2021 [cited 2022 Nov. 30]. Available from: http://lproweb.procempa.com.br/pmpa/prefpoa/sms/usu_doc/pms_2022_25.pdf.

15. Brasil. Resolução nº 466, de 12 de dezembro de 2012. Dispõe sobre diretrizes e normas regulamentadoras de pesquisas envolvendo seres humanos. Diário Oficial [da] República Federativa do Brasil, Brasília, DF, 13 jun. 2013. Available from: http://conselho.saude.gov.br/resolucoes/2012/Reso466.pdf

16. Pianori D, Maietti E, Lenzi J, Quargnolo M, Guicciard S, Adja KYC, et al. Sociodemographic and health service organizational factors associated with the choice of the private versus public sector for specialty visits: evidence from a national survey in Italy. PLoS ONE. 2020;15(5):1-12. Available from: https://doi.org/10.1371/journal.pone.0232827

17. Meier JG, Cabral LPA, Zanesco C, Grden CRB, Fadel CB, Bordin D. Factors associated with the frequency of medical consultations by older adults: a national study. Rev Esc Enferm USP. 2020 Mar;54:e03544. Available from: http://dx.doi.org/10.1590/s1980-220x2018048103544

18. Melo-Silva AM, Mambrini JVM, Souza Junior PRB, Andrade FB, Lima-Costa MF. Hospitalizações entre adultos mais velhos: resultados do ELSI-Brasil. Rev Saúde Pública. 2018;52 Supl 2:3s. Available from: https://doi.org/10.11606/s1518-8787.2018052000639

19. Ribeiro SP, Cavalcanti MLT. Atenção Primária e Coordenação do Cuidado: dispositivo para ampliação do acesso e a melhoria da qualidade. Ciên Saúde Coletiva.2020 Mai;25(5):1799-1808. Available from: https://doi.org/10.1590/1413-81232020255.34122019

20. Brasil. Ministério da Economia. Instituto Brasileiro de Geografia e Estatística. Pesquisa nacional de saúde: 2019: percepção do estado de saúde, estilos de vida, doenças crônicas e saúde bucal: Brasil e grandes regiões [Internet]. Rio de Janeiro: IBGE; 2020 [cited 2019 July 01]. Available from: https://biblioteca.ibge.gov.br/visualizacao/livros/liv101764.pdf.

21. Porto Alegre. Secretaria de Governança Local. População idosa de Porto Alegre: informação demográfica e socioeconômica [Internet]. Porto Alegre: SGL, 2015 [cited 2022 Nov. 30]. Available from: http://lproweb.procempa.com.br/pmpa/prefpoa/observatorio/usu_doc/informacao_demografica_e_socioeconomica-populacao_idosa02.pdf.

22. National Health Service. Community Services Statistics. NHS Digital 2020 [Internet]. Available from: https://digital.nhs.uk/data-and-information/publications/statistical/community-services-statistics-for-children-young-people-and-adults

23. Souza Júnior EV, Costa EL, Matos RA, Cruz JS, Maia TF, Nunes GA, et al. Morbidity-mortality epidemiology and public costs of kidney failure. Rev Enferm UFPE On line. 2019 Mar;13(3):647-54. Available from: https://doi.org/10.5205/1981-8963-v13i03a236395p647-654-2019

24. Viana FS, Boachat YEM, Lugon JR, Matos JPS. Diferenças na cognição e na qualidade de vida entre os pacientes idosos e os muito idosos em hemodiálise. J Bras Nefrol. 2019 Jul-Set;41(3):375-83. Available from: http://dx.doi.org/10.1590/2175-8239-jbn-2018-0167

25. Andrade CA, Andrade AMS. Perfil da morbimortalidade por doença renal crônica no Brasil. Rev Baiana Saúde Pública. 2020 Abr-Jun;44(2):38-52. Available from: https://doi.org/10.22278/2318-2660.2020.v44.n2.a2832

26. Santos CS, Collares PMC, Melo AM, Moraes GLA, Lacerda MRL, Santos DHP. Capacidade funcional de idosos acompanhados pela fisioterapia de uma unidade de Atenção Primária à Saúde. FisiSenectus. 2019 Jul-Dez;7(2):23-38. Available from: https://doi.org/10.22298/rfs.2019.v7.n2.5120

27. Freire MCM, Marin MJS, Lazarini CA, Damaceno DG. Life and health conditions of the elderly with mental disorders according to sex. SMAD, Rev Eletrônica Saúde Mental Álcool Drog. 2020;16(1):1-11. Available from: http://dx.doi.org/10.11606/issn.1806-6976.smad.2020.153846

28. Schroeder FMM, Mendoza-Sassi RA, Meucci RD. Condição de saúde bucal e utilização de serviços odontológicos entre idosos em área rural no sul do Brasil. Ciênc Saúde Coletiva. 2020 Jun;25(6):2093-02. Available from: https://doi.org/10.1590/1413-81232020256.25422018

29. Massa KHC, Duarte YAO, Chiavegatto Filho ADP. Análise da prevalência de doenças cardiovasculares e fatores associados em idosos, 2000-2010. Ciênc Saúde Coletiva. 2019 Jan;24(1):105-14. Available from: https://doi.org/10.1590/1413-81232018241.02072017

30. Cordeiro P, Martins M. Mortalidade hospitalar em pacientes idosos no Sistema Único de Saúde, região Sudeste. Rev Saúde Pública. 2018 Jul;52:69. Available from: https://doi.org/10.11606/S1518-8787.2018052000146

31. Francisco PMSB, Friestino JKO, Ferraz RO, Bacurau AGM, Stopa SR, Moreira Filho DCM. Prevalência de diagnóstico e tipos de câncer em idosos: dados da Pesquisa Nacional de Saúde 2013. Rev Bras Geriatr Gerontol. 2020 Jan;23(2):e200023. Available from: https://doi.org/10.1590/1981-22562020023.200023

32. Costa GAPC, O'Dwyer G, Carvalho YS, Campos HS, Rodrigues NCP. Perfil de atendimento de população idosa nas Unidades de Pronto Atendimento do município do Rio de Janeiro. Saúde Debate. 2020 Jun;44(125):400-410. Available from: https://doi.org/10.1590/0103-1104202012509

33. Hansel CG, Silva, J, Araújo STC, Fernandes LLRA, Martins AMF, Almeida JRS. Demandas no itinerário terapêutico de idosos: um estudo descritivo. Esc Anna Nery. 2020 Jun;24(4):1-6. Available from: https://doi.org/10.1590/2177-9465-ean-2019-0375

34. Silva CSO, Barbosa MMS, Pinho L, Figueiredo MFS, Amaral CO, Cunha FO, et al. Family health strategy: relevance to the functional capacity of older people. Rev Bras Enferm. 2018;71 Suppl 2:740-6. Available from: https://doi.org/10.1590/0034-7167-2017-0078

35. Lubenow JAM, Silva AO. O que os idosos pensam sobre o atendimento nos serviços de saúde. Rev Bras Geriatr Gerontol. 2019;22(2):1-13. Available from: https://doi.org/10.1590/1981-22562019022.180195

Low muscle reserve in older adults and associated factors

Danúbia Joanes Rosa Guerra[1]
Dalila Pinto de Souza Fernandes[1]
Renato Pereira da Silva[1]
Andréia Queiroz Ribeiro[1]

Abstract

Objective: To estimate the prevalence of low muscle reserve and identify associated factors in older people. *Method*: Cross-sectional study carried out with 784 non-institutionalized older people (60 years or older), living in Viçosa, Minas Gerais, in 2009. The characteristics of interest were sociodemographic, life habits, health and anthropometric conditions. Low muscle reserve (LMR) was defined as leg circumference (LC) < 33 cm for women and < 34 cm for men. Descriptive analysis, bivariate and multiple analysis were performed, using Poisson regression with robust variance, to identify the factors independently associated with the outcome of interest. *Results:* More than half of the sample consisted of women (52.9%), more frequently younger seniors (60 – 69 years old :49.5%), with a maximum of four years of study (79.9%). The prevalence of low muscle reserve was 21.7% (95%CI 18.9%-24.7%) and the independently associated factors were the age group from 70 to 79 years (PR:1.31; 95%CI: 0.96-1.795), 80 years or older (PR:1.64; 95%CI:1.12-2.70), history of hospitalization (PR: 1.46; 95%CI: 1.02-2.09) and low weight (PR: 5.45; 95%CI: 3.77-7.88). *Conclusions:* The prevalence of LMR in the sample is expressive, it is related to older age, hospitalization and low weight. LC monitoring is important for tracking changes related to low muscle reserve in older people and associated factors should be considered in anthropometric assessments for this population.

Keywords: Older Person. Aging. Body composition. Nutritional status.

[1] Universidade Federal de Viçosa, Departamento de Nutrição e Saúde (DNS). Viçosa, MG, Brasil.

No funding was received in relation to the present study.
The authors declare that there is no conflict in the conception of this work.

Correspondence
Danúbia Joanes Rosa Guerra
E-mail: danubia.guerra@ufv.br

Received: October 10, 2022
Approved: January 18, 2023

http://dx.doi.org/10.1590/1981-22562022025.220159en

INTRODUCTON

One of the most prominent phenomena in this 21st century is population aging, the older population has increased considerably and according to projections, in 2060, 33.7% of the population will be older people[1,2,3]. This fact reflects achievements, but constitutes challenges for the promotion of healthy aging. The prevention and adequate control of the high prevalence of non-transmissible chronic diseases and geriatric syndromes in older people are emphasized, which have a strong relationship with the nutritional status and body composition of individuals[4,5].

During the aging process, physiological changes occur, with emphasis on changes associated with body composition, such as accumulation of abdominal fat and loss of muscle mass. In this sense, the assessment of muscle mass to estimate protein reserve based on the leg circumference measurement is a relevant alternative to assess the loss of muscle mass in this population[6].

Among the possible outcomes resulting from low muscle reserve in older people, sarcopenia stands out, a disease of multifactorial origin, which consists of the depletion of muscle mass associated with loss of strength. This condition is related to the increased prevalence of chronic non-communicable diseases, inflammation, insulin resistance, in addition to changes in functionality, which can lead to a state of dependence of the older people in daily tasks, greater risk of falls, frailty, hospitalization and death[7,8].

In view of these consequences, interest in the study of factors associated with muscle reserve deficit has been growing. In Brazil, little is known about the magnitude and determinants of this condition in the older population. Thus, the present study aimed to investigate the prevalence of low muscle reserve and identify associated factors in non-institutionalized older people in the city of Viçosa (MG) in 2009.

METHODS

Cross-sectional study, arising from the research project entitled "Health conditions, nutrition and medication use by older people in the municipality of Viçosa (MG): a population-based survey", approved by the Ethics Committee on Research with Human Beings of the Federal University of Viçosa (No 027/2008).

Sample

The study consisted of non-institutionalized older people aged 60 years or older, totaling 7980 residents in the city of Viçosa, MG. The source population was identified from a census during the National Vaccination Campaign for Older People in 2008 (80% vaccination coverage). From this census, a database was generated, which was complemented with information from the bases of occupational records and health services in the municipality.

The sample size was calculated considering a confidence level of 95%, an estimated prevalence of 50% (due to different outcomes of interest to the larger project) and a tolerated error of 3.5%[8]. By adopting these parameters, the final minimum sample consisted of 714 older people, to which 20% was added to cover possible losses, totaling 858 older people to be studied. These were selected by simple random sampling.

Data collection was carried out at the participant's home, from June to December 2009. Semi-structured questionnaires were applied and anthropometric measurements were taken, following the recommended protocols. The questionnaires were submitted to completion review by a field supervisor. After the review, data were entered twice for quality control.

Study variables

Dependent variable

The dependent variable is the low muscle reserve (LMR), obtained by measuring the leg circumference (LC). For that, a flexible and inelastic millimeter measuring tape was used, with respective capacity and precision of 1.80 m and 0.1 mm. For this measure, the most protruding part of the left leg was verified, with the older person sitting, with the left leg bent, forming a 90° angle with the knee[6]. In the present study, the classification proposed by Pagotto *et al.*

(2018)[11] who established cutoff values lower than 33 cm for women and 34 cm for men.

Independent variables

The independent variables evaluated in this study were selected based on the literature review and their availability in the project's database. They are as follows:

Sociodemographic

Information on sex (male and female), age (continuous in years and categorized into 60 to 69 years; 70 to 79; 80 years or more), education (never studied; 1 to 4 years of study; more than 4 years of study) and cohabitation (lives alone; lives with others) were evaluated.

Life habits

The variables practice of physical activity (yes; no) and diet quality assessed according to the Healthy Eating Index (HEI) were included in the study, revised and validated for the Brazilian population[11]. In order to calculate the HEI, information from the usual intake recall was used. This index considers 12 components, nine of which are from the food groups contained in the Brazilian Food Guide (2006), two nutrients (sodium and saturated fats) and SoFAAS (calories from solid fat, alcohol and added sugar)[12].

Health conditions

The variables self-perception of health (very good/good; fair; poor), history of hospitalization in the year prior to the interview (none; 1 or more), and history of the following diseases (yes; no): arterial hypertension, diabetes *mellitus*, cerebrovascular accident (CVA), heart attack, asthma or bronchitis, osteoporosis, arthritis, arthrosis or rheumatism (rheumatic disease), dyslipidemia and depression were considered.

For the assessment of functional disability, a scale with 14 types of activities was used, which include BADL (Basic Activities of Daily Life) and IADL (Instrumental Activities of Daily Life). The selection of activities to be included was based on the proposal by Katz *et al.* (1963)[13] for BADL assessment and Lawton and Brody (1969)[14] for IADL assessment. The BADLs selected in this study were: bathing; dressing up; feeding; and getting up from bed to a chair. The contemplated IADL were: preparing food or cooking; using the phone; leaving the house or taking a bus; taking medications without help; managing money; shopping; tidying up the house; performing domestic manual work; and washing and ironing clothes.

For each of the evaluated activities, the following classifications were considered regarding the difficulty in carrying it out: 1: No difficulty; 2: Has little difficulty; 3: Has great difficulty, 4: Cannot and 5: Does not do the activity. The classification of functional disability was adapted from the methodology of Fielder and Peres (2008)[15]. From the BADL and IADL set, the individual who declared some difficulty in performing six or more activities (categories 2 and 3) or when they did not feel able to perform three activities or more of the proposed total (category 4) was classified as "functional disability". The other individuals were classified as "without functional disability".

Anthropometric indicators

Nutritional status was assessed based on the calculation of the Body Mass Index (BMI) (body weight in kilograms divided by height in meters squared – kg/m^2). The cutoff points used for BMI were those proposed by the Pan-American Health Organization[16], considering underweight <23 kg/m^2, eutrophic 23 to 27.9 kg/m^2, overweight 28 to 29.9 kg/m^2, obesity ≥ 30 kg. For the purposes of the study, overweight or obesity was considered overweight.

Data analysis

A descriptive analysis of the data was carried out, through the distribution of absolute and relative frequencies for qualitative variables, and estimation of measures of central tendency and dispersion for quantitative variables. The evaluation of the normal distribution of the quantitative variables

was performed using the *Shapiro-Wilk* test. The prevalence of LMR was estimated with its respective 95% confidence interval (95% CI). The prevalence of LMR was compared according to the independent variables of interest, using Pearson's chi-square and linear trend chi-square tests. Comparisons of the means of the characteristics of interest, according to the occurrence of LMR, were performed using Student's t test.

To identify the factors associated with LMR, bivariate and multiple analyzes were performed using Poisson regression with robust variance. The variables that, in the bivariate analysis, were associated with the outcome with a p-value ≤ 0.20 were selected for the multiple regression analysis. In the multiple regression, the backward strategy was used, keeping in the final model those variables that were associated with low muscle reserve with p value <0.05. The significance level adopted for all analyzes was $\alpha = 0.05$.

RESULTS

After excluding losses (death, refusal, moving to an address not located) the final sample consisted of 796 older people. However, only those with leg circumference data were considered for analysis, totaling 784 individuals. The mean age was 71 years (sd=8.1 years), with more than half being female, 52.9% (95% CI: 49.0%-56.0%).

The prevalence of low muscle reserve was 21.7% (95%CI: 18.9-24.7). As shown in Table 1, there was a significant increase in the prevalence of LMR with increasing age, 24.2% (PR=1.77; 95%CI: 1.28-2.45) and 42.0% (PR= 3.07; 95%CI: 2.22-4.27) and according to the decrease in education 9.6% (PR=0.28; 95%CI: 0.16-0.49), 22.5% (PR= 0.67; 0.50-0.90) and 33.6%. Regarding life habits, the prevalence of LMR was significantly lower among older people who practiced some regular physical exercise (17.3% vs. 23.3% (PR= 0.74; 95% CI: 0.54-1.03).

Table 1. Low muscle reserve according to sociodemographic characteristics and lifestyle habits of older people. Viçosa, MG, 2009.

Variables	Total (n=784)	With LMR (n=170)		Without LMR (n=614)		p Value	PR (95% CI)
	n	n	%	n	%		
Sociodemographic							
Sex							
Male	369	75	20.3	294	79.7	0.217*	1
Female	415	95	22.9	320	77.1		1.13 (0.86-1.47)
Age group							
60 to 69 years	388	53	13.7	335	86.3		1
70 to 79 years old	277	67	24.2	210	75.8	**<0.001****	1.77 (1.28-2.45)
80 years or older	119	50	42.0	69	58.0		3.07 (2.22-4.27)
Education[1]							
Never studied	128	43	33.6	85	66.4		1
1 to 4 years of study	498	112	22.5	386	77.5	**<0.001****	0.67 (0.50-0.90)
More than 4 years of study	157	15	9.6	142	90.4		0.28 (0.16-0.49)
Cohabitation							
Lives alone	93	20	21.5	73	78.5	0.543*	1
Lives together	691	150	21.7	541	78.3		1.01 (0.67-1.53)

to be continued

Continuation of Table 1

Variables	Total (n=784)	With LMR (n=170)		Without LMR (n=614)		p Value	PR (95% CI)
	n	n	%	n	%		
Life Habits							
Practice of physical activity [1]							
No	557	130	23.3	427	76.7	0.048*	1
Yes	225	39	17.3	186	82.7		0.74 (0.54-1.03)
Diet Quality [1] mean (sd)	64.53 (10.81)	63.27 (11.19)	_	64.76 (10.65)	_	0.111***	0.99 (0.98-1.00)

LMR: Low muscle reserve; PR: prevalence ratio; 95% CI: 95% Confidence Interval

[1]The n may vary according to missing data in the respective analyzed variables. Education (n= 783), physical activity (n= 782), diet quality (n=782).

* Pearson's Chi-Square Test. **Linear Trend Chi-Square Test. ***Student's t test.

According to health conditions, the prevalence of LMR was significantly higher among older people with a history of hospitalization in the previous year 29.5% vs. 20.4%; PR= 1.45; 95%CI:1.06-1.98) and with functional disability 33.3% vs. 19.2%; (PR=1.74; 95%CI: 1.31-2.31). Conversely, a lower prevalence of LMR was observed among those with dyslipidemia 17.7% vs.82.3%; PR=0.66; 95%CI: 0.51-0.87). When considering anthropometric indicators, the prevalence of LMR among underweight older people was 4.69 times greater than the prevalence among eutrophic older people (PR = 5.69; 95% CI: 3.94 – 8.23) and the prevalence among those with excess weight was 72% lower than among eutrophic individuals (PR = 0.28; 95% CI 0.13 -0.64) (Table 2).

In the multiple regression analysis, it was observed that the factors independently and positively associated with low muscle reserve were the age range from 70 to 79 years (PR: 1.31; 95%CI: 0.96-1.79), 80 years or more (PR:1.64; 95%CI:1.12-2.70), underweight (PR: 5.45; 95%CI:3.77-7.88) and history of hospitalization (PR: 1.46; 95%CI: 1.02-2.09). Excess weight was negatively associated with the outcome (Table 3).

Table 2. Low muscle reserve according to health conditions and anthropometric indicators of the sample. Viçosa, MG, 2009.

Variables	Total (n=784)	With LMR (n=170)		Without LMR (n=614)		p Value	PR (95% CI)
	n	n	%	n	%		
Health Condition [1]							
Self-perception of health							
very good/ good	344	65	18.9	279	81.1		1
Regular	367	79	21.5	288	78.5	0.099*	1.14 (0.85-1.53)
Bad/Very bad	50	16	32.0	34	68.0		1.69 (1.07-2.68)
Hospital admission history							
None	658	134	20.4	524	79.6	**0.025***	1
1 or more	122	36	29.5	86	70.5		1.45 (1.06-1.98)
Functional Disability							
No	642	123	19.2	519	80.8	**<0.001***	1
Yes	141	47	33.3	94	66.7		1.74 (1.31-2.31)

to be continued

Continuation of Table 2

Variables	Total (n=784)	With LMR (n=170)		Without LMR (n=614)		p Value	PR (95% CI)
	n	n	%	n	%		
History arterial hypertension	596	126	21.1	470	78.9	0.489*	0.90 (0.66-1.21)
History of diabetes mellitus	172	40	23.3	132	76.7	0.323*	1.09 (0.80-1.49)
History of CVA[a]	47	14	29.8	33	70.2	0.166*	1.40 (0.88-2.23)
Heart attack history	46	5	10.9	41	89.1	0.062*	0.49 (0.21-1.12)
History of asthma or bronchitis	123	34	27.6	89	72.4	0.056*	1.34 (0.97-1.85)
History of osteoporosis	108	24	22.2	84	77.8	0.488*	1.03 (0.70-1.50)
History of rheumatic disease	180	41	22.8	139	77.2	0.700*	1.06 (0.78-1.45)
History of dyslipidemia	440	78	17.7	362	82.3	**0.003***	0.66 (0.51-0.87)
History of depression	141	30	21.3	111	78.7	0.890*	0.97 (0.68-1.38)
Anthropometric Indicators[1]							
Body Mass Index							
eutrophy	294	30	10.2	264	89.8		1
Low weight	136	79	58.1	57	41.9	**<0.001****	5.69 (3.94-8.23)
Overweight	241	7	2.9	234	97.1		0.28 (0.13-0.64)

CVA: cerebrovascular accident; LMR: low muscle reserve; PR: prevalence ratio; 95% CI: 95% confidence interval

[1] The n may vary according to missing data in the respective analyzed variables. Self-perceived health (n=761), history of hospitalization (n=780), functional disability (n=783), arterial hypertension (n=783), diabetes mellitus (n=783), CVA (n=783), heart attack (n=783), asthma or bronchitis (n=782), osteoporosis (n=783), rheumatic disease (n=782), dyslipidemia (n=781), depression (n=783) body mass index (n=671).

* Pearson's Chi-Square Test. **Linear Trend Chi-Square Test. ***Student's t test.

Table 3. Final model of the multiple regression analysis of the association between the sociodemographic variables, life habits characteristics, health conditions and anthropometric indicators with low muscle reserve among the older people. Viçosa, MG, 2009.

Variables	Low muscle reserve		
	PR	95% CI	p-value*
Age group			
60 to 69 years	1.00	-	-
70 to 79 years old	1.31	0.96-1.79	0.081
80 years or older	1.64	1.12-2.70	**0.011**
Hospital admission history			
None	1.00	-	-
1 or more	1.46	1.02-2.09	**0.037**
Body mass index			
Eutrophy	1.00	-	-
Low weight	5.45	3.77-7.88	**<0.001***
Overweight	0.28	0.12-0.63	0.002*

PR: prevalence ratio; 95% CI: 95% Confidence Interval. *Poisson regression with robust variance

DISCUSSION

The present study identified a high prevalence of low muscle reserve, as more than 1/5 of the older people had this condition. This finding corroborates the results of Martins Resende *et al.* (2017)[18] who, when observing older people in Uberaba, found a prevalence of LMR of 20.9%, measured by LC, using the cutoff point proposed by the World Health Organization (1995)9 (< 31 cm of LC for reduced muscle mass). On the other hand, it was lower than that found by Machado *et al.* (2019)[19], who observed a prevalence of 28.4% of low muscle reserve in community-dwelling older women in São Paulo, based on dual-energy X-ray absorptiometry (DXA). Higher values were also observed by Pagotto *et al.* (2018)[10], using the LC measurement, with a 25.9% prevalence of LMR in women and 30.8% in older men treated in primary care in Goiás.

Differences in the prevalence of LMR measured by the leg circumference may be related to the measurement method and the cutoff points adopted to classify low muscle reserve, as well as the source population of the older people who were part of the study samples. It is important to emphasize that there is no validated criterion for the older population and the criterion adopted by the present study is more sensitive than that proposed by the WHO (1995)[9], in order to have an impact on the increase in the prevalence of LMR.

More recent studies have focused on sarcopenia, a condition associated with low muscle reserve and decreased muscle strength[7]. In Brazil, a systematic review on the subject showed a prevalence of sarcopenia of 20% among women and 12% among men[20]. The diagnosis of sarcopenia is performed by combining different methods, including muscle mass detection methods such as DXA, bioelectrical impedance (BEI) and muscle mass prediction by LC. Associated with this quantification, it advocates the assessment of muscle strength, in which a dynamometer is used, an instrument that measures handgrip strength[6]. In this sense, recent studies highlight LC as a more accessible marker, when compared to the others, important for screening individuals affected by the disease[10,18,21] and widely used for the indirect assessment of muscle mass in population studies[21,22,23].

As for the associated factors, it was observed that the prevalence of low muscle reserve was higher in the more advanced age groups, which can be partially explained by physiological changes related to aging, such as lack of appetite, lower consumption of protein sources due to difficulties in chewing and changes in body composition[24,25]. This association is consensually reported in the literature. Gonzalez *et al.* (2021)[26] observed a strong correlation between LC and muscle mass reserve, with a decrease in values as age advances, especially in women.

In the present study, low muscle reserve was associated with a history of hospitalization. The literature points out that low muscle reserve is one of the determining factors for greater chances of hospitalization, propensity for respiratory diseases and functional disability in older people[27]. On the other hand, it also recognizes that hospitalization, for different reasons, predisposes to loss of lean body mass[7]. In the present study, the cross-sectional design limits the establishment of the direction of this relationship, so that it is not possible to establish whether the hospitalization history is a consequence of muscle loss or whether the muscle loss results from the hospitalization history.

Despite this limitation, this result highlights the importance of minimizing muscle reserve losses in order to avoid conditions that predispose to hospitalization and other consequences. Thus, it is important to ensure conducts that allow the prevention of low muscle reserve, such as regular monitoring of the LC measurement, promotion of oral health, encouragement of physical activity, in addition to nutritional conducts such as the adequate supply of protein foods in the older people's meals, and if necessary, supplementation. Such strategies are also important in the hospital environment in order to minimize muscle loss and its outcomes, considering that sarcopenia affects approximately 13% to 24% of hospitalized individuals[28].

Regarding life habits, the practice of physical activity helps in the formation and maintenance of muscle mass, however, this did not remain

independently associated with low muscle reserve in our study. The absence of this association can be attributed, in part, to the inaccurate way of measuring this variable, obtained by self-report, without detailing the time spent in physical activities.

Low weight was independently associated with low muscle reserve in older people, in line with what was observed by Nunes *et al.* (2021)[29] with older people from the community, in a city in the interior of São Paulo. In older individuals, the deficit in protein consumption and muscle synthesis implies an adaptation of the organism, characterized by a physiological compensation that results in greater storage of body fat[24,25]. Thus, there is an imbalance between fat mass and muscle mass that results in an inflammatory process due to changes in anabolic and catabolic mediators. With the reduction of concentrations of anabolic hormones such as testosterone, growth hormone (GH), insulin and IGF-1, catabolism is observed, which prevents muscle synthesis[30].

It was observed that excess weight in older people had a negative association with LMR, although it is expected that in aging there will be a depletion of muscle mass and an increase in adipose tissue, located mainly in the abdominal region of older individuals. However, the association between overweight and health risk still lacks consensus. In the older population, according to the "obesity paradox", excess weight has shown a protective effect on mortality. Despite this, studies show that the redistribution of fat is capable of permeating tissues and organs. Thus, it is important to control and monitor comorbidities associated with excess weight, as these can lead to a reduction in quality of life, with an increase in the occurrence of functional disability and frailty[31]. Functional capacity, in turn, has an important relationship with muscle reserve.

As this study has a cross-sectional design, it does not allow establishing a cause and effect relationship between the observed associations. It stands out as strong points, the fact that it is a study with a representative sample of older people, carried out by properly trained interviewers to assess anthropometric measurements based on well-established protocols. We highlight the use of LC, an easy to assess and non-invasive measure that has been considered an important marker for the diagnosis of sarcopenia in older people[10,21].

CONCLUSION

More than 1/5 of the older people in the study were classified as having low muscle reserve from the leg circumference. This event was related to age, history of hospitalization and low weight. Actions that promote the healthy aging of the population should include the implementation of measures that act to improve lifestyle habits, with emphasis on the promotion of healthy eating and physical activity. Such measures can have a great impact on the maintenance of muscle mass, strength and physical performance. Subsequent studies are needed to establish the best LC cutoff point for predicting LMR, given the lack of a validated cutoff point for the Brazilian older population. Despite this limitation, monitoring LC in older people is important for tracking and following changes related to low muscle reserve.

Edited by: Tamires Carneiro de Oliveira Mendes

REFERENCES

1. Oliveira AS.Transição demográfica, transição epidemiológica e envelhecimento populacional no Brasil. Hygeia. 2019;15(32):69-7. Available in:
2. Instituto Brasileiro de Geografia e Estatística (BR). Síntese de indicadores sociais: uma análise das condições de vida da população brasileira. Rio de Janeiro (RJ): Instituto Brasileiro de Geografia e Estatística; 2015. Available in: https://biblioteca.ibge.gov.br/visualizacao/livros/liv95011.pdf
3. Souza MFM, Malta DC, França EB, Barreto ML. Transição da saúde e da doença no Brasil e nas Unidades Federadas durante os 30 anos do Sistema Único de Saúde. Ciênc. Saúde Colet.2018; 23(6) :1737-1750. Available in: https://doi.org/10.1590/1413-81232018236.04822018.

4. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Análise em Saúde e Vigilância de Doenças Não Transmissíveis. Plano de Ações Estratégicas para o Enfrentamento das Doenças Crônicas e Agravos não Transmissíveis no Brasil 2021-2030 / Ministério da Saúde, Secretaria de Vigilância em Saúde, Departamento de Análise em Saúde e Vigilância de Doenças Não Transmissíveis. – Brasília : Ministério da Saúde, 2021. Available in: https://www.gov.br/saude/pt-br/centrais-de-conteudo/publicacoes/publicacoes-svs/doencas-cronicas-nao-transmissiveis-dcnt/09-plano-de-dant-2022_2030.pdf/view

5. Silveira EA, Pagotto V, Barbosa LS, Oliveira C, Pena GG, Velasquez-Melendez G. Acurácia de pontos de corte de IMC e circunferência da cintura para a predição de obesidade em idosos. Ciênc. Saúde Colet. 2020;25(3):1073-1082. Available in: https://doi.org/10.1590/1413-81232020253.13762018.

6. WHO. Physical status: the use and interpretation of anthropometry. Report of a WHO Expert Committee. World Health Organization technical report series, 1995.[citado 2022 fevereiro 19]. Available in: http://apps.who.int/iris/bitstream/10665/37003/1/WHO_TRS_854.pdf

7. Cruz-Jentoft AJ, Bahat G, Bauer J, Boirie Y, Bruyère O, Cederholm T, et al. Sarcopenia: revised European consensus on definition and diagnosis. Age ageing 2019];48(1):16–31. Available in:https://doi.org/10.1093/ageing/afz046

8. Bachettini, N. P., Bielemann, R. M., Barbosa-Silva, T. G., Menezes, A. M. B., Tomasi, E., & Gonzalez, M. C.Sarcopenia as a mortality predictor in community-dwelling older adults: a comparison of the diagnostic criteria of the European Working Group on Sarcopenia in Older People. Eur J Clin Nutr.2020;74(4): 573-580. Available in:https://doi.org/10.1038/s41430-019-0508-8

9. Lwanga SK, Lemeshow S.Sample size determination in health studies: a practical manual. Geneva, World Health Organization, 1991.[citado 2022 fevereiro 19]. Available in: https://apps.who.int/iris/handle/10665/40062

10. Pagotto V, Santos KF, Malaquias SG, Bachion MM, Silveira EA. Calf circumference: clinical validation for evaluation of muscle mass in the elderly. Rev Bras Enferm.2018 ; 71(2): 322-328. Available in: https://doi.org/10.1590/0034-7167-2017-0121

11. Previdelli AN, Andrade SC, Pires MM, Ferreira SRG, Fisberg RM, Marchioni DM. Índice de Qualidade da Dieta Revisado para população brasileira. Rev saúde pública. 2011; 45(4): 794-798. Available in: https://doi.org/10.1590/S0034-89102011005000035

12. Fernandes DPS, Duarte MSL, Pessoa MC, Franceschini SCC, Ribeiro AQ. Healthy Eating Index: Assessment of the Diet Quality of a Brazilian Elderly Population. Insights Nutr Metab. 2018; 11:1-7. Available in: https://doi.org/10.1177/1178638818818845

13. Katz S, Ford AB, Moskowitz RW, Jackson BA, Jaffe MW. The index of adl: a standardized measure of biological and psychosocial function. JAMA. 1963; 185:914-919. Available in:https://doi:10.1001/jama.1963.03060120024016

14. Lawton MP, Brody EM. Assessment of older people: self-maintaining and instrumental activities of daily living. The Gerontologist. 1969;9(3):179-186. Available in:https://doi.org/10.1093/geront/9.3_Part_1.179

15. Fiedler MM, Peres KG.Capacidade funcional e fatores associados em idosos do Sul do Brasil: um estudo de base populacional. Cad Saúde Pública. 2008;;24(2):409-415. Available in:https://doi.org/10.1590/S0102-311X2008000200020

16. OPAS. ORGANIZAÇÃO PAN-AMERICANA DE SAÚDE. XXXVI Reunión del Comitê Asesor de Investigaciones en Salud – Encuesta Multicêntrica – Salud Bienestar y Envejecimiento (SABE) en América Latina e el Caribe – Informe preliminar. 2001;12. Available in:https://www.paho.org/Spanish/HDP/HDR/CAIS-01-05.PDF

17. YANAGA MC. Sarcopenia em Idosos: Um estudo de revisão.2020;13(3):089-094. Available in:http://dx.doi.org/10.1055/s-0040-1718991

18. Martins Resende TI, Meneguci J, Eidi Sasaki J, da Silva Santos A, Damião R. Comportamento sedentário e massa muscular reduzida em idosos: um estudo de base populacional. Mundo saúde. 2017;41(4):588-96. Available in:http://doi.org/10.15343/0104-7809.20174104588596

19. Machado KLLL. Fatores de risco para baixa massa muscular em idosas da comunidade: coorte prospectiva de base populacional no brasil. São Paulo Ageing & Health Study (SPAH) [tese].São Paulo:Faculdade de Medicina da Universidade de São Paulo.2019.[acesso em 09 fev.2022]. Available in: https://www.musculoesqueleticousp.com.br/wp-content/uploads/2020/04/def_KettyLysieLibardiLiraMachado.pdf

20. Diz JBM, Leopoldino AAO, Moreira BS, Henschke N, Dias RC, Pereira LSM, et al. Prevalence of sarcopenia in older Brazilians: a systematic review and meta-analysis. Geriatr Gerontol Int. 2017; 17:5-16. Available in: https://doi.org/10.1111/ggi.12720

21. Sunyoung K, Kim M, Lee Y, Kim B, Yoon TY, Won Won T. "Calf Circumference as a Simple Screening Marker for Diagnosing Sarcopenia in Older Korean Adults: the Korean Frailty and Aging Cohort Study (KFACS). J. Korean Med. Sci.2018; 33:20 -151. Available in:https://doi.org/10.3346/jkms.2018.33.e151

22. Costa CE, Porto FE, Neto AFN, de Oliveira JP,de Melo Passinato IL, Reck HB, et al. Relação entre variáveis antropométricas, funcionalidade e massa muscular esquelética em idosas fisicamente ativas. ConScientia e Saúde. 2019; 18(3):312-325. Available in: https://doi.org/10.5585/ConsSaude.v18n2.13887

23. Mienche M, Setiati S, Setyohadi B, Kurniawan J, Laksmi PW, Ariane A, et al. Diagnostic Performance of Calf Circumference, Thigh Circumference, and SARC-F Questionnaire to Identify Sarcopenia in elderly compared to asian working group for sarcopenia's diagnostic standard. Acta med. Indones. 2019;51(2):117-127. Available in:http://www.actamedindones.org/index.php/ijim/article/view/976/pdf_1

24. Reis SS dos, Landim L dos SR. O processo de envelhecimento e sua relação entre sarcopenia, consumo de proteínas e estado nutricional: uma revisão de literatura. RSD 2020;9(11):e2009119671. Available in: http://dx.doi.org/10.33448/rsd-v9i11.9671

25. Damião R, Meneguci J, Santos Álvaro da S, Matijasevich A, Menezes PR. Estado nutricional de idosos residentes nos municípios da Superintendência Regional de Saúde de Uberaba: estudo transversal. Rev. Med. 2019; 98(5):290-7. Available in:https://doi.org/10.11606/issn.1679-9836.v98i5p290-297

26. Gonzalez MC, Mehrnezhad A, Razaviarab N, Barbosa-Silva TG, Heymsfield SB, Calf circle: cutoff values from the NHANES 1999–2006, Am. J. Clin. Nutr.2021; 113(6):1679 –1687. Available in:https://doi.org/10.1093/ajcn/nqab029

27. Cristaldo MRA, Guandalini VR, Faria SO, Spexoto MCB. Rastreamento do risco de sarcopenia em adultos com 50 anos ou mais hospitalizados. Revista Brasileira de Geriatria e Gerontologia. 2021;24, (2):. Available in: https://doi.org/10.1590/1981-22562021024.210016pub-date.

28. Parra FCS, Matos LBN ,Ferrer R ,Toledo DO. SARCPRO: Proposta de protocolo para sarcopenia em pacientes internados. Braspen J.2019; 34 (1): 58–63. Available in: http://arquivos.braspen.org/journal/jan-fev-mar-2019/artigos/7-AO-SARCPRO.pdf

29. Nunes JD, Zacarin JF, Pavarini SCI, Zazzetta MS, Orlandi AAS, Orlandi FS. Fatores associados à Sarcopenia em idosos da comunidade. Fisioter. Pesqui. (Online).2021; 28(2): 159-165. Available in: https://doi.org/10.1590/1809-2950/20002828022021.

30. Margutti KMM, Schuch NJ, Schwanke CHA. Inflammatory markers, sarcopenia and its diagnostic criteria among the elderly: a systematic reviewRev. bras. geriatr. gerontol. (Online).2017; 20(3):441-453. Available in: https://doi.org/10.1590/1981-22562017020.160155.

31. Amann VR, Santos LP, Gigante DP. Associação entre excesso de peso e obesidade e mortalidade em capitais brasileiras e províncias argentinas. Cad. Saúde Pública.2019;35(12). Available in: https://doi.org/10.1590/0102-311X00192518

Antiparkinson drugs use and adherence in older adults and associated factors: an integrative review

Géssica Cazuza de Medeiros[1]
Gabriela Avelino da Silva[1]
Nadja Maria Jorge Asano[2]
Maria das Graças Wanderley de Sales Coriolano[3]

Abstract

Objectives: To identify factors associated with antiparkinson drugs use and adherence in older adults with Parkinson's disease (PD) through an integrative literature review. *Method:* An integrative literature review involving a search for relevant publications in Portuguese, English, and Spanish on the electronic databases LILACS, MEDLINE - via PubMed, Web of Science and Scopus, without restriction regarding date or study design, was carried out during the period August-September 2021. The selection of studies was performed independently by two reviewers and the final validation conducted by a third reviewer. *Results:* After applying the eligibility criteria, 5 of the 460 studies found were included in the review. Results showed moderate adherence rates (range 35.3-66.8%) and the main factors associated with lower adherence to antiparkinson therapy were older age, cognitive deficit, greater motor impairment, multimorbidities, change in therapy regimens, depression, polypharmacy, lower education, non-white ethnicity and male gender. Factors associated with greater adherence were younger age, white ethnicity, no change in therapy regimen, higher level of knowledge about PD, good clinical control, higher educational level, married status, higher income and greater level of awareness. *Conclusions:* Non-adherence to antiparkinsonian therapy was frequent and multifactorial., Understanding this behavior is important to help inform the scientific community and devise public policies and strategic planning in health services for improving the quality of life of the older population.

Keywords: Medication adherence. Antiparkinson Agents. Cooperation and adherence to treatment. Older adults.

[1] Universidade Federal de Pernambuco, Centro de Ciências da Saúde, Departamento de Medicina Social, Programa de Pós-Graduação em Gerontologia. Recife, PE, Brasil.

[2] Universidade Federal de Pernambuco, Centro de Ciências da Saúde, Departamento de Medicina, Programa de Pós Graduação em Gerontologia. Recife, PE, Brasil.

[3] Universidade Federal de Pernambuco, Centro de Ciências da Saúde, Departamento de Anatomia, Programa de Pós Graduação em Gerontologia. Recife, PE, Brasil.

The authors declare that there is no conflict in the conception of this work.

No funding was received in relation to the present study.

Correspondence
Géssica Cazuza de Medeiros
gessicamedeirosnutricionista@hotmail.com

Received: August 15, 2022
Approved: January 10, 2023

http://dx.doi.org/10.1590/1981-22562022025.220131.en

INTRODUCTION

Parkinson Disease (PD) is a progressive neurodegenerative disorder of the central nervous system (CNS) characterized by loss of dopamine neurons in the substantia nigra which causes motor deficits[1,2]. The etiology of PD is believed to involve both genetic susceptibilities and environmental factors, alone or in combination with the effects of aging[3].

With regard to prevalence, PD is the second-most-common neurodegenerative disease globally. According to the World Health Organization (WHO), the condition affects 1% of the population aged over 65 years, representing around 5 million people. The estimated prevalence of PD is 100-200 cases per 100,000 population, predominantly affecting older individuals [4].

The disease is marked by motor abnormalities, such as resting tremor, muscular rigidity, bradykinesia, postural instability, together with non-motor symptoms, including autonomic dysfunctions (hypotension, constipation), paresthesia, anxiety, depression, sleep disturbances, pain, excess fatigue, olfactory dysfunction, rapid eye movements, and both cognitive and behavioral deficits[5-8].

The diagnosis of PD is based on clinical criteria of the patient and characterized by a combination of at least 2 out of the 4 cardinal signs, i.e. resting tremor, bradykinesia, cogwheel rigidity and postural abnormalities, with the first two being the most typical symptoms[6]. The International Parkinson's and Movement Disorder Society (MDS) has developed its own core clinical diagnostic criteria which include: presence of parkinsonism (bradykinesia plus resting tremor or rigidity); absence of absolute exclusion criteria; and supportive criteria and red flags[9].

Regarding the complexity of this phenomenon, adherence to pharmacological treatment in PD may be influenced by epidemiological and clinical factors, including educational level, marital status, disease duration, polypharmacy, complex medication regimens, fear of side-effects, mood disorders, depression, anxiety, together with age-related aspects, such as physical difficulties and cognitive deficit[10,11].

Satisfactory adherence to treatment by PD patients allows physicians to make the necessary adjustments according to each individual patient´s clinical response. By contrast, non-adherence to treatment, in the form of failing to take medications and mistiming of new doses or extra doses, can lead to increased parkinsonism, with consequent worsening of motor fluctuations[12,13].

Non-adherence to therapy has negative repercussions for the individual, influencing socioeconomic factors and poses a public health problem, increasing the need for hospital admission, reducing quality of life and impacting the morbimortality of this population[14,15].

However, there is a gap in the literature on the subject, where further studies investigating the repercussions of low adherence to therapy by PD patients are needed to inform the scientific community. Therefore, the objective of the present study was to identify the factors associated with antiparkinsonian drugs use and adherence in older adults through an integrative review of the literature.

METHOD

An integrative literature review is an approach entailing a search, synthesis and critical analysis of scientific content on a given topic or question of research interest, contributing to evidence-based practices[16].

The study was conducted using a 6-stage method as outlined below: 1- identification of the topic and selection of the research question; 2- establishment of inclusion and exclusion of studies; 3- definition of information to be extracted from studies selected and categorization of this content; 4- methodological assessment of studies included; 5- interpretation of results; 6- presentation of the review and synthesis of knowledge.

In the first stage, in order to structure the search, the following guiding research question was defined: *What factors are associated with antiparkinsonian drugs use and adherence in older adults with Parkinson Disease?*

Subsequently, the articles were selected by performing a search of the *Biblioteca Virtual em Saúde* – (Virtual Health Library - BVS) site between August and September 2021. Via this site, a concomitant search of relevant studies was performed on the following scientific databases: MEDLINE (Literatura Internacional em Ciências da Saúde – International Literature on Health Science) – via Pubmed (*U.S. National Library of Medicine*), LILACS (Literatura Latino-Americana e do Caribe em Ciências da Saúde). The Web of Science and Scopus databases were also searched. These latter 2 restricted access databases were accessed free of charge via the *Comunidade Acadêmica Federada* (CAFe - Federated Academic Community) of the *Rede Nacional de Ensino e Pesquisa* (RNP - National Education and Research Network) using the Capes Journals site. Lastly, the review was complemented by handsearching the reference citations drawn from the primary studies identified.

The inclusion criteria were: primary original articles (cross-sectional, cohort or case-control studies) and unpublished literature such as congress abstracts and technical documents, addressing the factors associated with antiparkinsonian drugs use and adherence in older (>60 years) patients with Parkinson Disease, available in Portuguese, English or Spanish. There was no restriction on study design or publication date. The references/citations of articles selected were also examined for inclusion (backward reference search strategy). The search for studies, selection, extraction and analysis of data was carried out by two independent researchers. In order to reduce possible errors involving the search, assessment, analysis and interpretation of studies in the event of doubts arising from the review process, a third reviewer was consulted to resolve issues and validate the final listing.

Exclusion criteria were: articles not addressing the topic; presence of other parkinsonian syndromes; other neurological diseases; failure to report the age of study participants; duplicate studies on databases; publications unavailable in full or whose results were yet to be published; integrative or systematic reviews; letters to the Editor; and reflexive studies or experience reports.

The search for articles employed descriptors indexed on Descritores em Ciência da Saúde (DeCS) – "Adesão à medicação", "Cooperação e adesão ao tratamento" and "Antiparkinsonianos"and "Doença de Parkinson", and on Medical Subject Headings (MeSH) – "Medication Adherence" or "Treatment Adherence and Compliance" and "Antiparkinson Agents" and "Parkinson" or "Parkinson disease". These descriptors were combined using the Boolean operators AND and OR.

Chart 1. Databases consulted of articles comprising study sample. Recife, Pernambuco state, 2022.

Database	Search strategy employed to perform the search – combination of key words
LILACS MEDLINE	("Adesão à medicação" or "cooperação e adesão ao tratamento") and ("Antiparkinsonianos") and ("Doença de Parkinson")
PUBMED	("Medication Adherence" OR "Treatment Adherence and Compliance ") AND ("Antiparkinson Agents") AND ("parkinson" OR "parkinson disease")
WEB OF SCIENCE	(TS=((Medication Adherence) OR (Treatment Adherence and Compliance))) AND (TS=(Antiparkinson Agents)) AND (TS= parkinson) OR (parkinson disease)))
SCOPUS	(KEY ("Medication Adherence" OR "Treatment Adherence and Compliance") AND KEY ("Antiparkinson Agents") AND KEY ("Parkinson" OR "parkinson disease"))

Source: produced by author.

The present integrative review was registered on the OSF Registries system under protocol 10.17605/OSF.IO/SK3RE. For data extraction, a second full reading of the 5 articles selected was done. The data were compiled into tables under the headings study title and publication year, authors, name of journal, objective, study/method type, results and level of evidence.

The methodological analysis of the studies reviewed was performed by applying an instrument which allowed appraisal of different study design adapted from the Critical Appraisal Skill Programme (CASP). The original CASP comprised 8 specific assessment tools for different study designs such as reviews, cohort studies, cross-sectional studies, clinical trials etc. In the present review, an instrument adapted from CASP containing 10 scored items was employed: 1) clear and justified aims; 2) methodology appropriate; 3) presentation and discussion of theoretical and methodological procedures; 4) adequate selection of sample; 5) detailed data collection; 6) relationship between researchers and participants; 7) ethical issues maintained; 8) robust rigorous data analysis; 9) presentation and discussion of findings; and 10) contributions, limitations and identification of new areas for research. A value of 0 (zero) or 1 (one) was assigned to each item, where the final result was the sum of scores (maximum 10 points). The articles selected were rated according to score range: level A – 6 to 10 points (good methodological quality and low bias) or Level B – ≥ 5 points (satisfactory methodological quality, but high risk of bias)[17].

The studies were rated according to the level of evidence based on the classification of the Oxford Centre for Evidence-Based Medicine (2009)[18], comprising 5 hierarchical levels of evidence per study type, as outlined below: 1a. Systematic review (with homogeneity) of randomized clinically controlled trials (RCTs). 1b. RCTs with narrow confidence interval (CI), 1c. Therapeutic results of "all or none" type. 2a. Systematic review (with homogeneity) of cohort studies. 2b. Individual cohort study (including low quality RCT, e.g., <80% follow-up). 2c. Outcomes research (observation of therapeutic results or clinical evolution); Ecological studies. 3a. Systematic review (with homogeneity) of case-control studies. 3b. Individual case-control study. 4. Case-series (and poor-quality cohort and case-control studies) 5. Expert opinion without explicit critical appraisal, based on physiology, bench research or "first principles". For summarizing of associated factors, the percentage of studies whose intergroup analysis, association or correlation was significant for the expected outcome was considered.

RESULTS

A total of 460 studies were identified in the databases searched which, after removal of duplicates (n=11), gave 449 studies for screening. After analysis of titles and abstracts of each study, a further 418 were excluded for being off-topic or not matching the objective and inclusion criteria. Subsequently, another 8 studies were excluded because the texts were not available in full. Thus, 23 studies were selected for full reading, 18 of which were later dropped for not meeting the eligibility criteria, giving a final sample of 5 studies for inclusion in the review (Figure 1).

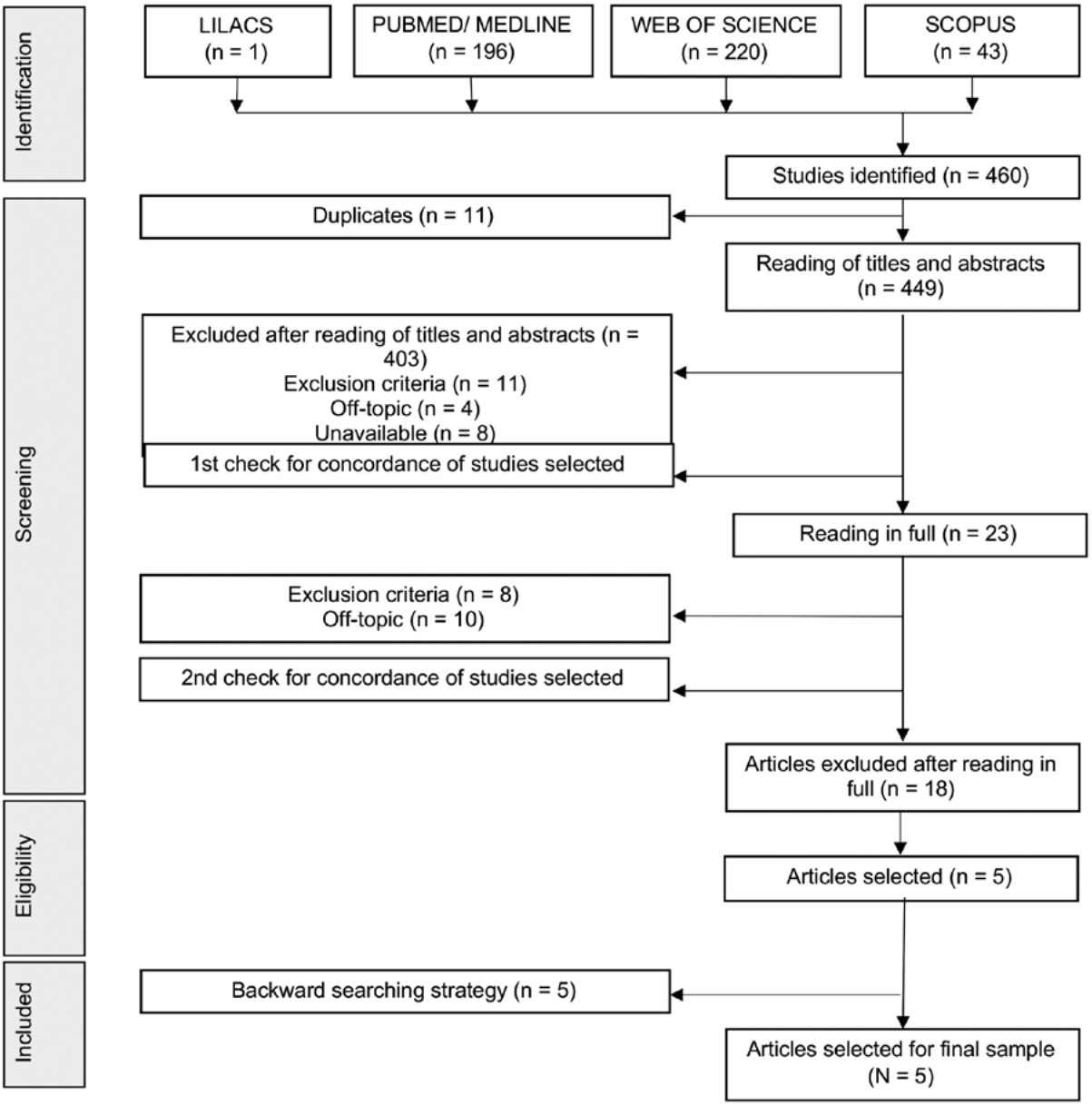


Figure 1. Flow diagram of search process, selection stages and reasons for exclusion of studies selected for integrative review. Recife, Pernambuco, 2022.

In the present integrative review, 5 studies that met the pre-defined selection criteria were selected for inclusion in the final sample. All articles were published in English in international journals between 2011 and 2020. Of the studies reviewed, 4 (80%) were conducted in European countries (Spain, Germany and Slovakia) and 1 (20%) in the USA. The objectives of the articles addressed the research question and the methodologies entailed a quantitative approach.

All studies were rated as Level A in methodological quality by the adapted CASP instrument. The articles addressed the following main topics: a)

level of adherence to antiparkinson agents; and b) factors associated with good adherence and poor adherence in patients with PD. The main elements reported were: age, cognition, non-motor symptoms, polypharmacy, and sociodemographic data (sex, income, marital status, education, color and ethnicity).

An overview of the characteristics of the studies included in the review are given in Table 1. The following parameters are included: study author, year of publication, place, journal, objective, study design, sample, and level of adherence.

Details on study author, year of publication, method of assessing adherence of PD patients and factors associated with adherence or non-adherence to antiparkinson drugs therapy are given in Table 2. The factors associated with non-adherence to treatment in more than one study were male gender, presence of non-motor symptoms, polypharmacy and cognitive impairment.

Table 1. Main characteristics of studies included in integrative review. Recife, Pernambuco state, 2022.

Author, year, place and journal	Objective	Study design, sample	Instruments used to assess medication adherence	Main results on adherence
1) Valldeoriola et al.[15], 2011, Barcelona (Spain), *European Journal of Neurology*	To determine demographic, social and clinical aspects modifying therapy adherence.	Cross-sectional study, N= 418 patients	Neurologist Opinion Morisky-Green Test (MGT).	According to physician´s opinion 93.6%, and on the MGT 60.4%, of patients adhered to parkinsonian therapy.
2) W.J. Yu et al.[19], 2013, Baltimore (Maryland), *Clinical Therapeutics*	To provide updated, comprehensive population-based data on antiparkinson drugs (APD) use and adherence and to examine characteristics associated with adherence behaviors.	Cross-sectional study N= 7,583; 65 years (93.6%); female (59.9%); White (89.3%)	Medication possession ratio (MPR).	Good adherence rate: 72.7% of sample.
3) Straka et al.[20], 2019, Slovakia, Journal Frontiers in Neurology	To detect the extent of adherence to pharmacotherapy in PD patients who take a minimum of three daily doses of drugs and to identify factors associated with lower levels of adherence.	Cross-sectional study, 124 individuals Male (58%)	Morisky Medication Adherence Scale (MMAS). .	The MMAS identified a high level of adherence in 33.9% of sample; medium level in 29.8% and 36.3% reported low level of adherence
4) Mendorf et al.[21], 2020, Germany, Frontiers in Medicine	To describe common self-reported reasons for nonadherence. replicate the associations between different degrees of nonadherence and PD-specific clinical parameters explore the impact of PD-specific clinical parameters on distinct clusters/reasons of nonadherence.	Cross-sectional study, N=226 patients, Male (58.7%)	Self-reported German Stendal Adherence to Medication Score (SAMS).	Fully adherent: 14.2% of patients; Moderately non-adherent: 66.8%, and non-adherent: 19%.
5) Zipprich et al.[22], 2021, Germany, Brain Sci	To provide additional data to determine whether self-reported non-adherence is associated with HRQOL in PD	Cross-sectional, N=164 patients, Male (61%)	Self-reported German Stendal Adherence to Medication Score (SAMS).	10.4% of patients were fully adherent, 66.4% moderately nonadherent and 23.2% nonadherent.

*Source: produced by author.

Table 2. Categorization of studies, author, publication year, assessment instruments and factors associated with adherence and non-adherence to antiparkinson therapy in older adults. Recife, Pernambuco, 2022.

Author, year	Assessment Instruments	Factors associated with adherence	Factors associated with non-adherence	Measures of statistical association/Level of evidence
1) Valldeoriola et al,[15] 2011	Physician´s subjective perception and Morisky–Green Test (MGT).	High level of knowledge about the disease, good clinical control, spouse or life partner, and higher income.	Psychiatric symptoms	95% CI/2b
2) W.J. Yu et al.[19], 2013	1. Medicare records; 2. Chronic Condition Data Warehouse 2006–2007	Younger age, white ethnicity, receipt of financial support, early enrollment, intact cognitive function, fewer comorbidities, no change in drugs regimen, and longer long-term care stay.	Older age, non-white race, cognitive impairment, high comorbidity, and patients switching therapy and/or augmentation.	Prevalence ratio and 95% CI/ 2b
3) Straka et al.[20], 2019	8-Item Morisky Medication Adherence Scale (MMAS-8)	Factors associated with adherence not assessed.	Male gender, longer PD duration, worse quality of life, frequency and severity of non-motor symptoms and more severe motor and non-motor symptom fluctuations.	Spearman's rank correlation coefficient (r_s) and correlation ratio eta (η)/ 2b)
4) Mendorf et al.[21], 2020	German Stendal Adherence with Medication Score (SAMS)	Factors associated with adherence not assessed.	Lower educational level, higher rate of motor impairment in activities of daily living, higher number of medications per day and higher rate of motor complications of PD	Regression coefficient for cluster/ 2b
5) Zipprich et al.[22], 2021	Self-reported German Stendal Adherence with Medication Score (SAMS).	Factors associated with adherence not assessed.	Male gender, lower Montreal Cognitive Assessment (MoCA) score, higher non-motor symptoms questionnaire (NMS-Quest) score, greater number of medications per day (indicator of comorbidity), and higher Beck Depression Inventory (BDI) score	Correlation/ 2b

Source: produced by the author.

DISCUSSION

The present integrative review identified a higher rate of good adherence to therapy in 2 studies[1,5,19], whereas 3 studies[20-22] found predominantly moderate adherence, followed by low adherence. Rates reported ranged from 10-93% for higher adherence, 36.3%-66.4% for moderate adherence, and 6.3-36% for lower adherence. In the PD patients assessed, sociodemographic, clinical and mental aspects were associated with treatment adherence.

Publications on this topic in Brazil proved scarce, while most studies were published by European

researchers. This lack of local publications highlights the need for more studies in the Brazilian population.

Adherence to therapy is influenced by multiple factors both in the older population in general and patients with Parkinson disease[23,24]. The pharmacotherapy in PD patients is often less than ideal and non-adherence is influenced by a number of aspects, such as disease stage, motor complications, complexity of timing and the presence of clinical depression[25]. A study of 27 individuals in a geriatric and gerontological referral service found low medication adherence in 79% of older patients[23]. Another study (n=80 older participants) found that 16% of patients were fully adherent and 25.9% non-adherent[24].

Lower adherence was associated with male gender[20,22], corroborating the findings of Weyn et al.[26] showing that men represented 34% of the group of potential non-adherents to medication and that males, besides making lower use of health services, do not exhibit care in taking medications correctly, behavior regarded as a risk factor.

Concerning age, one of the studies reviewed[19] showed that more advanced age was associated with lower adherence. Tavares et al.[27] demonstrated in their findings that younger old had lower treatment adherence and there was no significant difference between males and females. Similar results were reported by another study in which men aged 60-79 years and black individuals had lower adherence to treatment[28]. This correlation can be explained by the fact that younger old individuals have less family support and lower presence of caregivers involved in administering medication therapy compared to older old individuals with greater cognitive deficit[29].

However, cognitive deficit and older age are considered risk factors for non-adherence to treatment because of a greater number of age-related comorbidities, such as impaired memory, attention and concentration inherent to cognitive decline[30].

Regarding medication treatment non-adherence associated with skin color, a higher prevalence of treatment abandonment was reported in non-whites. This finding might be related to the socioeconomic characteristics of low family income, low educational level and less access to health services in this group[31].

Muniz et al.[32] noted that non-adherence to drug therapy is associated with cognitive deficit, reduced independence, low education, presence of comorbidities and polypharmacy, increasing the risk of adverse events and drug-drug interactions.

With regard to educational level, lower education was found to be associated with poorer adherence[21]. This result is consistent with the findings of Mendorf et al.[33,] confirming that lower educational level was mainly associated with modification of medication and poorer knowledge about prescribed medication, but not with forgetting to take medication.

The sociodemographic variable of greater income correlated positively with adherence to antiparkinson therapy[19], whereas low-income individuals were less likely to adhere to drug therapy[34]. The economic aspect is an important predictor of treatment adherence and of reduction in signs and symptoms. PD leads to physical and cognitive limitations that can force these individuals to give up their jobs, resulting in a loss of income for both the individual and family members. Moreover, expenses with medical visits, hospital admissions, medications and food also tend to increase, directly impacting treatment and disease evolution[35].

Akin to the present study, previous investigations found that a higher number of drugs was associated with lower adherence[19,21,22]. Similarly, Grosset et al.[36] found that total adherence and timing adherence were significantly better for once daily drugs compared with drugs prescribed more frequently. Assessment of prescription of dopamine agonists once daily versus thrice daily revealed that patients taking more medications had poorer adherence for both antiparkinson drugs alone (P=0.007) and all medications combined (P=0.01).

The same factors found to be positively associated with adherence[15] were also documented by Almeida et al.[37] and Nunes et al.[38], noting that patients who had a partner exhibited greater treatment adherence compared to individuals who lived alone or were widowed. According to the literature, the presence of a partner and being part of an active support network is fundamental for resolving the problems which arise during the process of living with PD. The partner is often also the caregiver, serving to

assist in the administration of medications and in accompanying the patient during health service visits.

With regard to the variable depression, this is also considered a factor impacting therapy adherence by patients, particularly for being directly involved in the progression of physical symptoms of PD, cognitive decline, reduced self-care ability and worse quality of life[38]. However, no association between patient adherence to treatment and presence of depressive symptoms was found ($p>0.05$) when correlating results of the Morisky-Green Test and the IAAFTR instrument with scores on the GDS-15 used in the cited study[39].

As highlighted in the present review[15,20-22], the Morisky-Green Test and German Stendal Adherence with Medication Score (SAMS) were the most used measures for assessing adherence. According to the literature, the most commonly employed methods include interview, pill count, drug dispensing control, treatment monitoring, semi-structured questionnaires and self-reporting. This heterogeneity hampered comparison of results found[40].

There are a range of consequences of non-adherence to medication therapy, including poor disease control, greater risk of hospital admission and increase in mortality, leading to clinical, social and economic repercussions[40].

The synthesis of the studies reviewed showed that adherence to antiparkinson therapy is multifactorial. Thus, identifying and understanding the factors outlined above is important given they are amenable to intervention through the devising of public policies and targeted strategic planning. This approach involves the implementation of health service interventions with the formulation of public policies optimizing therapy management for this patient group to reduce complications, promote adherence and improve quality of life in older individuals, thereby ensuring active healthy aging.

This integrative review has some limitations including the dearth of longitudinal studies addressing PD in older Brazilians and investigating the factors that influence adherence. Also, the lack of standardization of instruments assessing the factors associated with adherence may influence the interpretation of results. In addition, the inclusion of self-reports as a tool for assessing adherence introduces the risk of overestimation of results owing to memory problems in this older population[42]. It should be noted, however, that the measures used in the studies investigating adherence were internationally validated instruments. Future studies should include interventions on adherence in older adults with Parkinson Disease.

CONCLUSION

The analysis of the results of this integrative review identified the factors which contribute to higher or lower adherence to antiparkinson therapy in older patients. The reasons for poor adherence were determined, namely: low educational level, concurrent use of several medications, comorbidities, older age, cognitive deficit, presence of depression and non-motor symptoms. The main factors associated with good medication adherence were younger age, higher level of knowledge about the disease, good clinical control of PD, no changes in treatment regimen, white ethnicity, higher income, and presence of family or a partner. Patients with higher educational level were more likely to practice behaviors favorable for positive adherence. Although the studies reviewed differ for level adherence of the population studied, a considerable proportion of studies (3 out of 5) reported low-to-moderate adherence to drug treatment, with rates of 36.3-66.4% for moderate adherence and 6.3-36% for low adherence.

Lastly, the evidence gathered in this study can help inform the scientific community on which factors favor and detract from antiparkinson drug treatment adherence, contributing to debates and furthering understanding of this process in older patients with Parkinson Disease.

Edited by: Tamires Carneiro de Oliveira Mendes

REFERENCES

1. Simon DK, Tanner CM, Brundin P. Parkinson disease epidemiology, pathology, genetics and pathophysiology. Clinics in Geriatric Medicine. 2019;36(1):1-12. Disponível em: https://doi.org/10.1016/j.cger.2019.08.002
2. Martins CCM, Caon G, Moraes CMO. A Doença de Parkinson e o Processo de Envelhecimento Motor: uma Revisão de Literatura. Saúde e Desenvolvimento Humano. 2020;8(3):155-67. Disponível em: http://dx.doi.org/10.18316/sdh.v8i3.6567
3. Fernandes BJD, Filho ASA. Perfil farmacológico da opicapona em pacientes com Doença de Parkinson sob tratamento com levodopa. Revista Brasileira de Neurologia e Psiquiatria. 2018,22(1):60-72.
4. Silva TP, Carvalho CRA. Doença de Parkinson: o tratamento terapêutico ocupacional na perspectiva dos profissionais e dos idosos. Caderno Brasileiro de Terapia Ocupacional. 2019;27(2):331-44. Disponível em: https://doi.org/10.4322/2526-8910.ctoAO1229
5. Snell RS. Neuroanatomia clínica. Rio de Janeiro. 8ª ed. Rio de Janeiro: Guanabara Koogan, 2021.
6. Cabreira V, Massano J. Parkinson's Disease: Clinical Review and Update. Acta Médica Portuguesa. 2019;32(10):661-70. Disponível em: https://doi.org/10.20344/amp.11978
7. Palamarchuk A. Chronic pain in Parkinson disease. Journal of Education, Health and Sport. 2020;10(5):315-20. Disponível em: https://doi.org/10.12775/JEHS.2020.10.05.033
8. Chahine L, Tarsy D. Management of nonmotor symptoms in Parkinson disease. UpToDate. 2020. Disponível em: https://www.uptodate.com/contents/management-of-nonmotor-symptoms-in-parkinson-diseaseH2150235961
9. Jankovic J, Tan EK. Parkinson's disease: etiopathogenesis and treatment. J Neurol Neurosurg Psychiatry. 2020;91:795–808. Disponível em: doi:10.1136/jnnp-2019-322338
10. Shin J, Moczygemba LR, Barner JC, Garza A, Linedeckersmith S, Srinivasa M. Patient experience with clinical pharmacist services in Travis County Federally Qualified Health Centers. Pharm Pract. 2020;18(2):1751. Disponível em: DOI: 10.18549/PharmPract.2020.2.1751
11. Prell T, Gaur N, Stubendorff B, Rödiger A, Witte OW, Grosskreutz J. Disease progression impacts health-related quality of life in amyotrophic lateral sclerosis. Journal of the neurological sciences. 2019;397:92–95. Disponível em: DOI:10.1016/j.jns.2018.12.035
12. Plasencia A. et al. Methods, information sources and algorithms for the analysis of symptoms and support to the Parkinson disease patients. Procedia Computer Science. 2021;186:564-554. Disponível em: https://doi.org/10.1016/j.procs.2021.04.175
13. Muthumanickam S, Gayathri J, Eunice Daphne. Parkinson's Disease Detection And Classification Using Machine Learning And Deep Learning Algorithms – A Survey. International Journal of Engineering Science Invention (IJESI). 2018;7(5):56–63.
14. Monterroso LEP, Sá LO, Joaquim NMT. Adherence to the therapeutic medication and biopsychosocial aspects of elderly integrated in the home-based longterm care. Revista Gaúcha de Enfermagem. 2017;38(3):9-16. Disponível em: doi: http://dx.doi.org/10.1590/1983- 1447.2017.03.56234
15. Valldeoriola F, Coronell C, Pont C, Buongiorno MT, Câmara A, Gaig C, Compta Y. Socio-demographic and clinical factors influencing the adherence to treatment in Parkinson's disease: the ADHESON study. 2011;18(7):980-87. Disponível em: https://doi.org/10.1111/j.1468-1331.2010.03320.x
16. Sousa LMM, Marques-Vieira C, Severino S, AntunesV. Metodologia de Revisão Integrativa da Literatura em Enfermagem. Rev Invest Enferm. 2017;21(2):17-26. Disponível em: https://www.researchgate.net/publication/321319742_Metodologia_de_Revisao_Integrativa_da_Literatura_em _Enfermagem
17. Critical Appraisal Skills Programme. CASP make sense of evidence. 10 questions to help you make sense of qualitative research [Internet]. [unknown place]: CASP; 2017 [acesso em 21 jan. 2022]. Disponível em: http://media.wix.com/ugd/dded87_25658615020e427da194a325e7773d42.pdf
18. Oxford Centre for Evidence-Based Medicine. Levels of evidence. Oxford; CEBM; 2009. Disponível em: http://www.cebm.net/oxford-centre-evidence-basedmedicine-levels-evidence-march-2009/.
19. Wei YJ, Palumbo FB, Simoni-Wastila L, Shulman LM, Stuart B, Beardsley R, Brown C. Antiparkinson drug use and adherence in medicare part D beneficiaries with Parkinson's disease. Clin Ther. 2013;35(10):1513-1525. Disponível em: DOI: 10.1016/j.clinthera.2013.09.001
20. Straka I.; Minár M.; Škorvánek M.; Grofik M.; Danterová K.; Benetin J.; Kurca E; Gažová A.; Boleková V.; Wyman-Chick KA; et al. Adherence to Pharmacotherapy in Patients With Parkinson's Disease Taking Three and More Daily Doses of Medication. Frontiers in neurology. 2019; (10) 799. Disponível em: doi: 10.3389 / fneur.2019.00799

21. Mendorf S, Witte OW, Grosskreutz J, Zipprich HM, Prell T. What Predicts Different Kinds of Nonadherent Behavior in Elderly People With Parkinson's Disease? Front. Med. 2020,7:103. Disponível em: doi: 10.3389/fmed.2020.00103

22. Zipprich, H.M.; Mendorf, S.; Lehmann, T.; Prell, T. Self-Reported Nonadherence to Medication Is Not Associated with Health-Related Quality of Life in Parkinson's Disease. Brain Sci. 2021, 11, 273. https://doi.org/10.3390/ brainsci11020273

23. Oliveira GL, Lula-Barros DS, Silva SLM, Leite SN. Fatores relacionados à adesão ao tratamento sob a perspectiva da pessoa idosa. Rev Bras Geriatr Gerontol. 2020;23(4):e200160. Disponível em: https://doi.org/10.1590/1981-22562020023.200160

24. Prell T, Schaller D, Perner C, Franke GH, Witte OW, Kunze A, et al. Comparison of anonymous versus nonanonymous responses to a medication adherence questionnaire in patients with Parkinson's disease. Patient Prefer Adherence. (2019) 13:151–5. doi: 10.2147/PPA.S1 86732

25. Durand H, Hayes P, Morrissey EC, et al. Medication adherence among patients with apparent treatment-resistant hypertension: systematic review and meta-analysis. J Hypertens. 2017;35(12):2346–2357

26. Weyn GC, Breda D, Faria MQG, Rauber R. Variáveis inerentes ao idoso influenciando na adesão medicamentosa em uma Unidade Básica de Saúde de Cascavel - PR. EACAD [Internet]. 1º de setembro de 2022 [citado 19º de novembro de 2022];3(3):e0233271. Disponível em: https://eacademica.org/eacademica/article/view/271

27. Tavares DMS, Guimarães MO, Ferreira PCS, Dias FA, Martins NPF, Rodrigues LR. Qualidade de vida e adesão ao tratamento farmacológico entre idosos hipertensos. Rev Bras Enferm 2016;69(01):134-41. https://doi.org/10.1590/0034-7167.2016690118i

28. Girotto E, Andrade SM, Cabrera MA, Matsuo T. Adesão ao tratamento farmacológico e não farmacológico e fatores associados na atenção primária da hipertensão arterial. Cienc Saude Coletiva. 2013;18(6):1763-72. DOI:10.1590/S1413-81232013001400027

29. Aiolfi CR, Alvarenga MRM, Moura CS, Renovato RD. Adesão ao uso de medicamentos entre idosos hipertensos. Rev Bras Geriatr Gerontol. 2015;18(2):397-404.

30. Tavares NUL, Bertoldi AD, Thumé E, Facchini LA, de França GVA, Mengue SS. Fatores associados à baixa adesão à medicação em idosos. Rev Saúde Pública. 2013;47(6):1092-101 disponivel em: https://doi.org/10.1590/S0034-8910.2013047004834

31. Barreto MDS, Cremonese IZ, Janeiro V, Matsuda LM, Marcon SS.Prevalência de não adesão à farmacoterapia anti-hipertensiva e fatores associados. Revista Brasileira de Enfermagem. 2015;68(1):60-67. https://doi.org/10.1590/0034-7167.2015680109p

32. Muniz, ECS., Goulart, FC, Lazarini, CA, Marin, MJS. Análise do uso de medicamentos por idosos usuários de plano de saúde suplementar. Revista Brasileira de Geriatria e Gerontologia. 2017;20(3):375-387. https://doi.org/10.1590/1981-22562017020.160111

33. Mendorf S, Witte OW, Grosskreutz J, Zipprich HM, Prell T. What Predicts Different Kinds of Nonadherent Behavior in Elderly People With Parkinson's Disease? Front Med (Lausanne). 2020 Mar 25;7:103. doi: 10.3389/fmed.2020.00103. PMID: 32269998; PMCID: PMC7109286.

34. Wei YJ, Palumbo FB, Simoni-Wastila L, Shulman LM, Stuart B, Beardsley R, Brown C. Antiparkinson drug use and adherence in medicare part D beneficiaries with Parkinson's disease. Clin Ther. 2013 Oct;35(10):1513-1525.e1. doi: 10.1016/j.clinthera.2013.09.001. PMID: 24139423.

35. Marchi KC, Chagas MH, Tumas V, MIASSO AI; CRIPPA JA.; TIRAPELI CR. Adesão à medicação em pacientes com doença de Parkinson atendidos em ambulatório especializado. Ciênc. saúde coletiva. 2013;18(3):855-862. https://doi.org/10.1590/S1413-81232013000300031

36. Grosset D, Antonini A, Canesi M, Pezzoli G, Lees A, Shaw K, Cubo E, Martinez-Martin P, Rascol O, Negre-Pages L, Senard A, Schwarz J, Strecker K, Reichmann H, Storch A, Löhle M, Stocchi F, Grosset K. Adherence to antiparkinson medication in a multicenter European study. Mov Disord. 2009 Apr 30;24(6):826-32. doi: 10.1002/mds.22112. PMID: 19191340.

37. Almeida NA, Reiners AAO, Azevedo RCS, Silva AMC, Cardoso JDC, Souza LC. Prevalência e fatores associados à polifarmácia entre os idosos residentes na comunidade. Rev Bras Geriatr Gerontol. 2017;20(1):143-53. https://doi.org/10.1590/1981-22562017020.160086

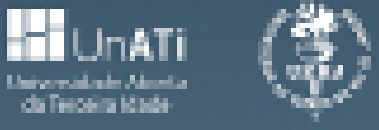
38. Nunes SFL, Alvarez AM, Valcarenghi RV, Hammerschmidt KSA, Baptista R. Adaptação dos Familiares Cuidadores de Idosos com Doença de Parkinson: Processo de Transição. Psicologia: Teoria e Pesquisa, 2019; 35 e35nspe4.

39. Dobkin RD, Allen LA, Menza M, A Cognitive-Behavioral Treatment Package for Depression in Parkinson's Disease. Psychosomatics. 2006;47(3):259-263

40. Obreli-Neto PR, Baldoni AO, Guidoni CM, Bergamini D, Hernandes LC, Luz RT, et al. Método de avaliação de adesão à farmacoterapia. Rev Bras Farm. 2012;93(4):403-10.

41. Lutz BH, Miranda VIA, Bertoldi AD. Inadequação do uso de medicamentos entre idosos em Pelotas, RS. Rev Saúde Pública. 2017;51:1-12.

42. Lehmann A, Aslani P, Ahmed R, Celio J, Gauchet A, Bedouch P, et al. Assessing medication adherence: options to consider. Int J Clin Pharm. 2014;36(1):55-69. Disponível em DOI: https://doi.org/10.1007/s11096-013-9865-


UnATi
Università Aperta
della Terza Età