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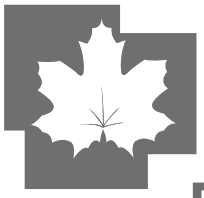

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The Health Record and the Digital Patient

The growth of technology and the need for the systematization of information has transformed the most traditional form of paper-based health records into various types of electronic applications. Such apps were developed with the goal of improving the quality of health systems. Among them, the Electronic Health Record (EHR) is notable for allowing structured data organization, providing support for the decision making of medical teams. Numerous EHRs have been developed to meet the demands of clinics and hospitals. They aim to provide a unidirectional perspective to assist with bureaucratic issues and care needs, from healthcare provider to patient.

With the advent of the internet and cloud computing, electronic health records have become important tools, not just allowing doctors to record and organize information about their patients, but notably functioning as the primary vehicle through which doctors and patients can quickly, easily and safely access and input health data.

In the world of Digital Health, patients have apps which are integrated with electronic medical records which make it possible, for example, to send laboratory and imaging exam results. Numerous medical devices such as watches, bracelets and sensors capable of continuously sending qualified data and warning signals about blood pressure, oximetry, body temperature and heart rate are currently available. Through phone applications and adapters, blood glucose values and electrocardiographic tracings or even dermatological and otological images are sent to medical centers with just a few taps on a cell phone screen.

Cloud-based electronic health records have become platforms for data communication, digitization, storage and interpretation.

In countries where regulatory issues are more advanced, EHRs have become integrated with tele-consultations, tele-interconsultations and tele-diagnosis platforms. In the USA, in 2018, a single service provider performed more than 3 million tele-consultations, all properly integrated with EHRs, following information security protocols. Regardless of the current debates on issues surrounding telemedicine, EHRs will be the main tools in the Digital Health universe.

In this long trajectory from simple paper records to complex platforms, electronic medical records have had to adapt to the needs of patients. They have become friendlier and easier to use. For health professionals, EHRs have become empowering tools for patients to engage in their own treatment. Despite this evolution, there remain obstacles to the implementation of EHRs. A lack of standardized terminology results in the

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loss or impracticality of many of the resources that might otherwise be available, such as alerts, decision support systems, clinical research and others. The lack of security and confidentiality resources in itself creates suspicion, adding to a lack of trust among users. The recent General Personal Data Protection Act (or LGPDP), which establishes rules in Brazil for the handling of personal information by individuals or legal entities, has brought more legal certainty for everyone involved, including patients, healthcare professionals, healthcare operators and system developers.

Health professionals need to be trained and develop skills to incorporate technology into their practice. Technology does not ask for "permission" to enter. It becomes accepted through the support of digital users, in this case, the Digital Patient.

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Proposal for an instrument for the admission of the elderly to long-term care facilities: elaboration and validation

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Abstract

Objective: To elaborate and validate an instrument for the admission of the elderly to long-term care facilities. *Method:* A methodological study was performed, divided into two phases, the first of which was the elaboration of the instrument based on a literature review of research published in journals indexed in SciELO and in databases such as Medline, LILACS, IBECS, Embase and books related to gerontology, defining theoretical dimensionality through relevant information to support individualized and integral care for the elderly. The second phase of the study involved validation by nine experts from a multidisciplinary field. Six criteria were used to validate the construct, for which the experts chose one of the following options: *adequate, inadequate or requires greater adequacy* and also, when necessary, added suggestions. The decision to maintain, reformulate or exclude items was based on the Percentage of Consensus (PC) among the experts, for which consensus of more than 80% was adopted as the value of statistical significance. *Results:* The scientific evidence base for the construction of the instrument consisted of anamnesis and physical examination domains, segmented in ten and four sections, respectively. Half of the sections achieved a score above that proposed, four of which received a maximum consensus score in all criteria. *Conclusion:* The instrument was developed and proved to be consistent for applicability by different professionals in the area, with the aim of promoting geriatric care focused on the health of the institutionalized patient.

Keywords: Data Collection. Geriatric Nursing. Validation Studies. Aged. Homes for the Aged. Health of Institutionalized Elderly.

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INTRODUCTION

There has been a notable increase in the world's elderly population in recent decades. It is therefore important to understand that the aging process brings morphological, functional, biochemical and psychological changes that generate greater vulnerability, a higher incidence of pathological processes and difficulties in performing daily activities[1].

In Brazil, approximately half of the elderly population need some help to perform at least one of their daily activities and a significant minority are highly dependent[2]. This data, coupled with the rapid demographic transition brings serious challenges and consequences for health services for the geriatric population, public policies and the family environment[3].

As a result, the Brazilian Society of Geriatrics and Gerontology (or SBGG) and specialized committees have been debating the nature of Long-term Care Facilities for the Elderly (LTCFs), which can be governmental or non-governmental institutions, of a residential nature, dedicated to people aged 60 and over, with or without family support, in full conditions of dignity, freedom and citizenship[4].

From 2007 to 2009, Brazil had 3,549 LTCFs, responsible for accommodating around 0.6% to 1.3% of the total elderly population, yet there are no well-defined selection criteria for the occupying of places[2, 5]. Thus, in the context in which we live, which is marked by great socioeconomic and cultural inequalities, geriatric clinics are extremely heterogeneous in relation to care, structure, financial support and the population served[3].

Although the minimum standards of operation of these institutions is established by Resolution RDC No. 283/2005, following the guidelines of the National Policy of the Elderly[6], many operate in precarious conditions, without systematization of care and with little individualized care[3]. In addition, institutionalization itself has a decisive impact on the health-disease process of the elderly, and should be composed of actions that address all the needs of these people, preserving their autonomy and reducing their limitations[7].

Therefore, the elaboration of an instrument to be applied in the admission of patient-residents to the LTCFs, which collects information to support the planning of comprehensive and humanized gerontological-geriatric care, is necessary.

Following the elaboration of the instrument, the validation of to what extent it measures the desired phenomenon of interest is essential. The validation techniques are content validity, criteria validity and construct validity, and the content validity used in the present study attests to whether each element of the instrument contemplates the proposed theoretical dimension, ensuring its quality and veracity[8].

The opinion of a committee of experts in the gerontological-geriatric area on the items of the instrument, known as the Delphi technique, was employed along with content analysis[9].

Based on the above, the present study aimed to develop and validate an instrument for the admission of the elderly to long-term care facilities, to be used by qualified professionals from all areas of health, thus representing an interdisciplinary instrument that meets the current and future needs of the elderly population.

METHOD

A methodological study was conducted between September 2017 and November 2018, and divided into two stages: 1) elaboration of the instrument for the multidisciplinary team for the admission of elderly persons to the LTCF; 2) validation and reformulation of the instrument.

For data collection, a bibliographic survey was conducted in journals indexed in the Scientific Electronic Library Online (SciELO) and in the PubMed databases, available through the Virtual Health Library (VHL), Medline, LILACS, IBECS and Embase using descriptors such as: data collection; validation studies; geriatric nursing; elderly person; long-term care facility for the elderly and health of the institutionalized elderly person.

From the integrative review of scientific articles, books related to gerontology and random consultations with professors from the area of health qualified in the

process of construction and validation of instruments, the theoretical definitions, identification of domains and formation of sections and topics constitutive of the instrument were elucidated.

The theoretical dimensionality of the instrument was based on *Anamnesis* and *Physical Examination*, two major domains shared in the daily applicability of a range of health professionals, but with different denominations depending on area, such as in Nursing, in which anamnesis is designated as nursing history, but which ultimately share the same concept: fundamental data collection tools to support the formulation of diagnostic hypotheses and therapeutic planning[10,11].

Thus, the *Anamnesis* and *Physical Examination* domains were divided, respectively, into ten and four sections, in order to organize and facilitate the completion and visualization of information.

Subsequently, the content validation method was performed, which consisted of verifying the quality of the instrument through the subjective judgment of a committee of experts. This step made it possible to ensure the validity of the instrument, that is, to indicate precisely what it was intended to measure. The evaluation of the experts involved qualitative and quantitative methodology. The measurement of the quality of the instrument was related to the clarity, pertinence, relevance and representativeness of the items, and the qualitative evaluation comprised the analysis of the domains in terms of the division of the set of items. The quantitative evaluation was measured by the degree of consensus among the experts[12,13].

In the absence of a defined standard for the selection of experts and in line with the objective of the study[9,14], the eligibility criteria were: to be a health professional with clinical experience in LTCFs or in the care of the institutionalized elderly for at least five years; to be a researcher in the gerontological-geriatric area and understand the methodological process employed in the construction of the instrument.

From this, a data survey was performed of health professionals from the city of Maringá, Paraná, Brazil, who worked in the geriatric sector, through the recommendation of the Post-Graduate Department in Health Promotion of the Medical Course of the Centro Universitario de Maringá (Unicesumar). Then, through curriculum analysis via the Lattes Platform, researchers were selected that fit the study outline.

It was decided to select an odd number of professionals, between five and ten, to make up the committee, due to the fact that there is no consensus in the literature as to the exact number of members required. Thus, nine experts were invited to compose a multidisciplinary committee, via e-mail, in order to add distinct theoretical and practical knowledge, extolling the validation process: two geriatricians, one nurse, two physiotherapists, a speech therapist, a nutritionist, a pharmacist and a professional with a degree in Nursing and Pharmacy.

After the experts agreed to contribute to the research, the data collection instrument and an explanatory document about the purpose of the study and its evaluation method were sent via e-mail[12]. At the same time, a guiding script containing a table-organized instrument was sent to evaluate domains, sections and items.

The criteria used by experts to evaluate the instrument in relation to the adequacy of the data contained in each dimension were: 1) format and presentation; 2) readability and ease of completion; 3) clarity and comprehension; 4) pertinence of content; 5) relevance of items and 6) proper sequence. Parameters one, two, and six refer to the aspect, appearance, and exteriority of the form; item three assesses whether the wording is intelligible, transparent, with coherent and unambiguous expressions; pertinence analyzes whether the data reflect the concepts involved and achieve the proposed objectives; and, finally, relevance verifies the significance of each item[12,13,15].

The experts evaluated each section and item against the six criteria, for which they selected only one of the options: *Adequate*, *Inadequate*, or *Requires Greater Adequacy*. At the end of the script they recorded their opinions, criticisms and suggestions in the open spaces.

The forms were collected in the first half of February 2018, after 30 days. For data analysis, the answers were manually tabulated and all comments

were organized in tables. The decision to maintain, reformulate or delete items was based on the Percentage of Consensus (PC) among the experts, with a value of statistical significance of consensus above 80% adopted[13-15].

It should be noted that the participation of the experts did not consider them subjects of the research, but as evaluators of a proposal for a data collection instrument, therefore, the approval of the Research Ethics Committee involving human beings or a Form of Free and Informed Consent is not required.

RESULTS

After an extensive literature review of the scientific literature, the theoretical frameworks were established and the representative domains of the clinical evaluation of the institutionalized elderly persons chosen. Universal dimensions were used for the multiprofessional data collection, since the instrument is not restricted to a certain professional class.

The instrument consisted of two domains: *Anamnesis* and *Physical Examination*, common tools used by healthcare professionals to collect patient information. The researchers then returned to literature to define which dimensions would be relevant for the clinical evaluation of the institutionalized elderly, which constituted the sections of the instrument.

The *Anamnesis* domain was fragmented into the following sections: identification; legal guardian; reason for institutionalization; history of previous diseases; neurological evaluation; auditory and visual evaluation; gastrointestinal and nutritional evaluation; genitourinary evaluation; evaluation of lifestyle and basic activities of daily living. The Physical Examination consisted of: vital signs, anthropometric data, general evaluation and evaluation of skin and mucous membranes.

After the elaboration of the instrument, validation was performed by the nine experts with experience in caring for the institutionalized elderly. The profile of the experts is presented in Table 1.

Table 1. Data of professionals who evaluated the instrument designed for admission to LTCFs. Maringá, Paraná, 2018.

Variables	n (%)	Mean (standard-deviation)
Age (years)		39.33 (±10.03)
34-39	3 (33.33)	
40-49	4 (44.44)	
50-57	2 (22.22)	
Gender		
Female	7 (77.77)	
Male	2 (22.22)	
Time since graduation (years)		16.22 (±10.60)
10-19	6 (66.66)	
20-29	2 (22.22)	
30-39	1 (11.11)	
Academic qualification		
Specialization	7 (77.77)	
Master's	5 (55.55)	
Time working (years)		15.66 (±10.98)
6-10	2 (22.22)	
11-20	5 (55.55)	
21-30	2 (22.22)	
Institution		
Long Term Care Facility for the Elderly	5 (55.55)	

To identify the experts, an alphabetical letter system was used, represented by: A and B- doctors; C- pharmacist; D and E- physiotherapists; F - speech therapist; G- pharmacist and nurse; H- nurse and I- nutritionist.

The results of the evaluation of the body of experts of the consensus and representativeness of the items in each section are shown in Table 2.

According to the responses of the experts regarding the consensus and representativeness of the sections, eight achieved consensus rates above 80% in all the stipulated criteria. Of these, five remained unchanged, as shown in Chart 1, while in the remaining suggestions to modify some terms to better cover the proposed content were accepted, as shown in Chart 2.

Table 2. Distribution of level of consensus among experts regarding the six evaluation criteria in the content validation process. Maringá, Paraná, 2018.

Indicators Analysis Criteria	Format and Presentation	Readability and Ease of Completion	Clarity & Comprehension	Pertinence of Content	Relevance of Items	Proper order
Anamnesis						
Identification	100%	100%	100%	100%	100%	100%
Legal Guardian	100%	100%	100%	100%	100%	100%
Reason for institutionalization	100%	100%	100%	100%	100%	100%
History of previous illness	78%	78%	89%	89%	100%	78%
Neurological evaluation	89%	89%	67%	78%	100%	67%
Auditory and visual evaluation	89%	89%	89%	89%	89%	89%
Gastrointestinal and nutritional evaluation	78%	78%	67%	89%	89%	67%
Genitourinary evaluation	78%	89%	78%	89%	89%	78%
Living habits	89%	100%	89%	89%	89%	89%
Evaluation of basic activities of daily living	78%	89%	89%	78%	100%	89%
Physical Exam						
Vital signs	100%	100%	100%	100%	100%	100%
Anthropometric data	100%	100%	100%	89%	100%	89%
Overall evaluation	89%	89%	89%	89%	100%	89%
Skin and mucous membrane	89%	89%	89%	89%	100%	78%

Chart 1. Unchanged sections due to scores higher than stipulated in the six established criteria. Maringá, Paraná, 2018.

Identification Name:_____ Sex: ( ) F ( ) M Date of birth: _____/_____/_____ CPF:_____ ID:_____ Origin: ( ) home ( ) general hospital ( ) psychiatric hospital ( ) home for the elderly ( ) other:_____ Profession: ( ) retired ( ) _____Schooling: _____ Health plan: ( ) no ( ) yes Which?_____ N° SUS: _____ Religion: ( ) Catholic ( ) Spiritist ( ) Evangelical ( ) Atheist ( ) other Date of admission:_____/_____/_____
Legal Guardian Name:_____ Degree of kinship:_____ CPF:_____ RG:_____ Telephone: _____residential_____cell_____commercial Home address:_____ Number:_____ Flat No.: _____ Neighborhood:_____ CEP:_____ City/State:_____ Other contacts: Name:_____ Telephone:_____ Degree of kinship:_____ Name:_____ Telephone:_____ Degree of kinship:_____ Name:_____ Telephone:_____ Degree of kinship:_____
Reason for institutionalization ( ) Seeking specialized and elderly-focused care ( ) Family conflict and tensions ( ) Has no family or close relatives ( ) Court order ( ) Patient's own choice
Vital Signs Blood pressure: _____mmHg O_2 saturation: _____% T:_____°C Pulse:_____ bpm Characteristics: ( ) Regular ( ) Irregular ( ) Full ( ) Filiform RR: _____rpm Breathing: ( ) Spontaneous ( ) Oxygen therapy - > ( ) Nasal Catheter ( ) Tracheostomy ( ) Oxygen Mask
Overall Evaluation Overall state: ( ) Good ( ) Fair ( ) Poor Level of consciousness: ( ) Conscious ( ) Unconscious ( ) Partial Loss - Confused Pallor: ( ) Coloration ( ) Hyper-coloration ( ) Paleness __ / ++++ Hydration: ( ) Hydrated ( ) Dehydrated __ / ++++ Jaundice: ( ) Anicteric ( ) Icteric __ / ++++ Cyanosis: ( ) Acyanotic ( ) Cyanotic __ / ++++

Chart 2. Alterations made following specific suggestions of experts. Maringá, Paraná, 2018.

Sections	Suggestions of experts accepted
Auditory and visual evaluation	Inserted: item "In what year would you estimate your last ophthalmological appointment took place?".
Living habits	Excluded: subitem "Little sleep". Reformulations: item "Occupational activity" substituted by "Leisure activity". Subitem "Disturbed sleep" substituted by "Interrupted sleep" and "Insomnia" by "Initial insomnia". Inserted: item "Physical activity" and subitem "Excessive sleep".
Anthropometric data	Inserted: items "Weight", "Height", "Body Mass Index", "Calf circumference", the calculation of Body Mass Index by weight and height and the classification of reference values specific for the elderly[16,17].

The experts selected the option *Requires greater adequacy* for all the criteria that had a score of less than 0.8, while the option *Inadequate* was chosen once, by Expert D, for the criteria of adequate sequence in Gastrointestinal and nutritional evaluation.

The mean AP value for each of the six parameters was 0.90; 0>92; 0.89; 0.91; 0.97 and 0.87, respectively. All achieved means over 0.80, with the criteria of relevance having the best score (97%) and proper sequence the lowest (87%).

There were 48 suggestions in all, with each expert suggesting between one and 14 reformulations, some of which, despite the percentage indicating valid content, were accepted, in order to improve the instrument. Additionally, all the sections that did not achieve the determined percentage were reformulated and adapted.

The sections History of Disease, Gastrointestinal and nutritional evaluation, Genitourinary evaluation and Skin and mucous membrane evaluation underwent major adaptations, with the disparity between the initial version and the definitive version becoming clear, as can be seen in Chart 3.

In contrast, the sections Neurological evaluation and Evaluation of Basic activities of daily living underwent few changes. In the first, two experts proposed the following: substitution of the item "communication" with "comprehension"; the word "speech" was added to the item "communication" (speech/communication)"; the word "stutter" was excluded and the sequence of the items was inverted. In the second section, three experts (A, B and H) opted to include the Katz Scale, since the initial instrument included all the items that composed the scale in the form of questions and did not generate a score for dependence.

Chart 3. Initial and final versions of sections: History of previous disease, Gastrointestinal and nutritional evaluation, Genitourinary evaluation and Skin and mucous membrane evaluation. Maringá, Paraná, 2018.

History of previous disease
Initial version Existing diseases: ( ) Diabetes *mellitus* ( ) SAH ( ) Cardiac Insufficiency ( ) Stroke ( ) Severe myocardial heart attack ( ) Parkinson's ( ) Alzheimer's ( ) Depression ( ) Psychiatric disease ( ) Respiratory disease ( ) Joint problems ( ) Kidney problems Others:_____ Time since contracting disease:_____ Infectious/contagious diseases: ( ) HIV ( ) Tuberculosis ( ) Meningitis ( ) Hepatitis B Allergic to medications: ( ) no ( ) yes Which?_____ Hospitalizations: ( ) no ( ) yes Date of last hospitalization:_____ Duration of hospitalization:_____ Reason for hospitalization _____

to be continued

Continuation of Chart 3

Have you suffered a fall? ( ) no ( ) yes
Have you suffered a fracture? ( ) no ( ) yes
How long ago?_____
Region affected:_____
Have you undergone surgery in the past: ( ) no ( ) yes
Which?_____

Vaccination status
Mark vaccinations taken with an X:
( ) Flu: annual ( ) Pneumo 13 ( ) Pneumo 23 ( ) Diphtheria, Tetanus and pertussis: every ten years
( ) Hepatitis B: 3 doses (0, 1, 6 months) ( ) Herpes-zoster: single dose over the age of 60

Do you take medication? ( ) no ( ) yes
Medications being used:

Name	Indication	Posology

Final Version
Existing diseases: ( ) Diabetes *mellitus* ( ) SAH ( ) Cardiac Insufficiency ( ) Stroke ( ) Acute myocardial infarction ( ) Neoplasm ( ) Joint problems ( ) Osteoporosis ( ) Renal problems ( ) Parkinson's ( ) Dementia ( ) Alzheimer's ( ) Vascular disease ( ) Levy Bodies
( ) Psychiatric disease: _____( ) Respiratory disease: _____
Others:_____
Infectious diseases: ( ) HIV ( ) Pneumonia ( ) Urinary infection
( ) Influenza A H1N1 ( ) Scabies ( ) Others:_____
Allergic to medication: ( ) no ( ) yes Which?_____
Hospitalizations: ( ) no ( ) yes Date of last hospitalization: _____
Duration of hospitalization:_____
Reason for hospitalization _____
Have you suffered a fall? ( ) no ( ) yes
Have you suffered a fracture? ( ) no ( ) yes Location: _____
How long ago did you have the fracture?_____
Have you previously undergone surgery? ( ) no ( ) yes
Which?_____

Vaccination status
Mark vaccinations taken with an X:
( ) Annual flu ( ) Pneumo 13 ( ) Pneumo 23
( ) Diphtheria, tetanus and pertussis - every ten years
( ) Hepatitis B - 3 doses (0, 1, 6 months)
( ) Herpes-zoster – single dose over the age of 60

to be continued

Continuation of Chart 3

Do you take medication? ( ) no ( ) yes

Medications being used:

Name	Indication	Posology

Gastrointestinal and Nutritional evaluation and Genitourinary evaluation

Initial Version

Gastrointestinal and nutritional evaluation

Feeding route: ( ) Oral ( ) NGT ( ) NET ( ) Parenteral ( ) Jejunostomy

( ) Gastrostomy Quantity:_____

Oral disorders: ( ) Use of dental implants ( ) Difficulty swallowing ( ) Difficulty chewing

Type of food: ( ) Solid ( ) Paste ( ) Semiliquid ( ) Liquid

Use of assistive techniques (straw, thickener, etc.): ( ) no ( ) yes

Eating frequency: _____ meals/day.

Have you lost weight in the last 3 months? ( ) no ( ) yes How much? _____kg

Food allergies: ( ) no ( ) yes Which?_____

Food preference?_____

Dietary restrictions (do not like to or cannot eat)? _____

Intestinal voiding routes: ( ) Normal ( ) Diaper ( ) Ostomy - Type/location:_____

If use diapers, do you have contact dermatitis (rash)? ( ) no ( ) yes

Notes:_____

Genitourinary evaluation

Urinary voiding routes: ( ) Spontaneous ( ) Indwelling Urinary Catheter ( ) Intermittent Urinary Catheter

( ) Diaper ( ) Collector

( ) Dialysis _____times/week

Do you have urinary incontinence? ( ) no ( ) yes

Notes:_____

Final Version

Digestive and Urinary Evaluation

Urinary voiding routes: ( ) Spontaneous ( ) Catheter ( ) Diaper ( ) Collector

( ) Dialysis _____times/week

Intestinal voiding routes: ( ) Normal ( ) Diaper ( ) Ostomy - Type/location: _____

Do you have urinary incontinence? ( ) no ( ) yes Do you have fecal incontinence? ( ) no ( ) yes

If use diapers, do you have contact dermatitis (rash)? ( ) no ( ) yes

Notes:_____

Nutritional Evaluation

Feeding route: ( ) Oral ( ) NGT ( ) NET ( ) Parenteral ( ) Gastrostomy ( ) Jejunostomy

Type of diet: ( ) Solid ( ) Paste ( ) Semiliquid ( ) Liquid

Oral disorders: ( ) Use of dental implants ( ) Difficulty swallowing ( ) Difficulty chewing

to be continued

Continuation of Chart 3

Have you lost weight in the last 3 months? ( ) no ( ) yes How much? _____kg
Use of assistive techniques (straw, thickener, etc.): ( ) no ( ) yes
Eating frequency: _____ meals/day.
Food allergies: ( ) no ( ) yes Which?_____
Food preference: _____
Dietary restrictions (do not like to or cannot eat): _____
Notes:_____

Skin and mucous membranes evaluation

Initial version

Place an X in the type of skin disorder and corresponding location (if any):

Location	Skin disorder							
	Hematoma	Petechiae	Wound	Chafing	Blister	Cut	Nodule	Scar
Head and neck								
Back								
Chest								
Abdomen								
Upper right limb								
Upper left limb								
Lower right limb								
Lower left limb								

Other skin disorder? ( ) no ( ) yes Which?_____ Where? _____
Do you have pressure ulcers? ( ) no ( ) yes Diameter: _____cm Depth:_____ cm

Location:_____

Location	Place an X in the location and corresponding side, if any	
	Left	Right
Sacrum		
Trochanter		
Sciatic tuberosity		
Malleolus		
Calcaneus		
Hallux		
Other (Which):		

Degree

( ) I - Healthy skin with redness.
( ) II - Acute epidermis and dermis, may have blisters.
( ) III - Impairment of subcutaneous tissue, without bone, muscle or tendon exposure.
( ) IV - Total tissue loss with bone, muscle or tendon exposure.

Treatment / dressing: ( ) no ( ) yes Which?_____
Edema: ( ) no ( ) Upper limbs ( ) Lower limbs ( ) Sacrum ( ) Ascites
( ) Generalized Intensity:___/++++

to be continued

Continuation of Chart 3

Final Version

Do you have any skin disorders? ( ) no ( ) yes Which? ( ) Petechiae ( ) Hematoma ( ) Vesicle/Blister ( ) Nodules ( ) Cracking ( ) Chafing ( ) Pustules ( ) Scars
( ) Other:_____ Where? _____
Do you have pressure ulcers? ( ) no ( ) yes Location:_____
Description of wound:_____
Treatment/dressing: ( ) no ( ) yes Which?_____
Description of wound:_____
Treatment/dressing: ( ) no ( ) yes Which?_____

Evaluation of risk of pressure ulcers					
Risk factors	Score				Value
	1	2	3	4	
Sensory perception	Totally limited	Very limited	Slightly limited	No limitation	
Moisture level	Constantly moist	Often moist	Occasionally moist	Rarely moist	
Activity	Bedfast	Chairfast	Walks occasionally	Walks frequently	
Mobility	Completely immobile	Very limited	Slightly limited	No limitations	
Nutrition	Very poor	Probably inadequate	Adequate	Excellent	
Friction/Shear	Problem	Potential problem	No apparent problem	-	
				Total:	

Edema: ( ) no ( ) yes Location: _____ Intensity:____/++++

Score
≤9 – Extremely heightened risk
10-12 – Heightened risk
13-14 – Moderate risk
15-18 – Low risk
>19 – No risk

DISCUSSION

The importance of developing a specific data collection instrument for the admission of the elderly to long-term care facilities became evident when we identified the absence of such an instrument. The research on this theme also evidenced the inadequacies of publications available in the literature that contemplate integrative care among the various professional classes, aiming at holistic and integral care for the geriatric patient.

Therefore, for the development of the present study, it was difficult to obtain articles related

specifically to data collection and the unification of information that could be shared and used by all professionals of the multidisciplinary team.

The choice of theoretical framework presupposed the union of information based on clinical medical examination and nursing history contained in the systematization of nursing care (SNC). Both processes are based on obtaining patient data through anamnesis and physical examination to better trace diagnoses and possible therapeutic approaches, thus ensuring individualized and continuous care[18,19].

Thus, the references supported the structuring of the instrument, for which it was chosen to build two domains: *Anamnesis* and *Physical Examination*, which, in turn, were constituted by their respective sections and these by their respective items.

The first section refers to *Identification*, which provides the sociodemographic profile of the patient. These data are extremely important because they provide support for the analysis of anatomical-physiological differences between genders and the alternation of disease prevalence in relation to age and sex[11].

The second section comprises the data of the *Legal Guardian*, i.e. identifies the person responsible for the hospitalization of the elderly person and other necessary contacts.

The third section discusses the *Reason for Institutionalization*, the reason that motivated seeking the health service, which indirectly indicates the social environment in which the elderly person was inserted and the expectation regarding the desired care.

It is noteworthy that the first, second and third sections achieved a 100% consensus level for all evaluation criteria, and no recommendations were made for alterations.

The next section deals with *History of Previous Diseases*, in which three evaluated criteria that achieved a AP of 0.78 were reviewed and reformulated. The insertion of the dementia syndrome, suggested by three experts, is justified because it encompasses several irreversible diseases that compromise the higher brain functions and impair the functionality of the individual. Among these, Alzheimer's disease, vascular dementia and Lewy bodies were introduced as sub-items, as the former is responsible for 60% of all dementias, followed in order by the others (Chart 3)[20-22].

In the same section, the terms meningitis and hepatitis B were replaced by urinary tract infection and pneumonia. About 15% to 30% of all infections found in elderly residents of LTCFs are due to urinary tract infection[23]. In developed countries, more than 50% of hospitalizations for pneumonia are in the elderly, with a higher prevalence of respiratory infection in institutionalized elderly persons than those who live in the community[24].

Chronic diseases such as heart disease, diabetes *mellitus* and strokes negatively influence the functional capacity of the elderly and this deterioration progressively increases due to the number of morbidities[25].

The fifth section of the instrument refers to the *Neurological Evaluation*, which analyzes the production and comprehension of the spoken language, neurological changes and motor skills. It was difficult to choose the items for this section as it is a very broad area and, at the same time, specific to certain health professionals. Thus, the inserted items subsidize a neurological evaluation based on overall understanding so that all of the multidisciplinary team know how to complete it.

The sixth section deals with the *Auditory and Visual Evaluation* that asks about the existence of hearing alterations, visual acuity and the use of corrective methods, since the decrease of sensory capacity is related to an increase in falls, cognitive and functional decline, depressive processes, social isolation and immobility[2,6]. Given a rate of consensus of over 0.8 in all items of the section, there were no significant changes, only the addition proposed by Expert B (Chart 2).

In the initial instrument, the seventh section comprised the *Gastrointestinal and Nutritional Evaluation* and the eighth the *Genitourinary Evaluation*. The analysis of the experts identified that the two sections

were interconnected and for this reason received scores below the stipulated level in four evaluation criteria, and were reformulated in a different manner from the initial version, as shown in Chart 3.

After making the proposed changes, in the final version, the *Digestive and Urinary Evaluation* included urinary and fecal elimination, urinary incontinence and fecal incontinence, with the latter recommended by three experts (A, B and H). Both urinary and fecal incontinences are highly prevalent in institutionalized elderly persons, generating serious psychosocial consequences, such as social isolation, changes in self-esteem and self-image, and contribute to lower Katz Scale scores[25,27,28].

The *Nutritional Evaluation* section included questions about the diet of the elderly, data relevant to the maintenance of an adequate nutritional state in a context of so many obstacles, such as the existence of chronic diseases; polypharmacy; aging-related physiological changes that interfere with appetite, nutrient intake and absorption, and social and economic issues[29].

According to Silva and Dias[29], institutionalized women have a higher risk of malnutrition than men, while men are more malnourished than women. This study also confirmed the relationship between the influence of nutritional status on the functionality of the elderly, with men, who are statistically more malnourished, having a lower functional capacity and becoming more dependent on the activities of daily living. On the other hand, Barbosa et al.[25] found that women are more dependent in instrumental activities of daily living and, although they live longer, do so in worse living conditions.

Regarding the *Living Habits* section, which consisted of four items that investigate the consumption of tobacco, alcohol, fitness for certain leisure activities, including physical activity, and sleep patterns; it is important to specify which type of physical activity the elderly practice, as this age group prioritizes aerobic activities, flexibility, balance, endurance and muscle strength[29].

The evaluation of sleep quality is extremely important, since insomnia and drowsiness are frequent complaints of the elderly, increasing the risk of falls, as well as having cognitive, respiratory and cardiovascular repercussions[30].

The section *Evaluation of the Basic Activities of Daily Living* aims to assess the degree of dependence of the patient in performing activities of self-care[31].

The Katz Scale assesses six basic self-care activities: bathing; dressing oneself; performing hygiene; transferring from bed to chair and vice versa; being continent and having the ability to feed oneself. The final score provides the degree of dependence of the individual. Its construction is based on the conclusion that functional loss follows an equal pattern of decline, that is, the ability to bathe is lost first, followed by an inability to dress, transfer and feed oneself, and when there is recovery, it occurs in the reverse order[25].

Regarding the *Physical Examination* domain, the sections include: *Vital Signs, Anthropometric Data, General Evaluation* and *Skin and Mucosal Membrane Evaluation*, which were restructured after the evaluation of the experts.

Thus, the first section refers to the indicators of the body's vital functions, which is important due to the fact that these data are fundamental for observing health and adequate physiology in the respiratory, cardiac, endocrine and neural areas[32].

The second section, *Anthropometric Data*, despite being formed by a group of elements which are difficult to collect among the elderly population, are widely used because they are non-invasive, low cost and allow the nutritional status of the patient to be assessed[29]. The item calf circumference measurement was added as it is sensitive data for the evaluation of muscle mass; assisting in the detection of risks, in order to ensure adequate interventions to improve the quality of life of the elderly, as well as the body mass index and its reference values adopted for the elderly in Brazil[16,17].

The *Overall Evaluation* section was created for subjective evaluation, using patient data and being interpreted by professionals according to their experiences. In this context, checking the overall

state allows an understanding of how the disease has affected the body as a whole. The evaluation of the level of consciousness, although a little more complex, allows the individual's ability to remain alert to be tested through responsiveness to environmental and verbal stimuli[16]. At the same time, the state of hydration can be assessed through abrupt weight loss, skin changes in moisture, elasticity and turgor, mucous membrane changes in relation to moisture and eye changes. In addition, skin color changes were also included in the initial version as: pallor (attenuation or disappearance of rosy skin color), jaundice (yellowish skin and mucous membranes resulting from bilirubin accumulation) and cyanosis (bluish skin color and mucous membranes due to reduced serum hemoglobin)[33].

Finally, the last section, *Skin and Mucous Membranes Evaluation*, focused on elemental lesions - solid formations, liquid collections, changes in thickness and loss, and tissue repair – was initially organized in the form of tables to be completed. In this section, one expert (A) suggested excluding the items "skin disorders" and "pressure ulcer evaluation" from the table. In contrast, two experts (A and H) requested the incorporation of the Braden Scale into the instrument (Chart 3).

The Braden Scale assesses the risk for pressure ulcer, consisting of six topics: sensory perception (ability to react to pressure related to discomfort); moisture; activity; mobility (ability to change and control body position); nutrition; friction and shear. The sum of the score of these parameters can vary from 6 to 23, where the lowest values indicate worse conditions[34]. The scale is important as it complements the multidisciplinary clinical evaluation, with the purpose of identifying at risk individuals and supporting strategies for pressure ulcer prevention.

In short, after its construction and series of evaluations by the nine experts, the instrument was considered adequate in terms of meeting the needs of the health professionals for the admission of the elderly to LTCFs and their care while they remain institutionalized.

The process experienced in the elaboration of this instrument allowed the authors of this study to understand the relevance of multidisciplinary work, since, even after an extensive search for information in scientific databases, the numerous suggestions from professionals with their expertise was a relevant and fundamental factor for the functionality of the instrument.

CONCLUSION

Research in scientific and operational databases provided the necessary theoretical basis for the construction of the present instrument. However, it was difficult to choose the content inserted in the initial version, as the questions were required to cover universal dimensions for use by the multiprofessional team.

Subsequently, the instrument was evaluated by experts in the gerontological-geriatric area, a process designated as validation. Content validity, according to the opinion of the experts, demonstrated the satisfactory relevance, pertinence and representativeness of the inserted items. Some recommended suggestions allowed the inclusion, reformulation and exclusion of items to improve the clarity and comprehension of the instrument.

Thus, the present study achieved its objective - to develop and validate an instrument for the admission of the elderly in long-term care facilities that can be used by all healthcare professionals and, consequently, to support better care planning for this specific population.

This is an innovative instrument that is notable for its originality, since the justification for creating it was the absence of another multiprofessional form that allows a holistic view of institutionalized elderly persons and integrated care. Thus, the next step would be the application of the final instrument in long-term care facilities for the elderly, aimed at verifying its practicality, functionality and validity in clinical practice.

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Risk of hospitalization of elderly rural workers in the state of Rio Grande do Sul

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Abstract

Objective: To analyze the risk of hospitalization of elderly rural workers in the state of Rio Grande do Sul, Brazil. *Method:* A cross-sectional, population-based study was carried out of retired rural workers (N=604), over 60 years of age, of both genders, selected by clusters. In order to evaluate the risk of hospitalization, the Probability of Repeated Hospitalization (or PIR) instrument validated and evaluated for Brazil was used. Risk of hospitalization was calculated through logistic regression analysis, and was classified into the following strata: low (<0.300); medium (0.300-0.399); medium-high (0.400-0.499) and high (≥0.500). *Results:* The rural elderly persons surveyed had a low risk of hospitalization (n=553; 91.6%). There was a predominance of men among the medium to high risk categories (n=42; 82.3%), distributed mainly in the Santa Maria, Sul and Camaquã regions. *Conclusion*: The results of the present study suggest a low risk of hospitalization among this population, however, there is a need for improved, more profound and robust research into the identification of factors associated with the health specificities of this population.

Keywords: Hospitalization. Patient Readmission. Health of the Elderly. Rural Population.

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INTRODUCTION

The biological conditions inherent to the aging process make the elderly more susceptible to morbidities resulting from their physical state. They therefore use health services more frequent, suffer more hospitalizations and stay in hospital for longer than other age groups, making them more susceptible to complications unrelated to the main cause of hospitalization, such as the impairment of functionality[1,2]. In general, the diseases suffered by the elderly are chronic and multiple, persist for several years and require constant monitoring, permanent care, continuous medication and periodic examinations[1-3].

When researching scientific production on the hospitalization of the elderly, Lima et al.[4] emphasized that this reality represents a great challenge for public health management, due to its significant economic impact.

However, studies on the use of specialized services by the population aged over 60 years in Brazil rarely include data from the rural population[5]. Dal Pizzol et al.[6] state that elderly people living in rural areas can exhibit a different pattern of the use of health services to the urban population, both qualitatively and quantitatively. The non-availability of health services close to the homes of the elderly, including basic health care units, or reduced access to these services when available in other places due to transportation difficulties, can be important factors in relation to the use of health services[7].

The financial constraints and social isolation of rural dwellers can also contribute to reduced access to basic health services and, consequently, worsening health conditions, which can lead to increased consumption of specialized services, such as hospitalization.

For this reason, to improve system planning, it is necessary to develop mechanisms to identify the elderly subgroups that require specialized health services more urgently and more intensely, a characteristic described in literature in this field as the frailty syndrome[8].

Thus, effective instruments for evaluating the risk of hospitalization of the elderly population, such as the Probability of Repeated Admission (PRA) scale, are an extremely useful tool, especially for the elaboration of strategies of health management policies[9,10].

A systematic review and meta-analysis in the UK by Wallace et al.[11] confirmed the reliability of the PRA instrument as a predictor of future hospital admission (cluster specificity= 96%, 95%CI, 95.8-96.7=95%). Thus, participants stratified as high risk (score ≥0.5) are highly likely to be admitted to hospital the following year, and this risk score is a reliable predictor of future hospital admission.

Brazilian experience of the use of PRA was described by Perez and Lourenço[10] in a systematic review, reaffirming its applicability as a tool for tracking the risk of hospitalization. Oliveira[12], also in a systematic review, identified the use of this instrument and its effectiveness, establishing it as an effective tool in the elaboration of preventive management strategies[13-16].

The present study aimed to analyze the risk of hospital admission of elderly rural workers in the state of Rio Grande do Sul, Brazil.

METHOD

The present study comprises a cross-sectional, population-based study with sample selection carried out by clusters and systematized based on the identification of the regional units (N=24) of the Federation of Rural Workers of Rio Grande do Sul (or FETAG-RS) and the respective workers unions (N= 348) distributed in the 497 municipal districts of the state.

The sample consisted of 604 people over 60 years of age, affiliated with the rural workers' union of the state and resident in 12 of the 24 regional and 28 municipal units, dispersed throughout the mesoregions of the state.

The 12 regional units were chosen in a random manner, and were: 1- Médio e Alto Uruguai (n=154);

2- Serra do Alto Taquari (n=26); 3- Litoral (n=53); 4- Sul (n=30); 5- Fronteira (n=20); 6- Missões II (n=50); 7- Santa Maria (n=45); 8- Vale do Rio Pardo e Baixo Jacuí (n=33); 9- Camaquã (n=27); 10- Passo Fundo (n=73); 11- Vale do Rio dos Sinos e Serra (n=43); 12- Santa Rosa (n=50).

The sample size was established based on a 95% confidence level and a 5% sampling error, a design effect of 1.5 and a correction for the finite population, with an initial calculated sample of 576 (384 x 1.5 = 576). The calculation base considered a universe of 387,000 rural elderly people in 2013. The sample allocation was carried out in proportion to the number of elderly in each stratum, observed in the union branches of the regional units chosen in the investigation process.

Cognitive evaluation was used as a selection criterion, based on the Mini Mental State Exam (MMSE) with a cut-off of 18 points for the illiterate population and 23 points for individuals with more than one year of schooling[17]. Those with communication difficulties who lived in institutions for the elderly were excluded. Contact with the respondents was intermediated by the unions of the selected municipal districts and the interviews were carried out in homes or at events, in order to achieve saturation based on the number corresponding to each location chosen, on a random basis. The average duration of the interviews was 20 minutes. The researchers, who were university students and professionals, participated voluntarily and were properly trained before the information was collected. Data collection was performed in 2017 and 2018.

The instrument used in this study, known as the Probability of Repeated Admission (PRA) scale, was advocated by Boult et al.[13] and is a simple screening tool for the risk of hospitalization in the elderly population.

Risk factors related to the PRA include age, gender, self-perception of health, history of hospital admission in the last year, number of medical visits, presence of diabetes, heart disease and caregiver availability.

In Brazil, the use of the PRA was attested to by Veras[14], Negri et al.[15] and validated by Dutra et al.[16].

The risk of hospital admission was calculated by means of a logistic regression model, with the formula: PRA= eBX/(1+eBX), where: PIR=probability of repeated admission; E=natural logarithm; BX= B0+B1X1+B2X2+...B13X13; B0= constant of the logistic regression equation (-1.802); X=1 or 0, presence or absence of each risk factor; B= logistic regression coefficient for each risk factor[14,18-20].

Risk factors related to the PRA variables, when applied to a logistic regression model, generate values from 0 to 1, where higher values determine a higher risk of hospital admission. For the reference values, the studies of Pacala et al.[18,19] were used. The degree of frailty was calculated by means of the logistic regression of each risk factor, according to Veras[14]. In this study, the risk of hospital admission was calculated using logistic regression analysis and classified in the strata proposed by Veras[14] as low (<0.300); medium (0.300-0.399), medium-high (0.400-0.499) and high (≥0.500) (Chart 1).

The research data was processed in a spreadsheet with double entry of data, validation and data conferencing. The data was subsequently transferred to the Statistical Package for the Social Science (SPSS) version 24.0, for statistical analyzes.

The data were analyzed using descriptive statistics and the relationships between the frailty phenotypes and the variables by means of frequency distribution and Person's Correlation test, considering values of $p \leq 0.05$ as significant.

The study complied with Resolution N° 466/2012 and was approved by the Research Ethics Committee of the Universidade Federal do Rio Grande do Sul, under n° 1.716.579 on September 8, 2016. All the participants signed a Free and Informed Consent Form.

RESULTS

The sample studied (N=604) was composed of people aged between 60 and 93 years, with a mean age of 69.6 (±7.1) years. Men were the majority (n=321) representing 53.1% of the study population, while women (n=283) accounted for 46.9%.

The mean PRA score was 0.15 (±0.08). In a general context, the prevalence of PRA in the group represented 15.1% (n=91) of the overall population surveyed (N=604), presenting a low risk of hospital admission (n=553, 91.6%), and there was a predominance of the male population in the *Medium* (n=33; 80.5%); *Medium-High* (n=7; 87.5%) and *High* (n=2; 100%) (Chart 1).

Chart 1. Stratification of the probability of repeated admission (PRA) in the population of elderly retired rural workers. Rio Grande do Sul (N=604), 2017-2018.

Stratification of Risk	Probability of Repeated Admission (PRA)	n (%)
High	≥0.500	2(0.3)
Mean-High	From 0.400 to 0.499	8(1.3)
Mean	From 0.300 to 0.399	41(6.8)
Low	<0.300	553(91.6)
Total		604(100.0)

We observed that the rural elderly persons surveyed had a balanced perception between positive (n=312, 51.6%) and negative (n=292; 47.4%) concepts of their health (Table 1), placing the group surveyed among the concepts of *regular* and *good* (n=503, 83.3%). However, there was a predominance of the most negative (*poor* and *fair*) perceptions in the group with the highest hospital admission risk.

In general, the distribution of hospitalizations in the last 12 months, as a variable of the PRA, tended towards a reduction in stratified scores, that is, there was a greater number of people with few or no hospitalizations. However, the *Medium* and *Medium-High* risk factor strata values were higher in relation to individuals with more than one hospitalization (Table 1).

In relation to the number of doctor's appointments, it was observed that the majority of individuals had sought medical assistance in the previous year. However, individuals with a *high* and a *medium-high* risk of hospitalization reported having gone to the doctor or clinic more often (>3 times). In terms of chronic diseases, a diagnosis of diabetes mellitus was reported by the *Medium-High* (n=5, 62.5%) and *High* (n =2; 100%) groups. The *Low* and *Medium* risk groups, meanwhile, accounted for 80.7% (n=446) and 58.5% (n=24) of those who did not have the disease, respectively. Cardiovascular diseases were found to be more closely related to the at risk groups, with only the *Low* risk group containing a concentration of individuals without a diagnosis and/or symptoms of any cardiovascular disorder (n=435, 78.7%).

Analyzing the variables based on gender, there was (table 2) a predominance of men in the highest risk stratification scores, with 13.1% (n=42), in contrast to 3.2% (n=9) of women. In contrast, there is homogeneous distribution among the groups in relation to the perception of health, the presence of chronic diseases and perceptions of social support when referring to having a caregiver, where needed.

In terms of medical consultations, greater numbers of men reported not having sought any medical treatment in the previous year (n=49, 15%).

In relation to age, a significant trend in the distribution of risk scores was identified mainly in the 70-79 year-old group, when the sample was analyzed (p=0.022).

Regarding the regions surveyed (Table 3), although the prevalence of the risk of hospital admission is low, there was a distribution of *Medium* to *High* PRA scores in the South (Camaquã and Pelotas) and Santa Maria regions. However, the identification

of *Medium*, *Medium-High* and *High* risks can be seen, with distribution in the regions of Santa Maria and Camaquã. The Vale do Rio dos Sinos and Serra region (n=43; 100%) contained only elderly persons from the *Low* risk group. *Medium* risk, meanwhile, has a slightly greater distribution in the regions of Pelotas (South) (n=7; 23.3%), Santa Maria (n=5; 11.1%) and Litoral (coast) (n=5; 9.4%).

Table 1. Distribution of risk factors for hospital admission in the elderly rural population of Rio Grande do Sul (N=604), 2017 and 2018.

Risk Factor	Low (<0.300) n (%)	Medium (0.300 a 0.399) n (%)	Medium-High (0.400 a 0.499) n (%)	High (≥0.500) n (%)	Total n (%)	*p**
Perception of Health						
Poor	24 (4.3)	12 (29.3)	4 (50.0)	2 (100)	42 (7.0)	
Fair	220 (39.8)	26 (63.4)	4 (50.0)	0 (0.0)	250 (41.4)	
Good	252 (45.6)	1 (2.4)	0 (0.0)	0 (0.0)	253 (41.9)	0.001
Very good	39 (7.1)	1 (2.4)	0 (0.0)	0 (0.0)	40 (6.6)	
Excellent	18 (3.3)	1 (2.4)	0 (0.0)	0 (0.0)	19 (3.1)	
Hospitalization						
> 3 times	3 (0.5)	2 (4.9)	1 (12.5)	0 (0.0)	6 (1.0)	
2-3 times	16 (2.9)	1 (2.4)	1 (12.5)	0 (0.0)	18 (3.0)	
Once	52 (9.4)	11 (26.8)	3 (37.5)	1 (50.0)	67 (11.1)	0.001
None	482 (87.2)	27 (65.9)	3 (37.5)	1 (50.0)	513 (84.9)	
Doctor's appointments						
> 3 times	140 (25.3)	37 (90.2)	8 (100.0)	2 (100.0)	187 (31.0)	0.001
2 or 3 times	210 (38.0)	4 (9.8)	0 (0.0)	0 (0.0)	214 (35.4)	
Once	129 (23.3)	0 (0.0)	0 (0.0)	0 (0.0)	129 (21.4)	
None	74 (13.4)	0 (0.0)	0 (0.0)	0 (0.0)	74 (12.2)	
Diabetes						
Yes	107 (19.3)	17 (41.5)	5 (62.5)	2 (100.0)	131 (21.7)	0.001
No	446 (80.7)	24 (58.5)	3 (37.5)	0 (0.0)	473 (78.3)	
Cardiovascular diseases						
Yes	118 (21.3)	26 (63.4)	8 (100.0)	2 (100.0)	154 (25.5)	0.001
No	435 (78.7)	15 (36.6)	0 (0.0)	0 (0.0)	450 (74.5)	
Gender						
Male	279 (50.5)	33 (80.5)	7 (87.5)	2 (100.0)	321 (53.1)	0.001
Female	274 (49.5)	8 (19.5)	1 (12.5)	0 (0.0)	283 (46.9)	

*Pearson's Chi-squared test.

Table 2. Distribution of the elderly rural population of Rio Grande do Sul, in relation to hospital admission risk variables, by gender (N=604), 2017 and 2018.

Variables	Gender		Total	*p*
	Female	Male		
	n (%)	n (%)	n (%)	
Age Range (years)				
60-69	154 (54.4)	169 (52.6)	323 (53.4)	0.022
70-79	99 (35.0)	113 (35.2)	212 (35.2)	
80+	30 (10.6)	39 (12.1)	69 (11.4)	
Health Perception				
Excellent	10 (3.5)	9 (2.8)	19 (3.1)	
Very good	20 (7.1)	20 (6.2)	40 (6.6)	
Good	119 (42.0)	134 (41.7)	253 (41.9)	
Fair	111 (39.2)	139 (43.3)	250 (41.4)	
Poor	23 (8.1)	19 (5.9)	42 (7.0)	
Medical appointment				
None	25 (8.8)	49 (15.3)	74 (12.2)	
Once	63 (22.3)	66 (20.6)	129 (21.4)	
2 or 3 times	98 (34.6)	116 (36.1)	214 (35.4)	
> 3 times	97 (34.3)	90 (28.0)	187 (31.0)	
Diabetes Mellitus				
No	219 (77.4)	254 (79.1)	473 (78.3)	
Yes	64 (22.6)	67 (20.9)	131 (21.7)	
Cardiovascular disease				
No	205 (72.4)	245 (76.3)	450 (74.5)	
Yes	78 (27.6)	76 (23.7)	154 (25.5)	
Caregiver				
Yes	255 (90.1)	301 (93.8)	556 (92.1)	
No	28 (9.9)	20 (6.2)	48 (7.9)	
Hospital admission				
No	244 (86.2)	269 (83.8)	513 (84.9)	
Yes	39 (13.8)	52 (16.2)	91 (15.1)	
Probability of Repeated Admission				
Low	274 (96.8)	279 (86.9)	553 (91.6)	
Medium	8 (2.8)	33 (10.3)	41 (6.8)	0.001
Medium-High	1 (0.4)	7 (2.2)	8 (1.3)	
High	0 (0.0)	2 (0.6)	2 (0.3)	

Table 3. Distribution of Probability of Repeated Admission (PIA) in relation to the regions of residence of the elderly retired rural workers in the state of Rio Grande do Sul (N=604), 2017 and 2018.

Regional branches*	Low (<0.300) n (%)	Mean (0.300 to 0.399) n (%)	Mean-High (0.400 to 0.499) n (%)	High (≥0,500) n (%)	Total n (%)	*p*
Médio e Alto Uruguai	147 (26.6)	6 (14.6)	1 (12.5)	0 (0.0)	154 (25.5)	
Passo Fundo	67 (12.1)	5 (12.2)	1 (12.5)	0 (0.0)	73 (12.1)	
Litoral (Coast)	48 (8.7)	5 (12.2)	0 (0.0)	0 (0.0)	53 (8.8)	
Santa Rosa	48 (8.7)	2 (4.9)	0 (0.0)	0 (0.0)	50 (8.3)	
Missões II	47 (8.5)	3 (7.3)	0 (0.0)	0 (0.0)	50 (8.3)	
Santa Maria	36 (6.5)	5 (12.2)	3 (37.5)	1 (50.0)	45 (7.4)	
Vale do Rio dos Sinos e Serra	43 (7.8)	0 (0.0)	0 (0.0)	0 (0.0)	43 (7.2)	0.003
Vale do Rio Pardo e Baixo Jacuí	31 (5.6)	2 (4.9)	0 (0.0)	0 (0.0)	33 (5.4)	
Sul (Pelotas)	21 (3.8)	7 (17.1)	2 (25.0)	0 (0.0)	30 (4.9)	
Camaquã	23 (4.2)	2 (4.9)	1 (12.5)	1 (50.0)	27 (4.5)	
Serra do Alto Taquari	24 (4.3)	2 (4.9)	0 (0.0)	0 (0.0)	26 (4.3)	
Fronteira	18 (3.3)	2 (4.9)	0 (0.0)	0 (0.0)	20 (3.3)	

*Chi-squared test =60.142; degree of freedom =33; *p-value* =0.003.

DISCUSSION

The profile of the risk of hospital admission of the researched population, analyzed according to the variables proposed by Boult et al.[13], indicates certain peculiarities.

The rural elderly persons in this study exhibited a low risk of hospital admission; unlike the studies by Negri et al.[15] which identified a higher risk in the rural elderly population (54.6%) than in the urban elderly population (42.4%).

In general, other studies that evaluated urban or urban and rural samples, such as Estrella et al.[21], Veras[14] and Dutra et al.[16] found a higher prevalence of low risk in the population (76.3%, 75.0% and 64.3%, respectively). Low risk was more prevalent in these studies, with the progressive reduction of the other strata[14,16,20,21].

The rural elderly in Rio Grande do Sul surveyed had a young profile, with a mean age of 69.6 (+7.1) years. For Papalia et al.[22] the term young elderly person normally refers to people aged 65 to 74 years who, according to the authors, are usually active, full of life and vigorous. Older people aged 75-84 years and those aged 85 or older are more prone to weakness and illness and may find it difficult to perform some activities of daily living[22]. While the authors base their work on American studies, which consider elderly persons as those older than 65, it can still be inferred that the population studied has a significant prevalence of individuals at the beginning of the senility process and, therefore, better health conditions among the elderly.

A total of 53.4% of the studied group were concentrated in the 60 to 69 years age group (n=287) and 46.6% (n=281) in the over 70 years of age range. We identified a direct relationship with age in the risk strata observed in this study, as in the studies described by Boult et al.[13], which describe relationships of risk with more advanced ages. A study carried out in eight American states with elderly people hospitalized for acute strokes identified that 16.6% of this population was readmitted to hospital within 30 days and that the advancement of age was a predictive factor[23].

In terms of perception of health, it was observed that negative concepts were more closely related to a greater risk of hospitalization, however the population studied contains a higher prevalence of elderly people who described their health as good or regular. These findings are similar to those reported in other studies such as those of Dos Santos et al.[20] and Garbaccio et al.[24]. However, differences with findings in literature were found in relation to negative health perception, as women were more likely to refer to their health as poor[24]. In this regard, Confortin et al.[25] draw attention to the subjective judgment of the elderly in relation to their physical functioning, and health is included in this overall evaluation of the status described.

Hospital admissions were observed in 15.1% (n=91) of the group, with a higher percentage of cases in the *Medium* and *Medium-High* groups. Hospital readmission situations have been described in non-Brazilian studies, especially in relation to the presence of chronic diseases such as cardiovascular diseases[26] or diabetes *mellitus* (DM). Ostling et al.[27], indicate 30-day readmission rates for patients hospitalized with DM well above (14.4-22.7%) the rate for all hospitalized patients (8.5-13.5%).

Risk factors related to chronic diseases are consistently high, among readmission rates; especially those for heart failure, determining the need for strategies to systematically resolve this problem. Data-based care models that incorporate risk predictions can be used at the point of care to optimize interventions and provide patient-centered care[28].

In terms of regional aspects, differences were observed in the identification of greater risks of hospitalization in some regions, such as Santa Maria, Camaquã and the Southern region, as previously mentioned. A more sensitive analysis of factors associated with these findings requires a careful, deeper investigation, especially considering the prevalence of elderly persons at medium and high risk identified in this study.

Overall, it was found that 91.6% of the population studied had a low risk of hospitalization. In Brazilian studies, a low risk trend was also identified, as in the work by Veras[14], where the studied population presented a rate of 75.8%. It could be said that these 8.4% of the studied population at greater risk is comparable to the approximately 7% described by the aforementioned Brazilian and American studies[14,16,20,21,26].

As a limitation of this study it is worth noting its cross-sectional nature, and that it reflects the condition of rural workers residing in a certain region of the country, who are unionized and the majority of whom are active in their labor and social practices. The associations measured, in the same way, reflect the low number of subjects identified as having a significant risk of hospital admission.

Perez[8] points out that, although there is evidence of the usefulness of the PRA for Brazil, it was created from the identification of predictive variables based on empirical data from North American samples; indicating a need for the evaluation for distinct socioeconomic and cultural realities before its systematic use. In this sense, the present study reflects conditions of reality in the use of the factors of the PRA, without ruling out other conditions that may have an influence on the outcome of hospital admission and indicating the need for robust studies on the subject with this population. Another pertinent issue is the scarcity of literature concerning investigations in Brazil, which would allow comparison with the present study.

CONCLUSION

Population aging is a reality in Brazil, bringing with it socio-political demands inherent to this phase of the life cycle. Among these, those related to the characteristics of the use of health services by the elderly, especially hospitals, are worthy of note.

It can be concluded that the risks of hospital admission of the studied group are associated with elderly men living in the south and center-west regions of Brazil, with the region of the center of the state or the Santa Maria and Camaquã regions, located in the metropolitan mesoregion, representing a reference point. Aspects related to the regional characteristics of the findings of this research suggest

the need for more in-depth studies on several factors related to the Probability of Repeated Admission, especially those that may be associated with the rural elderly population.

Thus, the accelerated process of aging of the Brazilian population presupposes the necessity of understanding the specificities of this group, in relation to the management of health care resources, among other aspects relevant to a dignified and adequate quality of life for the elderly. Thus, the present study indicates certain peculiarities in relation to the demands of elderly persons retired from agricultural labor.

The perception of health and the elements of frailty of agricultural workers, as well as the conditions of access to health services, raise pertinent questions in relation to the agenda to be followed by healthcare managers. In this sense, the creation of suitable policies to address the protection and improvement of the quality of life of the aging population involves not only issues related to the consumption of health services, but also other elements that involve sectors responsible for access to services which are essential for the condition of preventing the frailty of the elderly.

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Factors associated with the quality of life of elderly caregivers of other elderly persons

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Abstract

Objective: To evaluate the association between the double vulnerability of being elderly and a caregiver and quality of life assessed by *Control, Autonomy, Self-realization and Pleasure* factors (CASP-19). *Method:* 148 elderly caregivers participated in the present study. They were selected for convenience from Brazilian public and private health services – a sample from the study "The Psychological Well-Being of Elderly Persons Caring for Other Elderly Persons in a Family Context". The variables: *caregiver's state of health, care demands, perception of burden, self-rated health, and quality of life* were selected. Descriptive analyses, chi-squared tests, Fisher's exact test, the Kruskal-Wallis test and analysis of multivariate hierarchical logistics were carried out, with the *Stepwise* criteria applied for selection of variables. *Results:* The hierarchical multivariate analyses found that number of symptoms and total burden were significantly associated with a poorer quality of life. Elderly persons with three or more symptoms and those with a high burden level were at a higher risk of poor quality of life. The variables *number of diseases, burden, and self-rated health compared with the past*, were significantly associated with a poorer quality of life. *Conclusion:* It can be concluded that for the elderly caregiver, physical aspects (signs and symptoms, chronic diseases and a perception of health deterioration) combined with burden are the aspects that most influence quality of life.

Keywords: Caregivers. Elderly. Quality of Life. Health Vulnerability.

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INTRODUCTION

Available literature on informal caregivers is wide-ranging, emphasizing the importance of studies of caregivers in the context of population aging[1-3]. However, one consequence of population aging remains little investigated: the growing number of elderly persons who are caregivers of other elderly individuals. This caregiver profile deserves attention, as the elderly are more vulnerable due to their biological frailty and are more prone to the development of chronic diseases[4-6]. Caregivers of the elderly, in turn, are also vulnerable to suffering possible burden from their activities and responsibilities, and to social isolation[7-10]. The elderly caregiver therefore suffers double vulnerability, needing to deal with the requirements of care and their own health needs at the same time.

A meta-analysis performed by Pinquart and Sorensen[11] found that elderly caregivers have worse physical health than their younger counterparts. In considering psychological aspects, the study by Borg and Hallberg[12] of caregivers aged 50-89 years found that life satisfaction declined as age increased. However, Chow and Ho[13] studied caregivers of spouses aged 55 and above and found that elderly caregivers scored significantly lower in emotional and social distress, negative feelings, and depression. Despite this, they presented greater subjective well-being.

In this context, the Control, Autonomy, Self-Realization and Pleasure (CASP-19) scale emerged from the need for an instrument that evaluated quality of life in a form that was theoretically based and specific to the elderly. This instrument consists of four domains: control, autonomy, self-actualization and pleasure. The scale was developed on the basis of Maslow's Basic Needs Theory, which understands that quality of life should be assessed as the degree to which human needs are met[14].

The study by Di Novi et al.[15] which used a sample from the first two phases of the Survey of Health, Ageing and Retirement in Europe (SHARE) study, carried out in 11 European countries, used the CASP-19 scale to compare caregivers and non-caregivers aged 50 and over. The authors divided the sample into three groups (northern Europe, southern Europe and continental Europe), according to public expenditure on long-term care. The results revealed the cultural complexity of informal care, as there were differences between caregivers and non-caregivers in total CASP-19 results and scores for the factors of the scale. These data show that socio-cultural differences influence the perception of the quality of life of caregivers; requiring, therefore, that care is taken when comparing studies from different regions of the world and the adequacy of the instruments and forms of the studies.

Rafnsson et al.[16] analyzed 6,784 participants from the first three phases of the English Longitudinal Study of Aging (ELSA) to prospectively investigate the impact of transitions in informal care on the emotional well-being of the elderly. The results showed that in comparison with non-caregivers, caregivers of spouses or parents had lower CASP-19 scores at baseline and after a follow-up period. Participants who were not caregivers at baseline but who cared for a spouse or their parents two years later, as well as those who continued with the status of caregiver, had deteriorating CASP-19 scores.

In this context, the CASP-19 instrument has been found to be effective in several surveys, some of which[17,18] have suggested working with factors other than those initially proposed. It is important to note that, although the scale has exhibited good internal consistency in several studies, the relationship between the items has demonstrated variability. This seems to be related to the specific characteristics of each population. These specificities need to be better explored for a more detailed understanding of the phenomenon. In a previous study with this sample[19], an association was established between double vulnerability and quality of life assessed by CASP-19.

The objective of the present study was to evaluate the association between double vulnerability (i.e. of elderly caregivers) and quality of life assessed by the factors of the CASP-19 scale, seeking a better understanding of this relationship through an evaluation of the disassembling of CASP-19 into factors. The model chosen was that developed by

Neri et al.[18], who performed a semantic-cultural validation of the scale for Brazilian adults and elderly persons. In addition, the authors performed factorial analysis and identified two models, with three and two factors, respectively. The proposal of this study was to prioritize the similarity between samples and to use the two factor model (factor 1, evaluating pleasure and autonomy and factor 2, related to autonomy and control with negative connotations), as this is the only study that performed factorial analysis of the instrument with a Brazilian sample.

METHOD

Data were collected from October 2014 to September 2015 and are taken from the study "Psychological Well-Being of Elderly Persons Who Care for Other Elderly Persons in a Family Context" carried out at the Faculty of Medical Sciences of the Universidade Estadual de Campinas, São Paulo, Brazil. The project employed a descriptive cross-sectional design and aimed to analyze the effects of providing care on the physical and mental health of the caregiver, based on the stress and coping model proposed by Pearlin et al.[20]. From this database, sociodemographic variables (age, gender, date of birth, schooling, marital status and paid work), satisfaction with quality of life needs, self-assessment of health, perceived burden, the physical measurements of the caregiver and the degree of physical and cognitive dependence of the elderly recipient of care were selected for the present study.

Sample size was calculated based on the correlations between quality of life and the coping measures investigated in the study. The Pearson correlation coefficient method was used, with Fisher's transformation, considering a level of significance of 1%, a test power of 90%, a null correlation of 0.10 and a minimum correlation of 0.40, resulting in the need to evaluate 140 caregivers.

The sample consisted of 148 people aged 60 years and older who informally cared for other elderly persons with some type of physical or cognitive impairment. They were recruited on a convenience basis in public and private health services in cities in southeastern Brazil, namely Jundiaí (38.5%), Indaiatuba (29.1%), Campinas (18.2%) and Vinhedo (14.2%), all of which are in the state of Sao Paulo.

The exclusion criterion applied was a score below the cut-off point of the Cognitive Abilities Screening Instrument - Short Form (CASI-S) validated for Brazil by Damasceno et al.[21]. The cutoff point for cognitive deficit is 23 for elderly persons aged 60 to 69 years and 20 for elderly persons aged 70 years and over.

Initially, the project was submitted to and approved by the Research Ethics Committee of the Universidade Estadual de Campinas (opinion: 822.364/2014). Participants were then invited to take part in the survey at the health service where the elderly care recipient received treatment. After signing a Free and Informed Consent Form, the research protocol, which lasted approximately one hour, was applied. The interviews were carried out at the health service or at home, when it was not possible for the caregiver to remain at the health service. Conducting interviews at the health service was authorized by the health professionals responsible through a printed document. Seven trained interviewers conducted the interviews at locations and times previously agreed upon with the participants.

The interviews were conducted in two parts. The first contained questions about the socioeconomic variables of the caregiver and their family, the cognition of the elderly care recipient, and the health conditions of the participants. The second part consisted of evaluations of the physical, psychological and social conditions inherent to the provision of care, family functionality, the health conditions and functionality of the care recipient, a subjective evaluation of care burden, subjective well-being, coping, and a self-assessment of health. After the interview the participants were offered a booklet with instructions on how to facilitate communication with the elderly. The instruments used are described in Chart 1.

Descriptive analysis was performed to describe the profile of the sample. Chi-squared and Fisher's exact tests were used to compare the categorical variables. The Kruskal-Wallis test was performed to

compare the numerical variables between the three groups. After this test was applied, Dunn's post-hoc multiple comparisons test was used to identify the differences in the pairs. To analyze the association between the independent variables and quality of life, multivariate hierarchical logistic regression analysis was used, with a Stepwise variable selection criterion. The level of significance was 5%.

Chart 1. Variables of interest and instruments used in study. Campinas, São Paulo, 2015.

Variables of interest	Instruments
Socioeconomic conditions of caregiver	Questions related to the characteristics of the caregiver: age, gender, date of birth, schooling, marital status and whether they perform paid work. The items in this block were tested in the Fibra Study [22].
Physical health of caregiver	Evaluated by a list of self-reported diseases, based on the question: *Has a doctor ever told you that you have the following diseases*? A list of signs and symptoms that have occurred in the last 12 months. The list of signs and symptoms was based on that used in the SABE Study[23] and replicated in the Fibra Study[22]. The measure of frailty validated by Nunes et al.[24] was also used, according to the criteria of Fried et al.[25]. This consists of five questions about weight loss, reduced strength, reduced physical activity, walking speed and fatigue. These measures are answered in a dichotomous manner.
Self-assessment of health	Contains a five-point question on how the participant evaluates their overall health, another on how they evaluate health care, a three-point question on how they evaluate their health compared to a year ago, and one on how they evaluate their health compared to other people of the same age. Suggested by Bowling[26] and tested in the Fibra Study[22].
Characteristics of elderly care recipient	Age, main health problem, if caregiver resides with the elderly care recipient, if caregiver is the main and/or sole person responsible for them.
Degree of dependence of elderly care recipient in IADLs and BADLs *	Brazilian version of the Lawton and Brody scale[27,28]: evaluates telephone use, transportation, shopping, preparing food, performing household chores, using medication and handling money. The respondent states whether, for each of the actions, they are independent, need help or are totally independent. Katz et al.[29] scale validated for the Brazilian population by Lino et al.[30]. Evaluates the following activities: bathing, dressing, using the toilet, transference, continence and food. The caregiver indicates if the patient needs partial or total help or does not need help for each of these activities
Cognitive dependence of elderly care recipient	Clinical Dementia Rating (CDR): assesses cognitive impairment through six categories: memory, orientation, judgment or problem solving, community relations, home or leisure activities, and personal care. Each category is classified according to the degree of impairment (no change, questionable, mild, moderate and severe). This evaluation is performed through an interview with a person close to the patient.
Satisfaction in quality of life needs	Composed of 19 items answered through a four point Likert type scale (CASP-19)[14].
Caregiver burden	An instrument consisting of 22 questions, with answers given through a five-point scale. It was developed by Zarit et al.[31] and translated and validated for the Brazilian population by Scazufca[32] (α=0.87). The study by Bianchi[33] carried out a factorial analysis of the scale and found three factors. Factor 1 is the domain related to the perception of stresses attached to the role, Factor 2 is the domain of perception of intrapsychic tensions, Factor 3 can be interpreted as the domain related to the presence or absence of competence and negative expectations related to care.

* IADLs: instrumental activities of daily living; BADLs: basic activities of daily living.

RESULTS

The participants were aged between 60 and 86 years old, with a mean age of 69.8 (±7.1) years. The majority were women (77%) and had between 0 and 4 years of schooling (87%), while 51% were the sole caregiver. Regarding the care recipient, 62% were spouses, 28% offspring and 10% other family members, and the mean age was 81 (±9.8) years.

Tables 1 and 2 show the results of the comparisons of the categorical and numerical variables between the terciles of the quality of life factor scores and the results of the hierarchical logistic regression analysis for worsening in quality of life factor 1 and quality of life factor 2. There was a significant difference between the terciles of the quality of life factor 1 score and the number of symptoms (a greater frequency of three or more symptoms in caregivers with worse quality of life), frailty (greater frequency of frail caregivers in those with worse quality of life), Zarit burden scale total and factor scores (greater frequency of greater degree of burden in those with worse quality of life), and subjective evaluation of current health and health compared with the past (greater frequency of worse subjective assessment of current health and health compared with the past in caregivers with worse quality of life).

There was also a significant difference between the terciles of the quality of life factor 2 score based on gender (greater frequency of women in caregivers with worse quality of life), number of diseases (greater frequency of three or more diseases in caregivers with worse quality of life), Zarit burden scale total and factor scores (greater frequency of greater degree of burden in caregivers with worse quality of life), and subjective health assessment (greater frequency of regular health with worse quality of life).

Table 1. Comparison between the frequencies of Casp-19/factor 1 and results of univariate logistic regression analysis for worse quality of life/factor 1, physical health, dependence of recipient of care, burden and self-assessment of health (N=148). Campinas, São Paulo, 2015.

Variable	n	Categories	Comparison between Casp-19 frequencies				Univariate regression analysis values		
			≤22 %	23-27 %	≥28 %	*p*-value	*p*-value	O.R.*	CI 95% O.R.*
Gender	143	Male	15.56	24.53	26.67	0.402**			
		Female	84.44	75.47	73.33				
Age	143	60-64	31.11	18.27	40	0.123**			
		65-74	46.67	54.72	31.11				
		≥75	22.22	26.42	28.89				
Number of diseases	143	0 (ref.)	20	15.09	28.89	0.357**	---	1.00	---
		1-2	40	52.83	44.44		0.510	1.31	0.59–2.90
		≥3	40	32.08	26.67		0.143	1.89	0.81–4.42
Number of symptoms	143	0 (ref.)	15.56	15.09	**33.33**[a]	**0.006****	---	1.00	---
		1-2	37.78	**60.38**[a]	48.89		0.195	1.70	0.76–3.78
		≥3	**46.67**[a]	24.53	17.78		**0.002**	4.31	1.75–10.62
Level of frailty	143	Robust (ref.)	8.89	**24.53**[a]	**20**[a]	**0.015****	---	1.00	---
		Pre-frail	35.56	**49.06**[a]	**53.33**[a]		0.754	1.14	0.49–2.65
		Frail	**55.56**[a]	26.42	26.67		**0.019**	2.91	1.20–7.09
Physical functionality of care recipient (dependence in IADLs and BADLs)	143	0-6 (ref.)	15.56	30.19	31.11	0.377**	---	1.00	---
		7-12	44.44	37.74	42.22		0.233	1.59	0.74–3.41
		13	40	32.08	26.67		0.077	2.06	0.92–4.60
Cognitive Functionality (CDR) of care recipient	143	0-0.5 (ref.)	31.11	49.06	53.33	0.253**	---	1.00	---
		1-2	28.89	20.75	22.22		0.146	1.77	0.82–3.83
		3	40	30.19	24.44		**0.045**	2.07	1.02–4.22
Total Burden	143	≤19 (ref.)	13.33	37.74	**46.67**[a]	**0.001****	---	1.00	---
		20-27	26.67	**39.62**[a]	28.89		0.301	1.51	0.69–3.30
		≥28	**60**[a]	22.64	24.44		**0.003**	3.09	1.46–6.54
Factor 1 burden	137	≤9 (ref.)	17.78	**47.92**[a]	**43.18**[a]	**0.011****	---	1.00	---
		10-15	28.89	22.92	**31.82**[a]		0.510	1.31	0.59–2.90
		≥16	**53.33**[a]	29.17	25		0.143	1.89	0.81–4.42

to be continued

Continuation of Table 1

Variable	n	Categories	Comparison between Casp-19 frequencies				Univariate regression analysis values		
			≤22 %	23-27 %	≥28 %	*p*-value	*p*-value	O.R.*	CI 95% O.R.*
Factor 2 burden	142	≤1 (ref.)	22.22	36.54	48.89	0.057**	---	1.00	---
		2-3	24.44	28.85	24.44		0.167	1.74	0.79–3.82
		≥4	53.33	34.62	26.67		**0.003**	2.98	1.44–6.18
Factor 3 burden	140	≤3 (ref.)	28.89	43.14	40.91	0.321**	---	1.00	---
		4-7	20	23.53	27.27		1.000	1.00	0.45–2.23
		≥8	51.11	33.33	31.82		0.087	1.85	0.91–3.74
Subjective health assessment	143	Good/Excellent (ref.)	33.33	**50.94**[a]	**64.44**[a]	**0.017****	---	1.00	---
		Fair	**57.78**[a]	41.51	35.56		**0.009**	2.33	1.24–4.41
		Poor/Very poor	**8.89**[a]	7.55	0		**0.034**	4.71	1.13–19.70
Subjective health assessment compared to past	143	Better (ref.)	8.89	**16.98**[a]	**17.78**[a]	**0.024****	---	1.00	---
		Same	33.33	**54.72**[a]	**53.33**[a]		0.776	1.14	0.46–2.83
		Worse	**57.78**[a]	28.30	28.89		**0.030**	2.85	1.10–7.34
Subjective assessment of health compared to others	135	Better (ref.)	54.76	54.72	75	0.274***	---	1.00	---
		Same	30.95	33.96	17.50		0.121	1.76	0.86–3.61
		Worse	14.29	11.32	7.50		0.191	1.98	0.71–5.54

*OR = odds ratio for worse quality of life; (n=45 with ≤22, n=53 with 23-27 and n=45 with ≥28). CI 95% OR = 95% confidence interval for odds ratio. Ref.: reference level. Proportional hazards model; **Chi-squared test; ***Fisher exact test; [a]Statistically significant difference.

Table 2. Comparison between Casp-19/factor 2 and results of univariate logistic regression analysis for worse quality of life/factor 2, physical health, dependence of recipient of care, burden and self-assessment of health (N=148). Campinas, São Paulo, 2015.

Variable	n	Categories	Comparison between Casp-19 frequencies				Univariate regression analysis values		
			≤9 %	10-12 %	≥13 %	*p*-Value	*p*-value	O.R.*	CI 95% O.R.*
Gender	144	Male	12.50	**33.33**[a]	18.87	0.046**			
		Female	**87.50**[a]	66.67	**81.13**[a]				
Age	144	60-64	30	25.49	33.96	0.082**			
		65-74	40	49.02	43.40				
		≥75	30	25.49	22.64				
Number of diseases	144	0 (ref.)	7.50	21.57	**32.08**[a]	0.005**	---	1.00	---
		1-2	40	**50.98**[a]	47.17		0.070	2.14	0.94–4.86
		≥3	**52.50**[a]	27.45	20.75		**<0.001**	5.01	2.05–12.26
Number of symptoms	144	0 (ref.)	12.50	23.53	24.53	0.081**	---	1.00	---
		1-2	42.50	56.86	50.94		0.473	1.34	0.61–2.96
		≥3	45	19.61	24.53		**0.044**	2.48	1.03–6.00
Level of frailty	144	Robust (ref.)	7.50	19.61	26.42	0.086**	---	1.00	---
		Pre-frail	42.50	50.98	43.40		0.093	2.08	0.89–4.89
		Frail	50	29.41	30.19		**0.013**	3.10	1.27–7.58
Physical functionality of care recipient (dependence in IADLs and BADLs)	144	0-6 (ref.)	17.50	27.45	30.19	0.492**	---	1.00	---
		7-12	47.50	45.10	33.96		0.130	1.80	0.84–3.87
		13	35	27.45	35.85		0.470	1.34	0.60–2.99
Cognitive Functionality (CDR) of care recipient	144	0-0.5 (ref.)	37.50	47.06	47.17	0.872**	---	1.00	---
		1-2	30	23.53	22.64		0.357	1.43	0.67–3.03
		3	32.50	29.41	30.19		0.588	1.22	0.60–2.47
Total Burden	144	≤19 (ref.)	12.50	**31.37**[a]	**52.83**[a]	<0.001**	---	1.00	---
		20-27	35	27.45	33.96		**0.017**	2.58	1.19–5.59
		≥28	**52.50**[a]	41.18	13.21		**<0.001**	6.25	2.82–13.84
Factor 1 burden	137	≤9 (ref.)	12.82	**37.50**[a]	**54**[a]	<0.001**	---	1.00	---
		10-15	**35.90**[a]	22.92	28		**0.010**	2.86	1.28–6.36
		≥16	**51.28**[a]	39.58	18		**<0.001**	4.88	2.24–10.64

to be continued

Continuation of Table 2

Variable	n	Categories	Comparison between Casp-19 frequencies			*p*-Value	Univariate regression analysis values		
			≤9 %	10-12 %	≥13 %		*p*-value	O.R.*	CI 95% O.R.*
Factor 2 burden	143	≤1 (ref.)	27.50	23.53	53.85[a]	**<0.001****	---	1.00	---
		2-3	15	**39.22**[a]	25		0.222	1.63	0.74–3.57
		≥4	**57.50**[a]	37.25	21.15		**<0.001**	4.13	1.96–8.72
Factor 3 burden	141	≤3 (ref.)	35	37.50	43.40	0.850**	---	1.00	---
		4-7	25	20.83	24.53		0.688	1.18	0.53–2.61
		≥8	40	41.67	32.08		0.347	1.40	0.70 – 2.81
Subjective health assessment	144	Good/Very good (ref.)	25	**60.78**[a]	**58.49**[a]	**<0.001*****	---	1.00	---
		Fair	**60**[a]	37.25	39.62		**0.017**	2.17	1.15–4.09
		Poor/Very poor	**15**[a]	1.96	1.89		**0.003**	11.87	2.32–60.68
Subjective health assessment compared to past	144	Better (ref.)	12.50	11.76	20.75	0.045**	---	1.00	---
		Same	37.50	**47.06**[a]	**58.49**[a]		0.761	1.15	0.47–2.83
		Worse	**50**[a]	**41.18**[a]	**20.75**[a]		**0.025**	2.94	1.14–7.54
Subjective assessment of health compared to others	135	Better (ref.)	47.22	62.50	70.59	0.125***	---	1.00	---
		Same	33.33	27.08	25.49		0.192	1.61	0.79–3.27
		Worse	19.44	10.42	3.92		**0.013**	3.96	1.33–11.75

* OR = Odds ratio for worse quality of life; (n=40 with ≤9, n=51 with 10-12 and n=53 with ≥13). 95% CI OR = 95% confidence interval for odds ratio. Ref .: reference level. Proportional hazards model; **Chi-squared test; ***Fisher exact test; [a]Statistically significant difference.

In the hierarchical multivariate analyzes, the number of symptoms and total burden were significantly associated with poorer quality of life in the factor 1 score. The elderly persons with the highest risk of a worse quality of life were those with three or more symptoms (3.0 times greater risk), and a high degree of burden (5.9 times greater risk). The variables *number of diseases*, *burden factor 2* and *subjective assessment of health compared with the past* were significantly associated with a worse quality of life in the factor 2 score. The elderly with the highest risk of a worse quality of life were those with three or more diseases (5.0 times greater risk), those with a high degree of factor 2 burden (6.0 times greater risk), and a worse assessment of health compared with the past (4.9 times greater risk).

DISCUSSION

Despite its different dimensions, burden was the most significant variable in determining quality of life. For factor 1, total burden remained in the model. For factor 2, only burden-factor 2 remained in the final model.

Factor 1 is more related to issues of pleasure and self-realization, or how one perceives one's life. This association was expected because, although perceived burden was associated with objective issues related to care, such as the degree of dependence of the care recipient and hours dedicated to care[34,35], it was also related to the variables *quality of life* and *well-being of the caregiver*[36,37].

Factor 2 is more closely related to control and autonomy, especially in relation to external factors. Contador et al.[38] evaluated the burden of informal caregivers of patients with dementia and verified that aspects related to control (self-efficacy and contingency) most explained burden. In this study, only factor 2 burden, which concerns intrapsychic tensions, remained in the final model.

Regarding caregiver health, having more signs and symptoms of disease was associated with a worse factor 1 quality of life, while chronic diseases were associated with factor 2 quality of life. Although signs and symptoms are directly related to physical health, studies have shown that the manifestation of symptoms does not occur in the same way for all subjects. The perception of symptoms is related to attention to internal states, mood, cognition and environment[39].

Thus, exhibiting more signs and symptoms of disease and perceiving greater burden was associated with lower quality of life in the pleasure and self-realization dimension; and the presence of more chronic diseases, perception of declining health and more intrapsychic stresses related to care were associated with lower quality of life in the control and autonomy dimension.

In general, the health of the caregiver (signs and symptoms, chronic diseases and perception of poor health) and perceived burden were the aspects most associated with quality of life. However, the degree of physical and cognitive dependence of the care recipient did not prove very important for this association. These data suggest that for the elderly caregiver, their health and how they perceive the burden of care influence quality of life more than the dependencies of the elderly care recipient.

Although it provides advances in our theoretical knowledge of elderly persons who care for other elderly persons, the present study has limitations. As it did not use a representative sample, the results cannot be extended to the entire population of elderly caregivers in Brazil.

CONCLUSION

When the two factors are considered it can be concluded that, for elderly caregivers, aspects of physical health (signs and symptoms, chronic diseases and perception of worsening of health), together with burden, most influence the quality of life of this type of caregiver.

The objective conditions of care (degree of physical and cognitive dependence of the care recipient) did not appear to be relevant to the caregiver's quality of life, contrary to the findings of other studies. Perhaps because of their age, the health of the caregiver is more important than the dependence of the care recipient.

Further studies on the elderly who informally care for other elderly persons are recommended. It is important to carry out research that tests interventions with this specific population, in order to propose improvements to the quality of life of these caregivers.

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Reach of "VAMOS" program in basic healthcare - organizational barriers and facilitators

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Abstract

Objective: To investigate the organizational barriers and facilitators to the reach of the "Active Life Health Improvement Program" (or VAMOS) implemented in two Basic Health Units (BHU) in Santa Catarina, Brazil. *Method:* An experimental study was carried out, based on the RE-AIM framework (http://www.re-aim.org/). Barriers and facilitators were identified through a focus group, semi-structured interview and content analysis. *Results:* In terms of reach, of the 297 Basic Health Care (BHC) users from the two BHU, 51 elderly people participated, a rate of 17.2%. One notable barrier identified was the lack of support from health teams, while the recommendation of the program by health professionals was found to be a facilitator. *Conclusion:* The VAMOS program has the potential to be incorporated as a public policy in the process of health care and promotion in BHC. It is an unprecedented strategy in Brazil, aimed at behavioral change, using a sustainable system, the BHU, which has a considerable population reach.

Keywords: Program Evaluation. Primary Health Care. Healthy Lifestyle. Health of the Elderly.

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INTRODUCTION

The prevalence of physical inactivity is high throughout world, including in Brazil[1,2]. It is considered one of the four risk factors for the development of chronic non-communicable diseases[2]. At the same time, physical activity is widely publicized as being beneficial to health. Such evidence is already established in literature[3]. Yet promoting physical activity at the population level is still a challenge[4].

In Brazil, the Ministry of Health has been investing resources in implementing physical activity programs in the Unified Health System (or SUS)[5,6] since 2005. In 2006, the National Policy for Health Promotion (or PNPS) was approved, which inserted physical activity into the health promotion strategy, and reinforced the importance of promoting a physically active lifestyle[6].

As part of this process, there has been an increase in the provision of traditional physical activity programs throughout Brazil. In general, these programs are characterized by the presence of a Physical Education professional and structured classes (aerobics, yoga, and dance, among others), with a weekly duration of two to three hours. This type of program has achieved good results when the group is assiduous and perform the activities with moderate intensity[7-11]. However, they are expensive for the SUS to maintain as they require appropriate spaces, specific materials and a large number of professionals, and also serve a restricted public and have low population reach[12].

In this context, a program of behavioral change was created, called the Active Life Health Improvement Program (or VAMOS), based on the social-cognitive theory of Albert Bandura[13], which aims to motivate people to adopt an active and healthy lifestyle through physical activity and eating habits[14,15]. It aims to remedy the gaps in current traditional physical activity programs, with a view to increasing the adhesion of participants and making them sustainable within the logic of the public health service[12].

There is a notable scarcity of studies that evaluate dimensions other than effectiveness[16,17]. The identification of intervening factors in relation to the reach of programs that promote physical activity in Basic Health Care (BHC) allows important reflections that can affect the implementation process.

Reach is one of the dimensions of the RE-AIM tool[18] and consists of a measure of participation on an individual level. In other words, it considers the absolute, relative and representative number of users who are interested in participating in a program, compared with those considered potentially eligible[19].

In addition, when considering this dimension from the perspective of the professionals involved in the program, especially with regard to barriers and facilitators, it is of fundamental importance to understand aspects that influence the adherence of users to the intervention. In view of the above, the present study investigated organizational barriers and facilitators to the reach of the VAMOS program in Basic Health Units (BHUs) in Florianópolis, Santa Catarina, Brazil.

METHOD

An experimental study using a mixed method approach was carried out[20]. The study was conducted in Florianópolis, Santa Catarina, Brazil, specifically, in two BHUs, in the year 2012. The population was composed of elderly BHC users and professionals from the BHU health service. In the year in question, the municipal region had an estimated population of 421,240 inhabitants and 50 BHUs distributed among five Health Districts (Center = 5 BHUs, Mainland = 12 BHUs, East = 9 BHUs, North = 11 BHUs and South = 13 BHUs)[21].

In order to define the BHUs in which VAMOS would be implemented, inclusion criteria were adopted hierarchically, and it was established that the program would only be implemented where all levels agreed to participate. Approval was required from: the Municipal Health Department; the project management in the BHC network; the coordination of the Family Health Support Center (FHSC); the coordination of each Health District; the coordination of the BHUs; and the FHSC Physical Education Professional.

The professionals involved were: managers or coordinators of programs developed in the BHC of Florianopolis City Council (n=2), FHSC Physical Education professionals (n=7) and professionals of the BHU health teams, including coordinators (n=2), upper (n=2) and middle (n=3) level health professionals and community health agents (CHA) (n=13).

Elderly persons who had undergone some type of procedure in the BHU in the six months prior to the start of the study (November 2011 to April 2012) were eligible to participate in VAMOS. To identify such individuals, data from the health information system (or InfoSaúde) of the Municipal Health Department[21] were consulted. From this information it was possible to quantify the number of elderly persons from the BHUs who were potentially eligible.

The health professionals participated in the VAMOS outreach process and were involved in all stages. Meetings were held about the implementation of the program, and dissemination strategies were developed with the staff of the health teams at each BHU, to invite elderly users to attend a meeting about the program. Among these strategies were: posters placed in the BHU, verbal invitations from professionals during appointments, verbal invitations and distribution of flyers by CHAs in community centers, churches and during home visits. The health teams publicized the program for a period of 15 to 20 days.

The elderly persons were invited to participate in the first meeting (stage 1 - S1) at a defined date, place and time. This was conducted by a team of researchers from the Universidade Federal de Santa Catarina (UFSC) with the assistance of health teams from the BHUs. VAMOS and how to participate in the program were discussed at the meeting. In order to identify the profile of those interested in participating, an individual assessment was carried out to obtain sociodemographic, clinical, anthropometric and lifestyle data.

However, due to the reduced participation of the elderly in each BHU in S1, the team of researchers with the health teams reformulated the format of the program presentation meeting, and established a new period of dissemination in order to recruit more participants. After final recruitment, two classes were formed (one in each BHU) and the program began.

The VAMOS program is based on the concept of empowerment, following an approach aimed at improving individual skills, identifying barriers that are important to people's lives, and developing strategies to minimize the same[14].

The group program lasted for 12 consecutive weeks, and involved weekly meetings of approximately 90 minutes, which were conducted by previously trained FHSC Physical Education professionals. At each meeting a topic from the didactic material was presented, available free to the elderly, using the methodology "health education" and behavior change techniques[14]. This program format, aimed at behavior change and developed and tested directly in the health service in Brazil is considered an unprecedented strategy.

The VAMOS meetings were held in the premises of a BHU and in a community space (church). Participation in the meetings was encouraged through positive reinforcement in the form of gifts to the participants and snacks at the end of each meeting to broaden interaction between the group.

During the program (stage 2 - S2), two focus groups were conducted with the Physical Education professionals involved in the study, the first of which occurred one month after the beginning of VAMOS and the other two months after the program began.

A focus group is a form of a collective interview that represents a network of interactions based on communication and seeks to gather information about the understanding of a particular topic[22]. A previously defined script was used and the meetings were conducted by a moderator trained and experienced in the technique, with the aid of two observers. The focal groups had an average duration of 30 minutes and the discourses were recorded and transcribed in full.

At the end of the program, post-intervention evaluations (stage 3 - S3) were performed. A new evaluation of the elderly (identical to S1) and 12 individual interviews (average duration of 15

minutes) were carried out with: the coordinator of the project management of the Municipal Health Department of Florianópolis, the coordinator of Physical Education of the FHSC, the FHSC Physical Education professionals who did not agree to the application of the program and the professionals from the BHUs that participated in the study, who were BHU coordinators and higher and middle level professionals. In addition to the interviews, three focus groups were conducted, two with the CHAs of each BHU and one with the Physical Education professionals involved in the program.

The reach of the VAMOS program was evaluated using the RE-AIM tool[18], which aims to evaluate the real impact of public health programs[16,18,19]. To calculate reach, the following formula was used: number of people who participated ÷ number of eligible persons × 100 = reach. In this study, the reach rate was obtained by the number of elderly people who were willing to participate in VAMOS and who underwent the first evaluation, divided by the number of potentially eligible elderly persons.

The descriptive data were expressed as mean, standard deviation, absolute and relative frequencies. Organizational barriers and facilitators were evaluated through focus group data and interviews using the thematic content analysis technique based on the following phases: pre-analysis, material exploration, interpretation of the statements[23,24].

The study was approved by the UFSC Ethics Committee on Research Involving Human Beings under process nº 2,387 and complied with the ethical precepts of Resolution 466/12 of the National Health Council. All the study participants read and signed a Free and Informed Consent Form.

RESULTS

Two BHUs from Florianópolis participated in this study and agreed to implement the VAMOS program. Of these, one was from the North Health District (BHU 1) and one from the Eastern Health District (BHU 2).

The reach rate of the program is shown in Figure 1.

Of the 297 eligible elderly persons, 30 participated in the first meeting (S1) and, after an extra dissemination period, 21 elderly persons joined, giving a total of 51 participants. BHU 2 of the Eastern Health District had the highest reach rate (20.4%). Through the first evaluations of the elderly in each BHU, it was possible to identify the profile of the population who were interested in participating in VAMOS (Table 1).

Organizational barriers and facilitators for the reach of VAMOS were subdivided according to the categories identified and the number of occurrences (Chart 1).

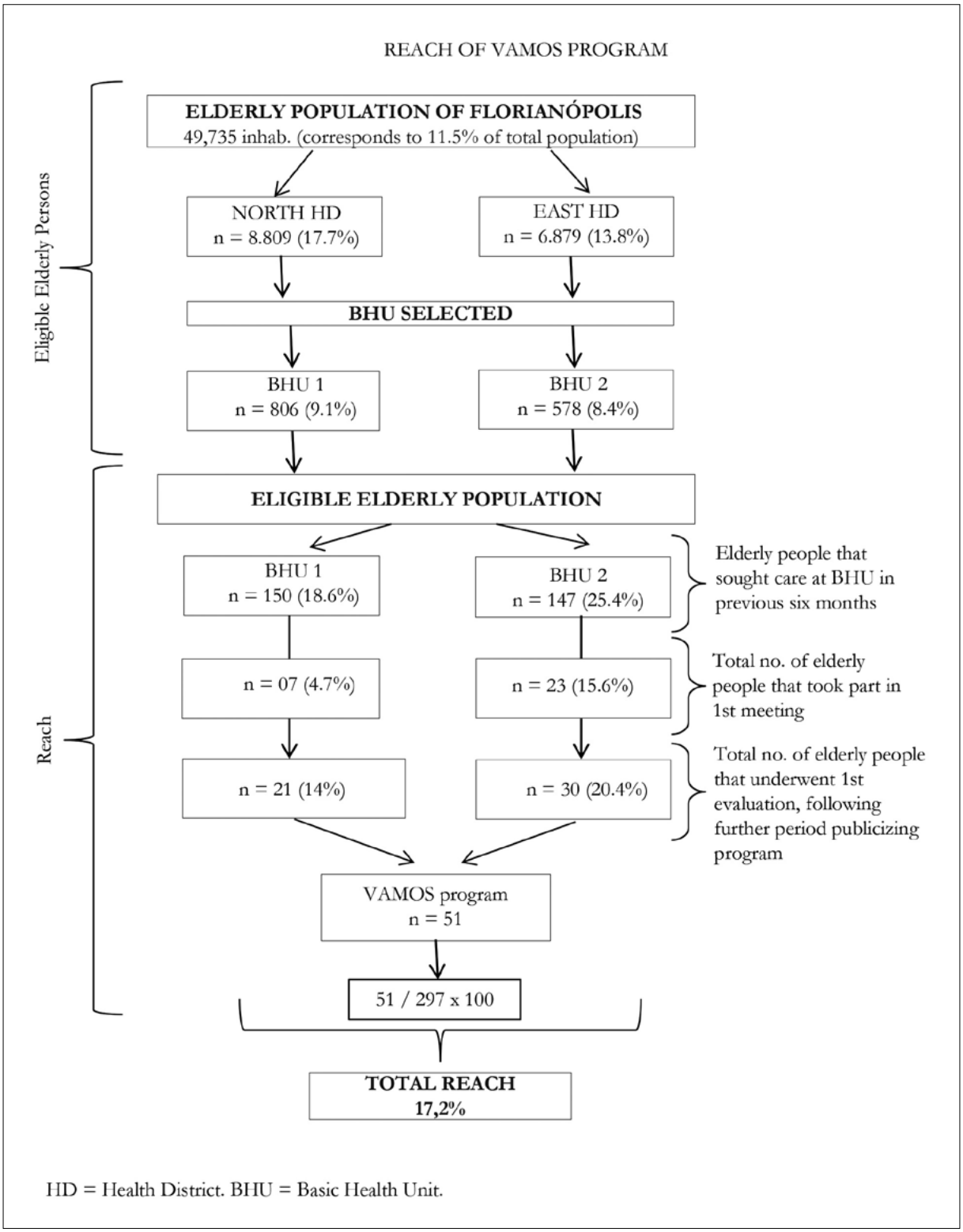

Figure 1. Populational reach of VAMOS in BHUs. Florianópolis, Santa Catarina, 2012.

Table 1. Sociodemographic, clinical, anthropometric and lifestyle profile of the elderly, by BHU (S1). Florianópolis, Santa Catarina, 2012.

Sociodemographic Variables	BHU 1	BHU 2
Age (years) * (n=37)	69.5 (±8.6)	70.1 (±7.1)
Gender ** (n=51)		
Female	12 (57.1)	29 (96.6)
Male	9 (42.9)	1 (3.4)
Schooling** (n=40)		
Illiterate	3 (13.0)	0 (0.0)
Incomplete Primary	9 (39.0)	11 (65.0)
Complete Secondary	3 (13.0)	3 (17.0)
Complete Higher	4 (18.0)	2 (12.0)
Others	4 (17.0)	1 (6.0)
Civil Status ** (n=40)		
Married/Civil Partnership	17 (74.0)	8 (47.0)
Widowed	2 (9.0)	6 (35.0)
Divorced	4 (17.0)	3 (18.0)
Current Occupation ** (n=37)		
Retired	14 (66.0)	11 (69.0)
Pensioner	2 (10.0)	3 (19.0)
Paid Labor	1 (5.0)	0 (0.0)
Unpaid Labor	3 (14.0)	0 (0.0)
Others	1 (5.0)	2 (12.0)
Clinical		
Presence of Disease** (n=40)		
Yes	23 (100.0)	16 (94.0)
Not	0 (0.0)	1 (6.0)
Use of Medications** (n=40)		
Yes	20 (87.0)	15 (88.0)
Not	3 (13.0)	2 (12.0)
Anthropometric		
Waist Circumference (cm)* (n=37)	89.0 (±11.4)	93.2 (±7.9)
Body Mass Index (kg/m²)* (n=37)	26.8 (±0.9)	28.1 (±1.1)
Lifestyle		
Daily MVPA level (minutes)* (n=43)	32.1 (±6.1)	36.0 (±5.5)

*Values show mean ± standard-deviation; **Data presented as absolute and relative frequency (in brackets); MVPA = moderate/vigorous physical activity.

Chart 1. Organizational barriers and facilitators for reach of VAMOS program in BHUs of Florianópolis, Santa Catarina, 2012.

Reach	
Barriers (n=15)	Facilitators (n=20)
Lack of support from health teams (n=9)	Recommendation of program (n=11)
Lifestyle of the elderly (n=7)	Includes practical activities (n=7)
Lack of understanding about the program (n=6)	Interest in the program (n=6)
Resistance to the innovative character of the program (n=4)	CHA support (n=5)
Elderly persons participated in other groups (n=4)	Delivery of flyer in BHU (n=5)
Program format limits the participation of illiterate people (n=4)	Involvement of health teams in publicizing program (n=4)
Administrative problems in BHU (n=3)	Informed about program face to face (n=4)
Program timetable (n=2)	Longer period publicizing program (n=4)
Overlooks territorial needs (n=2)	Diversification of age group (n=3)
Short period publicizing program (n=2)	Printed didactic material (n=3)
Seasonal nature (n=2)	Physical structure in or near BHU (n=2)
Physical distance (n=2)	PEP known to community (n=2)
Community resistant to program (n=1)	Publicized in strategic locations (n=2)
Lack of communication (n=1)	Publicized through former participants (n=2)
Program for restricted population (n=1)	Flexible program (n=1)
	Offer program to health teams (n=1)
	Meet the needs of the participants (n=1)
	Permanent publicity of program (n=1)
	Publicizing of program on radio (n=1)
	Program has a beginning, middle and end (n=1)

CHA = Community Health Agent; BHU = Basic Health Unit; PEP = Physical Education Professional; n = number of occurrences.

DISCUSSION

To understand the results, the discussion focuses on the three topics investigated: population reach, organizational barriers and organizational facilitators, emphasizing the main findings. It should be pointed out that, given the richness of the discourses analyzed, the sections of the speech with greater emphasis will be presented in order to broaden the understanding of the analyzed variables.

Population reach of VAMOS

The results of the study show a participation rate of 17.2%, higher than that found in the Squarcine study[25], which found a rate of 1.6%. The low reach of existing programs has worried researchers[12,14]. Despite evidence in literature[26,27] on the effectiveness of physical activity promotion programs, little progress has been made in finding new participants, failing to serve or reach a large portion of the population.

A study[28] suggests strategies, considered facilitators, to participate in behavior change programs, minimizing possible barriers and maximizing reach. Such strategies consist of locally accessible programs that allow quick and easy access, such as convenient, small-size socializing interventions, as well as informative websites, online programs, and integrative strategies for healthy behaviors in daily life.

Specific cell phone apps also represent an effective strategy and can be used by health professionals to promote the practice of physical activity[29]. Such technologies have the potential to significantly impact public health[30,31].

According to Mathews et al.[32], physical activity promotion strategies should address the modifiable determinants of physical activity, such as improving self-efficacy and knowledge about adequate fitness activity and recommended strategies for achieving the same, facilitating the achievement of goals, and improving social support through peer support and group-based activities.

From this it can be inferred that it is not enough to be effective, a program must also be attractive, so that reach is enhanced and a large part of the population benefits.

Organizational barriers to VAMOS reach

One barrier was the lack of support from the health teams. This is partly because the team believed it was not a BHU program, but rather something connected to the University. The professionals of the BHU were slow to incorporate the publicizing of the program in their daily routine of activities. "... *the* (health team) *wasn't obliged to do it. So it wasn't seen as a group from the unit, and so the team wasn't responsible for it* ... "(CHA BHU 2).

Another barrier mentioned related to the lifestyle of the elderly. In the view of some professionals, they generally prefer to spend most of their time at home, making it difficult for them to become involved in community group activities: "[...] *I think it was difficult because they're at home a lot, aren't they? They don't go out much. For most of the elderly people it's their children who do things, right*?" (MLP BHU 2).

A lack of understanding about the program was another barrier. As a cultural issue, health teams had limited understanding of what a behavior change program is, and the lack of understanding among the professionals involved made the recruitment of participants slower. "[...] *people still don't have a culture of talking about physical activity in theoretical groups, so often the teams didn't understand* [...]" (PEP 1). During the presentation of VAMOS to the health teams, according to the same individual, the objectives and format of the program were not clear: "[...] *so much so that the teams often did not understand* [...]" (PEP 1).

A lack of understanding of VAMOS may have influenced the ability of health care staff to invite elderly people to participate, affecting reach. However, this view was not in line with the answers given, as professionals referred to the program as attractive and innovative compared to other models of programs in BHC. The CHA criticized the impact of specific actions of Physical Education that routinely apply in the network:

> "[...] these innovations that the program brings, "what is it to be active?" because we work hard with, say, intermittent Physical Education actions, and do not reflect on what it is to be active in life. Thinking that you just go to the gym, do an hour, you're active. So for me, this awareness of being active on a daily basis is a great innovation of the program [...]." (G1).

Even with professionals realizing that the innovative character of VAMOS is an improvement over the current proposed program models, this characteristic was initially seen by the elderly as a barrier. "... *They (the elderly) have a certain difficulty with everything that is new ... they are afraid and then, when inviting them to do something new, they are frightened, just like a child, right? ... they do not know what will happen."* (CHA BHU 1).

In terms of a general analysis of the barriers, it should be noted that VAMOS was considered to have an innovative format for a program for the promotion of physical activity. It is very different to what the population is accustomed to, and initially there was resistance from the elderly, mainly because they are not used to participating in theoretical physical activity promotion programs.

According to literature, traditional programs of physical activity are culturally more attractive, since they are based on a framework of eminently practical activities[33]. Therefore, the identification of barriers that limit the applicability of behavior change programs is an important way of optimizing the actions performed.

Organizational facilitators of VAMOS reach

In relation to facilitating factors, several factors that can lead to the maximization of reach among the target population by BHC professionals were identified. Some of these are directly related to dissemination strategies, others to the attitudes of professionals and, finally, to the format of the program.

One frequently recurring facilitator was the recommendation of VAMOS by professionals. It is understood that if these professionals, in their different actions within the BHU, recommend the program, its dissemination is maximized, as it is not only diffusion by one professional or another, but by of all of them, as part of a team effort. "*For sure* [...]." (CHA BHU 1; ULP BHU 2); "*I would recommend it* [...]." (CHA BHU 2).

The insertion of practical activities, especially dance, was also considered an interesting strategy for attracting the elderly to the program by the BHC professionals. "*But if you organize a dance class, then they'll come.*" (CHA BHU 2); "*If it was like this, it there's going to be a band when we start exercising, they'll come, I guarantee they like to dance.*" (CHA BHU 2).

Interest in the program is an essential facilitator. If the health team has no interest in implementing it, then implementation will not be successful. This interest is shown below, where the coordinator reports a feeling of sadness at not being able to become more involved in the process: "[...] *I am sad because I could not get involved, but it's like I said, the health center is more disorganized in recent years, we've been commenting on it [...].*" (Coordination BHU 2).

The support of the CHAs was fundamental to the process of attracting the elderly. In this sense, a proposal was launched by the CHAs: applying VAMOS among themselves, even before recruiting users. This proposal would increase the understanding of the program by these professionals, as it would allow them to adopt the practice of physical activity. Getting to know and experiencing what the program is about, they would have the opportunity to enjoy its benefits, positively influencing its dissemination: "[...] *It would be good if the team could do the program* ..." (CHA BHU 1); "... *but in itself the program motivated the employees to be more active, and we ended up passing this enthusiasm on to the girls.*" (Other BHU professionals).

The adaptation and flexibility of the program in the context of BHC was cited as a facilitator. Set programs without the possibility of change are often created, and their application is practically unfeasible. In this sense, the need to design a program with a flexible format that adapts to context was identified, as each reality is unique and each group has its needs. *"[...] one thing that made it easier (*the recruiting*) was that they could not only join at the start (flexible program), they could join the next week, with each of them telling the others about it [...]."* (Coordination BHU 1).

In addition, the Physical Education professionals who applied VAMOS warned of the need for adjustments in the program, considering the profile of the majority of Brazilian elderly persons: "[...] *Our elderly people do not like to read, it has to be modified* (referring to the textbook used as a base) [...]. "(PEP 1); "[...] *Lessons can't be so theoretical* [...]". (PEP 2). According to the professionals, irrespective of the fact that it is an educational program, VAMOS should have practical activities, making it more attractive.

Another interesting aspect in relation to facilitating the recruitment of participants that was suggested is that VAMOS should not be limited to the elderly, but also to younger people, mainly because it is a behavior change program "[...] *I would be a little reluctant to leave it only for the elderly, broadening it more to other age groups I think (there would be demand)* [...]. (Coordination BHU 1). But it is worth mentioning that even in programs that are open to the general population, the highest adherence in activities is among people over 50, who are usually female[34].

Therefore, reach can be facilitated if the program to be implemented is designed through considering its real world feasibility. Flexibility is essential, so that the program can adjust to the practical environment[33]. In other words, the intervention must be adaptable, something conceived in VAMOS from the outset.

The present study did not include a detailed description of the sociodemographic and behavioral characteristics of the target population, a fact that

limits representative analyzes to elucidate the profile of the potential users of the program.

This study extrapolates the laboratory context, as it was developed in the "real world". The data strengthens the external validity of the study, as the health professionals themselves described the organizational barriers and facilitators that interfered in the process of recruiting the elderly to the VAMOS program. In addition, two different contexts were presented, reach by Health District and by BHU.

CONCLUSION

The present study provides important research that can contribute to the process of evaluating programs in Primary Health Care, aiming to reach and benefit a wider public with health promotion strategies.

The implementation of the VAMOS program showed that the organizational strategies used need to be improved to widen reach within the Unified Health System. However, it was observed that as a behavior change program to promote an active and healthy lifestyle, VAMOS has the potential to be incorporated as part of public policy in the process of care and promotion of the health of Basic Health Care users.

The program format and strategies of recruitment of the target population are being improved in order to enhance the VAMOS program and minimize the barriers highlighted in this study.

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Quality of life of elderly *quilombolas* in the Brazilian northeast

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Abstract

Objective: To evaluate the quality of life (QoL) of elderly *quilombolas* (residents of *quilombo* settlements first established by escaped slaves) in mixed urban and rural residential developments *(agrovilas)* in Alcântara, Maranhão, Brazil. *Method:* An observational, cross-sectional and descriptive study was performed. The sample consisted of 129 elderly people of both genders, aged 60 years or older and living in northeastern Brazil. The sample was allocated into three groups, distributed according to geographic space. Quality of life was assessed using the WHOQoL-Bref instrument and a sociodemographic questionnaire was applied. The comparison between groups was carried out using the Anova test (one-way) and subsequently the Bonferroni Post-Hoc test. The correlation was obtained by the Pearson test, $p<0.05$. *Results:* Elderly *quilombolas* had a mean age of 69.7 years (±7.9) and were predominantly men with low income and schooling. Quality of life had higher scores in the social domain (values) and lower in the environmental domain (values). Quality of life as measured by the psychological domain was higher in group I than in groups II ($p=0.012$) and III ($p=0.002$). The facets of QoL correlated with facets of health for group I (r=0.357; $p=0.032$) and III (r=0.461; $p<0.001$). *Conclusion:* The situation of the *quilombola* population surveyed is considered vulnerable and psychological factors influence QoL.

Keywords: Health of the Elderly. African Continental Ancestry Group. Quilombolas. Quality of Life.

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INTRODUCTION

The *quilomba* (residents of *quilombo* settlements originally established by escaped slaves) population is vulnerable to diseases that include social aspects, both at different stages of life and on an individual basis[1]. The situation of vulnerability experienced by the black population in Brazil was recognized by the Brazilian federal government when it created the Special Secretariat of Racial Equality Promotion Policies (or Seppir) in 2003[2]; through the Brazil *Quilomba* Program in 2004; and with the establishment of the National Policy of the Integral Health of the Black Population (or PNSIPN) in 2009[2]. This emphasizes the need to guarantee and expand the access of the rural population, particularly *quilomba* populations, to health actions and services[2].

The process of the official institutional recognition of a *quilomba* community by the Brazilian State begins with the community's own self-identification as such, through territory, social relations and specific cultural manifestations, with the inference of African heredity and memories of the resistance to the historical oppression suffered[3,4].

According to the Palmares Cultural Foundation[5], Maranhão has the second largest number of certified *quilomba* communities among Brazilian states, with a total of 492 (the largest is Bahia, with 638). Among the municipal regions of Maranhão, Alcântara has the largest number of communities, with a total of 79. For the Association of Rural Black *Quilomba* Communities of Maranhão (or Aconeruq) *quilomba*s still struggle to secure basic rights such as access to health, formal education, vocational training, improved working conditions and income generation[6].

In Alcântara, between 1986 and 1987, 312 families suffered the loss of their territory when they were transferred to seven *agrovilas* (mixed urban and rural residential developments) created by the Brazilian Air Force at the time of the establishment of the Alcântara Launch Center (ALC): Espera, Cajueiro, Ponta Seca, Só Assim, Pepital, Marudá and Peru[7,8]. Previous research[6-8] on the *quilomba* territories of Alcântara showed the transformations and impacts that occurred as a result of the resettlement in *agrovilas*; however, there was no discussion about the quality of life (QoL), especially of the elderly who experienced the entire process of loss of their territories.

The World Health Organization (WHO) defines QoL as "an individual's perception of their position in life, in the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards and concerns"[9].

The objective of this study was to evaluate the QoL of the elderly *quilombas* of the *agrovilas* of Alcântara, Maranhão, describing their sociodemographic characteristics and considering the general facets and the *physical, psychological, social relations* and *environment* domains.

METHOD

This is an observational, cross-sectional and descriptive study carried out in the urban area of Alcântara, Maranhão, Brazil, in the *agrovilas* created by the Brazilian Air Force.

The survey was conducted between June and December 2012 by a team of five healthcare professionals (one nurse, three nursing technicians and one pharmacist) who were previously trained to collect data.

The total number of elderly persons and their addresses in each of the *agrovilas* were obtained through home visits made by community health agents of the Family Health Strategy (FHS). The total population of the *agrovilas* is approximately 1,600 inhabitants. Based on this number, the sample size was calculated using the StatCalc tool of the Epi Info 7 statistical program, considering a prevalence of elderly persons of around 5% to 9% and a confidence interval (CI) of 95%, reaching a value of 117. A further 10% was added to this figure as a correction factor for possible losses.

The *agrovilas* were grouped by size and geographical proximity, resulting in their division into three groups, as follows: Group I: Ponta Seca, Cajueiro, Espera; Group II: Só Assim, Pepital, Marudá and Group III: Peru. A total of 129 questionnaires

were applied, with Group I containing 36 elderly persons, Group II 48 and Group III 45. There were 22 ineligible individuals, 11 of whom were unable to be located, six of whom were traveling and five who were unable to respond. The final sample calculation was 129 individuals.

The approach to the elderly began with the application of the Mini Mental State Examination to assess the cognitive conditions of those eligible to communicate with the researcher and consent to participation in the interviews. After this step, the objectives and procedures of the research were explained, as well as the request to sign a Free and Informed Consent Form, followed by interviews at the homes of the participants.

Quality of life was assessed using the World Health Organization Quality of Life-Bref questionnaire (WHOQoL-Bref), a version which was created from the WHOQoL-100 to allow easier application, as it is brief, convenient and accurate. The questionnaire consists of four domains (*physical, psychological, social relations* and *environment*) with 24 facets, and two general facets about self-assessment of QoL, through the questions: "*How would you rate your quality of life*?" (*Quality of life facet*) and "*How satisfied are you with your health*?" (*overall health facet*). The WHOQoL-Bref has five response options (ranging from 1 to 5) on a Likert scale[9].

The WHOQoL-Bref has three modes of administration: self-reported, assisted by the interviewer and administered by the interviewer, the latter of which was adopted by the researchers in the present study. The interviewer read the instructions, the questions and the answer scale descriptors and marked the answer given by the participant. A questionnaire adapted by the researcher with closed questions was also applied to identify socioeconomic level (main source of income; family income).

Data were presented as mean, standard deviation, absolute and relative frequency. One-way Anova test was used to compare intergroup means, after which Bonferroni's Post-Hoc test was applied to verify which of the groups differed from one another. Pearson's test was also applied for analysis of the correlation between the general facets of QoL and the perception of the QoL domains. Data were analyzed using the Statistical Package for Social Science (SPSS) version 2.0, considering α=5%, or in other words $p<0.05$.

The study was approved by the Research Ethics Committee of the Universidade Federal do Maranhão under nº 23115-017526 dated 01.03.2012.

RESULTS

The research sample consisted of 129 elderly *quilombas* (Group I = 36 elderly persons, Group II = 48 and Group III = 45).

The sociodemographic characteristics of the elderly *agrovila* residents are shown in Table 1. A total of 96.1% were black or brown skinned and men represented 51.9% of the population. Women were the majority in Groups I (52.8%) and III (66.7%). Illiteracy predominated in all groups, with high percentage values.

Table 2 shows the values of the four WHOQoL-Bref domains (*physical, psychological, social relations* and *environment*) by means and standard deviation, considering a scale of 0-100. The *social relations* average scores had the highest percentage values among the four domains analyzed for all the studied *agrovilas*.

The results summarized in Table 3 show the facets that explain the differences in Group I, which had different means and lower perception in the *psychological* domain.

Table 1. Sociodemographic characterization of elderly *quilombas* (N=129). Alcântara. Maranhão, 2012.

Variables	Group I n (%)	Group II n (%)	Group III n (%)
Ethnic Group/Color			
White	0	1(2.1)	3(6.7)
Black	29(80.6)	19(39.6)	11(24.4)
Brown-skinned	7(19.6)	27(56.2)	31(68.9)
Indigenous	0	1(2.1)	0
Gender			
Male	17(47.3)	35(72.9)	15(33.3)
Female	19(52.8)	13(27.1)	30(66.7)
Average age (years) (standard deviation)	65.77 (±7.3)	65.44 (±6.4)	71.40 (±9.8)
Schooling			
Illiterate	22(61.1)	31(64.6)	25(55.6)
Incomplete primary education	11(30.6)	17(35.4)	17(37.8)
Complete primary education	2(5.6)	0	2(4.4)
Complete secondary school education	0	0	1(2.2)
Graduate	1(2.7)	0	0
Average income (minimum wage: R$ 622.00) (standard deviation)	1.92 (±0.6)	1.58 (±0.8)	1.53 (±0.5)
Marital status			
Not married	10(27.7)	10(20.8)	10(22.2)
Married	13(36.1)	24(50.0)	17(37.8)
Widower	11(30.6)	12(25.0)	16(35.6)
Separated	2(5.6)	2(4.2)	2(4.4)

Table 2. Comparison between domains of quality of life of elderly *quilombas* (N=129). Alcântara, Maranhão, 2012.

Domains	Group I Mean (± sd)	Group II Mean (± sd)	Group III Mean (± sd)	*p*
Physical	56.7 (±12.9)	58.3 (±14.0)	61.4 (±12.4)	0.257
Psychological	54.7 (±13.1)	62.0 (±9.7)[a]	63.3 (±10.9)[a]	0.002
Social relations	73.8 (±10.8)	71.0 (±9.9)	73.1 (±3.9)	0.279
Environment	49.8 (±11.9)	49.2 (±7.8)	52.4 (±7.6)	0.220

[a] Differed from Group I.

Table 3. Facets of the *psychological* domain in elderly *quilombas* (N=129). Alcântara, Maranhão, 2012.

Facets	Group I (n=36)	Group II (n=48)	Group III (n=45)
How much do you enjoy life?	2.72	3.19	2.87
To what extent do you think your life has meaning?	3.25	3.63	3.78
How much can you concentrate?	3.25	3.21	3.22
Can you accept your physical appearance?	3.06	2.92	3.13
How satisfied are you with yourself?	3.89	3.75	3.78
How often do you have negative feelings such as moodiness, despair, anxiety, depression?	2.97	4.19	4.42

Table 4 shows the mean scores and standard deviation for the overall QoL and health facets of the three groups analyzed. Group III had the highest scores of 3.3 and 3.1 and Group II the lowest of 3.0 and 2.9.

The results of the correlations for the WHOQoL-Bref quantitative variables, taken two at a time between the two overall QoL facets and perception of health and between each of the overall facets and the four domains, are also shown in Table 4.

In Group I there were positive and significant correlations between the facets of QoL and health (r=0.357; p=0.032), as well as facets of health with the *physical* (r=0.615; p <0.001), *psychological* (r=0.447; p=0.006) and *environment* (r=0.486; p=0.003) domains. Group II exhibited a positive and significant correlation between the health facet and the *physical* domain of QoL (r=0.462; p=0.001). Group III also exhibited several positive and significant correlations, which were: between QoL facets and *health* (r=0.461; p<0.001), QoL facet with the *environmental* domain (r=0.358; p=0.016), and the health facet with the *physical* (r=0.591; p<0.001) and the *environment* domains (r=0.375; p=0.011) of QoL (Table 4).

Table 4. Relationship between general facets, quality of life and health perception with the domains: *physical*, *psychological, social relations* and *environment* (N=129). Alcântara, Maranhão, 2012.

Domains	Group I				Group II				Group III			
	QoL 3.2 (±0.6)		Health 3.0 (±0.9)		QoL 3.0(±0.7)		Health 2.9 (±0.8)		QoL 3.3 (±0.7)		Health 3.1 (±0.9)	
	r	p	r	p	r	p	r	p	r	p	r	p
Health	0.357*	0.032	--	--	0.278	0.056	--	--	0.461*	0.001	--	--
Physical	0.217	0.204	0.615*	<0.001	0.005	0.972	0.462*	0.001	0.417	0.004	0.591*	<0.001
Psych.	0.182	0.288	0.447*	0.006	0.123	0.406	0.278	0.056	0.193	0.203	0.233	0.124
Social Relation	-0.042	0.806	0.279	0.099	0.222	0.130	0.212	0.148	0.197	0.195	0.208	0.170
Environment	0.226	0.186	0.486*	0.003	0.230	0.116	0.224	0.125	0.358*	0.016	0.375*	0.011

*Significant correlation ($p<0.05$).

DISCUSSION

The *agrovilas* had a mostly black population. In comparison to white Brazilians, blacks have greater exposure to factors that affect both QoL and self-rated health perception, such as inferior socioeconomic status, worse living conditions and housing, higher rates of contracting infectious parasitic diseases, and greater exposure to situations of sexual, physical and psychological violence[1,4].

In terms of composition by gender, there was a predominance of men in the overall total. Thus, the demographic profile was different from the communities surveyed in Paraíba[10] and Bahia[4], where women predominated. It should be noted that the 2010 Census data[11] corroborate the predominance of the male population in the rural and urban areas of Alcântara, with 8,044 and 3,214 people respectively. Regarding age, there was a low frequency of octogenarians and nonagenarians compared to sexagenarians and septuagenarians, and the population can therefore be considered young elderly.

The three groups had an illiteracy rate of around 60%, far above the national rate of 26.5% in the population aged 60 and over[11]. According to the Brazilian Institute of Geography and Statistics (IBGE)[11], illiteracy rates in Maranhão for black and brown-skinned persons aged 60 years or older total 62.2% and 56.9%, respectively. Regarding the first group, the rate in the state of Maranhão was surpassed only by that of Piauí, with 67.8%; Alagoas, with 66.4%; and Paraíba, with 63.6%. In the second group it was surpassed by Alagoas, 59.6%, and Piauí, with 58.4%.

There was a predominance of married individuals in the three groups, followed by widowers. In a study by Vieira and Monteiro[12], 75% of people were found to be single, but with the status of married by common law. The authors also point out that until recently there was no civil registration among older *quilombas*, which can be explained by the low social income of this population.

Family income among the three groups was similar and ranged from one to two minimum wages, considering standard deviation. Several studies have identified low incomes in *quilomba* communities, quantifying an income of half minimum salary and minimum salary[4,12,13], or describing occupational activities such as small-scale agriculture[10], subsistence farming and domestic help work[14], which presupposes a low income. The family income of the elderly *quilombas* of the present study was higher than that found in literature (half a minimum wage), which may be due to a commercial income from handicrafts, in addition to social benefits[4,12,13]. The overall conditions of the elderly surveyed are similar to other Brazilian *quilomba* communities, as stated by Cabral-Miranda et al.[15]. These groups are located in rural areas and in conditions of social and health inequality, as they live in remote areas with difficulties in accessing health and education services.

These communities were originally located near the coast and had fishing as one of their main sources of food. The *agrovilas* are now located between 10 and 21 km away from the sea, making fishing impracticable.

The distance from the sea and the unfeasibility of fishing add to the difficulties in access to health, education and leisure services. The difficulties of accessing the public health service show the vulnerable situation of *quilomba* communities, especially of the elderly persons surveyed. In addition to the high rate of illiteracy among the elderly, there is an urgent need to implement adult literacy programs which, although envisaged in the Brazil *Quilomba* Program, have not yet implemented most of the proposed actions.

The *psychological* domain differed statistically between the groups. In Group I a predominance of self-declared black (80.6%) and illiterate (61.1%) individuals had the worst averages. In this group, average scores in the facets that make up this domain were lower than in the other groups; this indicates the need for actions aimed at the mental health of participants and, in particular, an investigation and approach to depression-related disorders.

Of the groups analyzed, Group III had the best averages in both overall facets. However, all groups have compatible socioeconomic and cultural realities, which would tend to make them similar.

The *social relations* domain had the highest average score for each of the analyzed groups, while the *environment* domain was the worst evaluated in all groups. A similar result was detected in *quilomba* communities in the state of Sergipe[16].

It is assumed that the high scores in the *social relations* domain, which is composed of the social relations, social support and sexual activity facets, were because this domain has the fewest facets and also because the highly social organization of the communities are strongly marked by kinship, offering greater social support to the elderly. Santos et al.[16] suggest that family and social ties are strong in *quilomba* communities and explain the higher averages of the *social* domain.

The *environment* domain received the worst evaluation by all the *agrovilas*. A likely explanation for such a poor perception may be a consequence of the compulsory resettlement process described earlier. The process of compulsory resettlement has had a negative impact on communities and, more than 30 years later, the impacts on the lives of those who are forced to resettle are still felt and remembered. The loss of their former dwelling places can be better understood by the analysis of Duprat[17], which claims that the land is the bond of union of the group and allows its temporal continuity across successive generations, preserving its culture and particular way of life.

The process of resettlement to the *agrovilas* made it impossible to practice the traditional fishing, hunting, extractive activities and agriculture that guaranteed the self-sufficiency of the communities. In return, the peasants received small, poorly fertile, eroded plots. In a general analysis of the creation of the seven *agrovilas* and their impacts, Clímaco[8] identified several authors who reported instability, discontent and negative repercussions among the Alcântara *quilombas*.

The *psychological* domain was the only one to identify statistically significant differences in the means of the three groups, with Group I having the worst average in the following facets: "*How much do you enjoy life*?" - positive feelings, "*To what extent do you think your life makes sense*?" - spirituality/religiosity/personal beliefs and "*How often do you have negative feelings such as moodiness, despair, anxiety and depression*?" - negative feelings. It can be inferred that this domain is directly related to the perception and presence of depression.

The *social relations* domain achieved the highest average scores. Conversely, Santos et al.[16] found little difference in the *social relations* and *psychological* domains, reporting hypertension and QoL in *quilombas*. Assis et al.[18] identified worse averages for the *psychological* domain in retired or pensioner *quilombas* and women.

The *physical* domain showed no statistical difference between the groups, which may be related to age group. One possible explanation for the satisfaction identified in this domain may be average age (young elderly persons), as the functional capacity of the elderly has not yet been impaired and positively influences the perception of QoL. Assis et al.[18] observed a correlation between age and the physical domain among *quilomba* communities investigated in Sergipe.

The overall facet scores of the groups were related, however Group I stood out due to having more correlations between the health facet and the different QoL domains. A study on sanitary and health conditions in *quilombas* identified low QoL due to the absence of basic sanitation and health services[4,10]. Due to the subjectivity and multidimensionality of the meaning of QoL, evaluation and comparison with other *quilomba* studies and/or groups becomes even more complex. Even among the seven surveyed *agrovilas*, which had very similar realities, the polysemy of the expression QoL may explain the inequalities in the evaluation between the groups.

In general, studies that assess *quilomba* health and/or QoL are still scarce[4], as stated by Santos et al.[16]. Demonstrating the incipient nature of *quilomba* research therefore contradicts one of the goals of the PNSIPN, which is to foster studies and research on racism and the health of the black population. It is also a challenge to the process of implementation and improvement of the PNSIPN[17].

Due to the aforementioned aspects, the present study had some limitations, as no other parameters that may be related to QoL were evaluated. The WHOQoL-Bref instrument used, however, allows

a deeper investigation of QoL. The difficulties experienced by researchers when accessing the Alcântara *agrovilas* to carry out the research is also notable, in many cases justifying the low academic production on *quilomba* communities.

CONCLUSION

The study found a predominance of men in relation to women, and a prevalence of young elderly persons with an average age of 67 years, who were married and/or widowed, and had low education levels and income. The WHOQoL-Bref instrument identified *social relations* as the best evaluated domain and *environment* as the worst.

It is inferred that the positive evaluation of the *social relations* domain by the elderly largely reflects the strength of the affective and kinship ties, cultures and practices of solidarity of these *quilomba* communities. Among traditional peoples and communities, respect for and protection of the elderly is generally still a feature. The cultural apparatus must always be considered in research and public policies that target ethnic groups with entrenched traditions.

The *environmental* domain proved to be the most worrying, given the low averages identified in all the *agrovilas*. The resettlement process in these *agrovilas* directly interfered with the low QoL assessment in this domain. In part, this low assessment may confirm the research assumption - that the process of compulsory resettlement has negatively impacted communities and is still felt and remembered by the elderly.

Finally, the *physical* domain was well evaluated. A likely explanation for this level of satisfaction is age range, since there was a predominance of young elderly persons in the *agrovilas*, who therefore had an active functional capacity. However, this situation can be reversed considering the lack of integrative public policies aimed at health promotion.

The situation of the *quilomba* population surveyed is considered to be worrying, given the institutional vulnerability identified, in addition to aspects assessed related to difficulties of access to services and frequent deficiency or even lack of implementation of policies aimed at health promotion, access to drinking water, sanitation, education, environmental protection and recovery, among others. It is noteworthy that in a state like Maranhão, where the majority of the population is black, several aspects of the National Policy for the Integral Health of the Black Population (or PNSIPN) have not been properly implemented, highlighting its deficiencies and the challenges to be addressed.

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Aging and vulnerability: an analysis of 1,062 elderly persons

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Abstract

Objective: To analyze the vulnerability of non-institutionalized elderly persons. *Method:* A cross-sectional, descriptive and analytical study was carried out using data of the City Health Department of Palmas, Paraná, Brazil, and the Vulnerable Elders Survey (VES-13) instrument. The questionnaires of people aged over 60 years who had answered the VES-13 questionnaire between January 2016 and December 2017 were included. The quantitative data were analyzed by the Student's T-Test and the categorical data by the Chi-square and Fisher's Exact Test. The correlation between the quantitative variables was performed by the Pearson correlation coefficient. *Results:* A total of 1,062 questionnaires were analyzed, of which 57.3% were female, with a mean age 69 (±7.8) years. In total 427 individuals (40.2%) were vulnerable and 635 (59.8%) were not vulnerable according to VES-13 score. A total of 635 (59.8%) elderly persons were classified as robust, 176 (16.6%) as at risk of frailty and 251 (23.6%) as frail. Women and those over 75 years were more vulnerable (p<0.001). *Conclusion*: Vulnerability was related to the female sex, age over 75 years and the presence of chronic diseases, with these being the priority groups for the elaboration of intervention strategies in the health of the elderly.

Keywords: Aging. Elderly. Health Vulnerability. Frail Elderly.

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INTRODUCTION

Human aging alters the main physiological systems, which makes elderly persons more frail and susceptible to impairment of their physical and functional capacity[1]. Although aging is not synonymous with illness, with advanced age, individuals become more vulnerable, and thus have greater social, physical and psychological needs[2].

Social vulnerability can be understood as multidimensional, affecting individuals, groups and communities in different ways and intensities, and on different levels of their well-being. It results from factors such as retirement, income reduction, discrimination, social and family isolation and a deficiency in public policies to support these elderly persons. As it is considered dynamic, it implies not only income-related poverty, but an understanding of the events that harm social, cultural, political and economic relations. Improving this understanding may contribute to reducing the vulnerability of the elderly, as it is related to the structural factors of society[2,3].

There are some gaps in studies on the vulnerability of the elderly in Brazil, partly justified by the absence of a single instrument composed of clinical and social questions appropriate for the Brazilian population. Thus, the prevalence of frail elderly persons in Brazil is uncertain[2].

In this context, the present study aimed to analyze the vulnerability of elderly residents in the community through the *Vulnerable Elders Survey* (VES-13) questionnaire.

METHOD

A quantitative cross-sectional survey was carried out using the database of the program of the Municipal Health Department of Palma, Paraná. This is a city located in the southern region of Brazil, with 42,888 inhabitants, of which 3,204 are elderly. All elderly persons (over 60 years old) treated at the public health service of the city are evaluated for their vulnerability, using the *Vulnerable Elders Survey* (VES-13) protocol[4]. This instrument consists of 13 items that include the self-perception of health, the presence of physical limitations and functional decline. Initially, the elderly are classified into two groups: vulnerable (VES-13≥3) and non-vulnerable (VES-13<3).

The present study also adopted the classification used by the Health Department of the State of Paraná, in which robust elderly (VES-13≤2) are those individuals who are able to manage their life independently and autonomously, have no functional disabilities or a chronic health condition associated with greater vulnerability. Elderly persons with a moderate risk or at risk of frailty (VES-13 from 3 to 6) manage their life independently, however, although they are in a dynamic state of senescence and senility, leading to functional decline, they are not yet dependent and may present one or more associated chronic conditions. Finally, frail elderly persons, with a high risk of frailty (VES-13≥7) are those with established functional decline who are unable to manage their lives autonomously due to the presence of single or multiple disabilities[4].

Data collection was performed through the analysis of medical records registered in the support software of the health service of the city, which is maintained by professionals, according to their area of expertise. This software contains all VES-13 questionnaires already completed in the city. During the collection of these data, which took place from January 2016 to December 2017, 1,062 people had answered this questionnaire, all of whom were included in the study. Exclusion criteria were incomplete questionnaires.

The student's t-test for independent samples was used to compare the distribution of quantitative variables, and the chi-square and Fisher's exact tests were used to analyze the association of categorical variables. Correlation between quantitative variables was performed using Pearson's correlation coefficient. A 95% confidence level was adopted.

The study was approved by the Ethics Research Committee of the Universidade do Oeste de Santa Catarina (or Unoesc), under opinion nº 2.237.890.

RESULTS

Of the 1,062 questionnaires analyzed, 609 (57.3%) were women, aged between 60 and 104, with an average age of 69 (±7.8) years. In total 42.0% rated their health as fair and 35.2% as good.

In the present study, 635 (59.8%) elderly persons were classified as robust, 176 (16.6%) as at risk of frailty and 251 (23.6%) as frail.

Table 1 shows the prevalence of self-reported disability in performing Instrumental Activities of Daily Living (IADL), according to the variables *gender, age and vulnerability*. Women reported more difficulty in dealing with money (p<0.001), performing housework (p<0.001) and shopping (p<0.001) than men. People over 75 reported more difficulties shopping, dealing with money, walking in the bedroom or walking in the living room and doing household chores. In the vulnerable elderly, the biggest difficulties were shopping (68.7%) and dealing with money (56.9%).

Table 2 shows that most vulnerable elderly persons reported greater difficulty or the inability to perform mobility-related activities, such as: bending, kneeling or crouching; lifting or carry five-pound objects; writing or handling small objects; walking 400 meters and performing heavy household chores, all of which had rates above 90%; while the robust elderly, the minority, presented difficulties in mobility activities, with rates below 10%.

The most vulnerable people were women over 75 years old, with high blood pressure and/or diabetes (Table 3).

Table 1. Disabilities in carrying out self-reported Instrumental Activities of Daily Living, according to the VES-13. Palmas, Parana, 2018.

Variables	Shopping* n (%)	Money** n (%)	Domestic chores*** n (%)	p***
Gender				
Female	183 (30.0)	151 (24.7)	122 (20.0)	<0.001
Male	90 (19.8)	76 (16.7)	59 (13.0)	
Age (years)				
60-74	154 (18.9)	130 (15.9)	97 (11.9)	<0.001
Over 75	119 (48.1)	97 (39.2)	84 (34.0)	
Vulnerability				
Yes	273 (68.7)	226 (56.9)	181 (45.5)	<0.001
No	0 (0.0)	01 (0.1)	0 (0.0)	

* Inability to shop alone; ** inability to handle money; ** inability to perform light housework alone; *** Chi-square test and Fisher's test

Table 2. Distribution of the elderly persons according to physical limitations based on VES-13 score and relationship with vulnerability. Palmas, Parana, 2018.

	Individual vulnerability		
Variables	Yes n (%)	No n (%)	p*
Limitation described			
Bend over, kneel or crouch	260 (92.9)	20 (7.1)	<0.001
Lifting or carrying 5 kg objects	239 (94.5)	14 (5.5)	<0.001
Raise/extend arms above shoulder level	172 (95.0)	09 (5.0)	<0.001
Write or handle and hold small objects	140 (96.5)	05 (3.5)	<0.001
Walk 400 meters	235 (94.4)	14 (5.6)	<0.001
Perform heavy housework tasks	289 (90.3)	31 (9.7)	<0.001

* Chi-square test.

Table 3. Vulnerability according to VES-13 adopted in Paraná. Palmas, Paraná, 2018.

Variables	Vulnerable n (%)	Non-vulnerable n (%)	*p**
Gender			
Female	261 (42.9)	348 (57.1)	<0.001
Male	136 (30.0)	317 (70.0)	
Age (years)			
60-74	234 (28.7)	581 (71.3)	<0.001
Over 75	163 (66.0)	84 (34.0)	
High blood pressure			
Yes	220 (42.4)	299 (57.6)	<0.001
No	177 (32.6)	366 (67.4)	
Diabetic			
Yes	64 (46.7)	73 (53.3)	<0.001
No	333 (36.0)	592 (64.0)	

*Chi-square test.

DISCUSSION

The present study found that people over 75 years of age, who were female and had one or more chronic non-communicable disease such as high blood pressure and diabetes mellitus exhibited greater vulnerability, corroborating literature and studies conducted with elderly Brazilians that show that high blood pressure and/or diabetes is related to greater frailty among the elderly[5,6].

High blood pressure and diabetes mellitus are chronic diseases linked to social determinants, such as: differences in access to information and services, social inequalities, low education levels, and modifiable factors such as smoking, physical inactivity and inadequate diet.

Suffering from a chronic disease increases the risk of vulnerability, and it is essential that these pathologies are tackled through the health service and intersectoral articulation, with the aim of reducing social disparities and generating a better quality of life for the elderly[7,8].

Another aspect observed in this study is the feminization of the elderly population. Census data from Brazil indicate that the female contingent over 60 years old has remained stable, being 50.7% in 2000 and 50.6% in 2019. In Paraná, in 2019, it is reported that 50.6% of people over 60 years of age are women[9,10]. Although they have greater longevity, studies show that older women are more vulnerable, due to factors such as low education and pay, loneliness and social isolation, and prolonged exposure to diseases such as high blood pressure, diabetes, depression and cancer[11,12]. In this study, women were more vulnerable, and reported more difficulty dealing with money, doing household chores and shopping.

In this research, most considered their health to be good or fair, with self-rated health in the elderly considered an excellent predictor of morbidity and mortality.

Self-perception of health is an indirect indicator of the presence of chronic degenerative diseases, and has therefore been the subject of research in other countries and been used as an indicator in the area of aging associated with functional capacity and mortality[13,14].

Functional capacity demonstrates the ability of human beings to remain independent in their instrumental activities of daily living, which correspond to the complex skills necessary to live independently. People with disabling processes are hampered in the performance of activities related to social functions and autonomy, causing disruption

for themselves and their families, who depending on the activity, will have to spend more time and financial resources on their needs[15,16].

Physical limitations or functional incapacity refer to the difficulty or impossibility of performing daily activities, influencing the quality of life of the elderly, and are related to the loss of autonomy, increased risk of hospitalization, institutionalization and death[17]. In this study, the people with the greatest difficulties in instrumental activities of daily living were women, vulnerable elderly persons and those over 75 years of age, and so these groups should be a priority in social and health actions and strategies.

Studies have found that functional disability is associated with physical activity, nutritional status and the number of chronic noncommunicable diseases. Age also directly interferes with functional capacity, and every additional ten years lived increases the risk of functional decline approximately two fold, with elderly people aged 80 and over having a 25 times greater chance of decline in functional capacity than younger elderly persons[17,18].

The limitations of this study were its cross-sectional assessment, which evaluated the data at a single point in time, and the lack of sociodemographic data so that other associations could be made, such as place of residence, education and income.

CONCLUSION

According to the results obtained in the study, it is possible to conclude that the elderly residing in the city of Palmas, Paraná, consider their health to be good and are, in the majority, robust and autonomous in terms of the performance of their daily activities. There is a high number of elderly persons considered fragile, however, who are therefore more susceptible to social and physical complications.

The most vulnerable elderly are women over 75 years old who have at least one non-communicable chronic disease.

The presence of a chronic disease as a susceptibility factor for vulnerability points to the need to promote the control of these diseases and prevent harm, as they are considered the main causes of death in the elderly.

The present study contributes data to illustrate the vulnerability of the elderly in the city and thus the possibility of developing intervention strategies for the health care of the elderly.

It is necessary to expand the care of the elderly in an interdisciplinary manner, acting in a preventive manner, providing a better quality of life, delaying and overcoming disabilities and age-related limitations, working and putting into practice the existing public policies, viewing the elderly from a multidimensional perspective.

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Falls among the elderly: environmental limitations and functional losses

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Abstract

Objective: To identify the intrinsic and extrinsic factors that predispose the elderly to falls and to discuss the consequences of these events in their lives. *Method:* A descriptive, exploratory study with a qualitative approach was carried out in a city in the southwest region of Bahia, Brazil. The target audience was composed of elderly people living in the area covered by the Family Health Strategy of this city. Data collection took place from April to June 2018 through a semi-structured, scripted interview. The content analysis technique proposed by Laurence Bardin was used to analyze and organize the information. *Results:* From the analysis of the interviews the main factors that predisposed the elderly to falls emerged, and these were methodologically divided into intrinsic and extrinsic. There were also post-fall events, such as the fear of falling again and the need to inhabit the same place where the fall occurred, as this is a domestic environment which, for social reasons, cannot be modified as recommended by preventive educational actions. *Conclusion:* The results show that falls among these elderly people occurred in the domestic environment due to structural (extrinsic) issues, and are less influenced by health problems (intrinsic). It can therefore be concluded that the need to inhabit the same place where the fall occurred, without it being modified, generates a fear of falling again, limiting independence and reducing functional capacity, and making effective intersectoral actions essential.

Keywords: Accidental Falls. Aging. Health of the Elderly.

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INTRODUCTION

The rapid growth rate of the elderly Brazilian population has resulted in significant concerns in relation to one of the major events affecting this age group: falls. Such events are known to have multifactorial causes and high therapeutic complexity, as they are unintentional and result in the individual suffering an impact against the ground, and are caused by intrinsic and extrinsic factors. The phenomenon occurs mainly in the home environment, causing reductions in the mobility and independence of the elderly, the main outcome of which is a decrease in functional capacity, as well as an increase in personal and public expenses due to hospitalization after the event[1].

Aging is considered a natural process, related to the functional impairment of the body that inevitably occurs over time. This change in functional capacity makes the elderly more vulnerable to the influence of extrinsic and intrinsic factors, as well as harm resulting from chronic noncommunicable diseases (NCDs)[2].

Extrinsic factors are those involved in the interaction of the elderly with the environment in which they live, with the home the place of greatest exposure to risk, and include: slippery and uneven floors, the absence of support bars and handrails on stairs, objects scattered around the floor of the home, high steps, inadequate lighting, among others, increasing the possibility of irreversible events[3,4].

Intrinsic factors, meanwhile, are considered health problems linked to the individual, and are related to biopsychosocial changes, reflected in their inability to balance when a displacement of their own height occurs. Examples are: dizziness; the use of medicines; muscle weakness; low visual and hearing acuity; change of gait; and acute diseases, among others[4].

Falling is usually associated with the increased frailty and vulnerability of the individual. However, some risk behaviors, such as sedentarism and the lack of physical activity, may increase the risk of falls and further reduce functional capacity in old age. It is also worth mentioning that some mental and cognitive disorders, such as depression and dementia, linked to other comorbidities and postural instability, are also limiting in old age[5].

Thus, as age advances, many older people become chronic users of medications to treat NCDs, defined as polypharmacotherapy, which arises from self-medication and iatrogenesis and is caused by ignorance of what it is most important to treat at this stage of life. The excess use of medications in everyday life is an important risk factor for the elderly, the result of which often causes prolonged hospitalization[6].

The increased prevalence of falls in this population, resulting in hospitalizations, leads to increased public health spending and the use of hospital beds for longer. Thus, it is essential to seek more investment in actions of health promotion and fall prevention, such as the development of educational practices aimed at improving knowledge about the risks that these events may cause, with the aim of positively affecting the quality of life of this population[7].

It is important to remember that while anyone can suffer a fall, the consequence of this event is greater for the elderly as it influences their mobility and reduces functioning, leading to psychophysical, functional and economic changes. Considering the elderly and their caregivers in terms of the Family Health Strategy (FHS) is sometimes limiting due to the responsibility of performing actions to promote fall prevention training and orientation among this population[8]. The importance of the multiprofessional team in the hospital is also emphasized, in terms of preparation for discharge and the returning home of the elderly, aimed at alleviating post-fall syndrome.

Given the importance of this theme, the present study aimed to identify the intrinsic and extrinsic factors that predispose the elderly to falls, as well as to address the consequences of these events in their lives.

METHOD

A descriptive, exploratory study with a qualitative approach was carried out in a municipal district located in the southwest region of the state of Bahia,

Brazil. The target audience of the study was elderly people living in the area covered by an FHS located in this municipal district.

The following inclusion criteria were chosen: elderly people who had suffered falls in the previous two years, given the limited period in which the issues important for the study could be recalled, who resided with their families or otherwise; who were registered with the FHS chosen for the study, and who if they could not communicate coherently, had a caregiver to assist with answering the questionnaire. Elderly persons who were not found at home on three consecutive visits were excluded. The elderly were intentionally selected through the Community Health Agents (CHA).

Ten elderly people participated in this study, and the criterion used to delimit the number of participants was data saturation. This indicates the moment when an increase in the data and/or information of a study will not change the understanding of the studied phenomenon. This criterion allows the observing and validating of a certain recurrence of information[9].

Data collection took place from April to June 2018, through a semi-structured interview script recorded with a voice recorder. This script addressed sociodemographic data, such as: location of fall, responsible factor (environmental and individual risks), amount of medications in daily use, post-fall syndrome (fear of further falls), harm after the event suffered (reduced mobility, dependence on third parties, physical inactivity), frequent the same environment where the fall occurred, data on behaviors related to health, and modification of the environment where the event occurred. A field diary for the notes made from observing the environment in which the elderly suffered the fall was also used.

The thematic content analysis technique proposed by Laurence Bardin was used to analyze and organize the information obtained from the semi-structured interview, and consisted of three stages: pre-analysis, exploration of material and treatment of results, where the raw results were treated to make them meaningful and valid[10]. Therefore, the information was categorized into thematic axes that converged with the objective of this study.

In order to preserve the anonymity of the participants, the speech fragments were coded with the capital letter P (participant) followed by an ordinal number (P01, P02 and so forth), although not necessarily in the order of the interviews.

This study was approved by the Research Ethics Committee of the Universidade do Estado da Bahia under Opinion No. 2.540.677, respecting the ethical and scientific aspects proposed in Resolution No. 466/2012 of the National Health Council/MS on research involving human beings[11].

After approval, contact was made with the FHS and, subsequently, the cooperation of CHAs was requested to identify the location of the homes of the elderly persons who had fallen. The interviewees were duly informed about the questions to be addressed by the research and the nature of their participation. After due clarification, a Free and Informed Consent Form (FICF) was signed by the elderly person or caregiver.

RESULTS AND DISCUSSION

The answers of the respondents were analyzed and information obtained from 10 participants. There was a predominance of females (80.0%), aged between 62 and 90 years, with an average age of 75.1 years, showing the feminization of old age and its consequences[12].

All the falls occurred at home, with a predominance in the bedroom and/or bathroom, with six (60.0%) falls, followed by four (40.0%) in the yard. Seven (70.0%) elderly persons reported at least one falling episode in the previous year, one (10.0%) reported two or more falls, while two (20.0%) experienced only one fall, more than a year ago. Of the respondents, only two (20.0%) elderly persons practiced physical activity regularly, such as cycling.

The content of the responses led to the understanding that falls in the elderly population assume various meanings that permeate intrinsic and extrinsic factors, extending to limiting consequences that affect the conduct of the elderly after the event in an integral manner. Based on the statements, the

following units of meaning that most frequently emerged were identified: factors associated with recurrent falls in the elderly, both extrinsic and intrinsic, and post-fall consequences.

Due to the functional alterations involved in the aging process, falls become common events which are multifactorial in cause and are a concern for the elderly. They may cause a decline in physical capacity, frailty, gait speed reduction, greater risk of institutionalization and increasing hospitalization costs, and subsequently represent an important public health problem[13].

Thus, when inserted in the community, there are numerous factors that increase the risk of the elderly suffering a fall, such as body and visual balance problems, polypharmacy, cognitive decline, muscle weakness, dizziness, a compromised environment in which the elderly must move around and the absence of a family caregiver or otherwise, among others[14].

Regarding environment, falls occurred most frequently in the bathroom, making it a location susceptible to falls, since most homes did not have a suitable structure for the use of such rooms by the elderly. Slippery floors, the absence of non-slip mats or safety grab bars, inadequate lighting, and steps at the exit increase the risk of falls[15].

After the bathroom, the yards of the homes of the elderly persons were significant in the episodes of falling in the present study. Research has shown that the structure of such environments presents major risk factors for the onset of falls, increasing the possibility of surgical interventions, especially those related to femoral fractures[16].

Thus, the factors that led the elderly to fall most often were: the impairment and/or irregularity of the environment in which they lived; the use of three or more medications per day; frequent dizziness; reduced gait from other recurrent events; decreased visual acuity; chronic diseases; objects scattered on the floor of the residence and slips in the bathroom.

It important to highlight how intrinsic and extrinsic factors occur in this context through the statements of the participants. Chart 1 shows this comparison.

Chart 1. Representation of the intrinsic and extrinsic factors of the discourse of the interviewed elderly. Guanambi, Bahia, 2018.

Extrinsic factors	Intrinsic Factors
"I was taking a shower, when suddenly, when I left the bathroom, I missed the rug at the door and I slipped" (P07).	"The medicines are there, there's no way I can remember, they so many medicines! Sometimes there are four, then there were times there were five, today there are six, apart from the insulin, with insulin there are seven" (P04).
"In the yard, when leaving the bathroom. I went out and tripped on a rock, my legs aren't so good" (P03).	
"A pillar, two fingers thick, I fell down, like a step" (P04).	"It seems that I felt dizzy and there was nothing I could do, if the girl (granddaughter) hadn't come I would have died there" (P09).
"It happened when I was taking a shower and I don't know what happened, I made it easy, my sandal slipped in and I took a step backwards and fell, hitting my spine on the toilet" (P11).	"Three for blood pressure and two for diabetes, apart from cholesterol which isn't here" (P06).
"The sandal got caught on the cement like this, going upwards, and I tripped" (P06).	"I take several, two for blood pressure, two for cholesterol and one for the heart, I'm not taking the one for diabetes, one I have to fast and two I take at night, eight medicines, because I took the diabetes one too" (P09).
"When I went backwards, I slipped and fell" (P02).	
"I stumbled and slipped, I stumbled because of the step" (P08).	
"I hit my head on the door and went backwards, there was a ramp, I couldn't balance myself and I fell" (P10).	"The dizziness isn't it, the dizziness!" "For high blood pressure I take several, I take about six medications a day" (P01).

Given the statements of the participants, the environmental risk factors, i.e. extrinsic factors, were identified as the main risk factors, increasing, in turn, the possibility of irreversible events occurring.

Based on the discourse of the participants, eight (80.0%) elderly persons fell due to factors associated with the environment in which they lived, while two (20.0%) fell due to adverse reactions such as symptoms of dizziness and/or those related to biological and psychosocial disorders, characterized as intrinsic factors.

In the present study, falls occurred most frequently in the bedroom and/or bathroom, which are considered the environments that the elderly most frequent in their homes. It was also observed that the main cause of falls in the yard of their homes was objects scattered on the ground, such as objects natural to the yard including plant pots, buckets, domestic animals and utensils. The irregularity of the ground in the yard represented 40.0% of falls.

A small number of the elderly investigated suffered falls because of intrinsic factors, and the use of various medications is a predominantly significant factor in these cases. Therefore, the use of antidepressants, antihypertensives, anxiolytics and antipsychotics may be associated with dizziness, instability, drowsiness, motor dysfunction, reflex impairment, loss of balance and slipping[17,18].

This fact was evidenced in the statements of the participants, when the elevated consumption of medicines favored the occurrence of adverse events, as polypharmacy among the elderly is currently an important protagonist in such occurrences. Thus, while drug reactions occur, polypharmacotherapy represents an influence on recurrent falls in the elderly population[19].

Therefore, in order to reduce the adverse events caused by medications, the importance of health professionals in care and drug management is highlighted, with regard to discussions and guidance for the elderly and the community, to develop strategies that minimize reactions and prevent the onset of recurrent falls.

Another issue pertinent to intrinsic factors concerns the reduction of the functional capacity of the body, which inevitably leaves the individual susceptible to the influence of disorders in balance stabilizers, representing postural instability, as well as the senility-based reduction in muscle mass, an example of sarcopenia, with consequent loss of strength, firmness and endurance[20,21].

During the application of the questionnaire the elderly having fallen due to the impairment of reflexes and indicated the use of four or more medications, associating them with probable adverse reactions of polypharmacy. Thus, it is worth considering that for these reflexes, especially those that are protective, and which are already diminished due to the natural aging process, medications are a further aggravating factor[22].

As well as presenting the factors that predispose the individual to falls, it was important to address the consequences that these events have on the lives of the elderly. A reduction in functional capacity, the fear of suffering other falls, the restriction of basic activities of daily living and, above all, the exposure to a greater risk of institutionalization, leading to an increased use of specialized services and generating high costs for public services, are important issues identified in this study and which corroborate other research on the theme[23,24].

The reports revealed a need to frequent the same place where the fall occurred, as this was always a room in the home. The fact that they cannot change these rooms to prevent other events means they must live with the fear of falling again. Chart 2 explains this through the statements related to this category.

Chart 2. Representation of fear of falling and need to frequent the same place, post-fall environmental changes, and decreased functional capacity. Guanambi, Bahia, 2018.

Fear of falling	Modification of environment post-fall	Reduction of functional capacity
"I'm afraid of falling in the bathroom. I'm afraid of it happening again, because I already suffered a fall and didn't change the environment" (P11).	"Yes, you have to take a shower, comb your hair, go inside and come back carefully, don't you?" Environmental modification: "No, I didn't do it, I just take care, right?" (P01).	"The job I did the most, reduced. The damage is that my expenses have increased, I pay more for the medicines I buy because of the pain of the accident I had in my leg, the monthly expenses increased" (P07).
"I'm very afraid. Because it seems that the pain is inside me and it seems like it will happen again" (P07).	"I do go there, I do." Environmental modification: "I didn't make any changes, it's still the same" (P03).	"The fall? It was just at the surgery. The lack of memory, the lack of balance" (P04).
"I was afraid of it happening again" (P09).	"Yeah, I go there! Because that's how it is, you have to take a shower." Environmental modification: "No, it's still the same" (P09).	"It was very bad for me because I used to go to more places before" (P06).
"We always have it, don't we? Fear! We get to this age, any carelessness or misstep and we risk a fall" (P08).	"Yes, I go to the same bathroom." Environmental modification: "I didn't install any safety measures, the bathroom is the same" (P11).	"Yeah, after this fall I got really bad. It seems that I got even weaker than I already was" (P02).
"Yes, I'm afraid. Fear, because anything we fall into, our legs are weak" (P03).	"In the yard, yes, there is no other way. But no in other places, today I can't even go to church." Environmental modification: "No. I didn't do anything in the yard, it's still the same, the same" (P06).	"After the fall I had to buy medicine, I hurt my back and my arm got worse because I was already injured" (P08).

The fear of suffering new falls (80.0%) and the need to frequent the same place in which the fall occurred (60.0%) generated a feeling of insecurity and frailty in the participants, which can be seen in the statements of participants 03, 07 and 09.

The statements of participants 08 and 11 mentioned aging as a probable cause of falls, while at the same time no environmental modifications were made in the location following the fall.

Of the elderly persons who fell in the yards of their homes, four (40%) also said they did not make any modifications to the environment, as it would involve replacing the surface or floor, and they described suffering from financial difficulties. Social issues cannot be ignored in this situation, representing an indirect aggravating factor for falls in elderly people from vulnerable communities in society.

Regarding the consequences after a fall, it was found that one adverse event can lead to others, which makes it difficult to maintain the functional capacity of these elderly persons, directly interfering with their quality of life. The first of these - the fear of falling syndrome - becomes a vicious circle, as the elderly fall[25]. In this study, the elderly portrayed their insecurity in an ambiguous manner, as while on the one hand it served to increase their concerns over maintaining balance after suffering a fall and prevented them from being injured again, on the other it showed that economic and social limitations are an obstacle to the adoption of preventive measures and changes in the environment in which they fell.

Research has shown that a sense of fear after a fall is a result of the deviation of attention, causing a reduction in the reception of stimuli and increased immobility and postural instability. Additionally, it

allows individuals to restrict themselves from certain activities and therefore makes them susceptible to new fall events[26,27].

In this sense, elderly persons become more apprehensive and less confident, thus limiting their performance in daily activities, which contributes to increased inactivity and a decline in functional capacity, which becomes more aggravated when the individual has difficulties in ambulation due to comorbidities[26,28].

Thus, psychosocial issues related to quality of life during old age also have a significant relationship with reduced muscle strength[20]. It was observed in the study that the fear of suffering further falls limited the basic activities of daily living of the elderly, making them sedentary and predisposing them to a decline in functional capacity, increasing the risk of future falls.

The elderly reported major limitations in their activities, such as impaired gait, causing a lack of balance, dependence on others, being restricted to wheelchairs, muscle weakness, using the telephone, taking care of finances, shopping, use of means of transport, difficulty and pain moving.

It was also observed that eight (80.0%) elderly people remained sedentary, leading to reflections on whether this way of life is the cause or a consequence of a fall. Sedentarism presents a higher risk of falls, but the consequences of the event can also lead to a sedentary lifestyle due to fear, insecurity and the sequelae present[29].

While not changing the frequency with which falls occur in the life of the elderly, certain measures that can make them less severe[4]. The recommendations of the World Health Organization (WHO) indicate the importance of modifying the home environment, the altering of habits and increased adherence to the proposed treatment of comorbidities, in order to prevent further falls, thus favoring the health of the elderly[30].

There is therefore a need to implement measures that mitigate the risks of falls in households and, consequently, the health complications they cause. Such risk factors should be established and guided by health professionals, both in the hospital environment (during preparations for discharge), as well as during consultations and/or visits by Primary Care health professionals, who should make the elderly person, caregivers and family members aware of them, and promote the reduction of the incidence of falls through changes that support the independence of this population.

Even in the homes of the elderly with lower purchasing power, where architectural and structural changes to the environment are impossible, health professionals can play a crucial role in providing guidance on how to provide a safe environment through the use of simple measures, such as avoiding the use of loose clothing and slippers, the presence of rugs, untidy environments and loose animals, among others, as well as encouraging the practice of physical exercise to strengthen the muscles of the elderly.

However, while recognizing and noting the need for environmental changes and physical activity in the prevention of falls, the limiting effect of the social conditions in which most of our elderly persons live cannot be ignored. It is therefore necessary to consider the importance of affirmative intersectoral actions aimed at minimizing the data provided by the inequities and inequalities in Brazil[31].

Falls can reduce the functional capacity of the elderly, increasing the chances of further such events[32]. Thus, the manner in which people age today is a concern, with losses in quality of life resulting in a consequent decrease in functional capacity and autonomy[16].

The present study has certain limitations that should be mentioned. First, only participants who suffered falls in the previous two years were chosen, resulting in limited scope for the making of generalizations. However, this limitation does not make the study unfeasible, as the degree of saturation demonstrated the commonality of factors that led to the occurrence of the event. Although the highest incidence of falls was found in the female population, the present study included the participation of only two elderly men, limiting the results for this population.

CONCLUSION

The results show that there is a greater prevalence of falls caused by the interaction between the elderly and the environment in which they live, than arise from the health problems of the individual. Therefore, extrinsic factors were more prevalent than intrinsic factors.

In the present study, falls occurred when walking and the main factors that led the elderly to fall were, respectively, impairments caused by the environment in which they lived or the irregularity of the same; the use of three or more medications per day; frequent dizziness; decreased gait due to other recurrent events; reduced visual acuity; chronic diseases; objects scattered on the floor of the residence and slipping in the bathroom.

Falls had emotional consequences, such as the fear of suffering new episodes; and functional effects, such as the impairment of gait, resulting in a lack of balance and being restricted to a wheelchair. In relation to this outcome, the elderly are forced to frequent the same place where the fall occurred without being able to adopt the recommended modifications in the rooms of their home. The social reality in which the majority of the elderly in Brazil eradicates the applicability of public policies, as without social support, there is no way to implement the same.

Therefore, it is up to health professionals, especially those in primary care, to develop measures that reduce the risk of falls in households and their complications, thus promoting actions that minimize the difficulties faced by the elderly, ranging from education to social issues.

With increased life expectancy, it is necessary for health professionals to think and reflect on educational activities that promote the autonomy and independence of the elderly population, in order to produce knowledge aimed at modifying life habits and environmental care strategies to reduce the risk of future falls and their consequences.

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Outcome of interventions in elderly persons classified according to the Fried frailty phenotype: an integrative review

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Abstract

Objective: To analyze the interventions carried out with elderly persons classified according to the Fried frailty phenotype criteria and the outcomes obtained. *Method:* The PubMed, Embase, Scopus, CINAHL, PEDro, SciELO, BVS and Web of Science portals were used, and a manual search was applied to identify the interventions implemented in elderly persons aged over 60 years, which were able to modify the scores of the frailty phenotype criteria and other outcomes. *Results:* The final sample totaled 14 randomized clinical trials published between 2001 and 2018. The combined interventions of exercise, orientation and nutritional supplementation with or without cognitive training presented better outcomes for the frailty criteria and other clinical outcomes in pre-frail and frail elderly persons living in the community and in long-term care facilities. *Conclusion:* The implementation of combined interventions sustains frailty as a reversible and multifactorial syndrome.

Keywords: Frail Elderly. Frailty. Nutrition. Dietary Supplements. Exercise. Cognition.

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INTRODUCTION

Frailty in the elderly, which is one of the geriatric syndromes, is widely understood as a decline in biological reserve, resulting in decreased physiological resistance to stressors[1]. According to this definition, frailty may start or be potentiated by the presence of sarcopenia, chronic diseases, malnutrition, a reduced basal metabolism rate and total energy expenditure which, in turn, may be related to senescence and neuroendocrine and immune disorders[1,2].

One of the most notable of the various definitions and methods for assessing frailty[3] is the phenotype proposed by Fried et al.[1], extensively used in clinical practice, due to the fact it can be applied[4] individually or in combination with other additional criteria[5]. The phenotype consists of five criteria: unintentional weight loss, self-reported exhaustion, weakness (grip strength), slow walking speed and low physical activity[1]. Elderly persons evaluated with one or two criteria are classified as pre-frail and those with three or more of the phenotype criteria are identified as frail[1,2,6].

The worldwide prevalence of pre-frail and frail elderly persons varies from 34.6% to 50.9%, and from 5.8% to 27.3%, respectively[7]. In Brazil, the prevalence of pre-frail elderly is 51.0% while that of frail elderly is 11.2%, with walking speed and weakness the phenotype criteria with the greatest chance of leading to the development of frailty[8]. This prevalence may increase, as Brazil is expected to occupy sixth place in the world among the countries with the largest number of elderly people by 2025[9,10].

As the presence of one or more frailty phenotype criteria leads to high health costs, early identification of these criteria in the elderly may be clinically useful for health services and professionals seeking the prevention, delay or reversal of frailty[11].

Evidence suggests that exercise, nutritional support and social support interventions offered by a multiprofessional team can be used to restore and/or maintain functional independence in the elderly and, consequently, prevent or reverse the frailty process[3,12,13]. However, recommendations on the appropriate design of the intervention protocol for each criterion of the frailty phenotype are yet to be presented.

The objective of the present study was to analyze interventions carried out with elderly persons classified using the phenotype criteria of Fried et al.[1] and the outcomes obtained.

METHOD

This is an integrative review, which helps identify the best evidence and synthesize it to support proposals for changes in the areas of prevention, diagnosis, treatment and rehabilitation. This research method follows the steps of identification of the problem, a literature search, data evaluation and analysis, and presentation[14].

To identify the problem, the variables of interest were defined as a proposal, being: frailty conceptualized by Fried et al.[1]; pre-frail elderly persons classified by the presence of one or two frailty phenotype criteria; frail elderly persons classified by the presence of three or more criteria; Intervention characterized by actions that enable outcomes capable of modifying the level of frailty and outcomes as results for the five phenotype criteria and for frailty found following the implementation of the interventions.

Thus, the defined guiding question was: *what interventions are carried out with elderly persons classified as pre-frail or frail based on the frailty phenotype criteria, according to Fried et al.[1], and what outcomes were obtained?*

A data search was carried out in September 2018, in the following portals and databases: PubMed, Embase, which includes the Medical Literature Analysis and Retrieval System Online (MEDLINE), the Virtual Health Library (VHL), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Web of Science, Physiotherapy Evidence Database (PEDro), Scientific Electronic Library Online (SciELO) and Scopus.

The selected controlled descriptor *frail elderly* was used; and uncontrolled descriptors listed to meet

the five phenotype criteria of Fried et al. (2001), defined as: *weakness; slowness; exhaustion; unintentional weight loss and low activity level*. In the combination of the descriptors as cited there were no occurrences in SciELO and PEDro, and so the combination *weight loss* (*weight loss AND frail elderly*) were used for these two databases.

As the search strategy must be precisely defined and organized, to maintain the scientific nature of all the review formats, Figure 1 presents the six descriptors used in the five search strategies performed in the eight databases.

The present review included randomized controlled trials (RCTs) published from the first definition of the frailty phenotype in the year 2001[1]; which classified frailty in individuals aged 60 years or older using the five criteria of the Fried et al.[1] phenotype in different scenarios; and whose main or secondary objective addressed the change in the frailty level of the elderly persons after the intervention.

To increase the reliability of the information from the databases, a manual search of available articles was conducted, based on the references of the works already collected.

To ensure the selection of publications and data analysis, based on the inclusion and exclusion criteria, an instrument was used with the following information: sample characterization, interventions carried out by the researchers with the sample, results or outcomes achieved by the study, limitations and conclusions. In addition to the variables described above, data associated with the characterization of scientific productions were also collected.

The present study complied with Law nº 9.610/98, intended to preserve and respect the ideas, concepts and definitions of the authors of the analyzed works, which must be presented faithfully, described and cited.

RESULTS

We identified 6,044 publications in the eight databases and portals analyzed, of which only eight met the inclusion criteria (Figure 2). From these publications, we included six RCTs that were part of the bibliographic references cited by the selected articles. Thus, the final sample of the integrative review (databases, portals and manual search) totaled 14 articles.

Chart 1 provides a summary of the selected articles, highlighting the objective and place of the study. Only two (14.3%) studies were conducted in an institution for the elderly, one in Amsterdam (Netherlands)[15] and one in Valencia (Spain)[16] and, according to the characterization of the articles, 12 (85.7%) studies performed their activities with elderly people living in the community[17-28]. No study carried out in a hospital environment was found.

In Chart 2, we describe the sample of 2,153 pre-frail and frail elderly persons (excluding studies from the same research project), of which 1,363 were female. Age ranged from 63[15] to 90 years[16] with an average of 77.02 (±5.19) years.

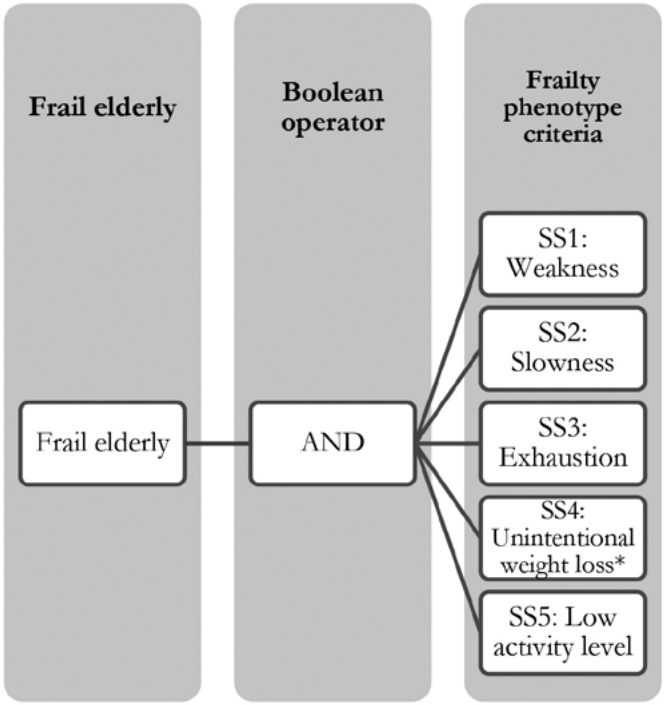

Figure 1. Search strategy using controlled and non-controlled descriptors, 2018.

SS: Search strategy; *Substituted by weight loss in SciELO and PEDro databases

Source: Research data (2018).

Search Strategy	SS1 + SS2 + SS3 + SS4+ SS5							
Databases and portals	BVS	CINAHL	SciELO	PubMed	PEDro	Scopus	Web of Science	Embase
Identified	696	567	91	1.009	35	2.699	798	6.468
Excluded due to falling outside the theme studied	18	151	02	65	07	707	203	72
Excluded for not considering frailty classification (Fried et al.)[1]	13	28	06	13	15	36	15	17
Excluded due to not using RCT method	631	378	66	918	08	1.923	571	363
Others (language, date of publication, scientific article)	07	04	00	07	01	04	00	00
Duplicated	24	05	17	06	03	29	08	14
Selected	03	01	00	00	01	00	01	02
Total	08							

Figure 2. Flowchart of the methodological steps of the integrative review, 2019.

Source: Research data (2018).

Chart 1. Articles according to author, year, objective and location of randomized clinical trials.

Author, year	Objective	Location of study
Buigues et al., 2016[16]	To examine the effectiveness of Darmocare Pre® biotic formulation (Bonusan Besloten Vennootschap BV, Numansdorp, the Netherlands) for improving the frailty syndrome in the elderly.	Valencia Institution for the Elderly (Spain)
Cameron et al., 2013[17]	Determine the effect of intervention on reducing frailty and improving mobility	Community in Sydney (Australia)
Cameron et al., 2015[18]	To examine the effect of a multifactorial, interdisciplinary intervention with frail elderly persons compared with usual care	Community in Sydney (Australia)
Cesari et al., 2015[27]	To investigate the effects of physical activity on frailty status in a sample of sedentary elderly at risk of mobility impairment	Community in Dallas (USA)
Chan et al., 2012[19]	Determine whether proposed interventions can have an impact on dynamic changes in frailty indicators	Community in Taiwan (China)
Chan et al., 2017[20]	To determine the effectiveness of two levels of integrated care on frailty and sarcopenia	Community in Taiwan (China)
Faber et al., 2006[15]	To determine the effects of a moderate intensity exercise program on falls, physical performance, and disability in the elderly, and to investigate the influence of frailty on these effects.	Amsterdam Institution for Seniors (Netherlands)
Fairhall et al., 2014[25]	To evaluate the effect of a frailty intervention on risk factors for falls in frail elderly	Community in Sydney (Australia)
Fairhall et al., 2017[26]	To evaluate the effect of a multifactorial intervention on frailty and mobility in frail elderly people who complete the allocated treatment	Community in Sydney (Australia)
Kim et al., 2015[28]	To investigate the combined and separate effects of exercise and milk fat globule membrane supplementation (MFGM) on frailty, physical function, level of physical activity and hematological parameters in Japanese elderly women living in the community.	Community in Tokyo - Japan
Li et al., 2010[24]	To evaluate the effectiveness of comprehensive geriatric evaluation and relevant interventions in pre-frail and frail community-based elderly persons based on Fried's phenotype criteria and the Barthel Index	Community in Taiwan - China
Ng et al., 2015[22]	To compare the effects of six-month interventions with nutritional supplementation, physical, cognitive training, and the combined treatment of these interventions with usual care to reduce frailty in community-dwelling elderly persons.	Southwest Singapore Community (Asia)
Ng et al., 2017[23]	To investigate the effect of multi-domain lifestyle interventions among frail and pre-frail elderly persons to reduce symptoms of depression.	Southwest Singapore Community (Asia)
Tarazona-Santabalbina et al., 2016[21]	Verify that a multicomponent exercise program in a supervised facility with frail elderly persons can reverse frailty and improve functionality; cognitive, emotional and social networks; as well as biological biomarkers of frailty when compared to a controlled population that did not receive training	Community in Valencia (Spain)

Chart 2. Sample characterization by author, year, age and follow-up of randomized controlled trials.

Author, year	Sample,% of pre, frail and female	Age [mean and standard-deviation)]	Follow up
Buigues et al., 2016[16]	50, being 70% female and 100% frail	66-90 [73.8 (±1.6)]	13 weeks
Cameron et al., 2013[17]	241, being 100% frail and 68% female	>70 [83.3 (±5.9)]	3-12 months
Cameron et al., 2015[18]	241, being 100% frail and 68% female	>70 [83.3 (±5.9)]	12 months
Cesari et al., 2015[27]	424, mean 1.67 (± 1.1) frailty criteria and 68.9% female	70-89 [76.8 (±4.2)]	12 months
Chan et al.,2012[19]	117, 87% pre-frail, 13% frail and 59% female	65-79 [71.4 (±3.7)]	12 months
Chan et al.,2017[20]	296 elderly, 53% female, 21% frail and 79% pre-frail	>65 [71.6 (±4.3)]	6 months
Faber et al, 2006[15]	238, 51.1% pre-frail, 48.9% frail and 79% female	≥63 [84.9 (±6.0)]	52 weeks
Fairhall et al., 2014[25]	241, being 100% frail and 67.63% female	≥70 [83.3 (±5.9)]	3-12 months
Fairhall et al., 2017[26]	241, being 100% frail and 67.63% female	≥70 [83.3 (±5.9)]	3-12 months
Kim et al., 2015[28]	131, being 100% frail and female	≥75 [80.7 (±2.8)]	3 months
Li et al., 2010[24]	310, 47.74% female, 18.39% frail and 81.61% pre-frail	≥65 IG [78.4 (±8.2)] and CG [79.3 (±8.5)]	6 months
Ng et al., 2015[22]	246, 51.4% female, 72% pre-frail and 28% frail	≥65 [70 (±4.7)]	12 months
Ng et al., 2017[23]	246, 51.4% female, 72% pre-frail and 28% frail (28%)	≥65 [70 (±4.7)]	3, 6 and 12 months
Tarazona-Santabalbina et al., 2016[21]	100, 54% female and frail [3.6 (± 0.8)]	≥70 IG [79.3 (±3.6)] and CG [80.3 (±3.7)]	12 months

The highest prevalence of articles in the sample, which was composed of 14 publications between 2006 and 2017, was found in 2015. This data shows that the search for preventive interventions or treatment of frailty has grown in publications in the area of health and there is currently a clear interest among researchers in identifying the potential of interventions in the assessment of the criteria of the frailty phenotype.

Regarding the structuring of RCTs, interventions that included exercise were identified, both as isolated interventions without association with other types of intervention[15] and combined with other interventions, such as nutritional orientation or supplementation or cognitive training[17-23,25-28].

The frequency of exercise sessions ranged from one to five times a week[21], for 20 minutes at home without supervision[19,20] to 90 minutes in groups under the supervision of health professionals[21]. The intensity of the exercises oscillated from slow and precise activities, to moderate[15], graduated and constantly increasing[22,28] or progressive[27].

Isolated interventions focused on cognitive[22,23] and nutritional training were identified, whether combined or not with other intervention activities, with the purpose of orienting small groups[19,20,27], individually orienting the elderly[17,18,21,24-26], offering supplementation of vitamins and minerals[21-23], proteins and calories[17,18,25,26], probiotics[16] and milk fat globule membrane (MFGM)[28]. The duration of these interventions ranged from 13 weeks[16] to 12 months[17-19,21-23,25-27].

The combined interventions were exercise with problem-solving therapy or psychotherapy, nutritional counseling and/or supplementation[19,20], cognitive training[21-23,28], based on a supervised multidisciplinary and interdisciplinary program[17,18,25,26] and interdisciplinary interventions coordinated by geriatricians[24].

According to the RCT results, one or more criteria of the frailty phenotype (unintentional weight loss, self-reported exhaustion, weakness (grip strength), reduced walking speed and low physical activity) and other non-frailty phenotype variables

were modified after the implementation of single or combined interventions in pre-frail or non-frail elderly persons.

Among the sample studies, five (35.7%) articles resulted in the modification of the grip strength weakness phenotype criterion after the interventions[16,19,20,22,25,26]. Modification of the reduced walking speed frailty phenotype criterion was identified in eight (57.1%) publications, with the best results obtained in the periods of 13 weeks[16] and 12 months[17,18,21,22,25].

The self-reported exhaustion frailty phenotype criterion was modified in three (21.43%) publications[16,20,28]. The intervention that associated exercise with vitamin and mineral supplementation not only reversed exhaustion within three months (post-intervention), but also obtained a higher odds ratio for the reversal of frailty in the post-intervention and follow-up[28] period than the other groups.

Only four (28.57%) publications modified the unintentional weight loss criterion after the interventions[19,21,22,28]. Among these were isolated exercise programs that aimed to improve strength and balance, the oral intake of vitamin and mineral supplements, and cognitive training after 12 months. Other interventions combined exercise with nutritional guidance, problem-solving therapy[19,21], cognitive training[22] and nutritional supplementation[28].

Low physical activity was modified in five (35.7%) publications, and two (14.28%) reversed physical inactivity through exercise over 12 months[27], and the ingestion of nutritional supplementation for six and 12 months[22]. The other interventions were exercise combined with supplements[28], orientation[20] and nutritional supplementation[21].

The implementation of interventions among the pre-frail and frail elderly was able to modify other variables that are not part of the five phenotype criteria that classify frailty in the elderly[15-17,19,21,23-25]. The intervention that obtained the highest number of modified variables after undergoing interventions was combined exercise, orientation and nutritional supplementation[21].

The interventions that modified the five criteria of the frailty phenotype and the other variables are listed in Table 3 below.

Chart 3. Criteria of the frailty phenotype and other variables that changed frailty and its outcomes after single or combined interventions.

Outcome	Interventions	Author, year
Increased muscle strength	Ex. + NuOri + ProTh	Chan et al., 2012[19]
	Ex. + NuOri + ProTh + HoCa Ex. + NuOri + ProTh	Chan et al., 2017[20]
	Ex. CogTra Ex. +CogTra + VMNu	Ng et al., 2015[22]
	MuProg.	Fairhall et al., 2014[25]
	Probiotic nutritional supplementation	Buigues et al., 2016[16]

to be continued

Continuation of Chart 3

Outcome	Interventions	Author, year
Increased gaitspeed	Ex. + NuOri + ProTh + HoCa Ex. + NuOri + ProTh + Su	Chan et al., 2017[20]
	Ex. VMNu CogTra Ex. +CogTra + VMNu	Ng et al., 2015[22] Ng et al., 2017[23]
	MuProg.	Fairhall et al., 2014[25] Cameron et al., 2015[18] Cameron et al., 2013[17]
	Probiotic nutritional supplementation	Buigues et al., 2016[16]
	Ex. MfgmNu Ex. + MfgmNu	Kim et al., 2015[28]
Increased body weight	Ex. + NuOri + ProTh	Chan et al., 2012[19]
	Ex. VMNu Cognitive training Ex. +CogTra + VMNu	Ng et al., 2015[22]
	Ex. + MfgmNu	Kim et al., 2015[28]
	Ex. + NuOri + VMNu	Tarazona-Santabalbina et al., 2016[21]
	OriBGE	Li et al. 2010[24]
Improvement in self-reported exhaustion	Probiotic nutritional supplementation	Buigues et al., 2016[16]
	Ex. MfgmNu Ex. + MfgmNu	Kim et al., 2015[28]
	Ex. + NuOri + ProTh + HoCa Ex. + NuOri + ProTh	Chan et al., 2017[20]
Increased physical activity	Ex. + NuOri + ProTh + HoCa Ex. + NuOri + ProTh + Su	Chan et al., 2017[20]
	VMNu	Ng et al., 2015[22]
	Ex. + MfgmNu	Kim et al., 2015[28]
	Ex. + NuOri + VMNu	Tarazona-Santabalbina et al., 2016[21]
	Ex.	Cesari et al., 2015[27]
ADL and IADL dependence	Ex. + NuOri + VMNu	Tarazona-Santabalbina et al., 2016[21]
Health care	Ex. + NuOri + VMNu	Tarazona-Santabalbina et al., 2016[21]
Osteopenia	Ex. + NuOri + ProTh	Chan et al., 2012[19]
Vitamin D	Ex. + NuOri + ProTh	Chan et al., 2012[19]
25-Hydroxyvitamin D Level	Ex. + NuOri + ProTh	Chan et al., 2012[19]
Falls	MuProg	Fairhall et al., 2014[25]
	Ex. + NuOri + VMNu	Tarazona-Santabalbina et al., 2016[21]
	Exercise	Faber et al., 2006[15]
Balance	MuProg.	Fairhall et al., 2014[25]
	Ex.	Faber et al., 2006[15]

to be continued

Continuation of Chart 3

Outcome	Interventions	Author, year
Physical performance	MuProg.	Fairhall et al., 2014[25] Cameron et al., 2013[17]
	Ex. + NuOri + VMNu	Tarazona-Santabalbina et al., 2016[21]
	Ex.	Faber et al., 2006[15]
Functional state	Probiotic nutritional supplementation	Buigues et al., 2016[16]
	Ex.	Faber et al., 2006[15]
Sleep quality	Probiotic nutritional supplementation	Buigues et al., 2016[16]
Mental state	Probiotic nutritional supplementation	Buigues et al., 2016[16]
	Ex. + NuOri + VMNu	Tarazona-Santabalbina et al., 2016[21]
Social support	Ex. + NuOri + VMNu	Tarazona-Santabalbina et al., 2016[21]
Depression	Ex. + NuOri + VMNu	Tarazona-Santabalbina et al., 2016[21]
	Ex. VMNu Ex. +CogTra + VMNu	Ng et al., 2017[23]
Quality of life	Ex. + NuOri + VMNu	Tarazona-Santabalbina et al., 2016[21]
Calcium level	Ex. + NuOri + VMNu	Tarazona-Santabalbina et al., 2016[21]
Blood clotting	Ex. + NuOri + VMNu	Tarazona-Santabalbina et al., 2016[21]
Physical rehabilitation	OriBGE	Li et al. 2010[24]
Geriatric evaluation	OriBGE	Li et al. 2010[24]
Referrals to specialists	OriBGE	Li et al. 2010[24]
Polypharmacy	OriBGE	Li et al. 2010[24]
Mobility	Ex.	Faber et al., 2006[15]

Ex.: Exercise; NuOri: nutritional orientation; ProTh: problem solving therapy; HoCa: home care; CogTra.: cognitive training; VMNu: vitamins and minerals nutritional supplementation; MfgmNu: milk fat globule membrane nutritional supplementation; OriBGE: orientations based on broad geriatric evaluation; ADL: activities of daily living; iADL: instrumental activities of daily living; MuProg., interdisciplinary and individual multifactorial program; Su.: supervised by professionals.

DISCUSSION

The analysis of the articles allowed the guiding question of the study to be answered and from this, the definition of frailty as a reversible syndrome to be corroborated. Systematic reviews reinforce the finding that physical activity[4,29] combined with other interventions may minimize or delay the onset of frailty among the elderly because its effects can influence other variables that, in turn, influence the aging process and enhance the outcomes of frailty[11,29].

The particularity of the RCTs, which consider only frail elderly persons in their sample and in which more than half of those sampled were women over 80 years of age[15-18,21,25,26,28], provides greater precision and confidence regarding the effectiveness of interventions, as these inherent characteristics of the sample potentiate consequences of frailty[30,31].

Among the frailty phenotype criteria, self-reported exhaustion was the criterion in which the outcome changed the least following the interventions. It can be supposed that the subjectivity involved in measuring exhaustion means that it cannot be guaranteed that the interventions are best suited to modifying this criterion. The modification of exhaustion is not dependent on cognitive or psychological aspects, but on professionals who are willing to supervise the elderly during exercises and manage their food intake by offering supplementation. This deduction is confirmed when the elderly person is referred to the psychiatrist or psychologist for the treatment of depressive symptoms and exhaustion, without changes in the self-reported exhaustion criterion[17,18,25,26].

Weakness in grip, as measured by handgrip strength, presented the best outcome for the combined interventions of exercise, orientation

and nutritional supplementation, as found in the literature[5,32,33]. Two groups of researchers[19,20] obtained improvements in the criterion by including, in addition to exercise and nutritional orientation, problem-solving therapy activities. The identification of interventions that significantly modify this criterion is extremely important because, as well as classifying frailty, it is a predictive method for mortality and disability[34].

The modification of the reduced walking speed frailty phenotype criterion, identified in 17.84% of the elderly resident in the community[31], is relevant in the context of health, as it is a predictive measure for several negative outcomes since it is related to the use of the sensory, motor and structural organs when traveling four meters at a speed less than 0.8 meters/second[31,35]. The integration and functionality of the physiological system required to increase walking speed in the elderly became more effective through monitoring and encouraging the elderly to begin and continue physical activity at home[17,18,22,25] and consume a high calorie intake, with or without supplementation[17,22,28].

The low physical activity frailty phenotype criterion presented better results following a combined exercise, orientation and nutritional supplementation intervention[21] than with the other interventions. This combined intervention reduced physical inactivity, increased walking time to more than three hours per week, and modified psychosocial, biochemical status and adverse health consequences[21]. In other words, the sensitivity for modifying low physical activity and frailty is direct, but not proportional, since inactivity does not necessarily reverse frailty.

The criterion of the unintentional weight loss frailty phenotype, identified in 57.7% of frail elderly persons[36], may have been triggered by neuroendocrine and musculoskeletal disorders, malnutrition, inflammation, catabolic diseases and decreased muscle mass[1]. However, it can be inferred that the lack of social support associated with the functional limitations of the elderly may be the cause of low nutritional intake, since the change in the score for the weight loss criterion was due to the preparation and provision of meals at the home of the elderly person[19,28].

However, the diversity of interventions cannot guarantee the existence of an ideal action that will reverse the criterion of the unintentional weight loss frailty phenotype in the long term, as the outcomes differ due to the scale of the effects. It was found, however, that the unintentional weight loss, grip strength and low physical activity criteria can be affected by many interventions and may undergo modifications following non-specific interventions.

Although the assessment instrument for frailty includes only physiological criteria[1], it is possible to state that interventions focused on pre-frail and frail elderly persons modify other variables that include the social, emotional, environmental, behavioral, cognitive, functional and physiological domains. This finding demonstrates that frailty, even when evaluated by physiological parameters, can be influenced by the modification of other variables, such as balance, falls, dependence in daily and instrumental activities of living, social support, sleep quality, mental state and quality of life, which potentiate the consequences of frailty.

The significant number of outcomes for the combined interventions lead to findings that frailty is sensitive to resistance, strength, balance and sensory perception exercises, general guidance, and nutritional supplementation. In addition, the effect of the interventions increased when the proposed activities provided socialization in small groups of elderly persons. However, this does not mean that isolated interventions do not have beneficial outcomes for the elderly, as compared to combined interventions they tend to increase the effect of the outcomes, making them less effective and comprehensive for the health of the elderly, whether pre-frail or frail.

As this study exclusively included RCTs that classified their sample based on the Fried et al.[1] frailty phenotype, there was an absence of bias regarding the inclusion of only the pre-frail and frail elderly. Possible limitations in the results presented in this study are based on the fact that it was restricted to certain data searches and languages and the inclusion

only of the elderly classified from the Fried et al.[1] frailty phenotype, with the exclusion of references that conceptualize frailty as a multidimensional clinical condition. The objective and explicit operationalization of the frailty phenotype[13] is valid and widely used in scientific evidence[37], ensuring predictive validity to identify the signs, symptoms and risk factors or determinants of frailty[11].

Although this review has applied well-defined inclusion criteria and adopted the integrative review method, no interventions developed with hospitalized elderly persons involving family or caregivers of pre-frail and frail elderly persons during activities were identified. It can be conjectured that adherence to interventions may present greater ease and participation with family support in any health context, which would impact comprehensive and effective outcomes for the elderly, their families and society.

CONCLUSION

The results of this review corroborate frailty as a reversible syndrome, as the outcome of interventions is effective in modifying the Fried et al.[1] phenotype criteria and, consequently, in reducing frailty levels among the elderly. However, replicating interventions that have brought benefits to the elderly may require adaptations or adjustments, due to the differences in the policy, health and professional structure available for the care of the elderly in Brazil.

Modification of other variables in addition to the phenotype criteria following the interventions reinforces that frailty is multifactorial and can sometimes be a risk factor or consequence for other health complications. It is believed that the modification of these other variables will give a broader view of the elderly, aimed not only at frailty, but also to the biopsychosocial process of aging.

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Comparison of social support network and expectation of care among elderly persons with different home arrangements

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Abstract

Objective: To compare the social support network and expectation of care among elderly persons who live alone and those who live with others. *Method:* A cross-sectional study with 348 elderly people living in the community in the municipal region of Várzea Grande, Mato Grosso, Brazil was performed. The elderly were interviewed using a questionnaire composed of socio-demographic issues; evaluation tools of basic and instrumental activities of daily living; and care expectation and perceived social support network. The data were submitted to descriptive and comparative statistical analysis, the chi-squared test or Fisher's exact test at a significance level of 5%. *Results:* Most of the interviewees were younger elderly women. Of these,14.66% lived alone and 85.34% lived with other people, with mainly bi-generation family arrangements. The majority stated that they had fair health, had up to two diseases, were dependent in instrumental activities of daily living and independent in self-care activities. Elderly persons who lived with others relied on their family, and the expectation of care was aimed at a daughter or daughter-in-law; while those who lived alone expected to rely on neighbors or friends to help with their tasks, if needed. *Conclusion:* Family members are the greatest providers of support and care, and the elderly hope to count on them when they need help in carrying out basic and instrumental activities of daily living.

Keywords: Health of the Elderly. Social Support. Caregivers.

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INTRODUCTION

Types of protection against the daily difficulties faced by the elderly can be created through bonds established over the years, which form spontaneous and reciprocal networks of relationships that can provide individual and collective well-being. Such relationships constitute an informal social support network in which feelings of affect, protection, security, common and mutual care, the socialization of knowledge and information are cultivated among its members[1-7].

Individuals establish bonds that form a social support network, which can offer material, affective, informative support or help with social interaction in old age, representing an important factor in preventing vulnerability and isolation among the elderly[3,8-10].

Support is usually provided by those with whom links have been maintained, such as family, friends, neighbors, and former co-workers, making up the informal social support network. In this context, the family occupies the main place of support in the care of the elderly[11-15].

The social network is effective in daily social relations, taking the form of mutual and concrete support in financial, psychological and social contexts[16,17]. Sometimes, this is restricted to family members, whether in urban or rural areas, but it is in the latter that the relationship of daily care is most facilitated, due to geographical proximity[14,18].

A study on the representation of old age shows that the family is a support for experiencing a positive old age and a space for exchanges and mutual help, where shelter, protection and the maintenance of health is found[19]. In this sense, the elderly not only feel that others are interested in them and will be available when they need them, but also receive satisfaction regarding existing relationships[8,19,20], increased sociability and the creation of a possible influence on their physical, cognitive and psychological functionality[3,4,6].

Friendships among the elderly are highly beneficial as they are free choices that meet their affective and dialogue needs and can help in solving everyday issues[9]. However, studies show that it is with the family that they maintain their main and closest relationships, providing social support, material help and support in activities of daily living, culture, leisure and care[2,9,13,20,21].

There are elderly people who need help from someone in performing certain tasks, especially those with the condition of dependence, lack of autonomy and other vulnerabilities. The social support network exists to provide them with personal care, hygiene and food when they are affected by disabling diseases[2,15] or bedridden[14].

Many elderly persons are faced with an inadequate social and health service structure, and for most of these individuals it is only the family that provides support and help. Thus, the identification and characterization of the existing social support network in communities is important, as are studies that can support the development of actions aimed at the care and support of the elderly, families and caregivers.

With the aim of supporting the creation of care policies for the elderly population and contributing to the knowledge and guiding of new research, this study aimed to compare the social support network and the expectation of care of elderly persons who live alone and those who live with others.

METHOD

A cross-sectional, descriptive and comparative study was performed with community-dwelling elderly persons treated at Basic Health Units (BHUs) in the city of Várzea Grande, Mato Grosso, Brazil.

To reflect the diversity of living and family arrangements of the population, elderly people from different areas were recruited - one in a central region and the other in a greener area. In consultation with the Municipal Health Department, BHUs located in the neighborhoods of Souza Lima and Água Vermelha were selected. From these units, elderly people living in green, riverside and urban areas, treated by the Community Health Agents Program (CHAP) were interviewed, as described below:

BHU Souza Lima: covers green, urban and riverside areas, and has nine areas served by Community Health Agents (CHAs) in seven neighborhoods: Bonsucesso, Gilson de Barros Housing Estate, Gonçalo Botelho, Pai André, Parque Boa Vista, Souza Lima and Vale Verde.

BHU Água Vermelha: covers the urban area and has two teams, totaling 12 CHAs in five neighborhoods: Água Vermelha, Jardim Glória I, Jardim Marajoara, Jardim Paula I and II. In this unit, eight CHAs collaborated in the data collection process, six from the Água Vermelha Team and two from the Jardim Glória I Team. Although data were not collected in the areas of all the agents, all the neighborhoods covered were represented.

At the time of data collection, which took place from February to September 2017, there was no systematic registration of users accompanied by the CHAPs of the units. Thus, the sample calculation was performed based on the number of appointments carried out: 362 elderly persons at BHU Souza Lima and 450 at BHU Água Vermelha. In this study, the following elderly persons were eligible: non-institutionalized individuals aged 60 years and over, attended by the selected BHUs, with whom it was possible to establish communication (listening and speaking comprehension) for the interview.

The sample size calculation was 50% of the registered elderly population, based on a 95% confidence level and 5% margin of error, resulting in 208 samples from BHU Água Vermelha and 187 samples from BHU Souza Lima. The sample participants were selected for convenience, considering the difficulty of locating addresses, obtaining the agreement of respondents without a CHA present, and the fact that not all of those from BHU Água Vermelha were available to follow or collect data.

A total of 164 (36.4%) elderly persons from BHU Água Vermelha and 191 (52.7%) from BHU Souza Lima met the eligibility criteria, totaling 355 elderly, representing 43.8% of the total registered with the CHAP; of these 348 questionnaires were validated for the study analysis.

Most interviews were conducted at home; at BHU Souza Lima, there were also meetings with the elderly after group meetings and appointments. Eight CHAs from each unit were involved in the data collection process, five of whom collaborated in recruitment and interviewing, and three of whom participated in recruitment only, at both BHU Souza Lima and Água Vermelha. All collaborators participated in a prior training program on the research protocol, objectives and procedures.

The data collection instrument was created with questions of the protocols used in the following studies: the Frailty of the Brazilian Elderly (or FIBRA) of the Postgraduate Program in Gerontology of the Medical Sciences School of the Universidade Estadual de Campinas (or FCM/UNICAMP)[22], and Welfare and Aging (or SABE), coordinated by the Pan American Health Organization/World Health Organization (PAHO/WHO) in Brazil, conducted by the School of Public Health of the Universidade de São Paulo (or USP)[23]. It was considered valid, since the protocols of these studies were built, applied and evaluated by specialists in the area of elderly health and epidemiology.

For this study, the following variables were selected: sociodemographic; living arrangements; self-rated health and self-reported illnesses; functional capacity; expectation of care and perceived support, as described below:

The sociodemographic variables were composed of self-reported responses: a) age: number of years calculated from date of birth to the date of the interview, subsequently grouped into two age groups (60 to 74 years; 75 years and over); b) gender: two categories (male; female); c) marital status: self-reported, with four categories (married/living with a partner, divorced, separated/unmarried, single, widowed); d) educational level: calculated in years of schooling and grouped into four categories (<1; 1-4; 5-8; >8); e) currently working: *yes*; *no*; f) retired/pensioner: including beneficiaries of the Continuous Cash Benefit Program (or BPC), in four categories (receive pension; receive bereavement allowance; receive pension and bereavement allowance; does not receive either).

The *living arrangement* variable was identified based on the answers to the questions: *Please, including yourself, tell me how many people live in your home*. Based on this the following classifications were produced: a) living condition: alone; cohabiting; b) *family arrangement*: when the elderly person lived with someone, the following question was asked *What is your degree of kinship*? Based on the responses, the individuals were regrouped according to the composition of the cohabitants.

Health covered: a) self-assessment of health: responses were grouped into three categories (very good/good; fair; poor/very poor); b) number of self-reported diseases: it was asked if a doctor had ever diagnosed the interviewee with one or more of the following diseases: heart disease (angina, myocardial infarction, heart attack, etc.); high blood pressure/ hypertension; stroke/ cerebrovascular accident/ ischemia; diabetes mellitus; malignant tumor/ cancer; arthritis or rheumatism; lung (bronchitis, emphysema etc); depression; osteoporosis, and the answers were then grouped by number of diseases into two categories (0 to 2; 3 or more).

Functional capacity was assessed as follows: a) Instrumental Activities of Daily Living (IADL) through the Lawton and Brody Scale (using the telephone; using transportation; shopping; preparing food; doing household chores; using medication; handling money)[24]; b) Basic Activities of Daily Living (BADL) through the Katz Scale (taking a bath; dressing; using the toilet; transference; controlling the sphincter; feeding oneself)[24,25]. Both Activities of Daily Living (ADL) were grouped as independent, partially dependent and totally dependent, and later regrouped as dependent and independent for statistical analysis.

The *expectation of care* variable was assessed based on the need for help with ADL. Beginning with the question *If you need or will need help doing any of the above, do you have anyone you can count on*? The answers were dichotomous: *yes* or *no* for each item (spouse, daughter or daughter-in-law, son or son-in-law, other relative, neighbor or friend, paid professional).

Perceived social support was assessed based on five questions: *Would you say that you have several people to talk to when you are lonely*?; *Would you say you meet up with and talk to friends and family*?; *Would you say that it is easy for you to find people who can help you with your tasks if you become ill*?; *Would you say you have someone to count on when you need a suggestion on how to deal with a problem*?; and *Would you say you have at least one person whose opinion you fully trust*? The answers had four categories: never; sometimes; most of the time; always.

In the data organization and analysis phase, following the interviews and conferring of the answers in the protocol, the data were stored in an *Excel* spreadsheet, checked using the filter tool, and all the questionnaires were reviewed, comparing them with the spreadsheet records (one by one). One-dimensional exploratory analysis and absolute (n) and percentage (%) frequencies were used.

In the two-dimensional analysis the chi-squared or Fisher exact tests were used at a 5% significance level ($p<0.05$) to assess the association between living conditions (alone or cohabiting) and the *age* and *health* variables of the elderly.

The study complied with the requirements of National Health Council Resolutions nº 466/2012 and nº 510/2016. The participants signed a Free and Informed Consent Form (FICF) and the project was approved by the Research Ethics Committee of the Universidade Estadual de Campinas (UNICAMP), under opinion nº. 1.995.932, on April 3, 2017.

RESULTS

The study showed that the majority of respondents (N=348) were women under 75 years of age, with an average age of 70.1 (±7) years; the age range ranged from 60 to 91. Most of the interviewees lived with other people, with spousal and bigenerational relationships predominating, which includes spouses, sons and daughters, sons-in-law and daughters-in-law (Table 1).

Table 1. Sociodemographic, health and functionality characteristics of the elderly (N=348). Várzea Grande, Mato Grosso, 2017.

Variables	Categories	n (%)
Age (years)	60 to 74	256 (73.6)
	75 or more	92 (26.4)
Gender	Male	132 (37.9)
	Female	216 (62.1)
Marital Status	Married or living with a partner	200 (57.5)
	Divorced, Separated, or Unmarried	24 (6.9)
	Single	28 (8.1)
	Widowed	96 (27.6)
Schooling	<1	57 (16.4)
	1 to 4	191 (54.9)
	5 to 8	74 (21.3)
	> 8	26 (7.5)
Work	Yes	109 (31.3)
	No	239 (68.7)
Pension/ Bereavement allowance	Pension	224 (64.4)
	Bereavement allowance	36 (10.3)
	Pension and Bereavement allowance	24 (6.9)
	Does not receive either	64 (18.4)
Living Conditions	Alone	51 (14.7)
	Lives with someone	297 (85.3)
Living Arrangement	Spouse	82 (27.6)
	Son/Daughter	24 (8.1)
	Grandson/Granddaughter	19 (6.4)
	Other family member	7 (2.4)
	Spouse, son/daughter/spouse, son/daughter, son-in-law or daughter-in-law	60 (20.2)
	Spouse, son/daughter, son-in-law or daughter-in-law, grandchild/spouse, son/daughter, grandchild/ spouse, son-in-law or daughter-in-law, grandchild/spouse, son/daughter, grandchild, other unpaid family member	45 (15.2)
	Spouse, son/daughter, parent/spouse, son/daughter, grandchild, siblings, spouse, grandchild, stepson/daughter, spouse, grandchild	19 (6.4)
	Son/daughter, son-in-law or daughter-in-law, Son/daughter, son-in-law or daughter-in-law, grandchild, son/daughter, grandchild/son-in-law or daughter-in-law, grandchild, other family member	29 (9.8)
	Son/daughter, siblings/son/daughter, other family member /grandchild, other family member	5 (1.7)
	Other cohabitants *	7 (2.4)
Health	Good/very good	97 (27.9)
	Fair	210 (60.4)
	Poor/Very poor	41 (11.8)
Diseases	0 to 2	259 (74.4)
	3 or more	89 (25.6)
IADL **	Dependent	201 (57.8)
	Independent	147 (42.2)
BADL***	Dependent	49 (14.1)
	Independent	299 (85.9)

* Stepchildren, siblings, parents, other paid or unpaid family members; **Instrumental Activities of Daily Living (IADL); ***Basic Activities of Daily Living (BADL).

The elderly described themselves as having fair health conditions (60.35%) and reported the presence of up to two diseases (74.4%), reflecting a profile of non-multimorbidity. The evaluation of IADL found dependence in all activities in 57.8% of the elderly. For activities involving self-care (BADL), most of the elderly (85.9%) were independent. Cohabitation, a condition reported by most respondents, was not correlated with age, health, number of diseases or functionality (Table 2).

Regarding the expectation of care, the elderly who lived with someone expected to rely, firstly on the help of their daughter or daughter-in-law, followed by their son or son-in-law, and then their spouse (Table 3).

Table 2. Comparison between the living conditions of the elderly with sociodemographic variables, health and functionality (N=348). Várzea Grande, Mato Grosso, 2017.

Variables		Lives alone	Lives with someone	*p**
		n (%)	n (%)	
Age (years)	60 to 74	34 (13.3)	222 (86.7)	0.2997
	75 or more	17 (18.5)	75 (81.5)	
Health	Good/Very good	18 (18.6)	79 (81.4)	0.2267
	Fair	30 (14.3)	180 (85.7)	
	Poor/Very poor	3 (7.3)	38 (92.7)	
Diseases	0 to 2	40 (15.4)	219 (84.6)	0.5919
	3 or more	11 (12.4)	78 (87.6)	
IADL**	Dependent	23 (11.4)	178 (88.6)	0.0676
	Independent	28 (19.1)	119 (81)	
BADL***	Dependent	4 (8.2)	45 (91.8)	0.2427
	Independent	47 (15.7)	252 (84.3)	

* Chi-squared test with a 5% level of significance ($p<0.05$); **Instrumental Activities of Daily Living (IADL); ***Basic Activities of Daily Living (BADL).

Table 3. Comparison between living conditions and on whom the elderly can rely (N=348). Várzea Grande, Mato Grosso, 2017.

Variables*		Lives alone	Lives with someone	*p***
		n (%)	n (%)	
Spouse	Yes	6 (3.3)	176 (96.7)	**<0.001**
	No	44 (27)	119 (73)	
Daughter or daughter-in-law	Yes	33 (12.3)	236 (87.7)	**0.0429**
	No	17 (22.4)	59 (77.6)	
Son or son-in-law	Yes	23 (10.2)	202 (89.8)	**0.0043**
	No	27 (22.1)	95 (77.9)	
Other relative	Yes	24 (14)	147 (86)	0.8960
	No	26 (15.1)	146 (84.9)	
Neighbor or friend	Yes	29 (15.6)	157 (84.4)	0.6358
	No	21 (13.2)	138 (86.8)	
Paid professional	Yes	16 (19.1)	68 (81)	0.2359
	No	34 (13)	227 (87)	

* Questions regarding expectation of care were answered as follows: 347 for son or son-in-law; 343 for another relative; 345 for other members of family;** Chi-squared test at 5% significance level ($p<0.05$).

The data show that most elderly persons always had someone to talk to, met with friends and family, and had an easy time finding people to help them if they got sick, as well as asking for advice or dealing with a problem. However, there was no significant difference between the elderly who lived alone and those who lived with someone (Table 4).

Table 4. Comparison between the living conditions of the elderly and the perceived support network (N=348). Várzea Grande, Mato Grosso, 2017.

Variables*	Lives alone n (%)	Lives with someone n (%)	*p***
There are several people with whom you can talk when you feel alone			
Never	1 (20)	4 (80)	0.5733
Sometimes	12 (15.8)	64 (84.2)	
Most of the time	11 (18.3)	49 (81.7)	
Always	27 (13)	180 (87)	
Meet and chat with friends and relatives			
Never	0 (0)	4 (100)	0.2063
Sometimes	20 (21.5)	73 (78.5)	
Most of the time	7 (13)	47 (87)	
Always	24 (12.3)	171 (87.7)	
Easy to find people that can help you with your tasks, if you get sick			
Never	3 (30)	7 (70)	0.3722
Sometimes	13 (15.5)	71 (84.5)	
Most of the time	8 (17.8)	37 (82.2)	
Always	27 (13.1)	179 (86.9)	
Do you have someone you can count on when you need a suggestion on how to deal with a problem?			
Never	2 (18.2)	9 (81.8)	0.9499
Sometimes	11 (14.7)	64 (85.3)	
Most of the time	6 (13)	40 (86.7)	
Always	31 (14.5)	183 (85.5)	
Would you say that you have at least least one person whose opinion you fully trust?			
Never	3 (23.1)	10 (76.9)	0.1828
Sometimes	11 (20.8)	42 (79.3)	
Most of the time	6 (20)	24 (80)	
Always	31 (12.4)	219 (87.6)	

*Questions were answered as follows: 348 for the first; 345 for the third; 346 for the others; **Chi-squared test at 5% significance level ($p<0.05$).

DISCUSSION

The socio-demographic profile of the elderly presented characteristics similar to other studies, i.e. a predominance of women[4,26], who were younger than 75[1,4,18,27-30], cohabited with others[4,26,28,30], had up to two diseases[4, 26-28] and were independent for BADL (85.92%). It is common, as the SABE study showed, that the development of dependence is greater for women (33.2%), the elderly (59.46%) and widowers (37.3%)[4].

There was no correlation between whether or not the elderly lived with someone and age, health, number of diseases or functionality. However, the data regarding the evaluation of dependence for BADL and IADL followed the same trend as the results of other studies[28-30].

Rabelo and Neri[28] found that elderly persons living with someone exhibited total independence for BADL (96.3%) and IADL (58.2%) and less social involvement (65.7%) among the oldest elderly persons. Elias, Marzola and Molina[30] reported in their study (N=637) that 20.3% of the elderly lived alone and that poor family functionality was associated with single-person living conditions.

Analysis of information from the National Health Survey with individuals aged 60 years or older (N=11,967) shows that 15.3% of elderly persons in Brazil live alone. This condition was 29% higher for women and prevalent in nearly 1/5 of individuals aged 75 and older[29].

Almost 1/3 of those who lived alone complained of suffering from an illness in the two weeks prior to the interview, the majority self-reported difficulties with IADL; falls (previous 12 months) and worse eating habits are also related to the elderly who live alone[29]. Most of the elderly lived with someone else[1,27,28,30,31] and, among their families, across generations, establish a comfortable reciprocity in giving and receiving help, especially material and emotional support[32].

In the correlation between expectation of care and living conditions, data showed the centrality of the family and care provided primarily by a daughter or daughter-in-law; followed by a son or son-in-law; and subsequently by a spouse, corroborating the studies by Souza et al.[1], since the expectation of care is aimed at family members. Oliveira et al.[27] point out that 89.12% of the elderly report having an expectation of care; 44% expect to be cared for by only one person, often their spouse, who is also usually an elderly person. Among those who live alone, there is a three times greater risk of the absence of an expectation of care.

Lins et al.[33] report that caregivers are mostly women (77%), spouses (39.9%) and reside with the elderly (85.7%). Another study indicates that caregivers tend to be women (40.4%); sons or daughters (56.3%), spouses (13%) and friends, neighbors, and those close to or who spend time with the elderly (10.1%), while 85.1% of caregivers of bedridden elderly persons live with the recipient of care[14].

The presence of a spouse or partner and greater involvement in social activities are indicators of better functionality and psychological health, and are less taxing upon the elderly, being particularly noticeable when the family meets the expectations of care[28].

Guedes et al.[5] emphasized that informal care is most effective when offered by close relatives. On the other hand, the absence of such individuals and/or geographical distance are associated with inadequate support.

In this study, the comparison between living condition and support network, both for those who live alone and those who live with others, showed the satisfaction of the elderly with their social networks, as they reported that they can always find people to talk or help with their tasks.

Family members tend to be closer and, therefore, are considered important when it comes to emotional support[14], while a satisfactory perception of family support influences mental health and stress situations, as well as providing social welfare and feelings of safety and autonomy[28,31]. The researchers highlight that the network composed of family and friends is larger than the family network, in relation to sons and/or daughters who do not live with the elderly. Although this network is smaller, it is that which most expressively supports the elderly[4].

Family, neighbors, friends and community are fundamental in situations of crisis and for socialization and stress reduction in general, representing an informal network and frequent provider of support in the event of the insufficiency of the social network offered by the government[5,7].

One imitation of the present study was that the homogeneity of the sample, despite being carried out in different areas, makes it impossible to assess the statistical significance of the social support network in relation to the profile of the elderly interviewed. The cross-sectional design also prevents the effectiveness and dynamics of the family network from being assessed, highlighting more specific differences for the elderly and those with impaired functional capacity. Nevertheless, the results of this study may support future research.

CONCLUSION

The study population consisted mainly of women, under 75 years of age, who were independent for basic and significantly impaired for instrumental activities of daily living. Most of the elderly who lived with others had an expectation of care and exhibited confidence in those close to them to help with daily activities, when necessary, especially in relation to their children, with the daughter or daughter-in-law the main caregivers.

Despite the lack of statistical significance, social relationships were observed among the elderly, as they stated that they always found people to talk to, help with tasks and give suggestions and opinions. In general, the family was the main social support for activities of self-care or tasks outside the home, but friends and others in the community were also providers of emotional and moral support, as they represented opportunities for conversation and social interaction.

Although this was not the case for most, the proportion of elderly people who lived alone or only with their spouses and had limitations in instrumental activities was noteworthy. This living condition suggested an inadequate support network, which also failed to effectively meet the daily needs of the elderly.

A more diverse support network could overcome the problems of the inadequate social support provided by the government. It is therefore suggested that further research on social support and assistance is carried out, and it is hoped that this study, in some way, encourages the search for strategies and the implementation of care and support programs for the elderly and their caregivers.

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Road traffic accidents involving elderly people: an integrative review

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Abstract

Objective: To identify the epidemiological and socio-demographic profile of elderly victims of traffic accidents reported in articles published in scientific literature from 2013 to 2018. *Method:* The Literatura Latino Americana em Ciências da Saúde (Latin American Literature in Health Sciences), Base de Dados de Enfermagem (Database in Nursing), Scientific Electronic Library Online, and Medical Literature Analysis and Retrieval System Online databases were used, with the guiding question being: *What is the scientific production on traffic accidents involving elderly people?* A total of 355 articles were found. After the application of the selection criteria, 16 were evaluated, and nine remained for final analysis. *Results:* The age range was 60 to 69 years and the majority of the sample were men, who were married and had low schooling. Being run over was the most frequent accident. The width of the traffic lanes and the time of the accident influenced the frequency and risk of accidents and the severity of the injuries. *Conclusion:* Younger elderly persons were the most affected, and being run over was the most frequent type of accident.

Keywords: Accidents Traffic. Health of the Elderly. Wounds and Injuries. Health of the Elderly. Elderly Population.

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INTRODUCTION

Traffic accidents are one of the main causes of death in the young and adult population. This cause is also significant among the elderly, especially with the increasing size of the older population[1-4].

A study on external causes carried out by the SEADE Foundation in the state of São Paulo, Brazil, found that car accidents and falls are among the main causes of death among the elderly. When the other causes of death among this population are compared, external causes have a lower impact, but are greater within the group itself[5].

Although external causes affect the younger population more frequently, the risks of dying from accidents or violence increase dramatically among those over 60. This is caused both by the condition of exposure to risk due to locomotion and other tasks that are part of activities of daily living, as well as by the inherent difficulties of age.

Among the accidents that can affect the elderly population are Road Traffic Accidents (RTA). The number of existing vehicles is a preponderant factor for the occurrence of these accidents, involving both automobiles and motorcycles, as they cause complications in the traffic in general, and increase the risks of this type of accident[5,6]. With the changing age of the population[4,6], RTA suffered by the elderly have become a major public health problem, and one with an increasing trend[7].

People in the 60 years or older age group have a higher mortality from external causes in Brazil, as well as hospitalizations from these causes within the Unified Health System (or SUS), with rates of 109 and 650 per 100,000 inhabitants, respectively, in 2008. Between 2008 and 2010, there were 413,139 hospitalizations for external causes among the elderly in the SUS, costing approximately R$570 million. These hospitalizations were mainly due to falls (62.4%), traffic accidents (8.1%) and unclassified external causes (7%)[8].

Between 2000 and 2010, the mortality rate from RTA increased from 18 to 22.5 deaths per 100,000 inhabitants in Brazil. Such accidents were also the second most frequent cause of hospitalizations in the SUS between 2002 and 2011, resulting in costs estimated at R$50 billion[9-11].

Although older people are living longer and more healthily, they face new challenges, among which are traumas resulting from RTA, which significantly affect this group[10].

It was therefore felt that there was a need to better understand how RTA affect this population through the identification of published works on the subject in scientific literature, and from this knowledge provide a foundation to contribute to the preparation of preventive public policies to benefit this age group.

Therefore, the present study aimed to identify the epidemiological and sociodemographic profile of elderly victims of RTA through articles published in scientific literature from 2013 to 2018.

METHOD

An integrative review of literature was carried out, which consists of the creation of an evidence-based scientific framework. This form of knowledge production requires a methodological rigor and is effective for the analysis and critique of literature, constituting one of the main research modalities in the context of health[12].

As a research strategy, the electronic databases Medical Literature Analysis and Retrieval System Online (PubMed), Latin American & Caribbean Health Sciences Literature (LILACS), the Scientific Electronic Library Online (SciELO) virtual library and the ScienceDirect platform were used.

The inclusion criteria were: (a) articles indexed by descriptors registered in the Medical Subject Headings (MeSH) database: "Traffic Accidents", "Elderly", "Old Age", "Old Adults" and in the Health Sciences Descriptors (DeCS): "Traffic Accidents" and "Elderly"; (b) articles published from 2013 to 2018 involving people over 60 years of age and (c) articles that answered the research question. The exclusion criterion was published literature other

than primary articles, excluding, in this manner, case studies, monographs, master's dissertations, doctoral theses, chapters of books and systematic reviews.

The survey was conducted between February and April 2018, with data collection performed at two different moments. The first was the selection of articles for a complete reading, the description of which is detailed in figure 1. Initially, 936 articles were established from the chosen descriptors. A total of 848 were discarded as they did not meet the inclusion criteria (n=840) or were duplicates (n=8), leaving 90 articles potentially eligible for the study.

From a careful reading of the titles and abstracts, 65 articles were excluded because they were outside the defined age group (n=49) or did not relate to the studied subject (n=16) and, thus, 25 articles were chosen as they responded closely to the guiding research question proposed.

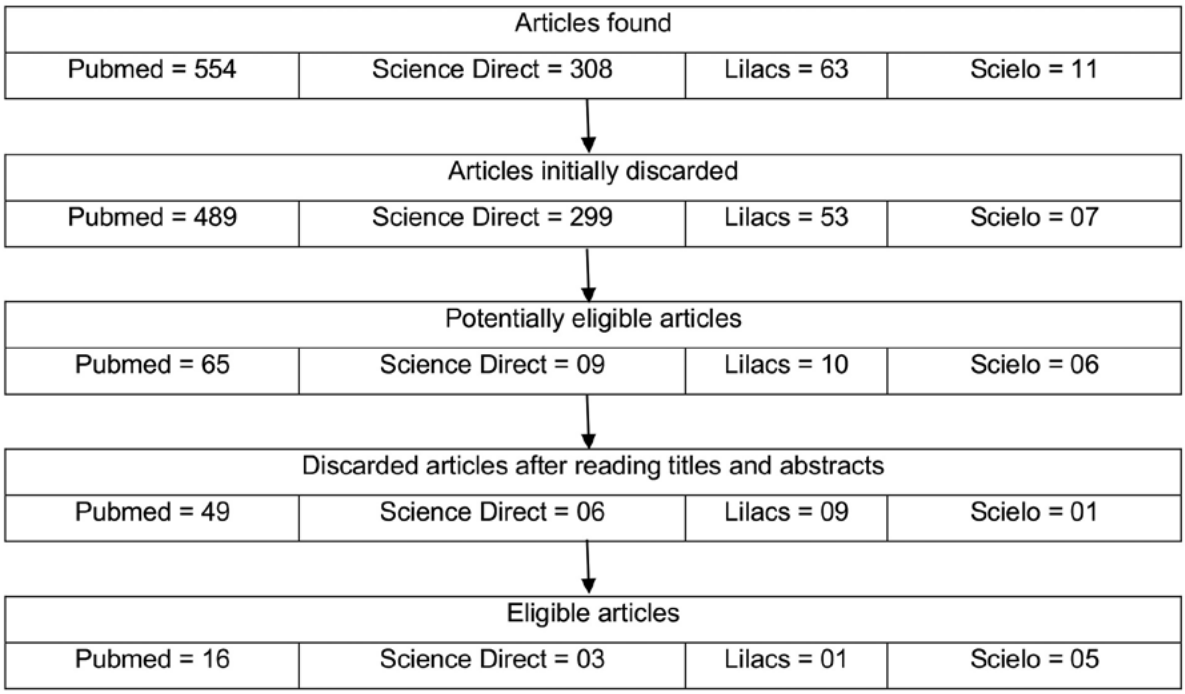

Figure 1. Selection process of articles included in the present review. Recife, Pernambuco, Brazil, 2018.

For the second part of the data collection, an instrument was created by the research team that contained the following items: article title, year of publication, country of affiliation of the main author, type of study and main results. Data analysis was performed in a descriptive manner, based on the Thematic-Categorical Content Analysis[13]. This process was divided into three stages, namely: pre-analysis, exploration of material or coding and treatment of results - inference and interpretation.

RESULTS

Chart 1 lists the studies included in the review.

Chart 1. Studies included in review, Recife, Pernambuco, 2018.

Database	Título of article	Author	Year of publication	Country of origin	Main results
PubMed	Associations of Near-Miss Traffic Incidents with Attention and Executive Function among Older Japanese Drivers	Makizako H, Shimada H, Hotta R, Doi T, Tsutsumimoto K, Nakakubo S, et al.[14]	2018	Japan	Visual and auditory acuity deficits increased the risk of collisions of vehicles between elderly drivers. Attention may be one of the measurable and modifiable contributors related to car accidents in the general population of older drivers.
PubMed	What are the differences in injury patterns of young and elderly traffic accident fatalities considering death on scene and death in hospital?	Heinrich D, Holzmann C, Wagner A, Fischer A, Pfeifer H, Graw M, et al.[15]	2017	Germany	The majority of pedestrian deaths were caused by polytrauma. Most deaths at the scene of the crash were due to thoracic and pelvic injuries, while in hospital the most prevalent were abdominal injuries.
PubMed	Age-related differences in fatal intersection crashes in the United States	Lombardi DA, Horrey WJ, Courtney TK.[16]	2017	USA	Accidents involving the elderly mostly occurred during the day, from Tuesday to Friday, with a lower collision speed than in accidents involving younger people. Older drivers were more likely to make mistakes regarding the culpability of the accident.
PubMed	Features of fatal injuries in older cyclists in vehicle–bicycle accidents in Japan	Matsui Y, Oikawa S, Hitosugi M.[17]	2017	Japan	Head injuries were the most common causes of cyclist fatalities after collision with a vehicle among those aged over 75 years, with severe injuries even at low speeds.
ScienceDirect	Predictors of older drivers' involvement in rapid deceleration events	Chevalier A, Coxon K, Chevalier AJ, Clarke E, Rogers K, Brown J, et al.[18]	2017	Australia	64% of participants were involved in at least one rapid deceleration event over one year, with most of those involved being older drivers with declining sensitivity and reduced confidence.
PubMed	Elderly road collision injury outcomes associated with seat positions and seatbelt use in a rapidly aging society - A case study in South Korea	Noh Y, Yoon Y.[19]	2017	South Korea	When younger (65-74 years) and older (75 years or more) elderly persons were compared, it was observed that older individuals were more likely to suffer serious injury. Severe injuries due to the absence of seat belts were also more frequent in the elderly. The proper application of the use of safety restrictions plays an important role in reducing injuries among the elderly in these accidents.

to be continued

Database	Título of article	Author	Year of publication	Country of origin	Main results
LILACS	Trends in mortality from road traffic accidents in the elderly in Brazil	Scolari GAS, Derhun FM, Rossoni DF, MathiasTAF, Fernando CAM, Carreira L.[20]	2017	Brazil	27% of registered causes of death were due to road traffic accidents. There were greater growing trends in: the northeast region, accidents involving elderly pedestrians, cyclists, motorcyclists and occupants of automobiles. The elderly are more susceptible to being knocked down.
SciELO	Trauma from traffic accidents among the elderly: risk factors and consequences	Santos AMR, Rodrigues RAP, Diniz MA.[21]	2017	Brazil	The elderly were between 60 and 79 years of age, male, married, with elementary school education, pedestrians, followed by motorcyclists, and not drunk.
ScienceDirect	Pedestrian injury risk and the effect of age	Niebuhr T, Junge M, Rosén E.[22]	2016	Germany	Age and physical conditions are the main risk factors for traffic injuries, and age groups from the youngest and oldest extremities present a higher risk of fatalities. The risk for the elderly is double that of adults, with more serious consequences for elderly persons over 65 years.
PubMed	The characterization of drug and alcohol use among senior drivers fatally injured in U.S. motor vehicle collisions, 2008 2012	Rudisill TM, Zhu M, Abate M, Davidov D, Delagarza V, Long DL, et al.[23]	2016	USA	20% of the tested drivers were considered drug-positive. The highest prevalence was in the elderly of 65-69 years. The most commonly reported drugs were antidepressants and narcotics, as well as benzodiazepines. Those who tested positive for drugs were 43% more likely to not be wearing a seat belt at the time of the collision.
PubMed	Age-Related Differences in Vehicle Control and Eye Movement Patterns at Intersections: Older and Middle-Aged Drivers	Yamani Y,Horrey WJ, Liang Y, Fisher DL.[24]	2016	USA	Older drivers had difficulty performing simultaneous tasks. Older drivers (over 70 years) have a high risk of a fatal vehicle accidents at intersections, as elderly drivers generally do not look twice for potential hazards at intersections.
Scielo	Trauma among the elderly: access to the health system through mobile pre-hospital treatment.	Silva HC, Pessoa RL, Menezes RMP.[25]	2016	Brazil	Among the victims of trauma, women were most prevalent, and were victims of falls, with pre-hospital treatment (basic life support), who were then transported to a tertiary referral unit.

to be continued

Database	Título of article	Author	Year of publication	Country of origin	Main results
Scielo	Instruction program with emphasis on self-care practices for elderly motorists	Almeida MHM, Caromano FA, Ribeiro SS, Batista MPP.[26]	2016	Brazil	54% of respondents reported difficulty driving, 42.9% reported emotional difficulties, and another 42.9% said they had physical, sensory and/or cognitive difficulties. There was also a deficit related to education, as well as inspection and punishment of traffic violations.
PubMed	Impact of road traffic accidents on the elderly	Etehad H, Yousefzadeh-ChabokSh, Davoudi-Kiakalaye A, Dehnadi AM, Hemati H, Mohtasham-Amiri Z.[27]	2015	Iran	The study divided the elderly into <75 and >75 years of age and, when comparing the two, found that the majority of the injured were male, married, pedestrians, affected by TBI and extremity fractures, while the elderly persons <75 years remained hospitalized for longer, and mortality was higher among the >75 years group
PubMed	Incidence and related factors of traffic accidents among the older population in a rapidly aging society	Hong K, Lee KM, Jang S.[28]	2015	South Korea	The incidence of traffic accidents among elderly Koreans was estimated at 11.74/1,000 inhabitants for men and 7.65/1,000 inhabitants for women. The most common risk factors were: depressive symptoms for both genders, employability for males and comorbidities such as arthritis for females.
SciELO	Elderly persons treated in urgent care services in Brazil: a study of falls and accidents in traffic.	Freitas MG, Bonolo PF, Moraes EN, Machado CJ.[29]	2015	Brazil	Main victims of falls: women with low levels of schooling, without a current job. Main victims of traffic accidents: younger men. Complications were found at similar levels in both sexes.
PubMed	The effects of age, gender, and crash types on drivers' injury-related health care costs	Shen S, Neyens DM.[30]	2015	USA	The estimate of average health costs in in US dollars in 2007 was $2310 for men >65 years and $2055 for women >65 years. In terms of age and gender, drivers in older groups have higher health care costs than drivers in younger age groups. The former have a reduced capacity to recover from lesions, leading to longer hospitalization time

to be continued

Database	Título of article	Author	Year of publication	Country of origin	Main results
PubMed	Street crossing behavior in younger and older pedestrians: an eye- and head-tracking study	Zito GA, Cazzoli D, Scheffler L, JägerM, Müri RM, Mosimann UP, et al.[31]	2015	Switzerland	Elderly persons performed significantly worse on the visual acuity test. Older participants significantly overestimated their walking speed, but they needed more time to complete the crossing. Older pedestrians have more difficulty analyzing the movement of an approaching car when it is still far away, increasing risky decisions and decreasing performance at the intersection.
ScienceDirect	Crossing a two-way street: comparison of young and old pedestrians	Dommes A, Cavallo V, Dubuisson JB, Tournier I, Vienne F.[32]	2014	USA	Reduced functional skills increase the risk of collision. The elderly presented flaws when required to increase the speed and the length of their steps in comparison with younger people. The elderly also had difficulty processing information from the visual scene, as well as not looking directly at traffic, in addition to making more risky decisions compared to young participants.
PubMed	Comorbidities and Crash Involvement among Younger and Older Drivers	Papa M, Boccardi V, Prestano R, Angellotti E, Desiderio M, Marano L, et al.[33]	2014	Italy	The burden of comorbidity is a self-limiting factor among elderly drivers, since the increase in comorbidities is associated with a reduction in involvement in collisions. Thus, the burden of comorbidities is a predictor of involvement in traffic accidents, regardless of gender.
PubMed	Association Between Vision Impairment and Driving Exposure in Older Adults Aged 70 Years and Over: A Population-Based Examination	Sandlin D, McGwin Jr G, Owsley C.[34]	2014	USA	Reduced visual processing speed was the strongest risk factor for the involvement of older drivers in vehicle collisions. Self-regulation was a highly adaptive strategy for reducing exposure to this risk.

to be continued

Database	Título of article	Author	Year of publication	Country of origin	Main results
PubMed	Mature Driver Laws and State Predictors of Motor Vehicle Crash Fatality Rates Among the Elderly: A Cross-sectional Ecological Study	Bell TM, Qiao N, Zarzaur BL.[35]	2014	USA	Overweight and a higher percentage of elderly persons >65 years with university degrees were associated with an increase in the rate of collisions between vehicles. Greater access to health services, such as primary care, access to medication and emergency surgeries, were associated with lower rates of fatality.
PubMed	Gender differences among older drivers in a comprehensive driving evaluation	Classen S, Wang Y, Crizzle AM, Winter SM, Lanford DN.[36]	2013	USA	Older female drivers presented more self-reported avoidance behaviors in relation to interstate/highway driving, driving in the rain, and driving at night. Contrast analysis by gender and age revealed that more emphasis should be given to the 75-year-old male and female group for failing the road test.
PubMed	Effect of Driver's Age and Side of Impact on Crash Severity along Urban Freeways: A Mixed Logit Approach	Haleem K, Gan A.[37]	2013	USA	Driver's age was an important predictor, and impacts from injuries, especially side impacts, were greater among elderly drivers.
SciELO	Comparative study of trauma among the elderly and non-elderly in a University Hospital in Curitiba	Broska Júnior CA, Folchini AB, Ruediger RR.[38]	2013	Brazil	The majority of trauma care in the elderly population was for women. Traffic accidents were the 2nd most frequent cause, with being knocked down predominating, while the elderly are most susceptible to femoral fractures and TBI.

DISCUSSION

Globally, trauma cases are the fifth highest cause of mortality among the elderly, with cases of Road Traffic Accidents (RTA) contributing to this increase[35]. In Brazil, the RTA-related death rate among elderly individuals has been increasing since 1996, especially in the northeast region of the country[20].

The demographic profile identified in several studies reveals that younger elderly persons, especially in the 60-69 age group, are the main victims of traffic accidents[16,21,27,29,38]. However, health care costs are higher for the population of drivers aged over 65 years, as they are more likely to suffer more severe traumatic injuries and have a lower recovery capacity for these injuries than younger elderly persons, thus leading to longer hospitalization and higher costs[18,19,30,37].

When the results were analyzed by gender, men were the most affected, which may be related to their greater movement around the urban perimeter of cities, due to their greater involvement in leisure activities and as participants in the labor market[30,36].

In addition, there is a greater proportion of RTA among married elderly persons, as well as those with lower schooling, as this is one of the determinants for a greater occurrence of traumatic lesions[21,29].

Risk factors that increase the vulnerability of the elderly population to traffic accidents may be related to the aging process itself, the prevalence of comorbidities, alcohol use, polypharmacy, traffic dynamics and the structural difficulties of places the elderly attend[21,22,27,37].

When comparing risk factors between genders, employability is found to be the greatest factor for males, with arthritis the most frequent comorbidity among females, and depressive symptoms evident factors for both genders[28]. Being overweight and elderly people over 65 with university degrees were other risk factors cited[35].

Another important risk factor was the use of alcohol and other drugs. One study that characterized such use in elderly drivers involved in fatal automobile collisions in the USA found that among drivers considered drug-positive, there was a 43% greater tendency to be without a seat belt at the time of the collision. The most commonly reported drugs were antidepressants and narcotics, as well as benzodiazepines, many of which can alter driving ability if not prescribed and administered properly[23].

Literature shows that elderly pedestrians are the most vulnerable to traffic accidents. This may be explained, in addition to the functional conditions of the elderly, by current traffic conditions and improper driving behaviors, such as carelessness on the part of car drivers and motorcycle riders, as well as situations where the elderly cross the road away from crossings or when the red light is showing for pedestrians[15,21,38]. Such situations potentiate trauma events in traffic and reaffirm their status as a public health problem[25].

The predominance of being knocked down among traffic accidents involving the elderly is partly related to the difficulty these pedestrians have when crossing the road, as cognitive decline is accentuated by increases in age. A study also showed the unsafe behavior of elderly people when crossing two-way streets, where they have difficulties in increasing step speed and length in comparison with young people[32]. A greater risk was also perceived among elderly drivers when decelerating vehicles due to reduced sensitivity and confidence[18].

A study in Switzerland compared the behavior of young and old people at the intersection of a lane, and found that the latter looked more towards the ground than to both sides of the street before crossing than the former[31]. This was justified by the fact that the elderly do not generally take a second look for potential hazards at intersections[24].

Regarding the day of the week, time of occurrence and speed of collision, when compared to traffic accidents involving younger people, accidents involving elderly people were more frequent during the day, from Tuesday to Friday, and involved a lower collision speed[16].

The most commonly reported injury patterns were traumatic brain injuries (TBI), due to the impact of parts of the vehicle or throwing the victim onto the road, and limb fractures due to the reduction in the bone mineral content characteristic of aging[22,27,38]. In addition, it was also identified that in the elderly, most of the deaths at the scene of the accident were due to thoracic and pelvic injuries, while in hospitals the majority of deaths were due to abdominal injuries[15]. Although these lesions may be conveniently treated, some elderly cyclists died because rescue teams did not identify early retroperitoneal bleeding after pelvic fractures, which require the careful clinical evaluation by the team that provides first response care to the injured elderly person[17].

In contrast, comorbidities help to reduce the risk of the elderly being victims of a RTA event, as they employ self-regulating behaviors. These behaviors are characterized by the self-reported decision to adopt protective strategies in traffic when perceiving their weakened physical condition, such as reducing their exposure to traffic, driving a vehicle at lower speeds and avoiding driving at night, which becomes preventive behavior[14,20,33,34,36].

With regard to the impacts of traffic accidents on the elderly population, it is known that this type of event can negatively affect the functional capacity

of such individuals, depending on the severity of the trauma. Immobilizations were the most frequent results, and the greater the intensity of the trauma, the more serious the consequences and the behavior adopted[26]. It was evidenced that the elderly are more predisposed to suffering fractures or trauma to the cranial and vertebral column[38].

One initiative worthy of note involved the development of a mentoring program for elderly drivers on driving difficulties associated with aging, encouraging self-care[26]. From this perspective, health services that care for the elderly, irrespective of the level of complexity, must be prepared to meet the specifics of trauma among this public, investing in professional training, infrastructure, health education, self-care practice and family participation[24]. These and other initiatives can serve as incentives to prevent the growth of the morbidity and mortality of elderly people due to traffic accidents and should be stimulated in the various contexts of care of this population.

The limitations of the present study concern the heterogeneity of the studies included in the review in terms of the discussion of the results, which may have hampered a more consistent analysis. The descriptors selected may not have found all the published studies. In addition, many of the articles surveyed are restricted access, which can be considered as a limiting factor. It is important that more studies are carried out in the area of gerontology and geriatrics involving traffic accidents.

CONCLUSION

According to this review, the profile of the elderly persons suffering traffic accidents was: elderly persons in the age group of 60 to 69 years, males, married, with low schooling and who worked. Pedestrians were the most vulnerable, with a predominance of being knocked down. The accidents occurred most often during the day, and cranio-encephalic trauma was the most frequent injury.

In view of the results, it can be inferred that there is a need to invest in the area of urgent and emergency care, in the planning of actions that contribute to the preparation of health teams for the integral care for the elderly, noting their particular characteristics, related to the frailty of age, such as the pathophysiological alterations that can compromise the quality of life of these individuals.

A fresh approach should be taken among professionals who work directly with traffic in cities with an elderly population, with the aim of training such individuals and raising their awareness about the treatment of the elderly, avoiding greater harm.

It is hoped that other researchers are encouraged to carry out further studies in the areas of geriatrics and gerontology involving Road Traffic Accidents (RTA) in order to create strategies where this population can have more freedom in their mobility without the risk of accidents, and with a better quality of life.

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Instruments used to evaluate functional health literacy in elderly persons with chronic kidney disease: Integrative review

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Abstract

Objective: To identify the instruments used to evaluate the functional health literacy of elderly persons with chronic kidney disease, and to assess whether they are suitable for this population. *Method:* An integrative review of the Lilacs, PubMed, Ibecs, Scopus and Cochrane databases was carried out in July and August 2018, seeking original articles dealing with functional health literacy and chronic kidney disease in the elderly. *Results:* A total of 15 articles were evaluated and seven different instruments used in the research were identified, with the Rapid Estimate of Adult Literacy in Medicine (REALM) and Test of Functional Health Literacy in Adults (TOFHLA) the most prevalent. *Conclusion:* The instruments identified are applicable for the elderly, but are not specific for this population. The construction and/or adaptation of new instruments is suggested considering the specific characteristics of this age group.

Keywords: Elderly. Health Literacy. Renal Insufficiency.

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INTRODUCTION

Functional Literacy in Health (FHL) implies the knowledge, motivation and competence of an individual to access, understand, evaluate and apply health information to judge and make decisions in daily life about health care, disease prevention and health promotion, to maintain or improve their quality of life[1].

The World Health Organization (WHO), through its Commission on Social Determinants of Health, has identified FHL as one such determinant, as it can contribute to improving the ability of an individual to access, understand, evaluate and communicate information so that they can improve their health, as well as that of their family and the community[2].

The Brazilian population is aging rapidly, with the elderly vulnerable to low FHL as a consequence of their biological conditions and social vulnerability[3]. In Brazil, 49% of the population is considered functionally illiterate[4]. In addition, there is a potential for a large portion of this population to develop a chronic disease, requiring suitable health control and the development of individual skills to better address risks and self-care strategies. Actions that promote improvements in the literacy of the population and the evaluation of FHL can therefore be a contributing factor to delaying the onset of these diseases[5].

During the aging process the elderly face challenges in their self-management of day-to-day activities following the manifestation of chronic diseases (CD). They struggle to control symptoms, comply with treatment regimens, minimize the negative consequences of their physical decline, and change their lifestyle to deal with the limitations created by the disease. It is estimated that patients with low FHL have difficulties in administering CDs, demonstrating inadequate self-management and eventually experiencing poor health outcomes[6].

Chronic Kidney Disease (CKD) is highly prevalent among the elderly, who are particularly susceptible to a reduction in renal function due to the physiological decline of glomerular filtration due to aging[7]. In addition, cognitive impairment is common in individuals with CKD undergoing hemodialysis, which hampers adherence to treatment[8].

Cognitive impairment often occurs in CKD. The conditions most associated with these losses are depression, delirium, mild cognitive impairment, and depression. The mechanisms involved are yet to be established, but factors such as uremic toxin-induced injury, ischemic cerebrovascular injury, oxidative stress, chronic inflammation, anemia, hyperhomocysteinemia, and endothelial dysfunction may be important[9].

Within this context, it is common for individuals to receive information about their condition that include unknown medical terminologies, such as laboratory results and even the clinical behaviors they will undergo. This information requires basic reading and numeracy skills so that the individual can actually understand their meaning[10].

Due to its importance, studies on literacy in health and the resources to measure it have been carried out. Tests validated so far allow the degree of literacy in health of individuals and populations to be assessed and, thus, the most appropriate intervention to be determined in cases where there are limitations of the skills evaluated. This process is fundamental for achieving more favorable patient outcomes[11].

The problem of such studies occurs from the moment in which cognitive loss occurs in the aging process, which is more pronounced in elderly persons with CKD and which has a direct impact on the performance in FHL tests. In addition, a low level of literacy can interfere with the understanding of elderly persons in relation to CKD and negatively affect possible health education actions, due to the lack of knowledge of health professionals when measuring literacy levels through individualized actions. In an attempt to contribute to the broadening of knowledge regarding health actions, the present study aimed to identify the instruments used to evaluate the FHL of the elderly with CKD, as well as assess whether they are adequate for this population.

METHODS

An integrative literature review was carried out, as this method of study enables the synthesis of knowledge of a given subject, as well as identifying gaps which should be filled by new studies[12]. In

order to carry out this review, the following steps were taken: establishing of the guiding question; selection of articles and inclusion criteria; evaluation of included studies; interpretation of results, and presentation of the integrative review. In order to guide the research, the following question was elaborated: *What instruments are used for the evaluation of FHL in elderly persons with CKD and are they adequate for this public?*

Data collection took place in July and August 2018 and the following databases were used for the selection of articles: PubMed, Lilac, Ibecs, Cochrane and Scopus. The MeSH (Medical Subject Headings) and DECs (Health Sciences Descriptors) descriptors Aged/healthliteracy/Renal insufficiency were used in English as this would identify the greatest numbers of articles, and were combined with the use of the Boolean operator AND. There were no limitations on the date of publication of the studies due to the incipience of research on the subject.

Also in this stage, the titles and abstracts were carefully read in order to verify compliance with the following inclusion criteria: articles that used instruments to measure health literacy and included elderly people in the results. The exclusion criterion were articles that did not address health literacy in the title or abstract, which were discarded, along as those that did not mention the instruments and results of the evaluation of health literacy, articles repeated on search platforms (used only once), reviews, and articles that did not address renal insufficiency within the context of literacy.

To evaluate the quality of the selected studies, two instruments were used: the first, the Critical Apprenticeship Skills Program (Casp)[13], a critical reading skills program, part of the Public Health Resource Unit (PHRU). The instrument is composed of ten items (maximum 10 points), covering: 1) objective; 2) methodological adequacy; 3) presentation of theoretical and methodological procedures; 4) sample selection; 5) procedure for data collection; 6) relationship between researcher and those surveyed; 7) consideration of ethical aspects; 8) procedure for data analysis; 9) presentation of results; 10) importance of research. The studies were classified based on the following scores: 6 to 10 points (good methodological quality and reduced bias), with a minimum of 5 points (satisfactory methodological quality, but with increased risk of bias). In this study, we chose to use only articles classified from 6 to 10 points.

The second instrument was the Hierarchical Classification of Evidence for the Evaluation of Studies, and included the following levels: 1) systematic review or meta-analysis; 2) randomized clinical trials; 3) non-randomized clinical trial; 4) cohort and case-control studies; 5) systematic review of descriptive and qualitative studies; 6) descriptive or qualitative study; 7) authoritative opinion and/or report of committee of experts[14]. At the end of the analysis of these two instruments, 15 articles remained.

A descriptive analysis of the distribution of the following variables was performed: order of articles, method and level of evidence, objective, instrument used and results. All the variables were critically analyzed and discussed. The main characteristics of the selected studies and of the most frequently occurring instruments for the evaluation of health literacy were organized in charts and tables.

RESULTS

Table 1 shows the results obtained in the descriptor-based search by database.

Certain articles were excluded as they did not include an FHL instrument or were repeated in more than one database, as in the case of Scopus (04), and were computed only once.

Articles from 2009 to 2017 were found, with the largest number identified in the PubMed database, and no other articles found in other databases. An average of two publications per year was observed, while the country with the greatest number of publications was the USA (Chart 1).

Eight of the studies were cross-sectional in design, four were cohort studies, two were randomized and one was a methodological study. One article had an evidence level of VII, eight a level of VI, four a level of IV and two were level II.

Table 1. Distribution of articles found and selected by database. Recife, Pernambuco, 2018.

Database	Articles			
	Found	Pre-Selected	Excluded	Selected
Pubmed	60	24	9	15
Cochrane	4	2	2	0
Scopus	25	4	4	0
Lilacs	1	0	0	0
Ibecs	1	0	0	0
Total	91	30	15	15

Chart 1. Synthesis of selected studies for the analysis of health literacy assessment instruments (n=15). Recife, Pernambuco, 2018.

Title, authors, country and year of publication	Method/level of evidence	Instrument used	Objective	Results
Functional health literacy and knowledge of renal patients on pre-dialytic treatment. Moraes KL, Brasil VV, Oliveira GF, Cordeiro JABL, Silva AMTC, Boaventura RP, et al. Brazil, 2017	Cross-sectional/ VI	Brief test of health literacy in adults (BTOFHLA)	To analyze FHL* and knowledge about chronic kidney disease in patients undergoing pre-dialysis treatment.	The average age of the interviewees was 63 (30-90) years, and the test was not limited by age. All presented inadequate health literacy.
Limited health literacy in advanced kidney disease Dominic M. Taylor et al UK, 2016.	Multi-center, prospective cohort / IV	Single-Item Literacy Screener (SILS)	To determine the prevalence of limited FHL and its associations with demographics, comorbidity, and socioeconomic status in patients at three different stages of treatment: early dialysis, kidney transplant waiting list, and kidney transplantation.	The age of patients in the study with advanced kidney disease ranged from 18 to 75 years. FHL was limited as defined by SILS.
Development of a health literacy questionnaire for Taiwanese hemodialysis patients. Chung-liang Shih, Tuan-hsun Chang, Dana A. Jensen and Chiung-hsuan Chiu. Taiwan, 2016.	Methodology	Health literacy questionnaire for Taiwanese hemodialysis patients	(1) A methodological study of the construction and validation of an instrument for measuring FHL; (2) to assess the level of health literacy of the hemodialysis population in Taiwan using the developed tool.	The sample consisted of individuals older than 18, and was not specific to the elderly population. The knowledge of hemodialysis patients about daily practices is satisfactory, while critical health literacy is weak.

to be continued

Continuation of Chart 1

Title, authors, country and year of publication	Method/level of evidence	Instrument used	Objective	Results
A Cross-Sectional Comparison of Health Literacy Deficits Among Patients With Chronic Kidney Disease. Kelly Lambert, Judy Mullan, Kylie Mansfield & Maureen Lonergan. Autralia,2015.	Descriptive cross-sectional / VI	Health Literacy Management Scale (HeLMS)	To investigate the types and extent of health literacy deficits of chronic kidney patients and to identify associations between the characteristics of the patients and FHL domains measured by HeLMS.	The mean age of the participants was 64.1 years, and while the elderly were included, the application of the test was not limited to this public. This study identified inadequate health literacy - especially in the areas related to health care needs, understanding of health information, social support, and socioeconomic factors.
Relationship between Health Literacy and Kidney Function. Radhika Devraj, Matthew Borrego, A Mary Vilay, Elisa J. Gordon, Junvie Pailden, Bruce Horowitz. USA, 2015.	Observational Cross-sectional/ VI	Newest Vital Sign (NVS)	To evaluate the relationship between FHL and estimated glomerular filtration rate.	The age of the participants ranged from 21 to 90 years. The prevalence of limited FHL was 63%, with a small but significant association between FHL and the estimated glomerular filtration rate.
Evaluation of a single-item screening question to detect limited health literacy in peritoneal dialysis patients. Deepika Jain, HeenaSheth, Filitsa H. Bender, Steven D. Weisbord, Jamie A. Green USA, 2014.	Cohort/ IV	Rapid Estimate of Adult Literacy in Medicine (REALM)	To evaluate the health literacy of 31 patients in peritoneal dialysis.	Age ranged from 21 - 79 years, and the prevalence of limited health literacy was 16%.
Limited health literacy is associated with low glomerular filtration in the Chronic Renal Insufficiency Cohort (CRIC) study. Ana C. Ricardo et al. USA, 2014.	Cohort/ IV	Short Test of Health Literacy in Adults (STOFHLA)	Assess the associations between limited health literacy with renal function and risk factors for cardiovascular disease.	Age ranged from 21-74 years and those with limited FHL were more likely to be older than participants with adequate health literacy.
Assessing health literacy in renal failure and kidney transplant patients. Wendy Escobedo, Penny Weismuller. USA, 2013.	Cross-sectional/ VI	Newest Vital Sign (NVS)	To identify the level of health literacy of patients treated at a suburban transplant center using the NVS tool.	The age range of the participants was 21 to 73 years. Of the 44 participants, 18 (41%) had scores indicating the probability of limited health literacy.

to be continued

Continuation of Chart 1

Title, authors, country and year of publication	Method/level of evidence	Instrument used	Objective	Results
Communicative and critical health literacy, and self-management behaviors in end-stage renal disease patients with diabetes on hemodialysis. Alden Yuanhong Lai, Hirono Ishikawa, Takahiro Kiuchi, NandakumarMooppil, KonstadinaGriva Singapore, 2013.	Randomized controlled / II	Functional, Communicative and Critical Health Literacy (FCCHL)	To explore functional, communicative and critical health literacy among patients with CKD with diabetes and to examine their specific relationships with self-management behaviors.	The age of the participants was 78 years. Self-management in patients with CKD with diabetes was associated with communicative and critical FHL, but not functional FHL.
Health literacy associated with blood pressure but not other cardiovascular disease risk factors among dialysis patients Gbemisola A. Adeseun, Christine C. Bonney and Sylvia E. Rosas USA, 2012.	Cross-sectional/ VI	Short Test of Health Literacy in Adults (STOFHLA)	To examine the relationship between literacy in health and cardiovascular risk factors	The mean age was 51.6 years (± 10.3 for inadequate FHL and ± 13.2 for participants with adequate FHL). The majority of participants had adequate health literacy while 21% had limited health literacy.
Prevalence and demographic and clinical associations of health literacy in patients on maintenance hemodialysis. Jamie A. Green et al. USA, 2011.	Cross-sectional	Rapid Estimate of Adult Literacy in Medicine (REALM)	To analyze the prevalence of limited FHL and the association with demographic and clinical characteristics in patients undergoing maintenance hemodialysis.	The median age was 64 years (56-73). Of the 260 patients who completed the REALM, 41 demonstrated limited health knowledge.
Development and results of a kidney disease knowledge survey given to patients with CKD. Julie A. Wright, Kenneth A. Wallston, Tom A. Elasy, T. Alp Ikizler and Kerri L. Cavanaugh. USA, 2011.	Cross-sectional/ VI	Rapid Estimate of Adult Literacy in Medicine (REALM)	To develop valid and reliable research to measure the specific knowledge of individuals on conservative treatment of renal disease and to describe the characteristics associated with low knowledge.	The median age of participants was 58 (percentile 25-75, 46-68) years. Limited literacy was 77%.
Low health literacy associates with increased mortality in ESRD. Kerri L. Cavanaugh. USA, 2010.	Prospective cohort	Rapid Estimate of Adult Literacy in Medicine (REALM)	To describe the prevalence of limited health literacy and its association with mortality risk in hemodialysis patients	The median age was 62.0 years. Compared with adequate literacy, limited health knowledge was associated with an increased risk of death.

to be continued

Continuation of Chart 1

Title, authors, country and year of publication	Method/level of evidence	Instrument used	Objective	Results
Perceived susceptibility to chronic kidney disease among high-risk patients seen in primary care practices L. Ebony Boulware, Kathryn A. Carson, Misty U. Troll, Neil R. Powe and Lisa A. Coope. USA, 2009.	Randomized controlled/II	Rapid Estimate of Adult Literacy in Medicine (REALM)	To assess the perception of risk and concern regarding the development or progression of CKD among high-risk patients receiving primary care.	Participants had diverse demographic characteristics, with a high proportion of participants aged 60 years or over, who were female and African American or black. Many patients were at high risk for the development or progression of CKD.
Health literacy and access to kidney transplantation. Vanessa Grubbs, Steven E. Gregorich, Eliseo J. Perez-Stable, and Chi-yuan Hsu. USA, 2009.	Cross-sectional	Test of Health Literacy in Adults (TOFHLA)	Examining health literacy in patients with end-stage kidney disease	Age ranged from 18 to 75 years. About one-third (32.3%) of the participants had poor health literacy.

*FHL: functional health literacy

A total of 14 articles had the objective of researching the measurement of literacy levels in the context of CKD, while one sought to validate a FHL instrument. In the studies analyzed, the elderly were included in the analyzes, but no specific instrument was identified for this public, and the research was performed without limiting age. However, the available tests were found to be adequate, with satisfactory results.

Seven different health literacy assessment instruments were identified in the 15 articles analyzed: the TOFHLA, REALM, SILS, TAIWAN SCALE, NVS, HELMS AND FCCHL. The TOFHLA (Test of Functional Health Literacy In Adults) and REALM (Rapid Estimate of Adult Literacy in Medicine) were the most commonly used instruments. The REALM was used in five articles (33.3%), all in the USA, and the TOFHLA was used in four articles (26.6%), three in the USA and one in Brazil. The NVS was used in two articles (13.3%), both in the USA. The other instruments used were the SILS, the Taiwanese scale, the HELMS and the FCCHL, all of which were used in one article each (6.7%), in the UK, Taiwan, Australia and Singapore, respectively. All the instruments used addressed the patient in the context of CKD, from the pre-dialytic phase to transplantation, in addition to peritoneal dialysis and comparison with renal function, evaluating the association between the disease and FHL.

DISCUSSION

The present review identified the instruments used to evaluate FHL among elderly patients with CKD. OF these, the REALM and TOFHLA stood out as choices for application by health professionals among this clientele. The studies were mostly carried out in the USA, with a cross-sectional design, indicating the incipience of Brazilian studies.

The studies showed that the knowledge of CKD of patients is insufficient, a fact possibly related to age and cognitive impairment[10]. They do not understand the permanent nature of the disease, believing that treatment will lead to the cure of their kidney problems. They also do not know that conservative treatment is intended to reduce or maintain renal damage without progression, to postpone the need for dialysis replacement therapy[15].

Identifying patients with inadequate FHL is not a simple task. Studies show that, in the context of health, individuals have considerable difficulty in reading texts typical of this situation. This limitation, associated with the fact that health professionals do not understand the literacy level of their patients, resulting in the use of an extremely specialized language, favors the occurrence of negative clinical outcomes[16]. In the USA, the National Working Group on Literacy and Health has warned of the inability of health professionals to recognize patients with inadequate FHL, and research has shown that physicians have difficulty detecting inadequate FHL levels in their patients[17].

Among the instruments used to measure FHL in the elderly, Carthery-Goulart et al.[18] state that the Short Test of Health Literacy in Adults (S-TOFHLA) can be a practical tool for screening individuals with functional illiteracy in the context of health care, focused on the identification of people with a greater need of special care. However, this is the short version of the instrument known as the 1995 Test of Health Literacy in Adults (TOFHLA). The English and Spanish versions of S-TOFHLA have been translated and adapted for use in Brazil, notably the reading comprehension texts, to convey information about the Unified Health System (or SUS). However, its terminology was maintained, and it is worth noting that despite using the STOFHLA acronym, the Brazilian version is abbreviated. Therefore, Brazilian studies[9,19,20] tend to adopt the B-TOFHLA terminology.

TOFHLA is especially geared towards identifying numeracy and reading comprehension skills. It consists of two subtests: one composed of 17 items, which measures numerical ability, and the other with 50 items, which evaluates reading comprehension. S-TOFHLA has 36 reading comprehension items. The brief version, B-TOFHLA, is made up of the same 36 items as S-TOFHLA and four additional numeracy items. The long version takes up to 22 minutes to administer, the short version lasts 7 minutes and the brief version 12 minutes. In each TOFHLA subtest the questions earn points. In the full version 100 total points are available, 50 of which relate to reading comprehension and 50 to numeracy. The total sum of the scores (numeracy plus reading comprehension) provides the literacy profile of the individual being assessed, which is divided into three levels: Inadequate FHL (0-59 scores); Marginal FHL (60-74 scores); Adequate FHL (75-100 scores)[21].

Another instrument used was the Rapid Estimate of Adult Literacy in Medicine (REALM), which was developed for use with adults and provides a rapid estimate of the reading level of common medical terms and involves only word recognition and not the understanding of individuals. The test consists of simple words arranged in columns containing terms of one or two syllables and three syllables or more. The instrument is validated in English, Spanish (The Short Assessment of Health Literacy for Spanish speaking Adults-SAHLSA) and Portuguese (The Short Assessment of Health Literacy for Portuguese-speaking Adults-SAHLPA)[22].

In addition to the TOFHLA and the REALM, the Newest Vital Sign (NVS) scale is a validated instrument for measuring FHL, requiring the respondent to review the nutritional label of one liter of ice cream and orally answer six questions based on the label. A score of four or more indicates adequate literacy, a score of two to three indicates limited literacy and a score of zero to one indicates a high probability of limited literacy[23].

The Functional, Communicative and Critical Health Scale (FCCHL) was also used to assess FHL levels. This is an instrument developed in relation to the structure of literacy as a separate component of functional, communicative and critical literacy. With five items for each FHL subscale and communicative literacy, and four for critical FHL, this self-reported measure of 14 items was evaluated in a range of one to four (never to many times) for each item. The scores of the items of each subscale were added together and divided by the number of constituent items of the subscale, resulting in a score (the theoretical variation for each domain was one to four). Higher scores indicate higher levels of FHL[24].

The literacy scale created in Taiwan was divided into assessment of health literacy and demographic information. There are a total of 52 items in the questionnaire, with 26 items in each section. The health literacy section was adapted from the Nutbeam

model and incorporated its three fundamental constructs: critical literacy in health, health literacy and functional literacy in health. The health literacy section includes seven subconstructs: functional literacy (five items), communicative literacy (four items), interactive literacy (three items), critical literacy (three items), basic health knowledge (four items), advanced health knowledge (five items) and patient safety (two items). A point is earned each time the respondents select the correct answer from the four multiple choice options; no points are awarded if the response is incorrect or no response is provided. The maximum total score is 26 and the minimum, zero. While other health literacy tools assess the ability to spell and pronounce medical terminology, this instrument placed more emphasis on assessing whether patients had health knowledge specific for dialysis to maintain their well-being. This means that patients should be more familiar with these problems and be able to make the right choices[25].

The Health Literacy Management Scale (HELMS) is a multidimensional health literacy assessment tool, developed and validated in Australia to identify the elements of FHL. The HELMS consists of 29 questions classified subjectively, and divided into eight domains. Domains two and five to eight include individual skills while the other three domains assess broader aspects such as attitudes, social support, and socioeconomic factors that can impact FHL. Scores less than or equal to four suggest inadequate FHL[26].

Another test used is the Single-Item Literacy Screener (SILS), which verifies health literacy using the following question: *How often do you need someone to help you when you read instructions, pamphlets, or other written materials from your doctor or pharmacy*? The options are: 1-never, 2-rarely, 3-sometimes, 4-often, and 5-always. The answers sometimes, often and always represent a limited level of health literacy[27].

The use of different instruments in the articles in this review partially limits the comparison between the studies due to the different realities of the elderly in the countries in which the research was carried out. A scarcity in literature of studies that evaluate the relationship between functional literacy in health and CKD and which are specific for the elderly was noted.

It should therefore be emphasized that measures aimed at raising FHL levels should focus both on improving individual competencies and on the role of humanized health services, which should improve their written and oral communications to meet the needs (and skills) of the elderly.

CONCLUSION

The present study identified instruments that evaluate FHL in elderly persons with CKD, verifying their suitability for this public. Among these, the REALM and TOFHLA instruments stood out. Most studies were conducted in the USA, with cross-sectional designs predominating. The elderly were included in the FHL tests, although no specific instruments were found to evaluate this population. The construction and/or adaptation of new instruments considering the specificities of this age group is suggested.

The identification of the instruments addressed in this study can facilitate the development of specific interventions to improve FHL, as well as making available to the population and health professionals instruments that evaluate literacy in the elderly, thus resulting in the improvement of care. It is therefore necessary to develop communicative processes between health teams and health service users, producing strategies that strengthen FHL skills, recognizing the needs of the elderly.

In addition to confirming the importance of assessing the level of FHL in the overall care of the elderly with chronic kidney disease, it is hoped that the results found contribute to increasing the application of such assessments. Therefore, it is essential that other studies with diversified initiatives are carried out to alter the planning of actions and behaviors in health, aimed at achieving better results in the production of care for this population.

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Level of resilience in the elderly according to the Connor-Davidson scale: a systematic review

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Abstract

Objective: To identify studies on resilience in the elderly measured by the Connor-Davidson scale. *Method:* A systematic review of literature on the level of resilience of the elderly was carried out, based on articles indexed in the Lilacs, IBECS, MedLine and PubMed databases, according to the Prisma method. *Results:* 27 studies were identified which included the elderly in their samples and determined the level of resilience through the Connor-Davidson scale. The USA (6), China (6) and Australia (5) had the greatest number of articles. A study carried out with elderly people in Australia had the highest level of resilience, which was attributed to public policies that favor the resilience development capacity of the population. The lowest level of resilience was observed in Japan in a study with survivors of major natural disasters, highlighting resilience as a significant protective factor for elderly persons who experience such events during their lives. *Conclusion:* The studies recognize resilience as an important protective factor for coping with external adversities and natural events, whether arising from the effects of the aging process on health, or through disease.

Keywords: Resilience Psychological. Health of the Elderly. Diabetes Mellitus. Health Personnel. Neoplasms.

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INTRODUCTION

The world is at the center of a unique and irreversible demographic transition that will result in older populations everywhere[1].

The 2015 World Report on Aging and Health[2] provides an up to date vision of the changes in perceptions of health and aging. Skill losses in the elderly are vaguely related to the chronological age of the individual; differences between one elderly person and another, in terms of their abilities and needs, originate from events that occur throughout the life course of each individual, and are often modifiable, underlining the importance of the life cycle to understanding the aging process. It points out that although most older adults have multiple health problems, over time advanced age does not necessarily lead to poor quality of life.

Given this, resilience represents a dynamic development process, which encompasses positive adaptation in a context of significant threat, severe adversity or trauma[3]. Originating in the physical sciences, the use of the concept of resilience in the field of health sciences dates from the 1970s, with studies on people who despite having been subjected to acute or prolonged trauma - factors considered a risk for the development of mental illnesses - did not become ill as expected. One of the first studies to cite resilience was one by Gayton et al.[4] on the emotional impact on people from families with children with cystic fibrosis.

The concept of resilience has distinct characteristics based on the country of origin. In the USA, the term resilience originated as a practical, individual-oriented perspective, while in Europe it was conceived from a more focused perspective on aspects of psychoanalysis and ethics. In Latin America, the concept of resilience emerged later and denotes a community-centered theoretical basis, with a greater focus on the themes of vulnerable populations, victims of violence and those on the fringes of society[5].

In Brazil, the first studies on resilience emerged in 1996 and 1998 in research on children exposed to situations of risk, factors of psychosocial protection and vulnerability, social and emotional support networks for children at risk and in the occupational area associated with resilience in the profile of executives. In short, research on resilience as a central theme or associated with other Brazilian aspects has been developing since the 2000s[6].

In the context of health promotion, active aging and resilience converge in the same direction. Increasing life expectancy demands strategies for active aging and requires, in addition to the ability to adapt and withstand challenges throughout the course of life, the development of a truly resilient and adapted society[7,8].

The concept of resilience is occupying an increasingly greater space in the gerontological discussion, but it is still a little studied subject in Brazil[1]. Studying the importance of resilience throughout life and its significance may be important in the coming years for the development of aging-related policies and also in gerontological research that explores its multiple dimensions and wide range of determinants.

The aim of the present study was to perform a systematic review of levels of resilience in the elderly, as measured by the Connor-Davidson scale.

METHOD

A systematic review of Brazilian and international scientific literature on the resilience levels of the elderly was performed. The object of analysis was scientific production published in journals indexed in the Latin American and Caribbean Health Sciences Literature databases (Lilacs), the Spanish Bibliographic Index of Health Sciences (IBECS), the National Library of Medicine (MedLine) available via the Virtual Health Library (VHL) through the website www.bvsalud.org, and also from the United States National Library of Medicine (PubMed), accessed by the site http://www.ncbi.nlm.nih.gov/pubmed. This survey was conducted in accordance with the methodological recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA)[9].

The document search was conducted from May to July 2018 and the following words were used as keywords: "resilience scale" and "Connor-Davidson

resilience scale". The following filters were applied to the Lilacs, IBECS and Medline databases: *human, elderly, complete text* and *year of publication from 2013 to 2018,* while the equivalent English filters were applied in the PubMed database: *+65 years, clinical trial, 5 years publication dates* and *humans*. Review articles and instrument validation articles were excluded.

To select the studies, two researchers worked in parallel using the following inclusion criteria: publications between 2013 and 2018; use of the 25-question Connor-Davidson instrument (CD-RISC 25) validated in the country of origin; presentation of average resilience level score (score); inclusion of people over 65; publication in Portuguese, English or Spanish.

The CD-RISC 25[10] scale assesses resilience through 25 items related to interpersonal relationships; religiosity; adversities; confidence and esteem for challenges; seeing the humorous side of things and the reasons they happen; dealing with stress; recovery time after illness; injuries and difficulties; adaptation to unpleasant and painful feelings; ability to do one's best in any situation; can achieve one's goals; do not give up; have someone to ask for help; ability to handle pressure; solve problems; are not discouraged after failure; recognize oneself as strong; make difficult decisions and enjoy success. For each question on the questionnaire, there is a Likert scale answer option, ranging from zero (not at all true) to four (totally true)[10].

RESULTS

Initially, the search process in the PubMed scientific research database allowed the identification of 2,230 articles related to the resilience scale. In the VHL database, 297 documents were found in MedLine, 11 in LiLacs and seven in IBECS. Due to the scarcity of studies conducted exclusively with individuals over 65 years of age, it was decided to select studies performed with all age groups, provided that the studies also included the elderly.

The evaluation of titles and abstracts resulted in 30 studies, of which three articles were unavailable online, meaning 27 documents were included in this study (Figure 1).

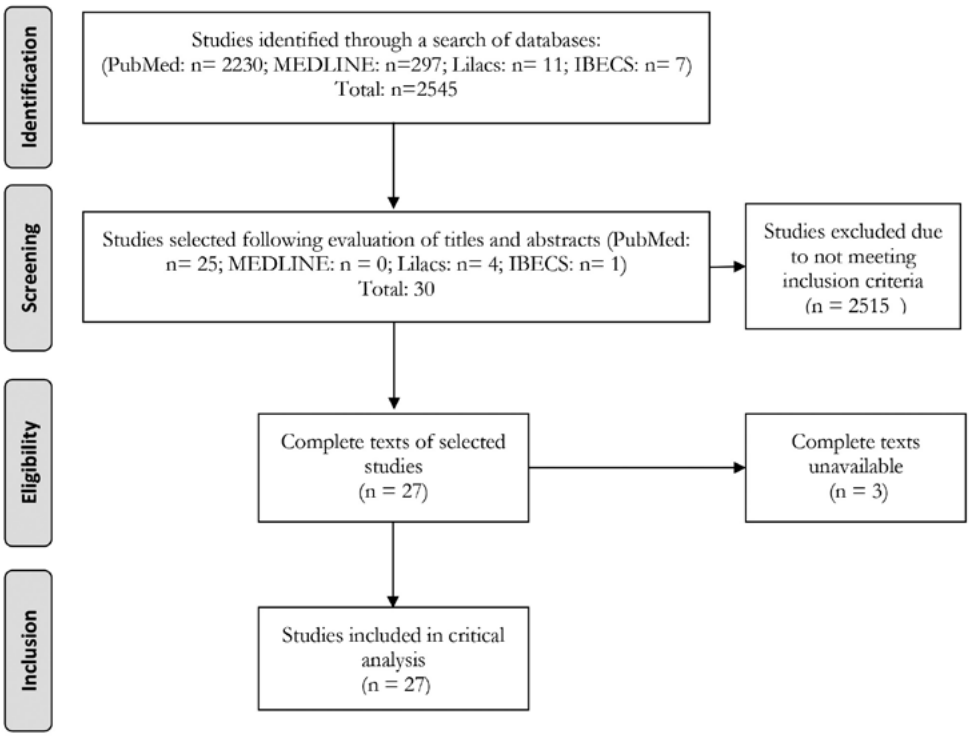


Figure 1. Schematic representation of the method of identification, screening, eligibility and inclusion of articles, adapted in accordance with the PRISMA Flow Diagram[9]. Maringá, Paraná, 2018.

After a critical analysis of the studies that assessed level of resilience through the Connor-Davidson scale, they were classified in relation to the authors, year of publication, journal, central theme, country, age group of participants and impact factor of the journal (Table 1).

The 27 articles selected and presented in Table 1 were conducted in 11 different countries: USA (6), China (6), Australia (5), Brazil (2), South Korea (2), Japan (1), Belgium (1), Switzerland (1), England (1), Iran (1) and Singapore (1).

The largest number of studies (11) on the level of resilience were published in 2016. The age ranges of the studied populations included individuals from 18 to 108 years old, with five studies[16,22,25,26,35] analyzing only the elderly, with ages ranging from 60 to 108 years (Table 1). No studies were identified from the databases consulted on the African continent regarding resilience levels in Elderly Persons analyzed using the Connor-Davidson scale.

All articles used in the construction of this systematic review are in journals that have been evaluated with impact factors ranging from 0.34 to 3.12 (Table 1). The quality of scientific journals is determined based on the evaluation of their respective articles, using specific criteria developed for each study design and obtained from the Equator Network website[38].

Table 1 identifies the various themes related to the level of resilience. Although all research selected in this study included Elderly Persons in their samples, CD-RISC 25 was applied in a number of situations (Figure 2) and levels of resilience in association with disease (Figure 3).

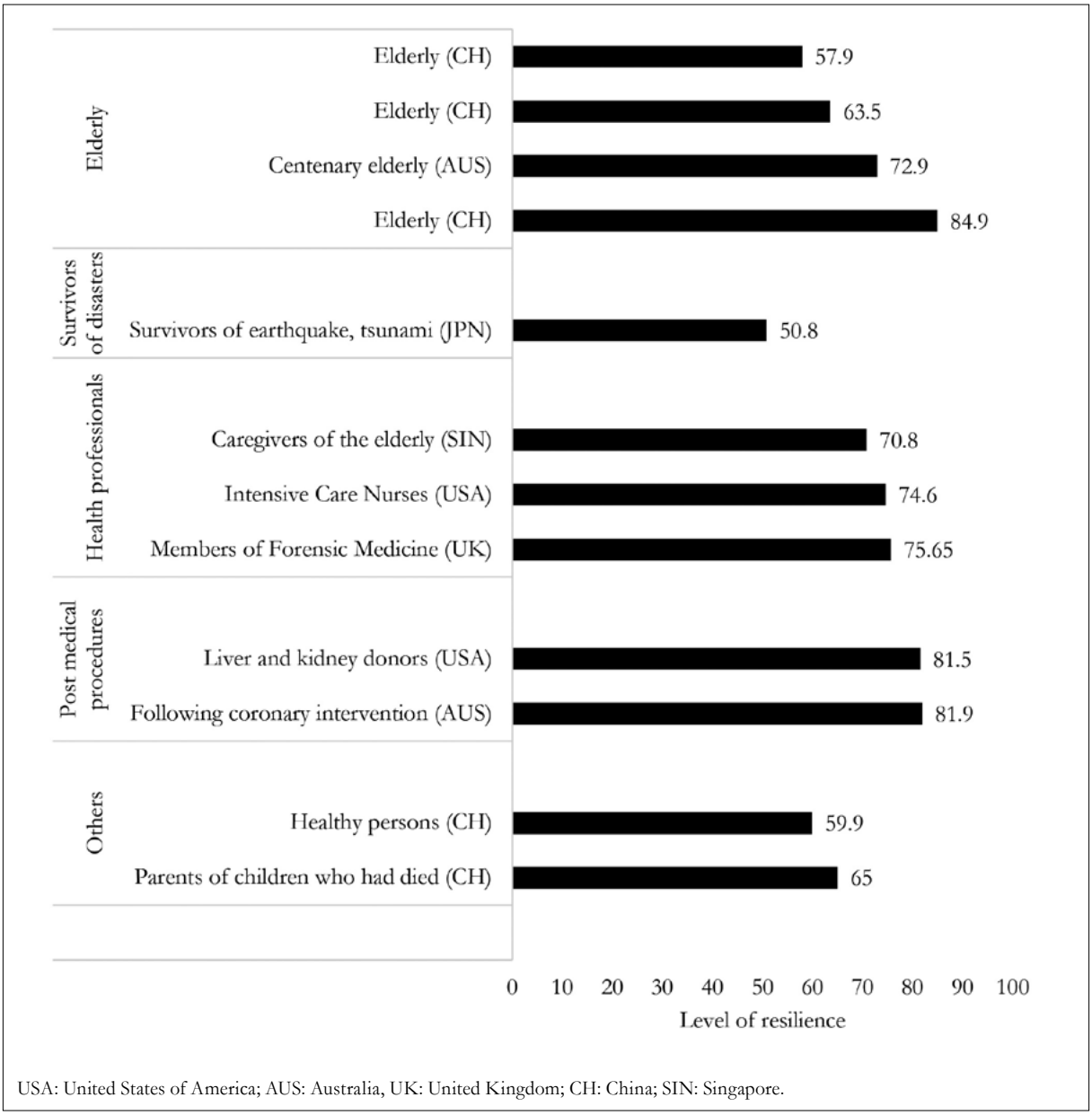
Figure 2 was elaborated based on the analysis of the 12 studies in the context of resilience in different situations, and not aimed at individuals with diseases. These studies were grouped into similar situations that resulted in five subgroups: survivors of medical procedures (2), survivors of natural disasters (1), healthcare professionals (3), elderly persons (4) and others (2). The lowest level of resilience was observed in a study conducted in Japan (R=50.8) with survivors of earthquakes, tsunamis and nuclear disasters[13].

The five studies that were conducted exclusively with the elderly were carried out on two different continents, three in Asia[22,24,26] and two in Oceania[16,35]. Variable resilience levels were obtained in the three studies conducted in China, with low (R=57.9)[24], intermediate (R=63.6)[26] and high (R=84.9)[22] scores. In contrast, the two studies conducted in Australia, the first with Elderly Persons who suffered orthopedic fracture (R=73.0)[35] and the second with Elderly Persons aged 100 or over (R=72.9)[16], both showed medium levels of resilience.

Figure 3 shows 15 studies that assessed resilience levels in individuals with diseases: psychological trauma (2), physical problems (4), ICU patients (1), those with chronic diseases (2) and cancer (6). The highest level of resilience was observed in a study conducted in Australia with depression (R=97.3)[34] and the lowest level was in Chinese women with breast cancer (R=61.0)[25].

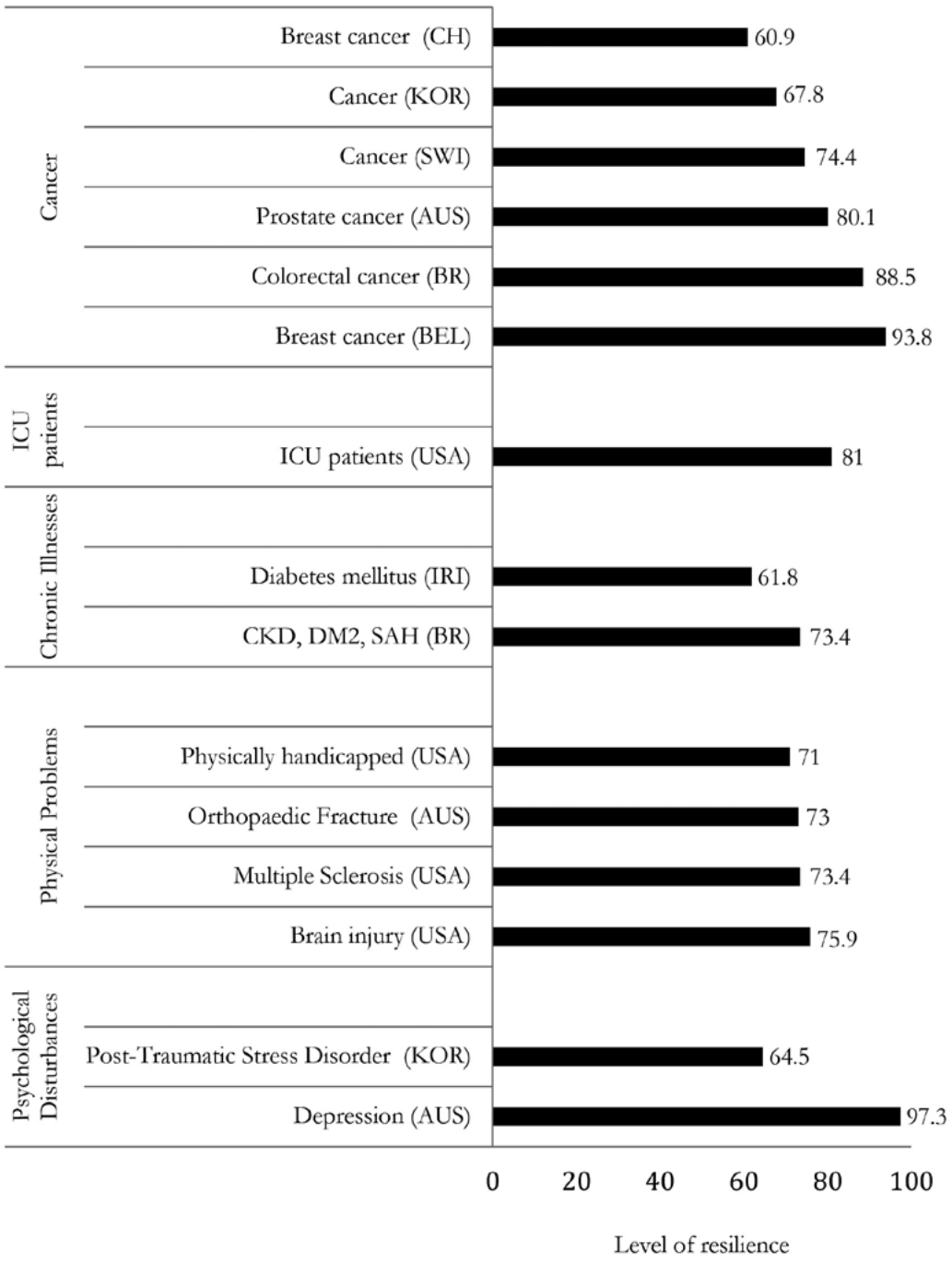
Table 1. Characteristics of studies on resilience of the elderly according to author, year, journal, central theme, country, age group and journal impact factor, published between 2013 and 2018. Maringá, Paraná, 2018.

Author	Year	Journal	Central Theme	Country	Age range	Impact factor
Min et al.[11]	2013	Supportive care in cancer	Cancer	South Korea	18-65	1.3
Sharpley et al.[12]	2013	American journal of men's health	Prostate cancer	Australia	49-84	0.59
Kukihara et al.[13]	2014	Psychiatry and clinical neurosciences	Earthquake, tsunami and nuclear accident survivors	Japan	>18	1.23
Bahremand et al.[14]	2014	Global journal of health Science	Diabetes *mellitus*	Iran	35-68	0.42
Lee et al.[15]	2014	Journal of affective disorders	Post-traumatic stress	South Korea	20-69	2.05
Law et al.[16]	2014	Archives of gerontology and geriatrics	One hundred years old or older	Australian	100-108	1.01
Senders et al.[17]	2014	Journal of evidence-based complementary and alternative medicine	Multiple sclerosis	USA	19-85	0.48
Rudow et al.[18]	2014	Progress in transplantation	Liver donors	USA	25-72	0.47
Ni et al.[19]	2015	Quality of life research	General population	China	>20	1.22
Dubey et al.[20]	2015	European journal of oncology nursing	Cancer	Switzerland	29-87	0.94
Rushton et al.[21]	2015	American journal of critical care	ICU nurses	USA	22-67	0.78
Lim et al.[22]	2015	Aging and mental health	Elderly Persons	China	>60	1.19
Markovitz et al.[23]	2015	Psycho-oncology	Breast cancer	Belgium	20-80	1.67
Lu Canjie et al.[24]	2016	Archives of Gerontology and Geriatrics	Elderly Persons	China	>60	1.01
Wu et al.[25]	2016	Plos one	Breast cancer	China	26-67	1.16
Zhong et al.[26]	2016	BMC palliative care	Elderly Persons	China	60-91	1.11
Zhang et al.[27]	2016	Plos one	Parents that had lost an only child	China	>49	1.16
Edwards et al.[28]	2016	Archives of physical medicine and rehabilitation	Multiple Scleroses, muscular dystrophy,	USA	45-64	1.5
Böell et al.[29]	2016	Revista latino-america de enfermagem (Latin American Nursing Journal)	Chronic kidney disease, diabetes, hypertension	Brazil	>18	0.34
Solano et al.[30]	2016	BMC palliative care	Colorectal Cancer	Brazil	29-86	1.11
Hanks et al.[31]	2016	Rehabilitation psychology	Brain injury	USA	18-68	0.71
Sottile et al.[32]	2016	Critical care medicine	Intensive Care patients	USA	>18	3.12
Edward et al.[33]	2016	BMC palliative care	Coronary Intervention	Australia	>18	1.11
Sharpley et al.[34]	2016	International journal of psychiatry in clinical practice	Depression	Australia	18-101	1.33
Kohler e Loh[35]	2017	Australasian journal on ageing	Orthopedic Fracture	Australia	>70	0.5
Ong et al.[36]	2018	BMC psychiatry	Caregivers of Elderly Persons	Singapore	21-65	1.35
Horvath and Massey[37]	2018	Journal of forensic and legal medicine	Members of forensic medicine	England	29-73	0.62



USA: United States of America; AUS: Australia, UK: United Kingdom; CH: China; SIN: Singapore.

Figure 2. Classification of studies in terms of levels of resistance measured by CD-RISC 25 grouped by a range of situations. Maringá, Paraná, Brazil, 2018.



KOR: South Korea; CH: China; SWI: Switzerland; BR: Brazil; BEL: Belgium; AUS: Australia; USA: United States of America; IRI: Iran; JPN: Japan.

Figure 3. Classification of studies on resilience levels measured by CD-RISC 25 and grouped by disease type. Maringá, Paraná, Brazil, 2018.

DISCUSSION

The greatest number of studies involving the measurement of resilience by the Connor-Davidson scale that included the elderly originated in the USA and China. The USA officially recognizes resilience in the doctrine of its national security strategy, which justifies the need to increase this quality among its population, including the ability to quickly resist and recover from deliberate attacks, accidents, natural disasters, as well as unconventional stresses, attacks and threats to the economy and the democratic system[39]. The Department of Homeland Security also recognized resilience in its quadrennial review of national security in 2014, with the elaboration of the Quadrennial Homeland Security Review (QHSR) mission number V of which addresses the national preparedness for resilience[40].

China, in turn, includes resilience in two philosophies: Taoism and Confucianism, cultures experienced by the most elderly persons to a significant degree. Not surprisingly, perspectives on resilience are reflected in different cultural views in China. For example, in Taoism, adversity is often interpreted by a positive, dialectical, dualistic approach. However, adversity is not necessarily understood as negative, but interpreted as an opportunity for positive change[41]. Self-control and moderate opinions are considered the meaning of social harmony. In addition, Taoism emphasizes the rules of dualism, revealing the cyclical oscillation between extremes, adversity, and success[41].

In China, three surveys have measured the level of resilience in the population of the community-dwelling elderly population[22,24,26]. In the context of mental health, the results of these surveys showed that the level of resilience of the elderly is influenced by stressful life events[22] and parenting style[26], that is, the way parents relate to their children and family relationships in quality of life[24].

The country with the third highest number of studies, Australia is notable for the positive influence of its public policies, encouraging high levels of resilience among its population[42]. The Health and Medical Research Institute[41] has developed the Wellness and Resilience Center, which has implemented mental health and wellness programs in South Australia through public health initiatives. The Center for Wellness and Resilience is part of the South Australian Health and Medical Institute (SAHMRI) and works with researchers, psychiatrists and neuroscientists focused on the "Mind and Brain" theme, and contributes to different spectra in health research from depression, suicide and anxiety, even resilience and well-being. With this focus on building mental health assets and growing human resilience, as well as research and treatment of mental illness, the Australian initiative is a reference and a global highlight[42,43].

Regarding the high level of resilience identified in the elderly in Australia[16,34], it is important to consider that the pension system in this country is recognized as one of the most sustainable on the planet, a determining factor for maintaining the quality of life of its elderly population[44]. Adequacy of pensions results in the ability to avoid poverty and social exclusion at an advanced age, ensuring a decent standard of living for retirees, enabling them to enjoy the economic well-being of their country and to participate in public, social and cultural life[44].

Health professionals had intermediate levels of resilience[21,37]. These professionals are routinely faced with numerous situations that challenge their professional practices, such as: complications on duty; the countless hours worked; the challenges of dealing with death; health system problems and the frequent requirement to work double shifts. This context requires emotional stability and resilient personality development to cope with adverse situations in their daily work[21]. Given this situation, health professionals should develop skills to deal with their professional practice, seeking self-confidence; self-control; empathy; a perception of self-healing; optimism and meaning in life; take on challenges; be flexible; tolerant; work in teams; and deal with the losses and frustrations experienced by their patients. In this scenario and with these needs, resilience is a necessary resource to face adversity, enabling the well-being, quality of life and health of these professionals[15].

The study of resilience through adverse situations that may mean outcomes aimed at improving people's lives, such as choosing to be a living organ donor[18] (liver and kidney donors), or surviving percutaneous coronary interventions[33], indicated the high levels of resilience of those involved in economically stable countries[18,33], unlike in China, which has an emerging economy and where the one-child policy was implemented in the early 1980s, leading to major changes in the structure of the Chinese population and its families. The study of a special group of parents whose only child[27] had died indicated low levels of resilience. Parents who have lost their only child experience a variety of emotional responses such as anxiety, depression, suicide risk, and prolonged pain, living on the borderline of severe mental disorders[27].

A study conducted in Japan[13] found the lowest level of resilience as measured by the Connor-Davidson scale. This country is located at the edge of the Eastern Eurasian tectonic plate, and is affected by one in five of the Richter-magnitude earthquakes occurring in the world. Its population, especially the elderly, has experienced repeated situations related to these natural disasters such as tsunamis, earthquakes and, more recently, nuclear accidents[45]. These events when they occur in significant numbers expose the population to extreme situations to which they are vulnerable, resulting in injury and loss of life, combined with damage to property and livelihoods. Discussing recovery and resilience in natural disaster situations implies community resilience[13]. Mutual support is needed to enable families to share their needs and build strategies together to seek resources to continue their life projects[46]. In this context, Kukihara et al.[13] found that some major disaster survivors were able to cope with traumatic events relatively well, and resilience was a significant protective factor in experiencing such events. It follows that it is crucial to help survivors improve their resilience by offering job opportunities and encouraging a healthy lifestyle.

The analysis of the studies selected in this review, focusing on identifying the level of resilience of the elderly in the presence of disease, found a strong consensus that resilience is an important protective factor for emotional distress, whether in the presence of diseases with greater repercussions, such as cancer[23,25], or chronic diseases such as high blood pressure and diabetes[14,29].

While Markovitz et al.[23] identified that Belgian patients (R=93.8) with greater resilience were more able to cope with the negative impact of breast cancer and were less likely to have depressive symptoms, in China Wu et al.[25] found low levels (R=60.9) of resilience in patients with the same cancer, especially in older women. Other studies carried out in different countries with breast cancer patients showed different levels of resilience: South Korea (R=67.8)[11], Switzerland (R=74.4)[20], Australia (R=80.1)[12] and Brazil (R=88.5)[30]. The variation of these results reinforces the thesis of the strong relationship of resilience with the cultural bases of different peoples, and less relation to the economic conditions of the country, since, for example, Brazilians have shown higher levels of resilience[30] than those living in countries. with greater economic stability[20] and better health care[12].

The resilience level of individuals with diabetes mellitus in Brazil was higher than the study conducted in Iran[14]. In Brazil, Federal Law No. 11,347/ 2006[47] provides free distribution of medicines and materials necessary for their application and the monitoring of blood glucose to patients with diabetes. For free medical consultations, receipt of medications and assistance from a multiprofessional team, the patient only needs to enroll in the special education program for diabetics (or HIPERDIA) at the nearest health center.

On the other hand, in Iran, although access to diabetes medications is affordable and covered by health plans[48], a study by Bahremand et al.[14] found that in that family relationships and mental health are significant interfering factors to levels of resilience, and concluded that diabetic patients who enjoyed a better family relationship had greater resilience and, consequently, better mental health.

Studies conducted in Australia[35] and the USA[17,28,31] have identified medium levels of resilience among people with physical disabilities due to orthopedic fractures (R=73.0)[35], multiple sclerosis [(R=71.0)[18];

(R=73.4[17])] and brain injury (R=75.9)[31]. Kohler and Loh[35] discuss the importance of using physical rehabilitation environments as places to implement beneficial strategies to improve the resilience of rehabilitation patients and the elderly in coping with their physical limitations.

Although most studies selected for resilience address, in different manners, psychological issues; two studies were identified that related mental disorders to resilience. The first was conducted in China by Lee et al[15], who analyzed the stress experienced by 552 firefighters with high stress levels in their daily routines, and concluded that interventions that improve resilience reduce the impact of traumatic events and, consequently, reduce the development of posttraumatic stress disorder, including in those aged 60 and older. The second study, meanwhile, developed in Australia by Sharpley et al[34], identified interventional strategies and goals that were successfully implemented for the individualized treatment of patients, considering subtypes of mental disorders.

Given the above, this literature review identified that the Connor-Davidson scale is a valuable tool for use in various situations of psychological stress that can greatly affect people's quality of life. Although the initial purpose of this study was limited to assessing resilience in the elderly, the scarcity of studies targeting this population led the researchers to broaden the search for studies developed by including elderly persons together with other age groups.

CONCLUSION

The present systematic review of the scientific literature on levels of resilience measured by the Connor-Davidson instrument, which included the elderly in their samples, identified studies in 11 countries with central themes in a range of situations. The countries with the most resilience studies were China, the United States, and Australia. Analysis of the level of resilience among patients with diseases identified a study in Australia as having the highest level of resilience in elderly patients with depression. In contrast, the lowest level of resilience was found among the survivors of natural disasters in Japan, although for the older population who experienced repeated events during their lives, resilience represented a significant protective factor for survivors against such events. Almost all studies recognized the need to implement interventions to improve resilience in the face of adversity.

Future research is needed to better understand the interventions that increase the resilience of those involved, whether in adverse situations imposed by the environment in which they live, or those arising from the natural events of the aging process, in the context of health or the presence of diseases.

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Letter to the editor

Tubarão, 21 May 2019.

To Renato Peixoto Veras
Editor, Revista Brasileira de Geriatria e Gerontologia (The Brazilian Journal of Geriatrics and Gerontology)

Dear Editor,

I write to share my considerations of the article *Prevalence of and factors associated with frailty in elderly users of the Family Health Strategy,* published on pages 704-714 of Volume 21, Nº 6, of the Revista Brasileira de Geriatria e Gerontologia (The Brazilian Journal of Geriatrics and Gerontology).

The study provided evidence of a diversity of factors related to frailty in different contexts, both in daily life and in the physiological process of aging itself, as such factors may influence the autonomy and quality of life of the elderly.

Old age has been the main risk factor for the development of certain systemic comorbidities, and should be closely monitored to reduce hospitalizations and mortality, given that the Brazilian population aged over 60 increased significantly between 1940-2000, and is estimated to grow by 917% by the decade of 2025[1].

In the study, the main variables associated with frailty identified were: being divorced, separated, widowed or single; showing symptoms of depression; dependence in activities of daily living; being at nutritional risk and suffering from comorbidities.

The prevalence of frailty was 65.25%, which is considered very high compared to other studies which found a low prevalence of frailty in the same studied population (the elderly aged over 60) in their results.[2]

Another important point to consider regarding the high frailty index observed is the application of the Tilburg Frailty Indicator (TFI) instrument. This method was used as it encompasses the three spheres that make up the syndrome - the physical, psychological and social states[3]. At the same time, it should be noted that some studies used other methods that also encompass these three spheres of the syndrome, such as the Edmonton Frailty Scale, and did not find such high frailty rates[4].

With regard to the TFI, different factors have been used to improve accuracy in identifying frailty, based on the clinical perspective, geriatric evaluation and the accumulation of deficits[5]. Therefore, among these instruments, the TFI seems to be the most appropriate for the current concept of frailty[6,7], and thus is considered the most suitable method for identifying frailty in Brazilian society.

http://dx.doi.org/10.1590/1981-22562019022.190100

Moreover, the article in question demonstrates that the other independent variables related to the frailty syndrome, such as: the female gender; being over 80 years old; being illiterate; being single or unaccompanied; and having other related morbidities (depression) are in line with other recent studies[8].

Based on the results described in the article, I agree with the conclusion of the authors that the theme presented will contribute to the development of the prevention of adversity among the elderly population, which is preponderant in reducing hospitalization and mortality rates.

Sincerely,

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