VOLUME 19, NUMBER 6 - NOVEMBER/DECEMBER 2016.

Revista Brasileira de Geriatria e Gerontologia

Brazilian Journal of Geriatrics and Gerontology

UnATi
Universidade Aberta da Terceira Idade

UERJ
UNIVERSIDADE DO ESTADO DO RIO DE JANEIRO

ISSN 1981-2256

Revista Brasileira de Geriatria e Gerontologia

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

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http://dx.doi.org/10.1590/1981-22562016019.160198

A time to reflect

For everything there is a season, a time for every activity under heaven: a time to be born and a time to die. A time to plant and a time to harvest... (Eclesiastes 3:1)

As well as being a reference for Health Promotion Programs for the Elderly in Brazil, UnATI/UERJ has been a milestone in my life. Participating in the birth and growth of this project has been one of the most cherished and gratifying achievements that a health professional could wish for.

When writing the editorial of volume 19, issue 6 of RBGG in 2016, when we will celebrate 18 years of the journal, I could not fail to reflect on this event and its importance for the history of UnATI/UERJ.

The initiative behind the creation of the journal was to provide a response to the growing demand from researchers, post-graduate students and other academics interested in obtaining subsidies to carry out their work within the challenging areas of interest of aging, old age and the elderly in Brazil.

Human aging has been approached in academic circles through two fields of knowledge production: geriatrics, which is more biological in nature, and gerontology, a field of knowledge that links several areas of academic production (such as the arts, architecture, law and health) to the process of human aging. At the time, there were no scientific journals that regularly disseminated knowledge produced in geriatrics and gerontology.

To meet this demand, in 1998 RBGG was born, under the name of Textos sobre Envelhecimento (Texts About Aging). Since its launch, it has been defined as a specialized periodical that publishes scientific production in the field of geriatrics and gerontology, with the aim of contributing to a deeper understanding of issues related to human aging.

It is impossible to discuss the history of the journal without giving credit to Professor Shirley Donizete Prado, coordinator of the Centro de Referência e Documentação sobre Envelhecimento (Center of Reference and Documentation on Aging) at the time, who had the idea for and led the development of the project behind the creation of the Magazine. Nor can we forget Conceição Ramos de Abreu, the executive editor of RBGG from the outset, when it was still known as Textos sobre Envelhecimento. Professor Shirley Prado and Conceição de Abreu, while they no longer form part of the editorial team, will always be part of the history of UnATI. Our gratitude and admiration for them both is assured.

The first issue of Texts included topics focused on the health and quality of life of the elderly, interpreting these issues in a broad sense, as a multi-professional and interdisciplinary perspective requires, encompassing living conditions and aspects to be considered when investing in a more autonomous and independent aging.

Until the first half of 2001, Textos sobre Envelhecimento existed only in printed form and in Portuguese. It was published every six months, with an average of three original articles and 60 pages per issues. Most of the articles corresponded to works derived from dissertations and theses developed in postgraduate programs in Brazil.

From 2001, the journal complied with the SciELO methodology to make scientific texts available on the Internet, which includes markers to facilitate the internal navigation of articles, links to bibliographic references, allowing the reader direct access to the database where a particular work is cataloged or to its full text, if the work is in the SciELO virtual library (www.scielo.org.br), and bibliometric and impact indicators. Since then, its periodicity has progressively increased until today's bimonthly publication in Portuguese and English, in a totally electronic form.

Thus, we can look back on this history after 18 years and reflect, and conclude that RBGG continues to make progress towards the fulfillment of its mission to contribute to the consolidation of Brazilian and international networks of information on aging and health.

Congratulations RBGG!!! And congratulations to all those who have contributed to the journal, the impact of which grows with each issue, over these 18 years. We are all part of this story.

Professor Célia Pereira Caldas

http://dx.doi.org/10.1590/1981-22562016019.160205

Care pathway for the elderly: detailing the model

Renato Veras[1]

Abstract

Greater knowlegde of patient history among health professionals leads to improved results. This is how the contemporary and resolutive models of care recommended by the most important national and international health agencies work. Current models of care stem from a time when Brazil was a country of young people and acute diseases. But the desire for a higher quality, more efficient and more cost-effective model of care is not only a Brazilian phenomenon. The whole world is debating the issue, recognizing the need for change and proposing improvements in their health systems. The same thing is occurring here. The theme of this text, as Dr. Martha de Oliveira, director of the Agência Nacional de Saúde Suplementar (National Agency Of Supplementary Health) (ANS) comments below, is in agreement with this movement. We advocate a logic that prioritizes low-intensity interventions and constant monitoring, with the doctor responsible for a portfolio of clients who he or she accompanies throughout the different care settings. The text proposes integrated medical treatment, a flow of educational actions, health promotion, the prevention of preventable diseases, the postponement of illness, early care intervention and rehabilitation from sickness. It is time to change and innovate!

Keywords: Health Services for the Aged. Integral Health Care. Monitoring. Care Pathways.

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INTRODUCTION

Elderly persons have a number of well-established characteristics – more chronic diseases and frailties, greater expenditure and less social and financial resources. Even without chronic diseases, aging involves functional loss. With so many adverse situations, care for the elderly must be structured differently from that of adults and provide special assistance. The current provision of health services fragments care for the elderly, with multiple specialist consultations, a lack of information sharing, and numerous drugs, tests and other procedures. This overloads the system, with a strong financial impact at all levels, and does not generate significant benefits for quality of life[1-3].

> Care for the elderly must be structured differently from care given to adults. Our care models date from a time when Brazil was a country of young people, while today we are a young country filled with grey hair. .

The demographic projection for the next few years predicts an older population, and so the current scenario is likely to worsen if the model remains unchanged. Increased longevity leads to greater use of health services, generating more costs, threatening the sustainability of the system and generating new demands. Today's care models are from the time when Brazil was a country of young people and acute diseases, while now we are an old country with chronic diseases. Actions based on health promotion and education, the prevention and delay of the onset of diseases and frailties, and the maintenance of independence and autonomy must be expanded[4,5].

A contemporary elderly healthcare model should bring together a flow of actions based on education, health promotion, the prevention of preventable diseases, delay of the onset of illness, early care and rehabilitation from diseases. A care pathway[2] for the elderly that aims to exhibit efficacy and efficiency must presuppose an articulated, referenced network with an information system based on this logic.

Currently, health systems operate with few points of care, which do not function in an integrated manner. Patients generally enter this disjointed network at an advanced stage. The entry point is often the hospital emergency room. Such a model, in addition to being inadequate and anachronistic, has a very poor cost-benefit ratio, as it is hospital-centered and makes intensive use of expensive technologies. Its failure, however, should not be attributed to the users, but to the care model itself, as there is an overburdening of users at more complex levels due to a lack of care at earlier levels.

One of the problems most current care models face is the exclusive focus on disease. Even when a program based on the logic of anticipating illness is offered, the proposals are geared primarily towards the reduction of a certain disease, overlooking the fact that when a chronic disease is established the objective should not be a cure, but the stabilization of the clinical profile and constant monitoring to prevent or ameliorate functional decline[6].

Studies show that care must be organized in an integrated manner and should be coordinated throughout the duration of the care in a logic-based network, from entry into the system to care at the end of life.

Therefore, new models of healthcare for the elderly should present a proposal for a care pathway focusing on actions of education, health promotion, the prevention of preventable diseases, the postponement of diseases, early care and rehabilitation[7].

The model is based on the early identification of the risks of frailty of users. Once risk is identified, the priority is early rehabilitation to reduce the impact of chronic conditions on functionality; seeking to intervene before harmful effects occur. The idea is to monitor health, not disease, with the intention of postponing illness so that the elderly can enjoy their remaining time. Thus, the best strategy for the proper care of the elderly is based on the permanent monitoring of their health and keeping them under continuous observation, varying only the levels, intensity and context of the intervention[8].

A set of healthcare actions can therefore be imagined, structured to meet the particular health condition of the individual, based on risk assessment. This risk consists of clinical, social, economic and environmental factors, among others.

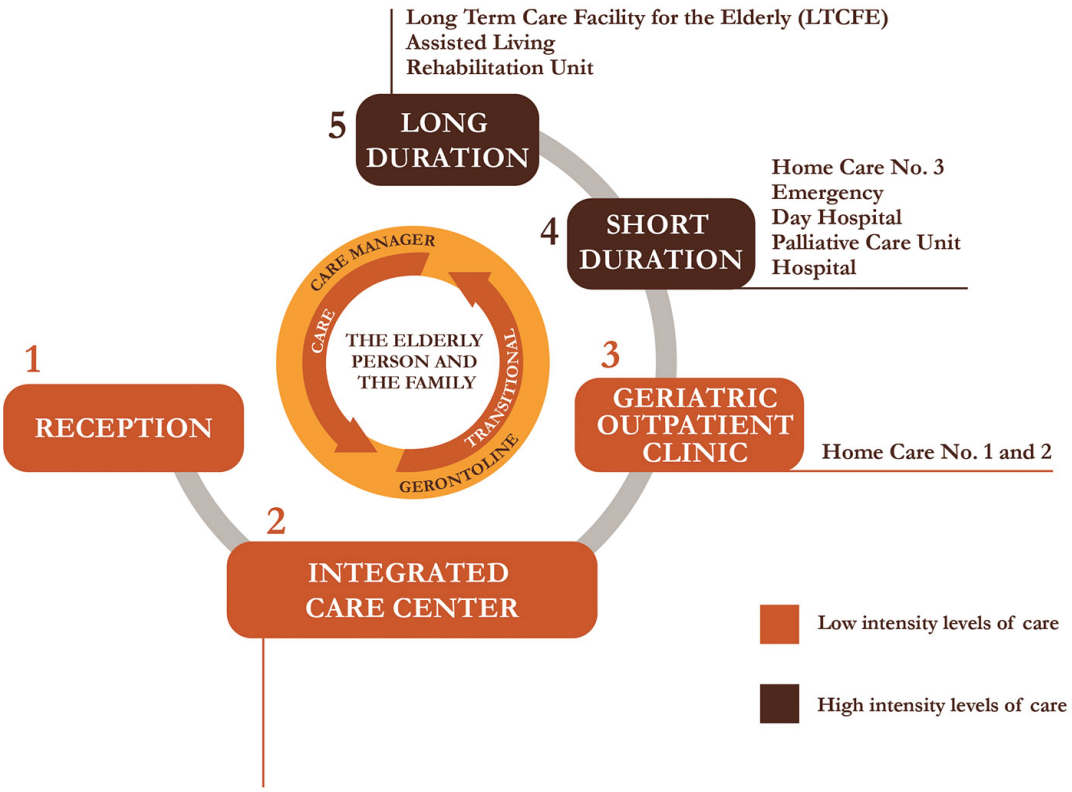
Hierarchical levels should be an integral part of the treatment plan and the care pathway to be followed by the user. This integration defines the success of the model, including from a financial perspective.

The hierarchy of the network provides at least two fundamental benefits for the care of the elderly: the reduction of iatrogeny and the organization of the flow of care. Clinical guidelines and protocols are also essential for the construction of the therapeutic plan. They should direct good practice, be based on the best evidence available and be appropriate for each clinical situation. The therapeutic plan guides the flow of the care pathway, and establishes the care route according to the needs of the patient[8].

When seeking to increase the effectiveness of the care model, it is necessary to increase information management, value scientific knowledge and reduce the absolute power of machines and technology. It is necessary to change the logic of our now outdated logic of care. Managers should therefore seek interventions aimed at reducing the use of advanced care settings (including the hospital) and expand the provision of care in lower-intensity settings (including integrated care centers), which should where possible have a preventive basis and be outside the hospital environment.

Some suggestions for care pathway models already exist. What is important is that each health institution has knowledge of its users, their profile and their needs, in order to construct the best way to organize the delivery of its services.

The model we propose is composed of five hierarchical levels of care - reception, an integrated care center, geriatric outpatient care, and complex short and long-term care (Figure 1). But it is in the first three levels, in low-intensity care settings, that the difference is clearest[9].



Key:

Level 1 – Reception

Level 2 – Integrated Care Center: Outpatient Clinic, Day Center, other care settings

Level 3 – Geriatric Outpatient Clinic: Home Care complexity 1 and 2

Level 4 – Short Duration: Home Care no. 3, Emergency, Hospital, Day Hospital and Palliative Care

Level 5 – Long Duration: Rehabilitation Unit, Assisted Living and Long Term Care Facility for the Elderly (LTCFE)

Levels 1 and 3, in orange, should be considered low-intensity care settings, or in other words, lower cost settings basically comprised of care provided by well-trained health professionals. Efforts should be made to maintain patients at these low-intensity levels, to preserve their quality of life and social participation.

The settings in brown, which are higher-intensity, are situated in hospitals and other long and short stay units. Efforts should be made to rehabilitate patients and return them to lower-intensity care settings, even if this is not always possible.

As such, health professionals and institutions should try to maintain the elderly persons in the first three levels of care, seeking to preserve their quality of life and reduce costs.

Figure 1. Brazilian mode of integrated care for the elderly. Rio de Janeiro, RJ, 2016.

The model should feature several care settings prior to the hospital, which is mistakenly seen as the ideal location for healing. This is a conceptual error. The hospitalization of the elderly should occur only at the acute moment of chronic illness, for the shortest possible time, or in cases of emergency[7,10].

The entry point to the system should be a location that allows the client and their family to feel protected and supported. It is in this setting of first contact that the user is informed of all the care possibilities and pathways. Reception is fundamental for those arriving and a stimulus for developing trust and fidelity.

The proposal of care for the elderly should be understood as a strategy to establish care pathways, organizing the movement of individuals through the system according to their degree of frailty. The identification of risk and the integrality of care at the different points of the network are key to this model. Hierarchization does not presuppose an evolutionary path between the care levels of the model, despite expected trends. The stages cannot be absolutely fixed as there is the possibility of reverting disability and the return to a less complex level, depending on the situation.

> Better care results and economic-financial outcomes are needed. What is required? That everyone should understand the need for change and allow themselves to innovate. Innovate in care, innovate in remuneration and innovate in the evaluation of the quality of the sector. Innovating often means recovering the simplest care and values that have been lost within our health system.

The necessary model

There are four aspects that underlie the entry point (or level 1) of the model: reception, fidelity, integrality and assessment of the risk of frailty/disability.

In the model constructed, levels 1 to 3 in orange (Figure 1) are low-intensity settings, or in other words involve lower costs and are largely composed of care by well-trained health professionals. Efforts should be made to maintain patients at such low intensity levels to preserve their quality of life and social engagement. The brown settings, which involve more serious cases, are expensive and include hospital and the other long stay facilities. In these settings, it is preferable to rehabilitate the patient and transfer them to low-intensity settings, even if this is not always possible. Efforts should be made to keep the elderly within the first three levels of care, to preserve quality of life and reduce costs. The goal is to concentrate more than 90% of the elderly in these settings[10].

Care models for this age group should be person-centered, considering the specific needs of individuals. Care should be managed from the moment of entering the system to the end of life, with constant monitoring. We know that the elderly face specific challenges due to chronic diseases and bodily and social frailities[5]. The graphic reproduction in Figure 1 helps to explain important aspects of the proposed model. Entry via Level 1 (reception) guarantees conscious access to the system, a beginning based on the transparency of the rules of the plan, grace periods, rights and responsibilities, the care offered, and bonuses and rewards. It is, therefore, the entry point, a crucial moment for establishing empathy and trust, fundamental elements of the fidelity of the user.

Another important differential is the proposal of registering the care pathways of patients through a comprehensive information system, which will record not only the clinical evolution of the elderly person, but also his or her participation in individual or collective preventative actions, as well as the support of the care support manager and the phone calls made to or by the "GerontoLine" (the name we have given to a qualified and resolutive call-center, which will be discussed later). This allows a sharing of information, enabling a more complete evaluation of the individual and including the medical records of the hospital unit, governed by specific norms.

The care support manager is a health professional, usually a nurse, who receives and accompanies the elderly and his or her family from level 2 (Integrated Care Center). The brief instrument of risk identification carried out at admission provides a monitoring ground zero and sets a parameter for monitoring the therapeutic plan between the different points of the network. This professional takes care of the transition

of care between the services and reassesses annually, or when necessary, the functional capacity of the elderly person, encouraging participation in the care process through the interlocution between the discourse of care and the patient, who is usually in a situation of frailty. To maintain quality of care, it is recommended that each care support manager has up to 300 elderly persons under his or her responsibility (for a 20-hour workweek, we suggest a portfolio of 300 customers) as a way of ensuring the trust and bonding of the elderly, values inherent in qualified care[6].

Level 2 is where various actions of education and the promotion and prevention of health are integrated through an outpatient clinic for low-risk elderly people, a cohabitation and social center, rehabilitation services, care and self-care support services, family support and the location where the elderly person can meet his or her care support manager.

The "GerontoLine" is a support service where the elderly persons and their families feel protected, have their needs met and any doubts about the care they are receiving clarified. It should act as a differential, playing the role of facilitator and reinforcing agent in the company-user relationship. The team of attendants should be formed by qualified personnel, under the coordination of a professional with training in psychology, whose role will be to talk to the client and meet their needs. The prerogative is that every situation should have a satisfactory solution. If the attendant is unable to offer a response in the first instance, he or she should call back later with the answer. The "GerontoLine" should be an effective communication channel, to support care and the other services offered.

The importance of a multidisciplinary team composed of a physician, nurse and social worker is emphasized at level 3 (geriatric outpatient clinic). They perform multidimensional geriatric assessment, which will allow for specific interventions where required. This evaluation considers the medical, care, social, environmental, cognitive, affective, religious belief and economic factors that make up the therapeutic plan, which is constructed collectively and discussed with the health team and the care support manager. This level is also where low and medium complexity home care is located.

With respect to the relatives of the elderly person, different models with varied participation arrangements exist – some elderly people live alone, without support from a family network. This does not necessarily mean having no friends or colleagues; some live with partners; some are cared for at a distance; and there are those whose care relationships are based on moral obligations, without affection. Support should not be restricted to blood relations, but be extended to those who live or share their lives with the elderly.

It should be noted that these features are absent in most elderly care models in Brazil today. When properly recorded in a single information system, they provide important information for care, because the more the health professional knows about the history of his/her patient, the better the results will be. This is how contemporary and resolutive care models should function[11].

The pursuit of excellence and innovative practices must be ongoing and represents a challenge that goes beyond the knowledge of biological sciences. Interlocution with the social and economic sciences should be permanent, as a way of maintaining more efficient, resolutive, higher-quality, lower-cost care models that allow inclusion and the reduction of risks[12,13].

> The geriatrician should have a portfolio of clients. For each portfolio there should be a pairing formed by the doctor and the nurse. The nurse is the care support manager, responsible for monitoring users and supporting the doctor, the elderly person and his or her family. With an efficient information system, a qualified "GerontoLine", a care support manager and a doctor with a client portfolio, the chances of success are much greater. The remuneration model should stimulate the efficient performance of professionals. After all, the best plan is one where everyone wins!

Reception: the beginning of the process

We detail here the proposal for the first level, which is the entry point to the system, the place where reception and registration take place and the beginning of the process of monitoring the health profile of the elderly person[14,18].

Our model consists of five levels. Level 1 is reception. This stage makes all the difference and is fundamental if elderly persons and their families are to develop confidence in and subsequently fidelity towards the system. The care model should be presented during the first contact with the company. The approach of the professional at the entry point should be educational, with information about the form of care, the logic of the interventions and the actions available and explanations of the proposed treatment plan based on a model of promotion and prevention and differentiated hierarchical levels[18].

It is of fundamental importance that this moment is well structured and provides confidence and a positive impression of the care proposal of the company. It is here that the individual is informed about the differentials of the model – integrality, his or her own attending physician, individualized monitoring through a care support manager, the "GerontoLine", constant evaluations, the health team and other factors, rather than mere clinical care. One important clarification relates to the patient's doctor. This model is based around the centrality of the managing doctor or attending physician. This professional is the driver of the process. If he or she considers the opinion or intervention of a specialist from a particular area necessary, the attending physician can refer the patient to a specialist. The progress of the case, however, is the responsibility of the general practitioner. After consultation with the specialist, the information and actions taken will be recorded in the patient's unique medical record, and the elderly person will return to his or her doctor[15].

In treatment plans in other countries, the general practitioner or family doctor deals completely with 85% to 90% of his or her clients without the need of a specialist. In addition, the attending physician can utilize health professionals with specific training (in nutrition, physiotherapy, psychology, or speech therapy). Therefore, the client will have a much larger range of professionals at his or her disposal, while the attending physician remains the doctor who provides guidance and referral. There is an excess of consultations carried out by specialists in Brazil, as the current care model prioritizes the fragmentation of care. This problem is demonstrated by comparisons with the National Health Service (NHS) in the UK, where the central organizational figures are general practitioners (GP), generalist doctors with a high resolutive capacity, favoring the establishment of patient-professional fidelity. The American model, on the other hand, opts for referral to numerous medical specialists. Two wealthy countries, therefore, with long medical traditions, use different models that provide quite different results[16].

> We ask for customer fidelity to our care proposal. But, what do we offer? We propose a REWARD for those who adhere to this healthcare plan. Financial incentives through the granting of rewards are very efficient, as EVERYBODY benefits, the client through the improvement in his or her health and the company through the reduction of costs.

The beginning of this new relationship should be based on technical aspects of care, in addition to the administrative and financial issues inherent to the contract - nothing should be omitted. The initial link must be based on trust and transparency, so that the user can decide whether or not to participate, as membership implies bonuses and rewards linked to the use of services, such as incentives granted by the health plan and encouraged by the Agência Nacional de Saúde Suplementar (the National Agency of Supplementary Health) (ANS). The refusal to participate is the right of the client and does not preclude his or her admission to the plan at a later date. The same is true for elderly customers who are already users of the company, who can sign up to this new product.

The beginning of the process occurs when the new customer is invited to learn about our proposals and hear the explanations of a trained health professional, who performs a much broader role than that of a mere health plan sales broker. However, if the elderly person is already a customer of the company and is changing products, the invitation to join can take place during an outpatient visit or at the hospital. The health professional responsible for the reception of the client should go to where he or she is being treated, as a way of capturing and expanding the coverage of participants in the new care proposal.

The first consultation should be performed by a health professional with training in geriatrics or gerontology, usually a nurse, who will explain the care pathway and its various treatment settings, establishing a relationship of trust between the user (and their family) and the proposed care model. This professional will give a broad exposition of the proposed actions, emphasizing, above all, the promotion of health and the prevention of diseases, as well as the care pathways of the network, allowing the user a comprehensive understanding of the model. It is necessary to detail to users in a clear and didactic way the various procedures that will be performed. We believe these are differentials which are beneficial and aim to improve the quality of life and health of the elderly, in the same way that the participation of the elderly persons should be encouraged, as they themselves are part of this health care model.

It is important, however, that there is a doctor present in the reception unit, in case doubts arise or in the event that a user does not accept certain information about his illness. In this type of conflict (which is rare, but can occur), the doctor must intervene. Trust in and fidelity towards the system are consequences of the user's perception about how much he or she is respected and what is being offered to him or her. There are advantages for both sides here: the elderly persons perceive their health to be well cared for and feel protected, while the operator obtains fidelity at lower costs.

Due to society's lack of awareness about this mode of care, many patients and their families may be in doubt and refuse the product. It is important to stress that no users should be obliged to participate in the care proposal offered. In this case, conventional health plans should be used, and the healthcare provider cannot refuse those who do not wish to participate, as determined by Law No. 9,656, dated June 3, 1998, which provides for private health insurance plans and insurance, ratified by ANS Normative Ruling No. 27, October 6, 2015, which prohibits the selection of risks by health plan providers, both in the contracting and the exclusion of beneficiaries[17].

Educational materials should also be available in the reception area so that, counseling on chronic pathologies such as hypertension, diabetes and osteoarthritis, as well as the safe use of medication, healthy nutrition, environmental safety, physical activity and vaccine guidelines can begin. During reception, a single, longitudinal and multi-professional electronic record will be opened. This will store the information from all the care settings within the care model, from the first contact to palliative care in the final phase of life. While the record should contain information about the clinical history and physical examinations of the elderly patient, it should also include information about his or her daily life, family, social support, and other factors. The medical records should also include the records of other non-medical professionals, such as physiotherapists, nutritionists and psychologists.

The participation of the family, the explanation of the activities of the "integrated care center" (level 2, to be explained) and the epidemiological screenings resulting from the services provided are other important differentials of this product. Information about all the procedures is essential for the monitoring of the user and the creation of a client card, which should have a chip containing his or her registration number, name of family contact, the unit where he or she receives treatment, the doctor and nurse responsible for care, a summary of important events and access to his or her electronic record.

This model is based on patient monitoring at all levels, verifying the effectiveness of the actions to allow effective decision making and follow-up care. As a way of organizing access to the different levels of the model, basic epidemiological screening is carried out, with a small number of questions that allow the identification of operational characteristics to prioritize care and ensure the efficient use of resources through the application of a brief risk identification (RI) tool. Technical decision-making about client referral must take place through agreement on participation in the proposed health care proposal and based on the assessment of risk of disability. In this way, RI "organizes the queue", setting priorities based on necessity and not on the perverse search for a position at the front of the treatment line. It is important that risk identification is applied to all users when they enter the model. It can be self-administered and carried out prior to reception (level 1), allowing the user to be met with prior information.

There are several validated instruments that meet all the scientific quality requirements. For the entry point at level 1, we suggest using the

Prisma-7 questionnaire. Developed in Canada, this is intended to track the risk of functional loss of the elderly. It consists of seven items, and its benefits include ease of application and response (yes/no type answers), greater objectivity, low risk of interviewer bias, reduced possibility of errors and easy analysis of results[18].

In addition to the identification of risk performed at the initial stage of the process, other epidemiological instruments will be used annually from the subsequent stage onwards, or in other words, level 2. This information will be part of the patient's medical record and will be maintained until the end of the care process. The doctor and his or her care support manager, in addition to the geriatric multiprofessional team, will make more detailed evaluations to propose an intervention plan.

We propose that ratification of the signing of the health plan be carried out during the reception phase, as a way to ensure that all clarifications are provided and there is no doubt on the part of the client, thus enabling a transparent relationship from the outset. The beginning of this new relationship should be based on technical aspects of care, in addition to the administrative and financial issues inherent in the treatment contract - nothing should be omitted.

A qualified membership interview is a moment of great importance in subscribing to a health plan, since, in addition to creating a relationship of trust between the parties, it avoids the focus being exclusively concentrated on the contractual relationship. It is a unique opportunity for patient evaluation and for insertion into the care network. Completion of the health document (health declaration), where all possible preexisting diseases or injuries (PDI) are reported and temporary partial coverage (TPC) is established, is an integral part of the contract. Its completion is necessary for the understanding of the contract to be signed, to define grace periods, procedures covered in cases of urgency and emergency and coverage offered in cases of PDI. Failure to complete this may represent fraud, subject to suspension of coverage or the unilateral termination of the contract.

The user must always fill out the health declaration through a qualified interview guided by a health professional belonging to the provider, without any burden or onus. Instead, however, this initial interview, which is of great importance to client fidelity in the proposed care model, is carried out by the broker who sells the health plan, who often does not inform the future user that his or her interest is to sell the product.

This relationship with the user needs to change. It must be transparent, establishing a pact based on truth. The actions performed must be recorded in the information system, which must be opened at reception and followed until the end of the patient's life[19].

The hierarchy of the care model provides knowledge of its users, their profile and their needs, in order to better organize the delivery of services. One thing is certain: without the organization of the care of the elderly and without the elaboration of a care plan, population aging and the greater prevalence of diseases will cease to be opportunities, and will become obstacles for the sustainability of the Brazilian supplementary health system.

It is important to emphasize that the proposal presented herein is not only intended to discuss mechanisms for reducing health costs. While this is an important factor, like so many others it drives us towards a greater goal, in other words the integral care of the elderly. The model presented has a commitment and goal to improve the quality and coordination of the care provided from the entry point to the system and throughout the continuum of care, avoiding redundant examinations and prescriptions, interruptions in the trajectory of the user and iatrogeny generated by the disarticulation of health interventions.

The hospital and the emergency room will always be important settings for the provision of health care, but it is necessary to redefine and recreate the role they play in the health care network today. These units of care should be reserved primarily for moments of acute chronic illness[20].

Detailing the graphic model

The initial connection should be based on trust and transparency, so that the user can choose whether or

not to participate in the model. Their membership may imply bonuses and rewards related to the use of the services, such as incentives granted by the health plan and incentivized by the Agência Nacional de Saúde Suplementar (National Agency of Supplementary Health) (ANS).

Figure 2 was included in the book "Idosos na Saúde Suplementar: uma urgência para a saúde da sociedade e para a sustentabilidade do setor" ("The Elderly in Supplementary Health: an urgent need for the health of society and the sustainability of the sector") of the Projeto Idoso Bem Cuidado (Well Cared For Elderly Person Project) of the ANS. Both Figure 2 and Figure 1 follow the logic of care, integrality, and the search for the required changes. It is necessary to innovate in care, in the form of remuneration, and in the evaluation of the quality offered. It is worth stressing the emphasis placed on the model and remuneration, as can be seen in the two overlapping platforms: one related to the care model and the other related to the remuneration model.

> A triad for success! 1. The doctor and nurse are responsible for a portfolio of clients. 2. The user will receive a financial stimulus (reward) to adhere to the care model, which is based on monitoring and fidelity to the health team. 3. The remuneration of the physician and the health team will be established through the success of the care. Better performance, better values. We acknowledge that health professionals are poorly paid.

Figure 2 shows, with similar significance, the quality of care offered by the attending physician, his or her client portfolio and his or her variable remuneration. Emphasis is also placed in the center of the chart on the client portfolio, functional assessments, risk tracing, the care support manager, and an efficient information system that records all client events. It is also important to emphasize the importance of the various care settings, such as the outpatient clinic, the hospital, home care, rehabilitation, the multidisciplinary team, the cohabitation center and palliative care. All are part of the network of care and are integrated through the information system and the attending physician, who is the clinical reference throughout the course of the model. It is clear that the hospital is only one setting. It is equal to the others, but surpassed by the importance of the preventive actions, which are in the center of the model. The logic is based on low-intensity settings and integral care, the multidisciplinary team and the doctor responsible for the patient.

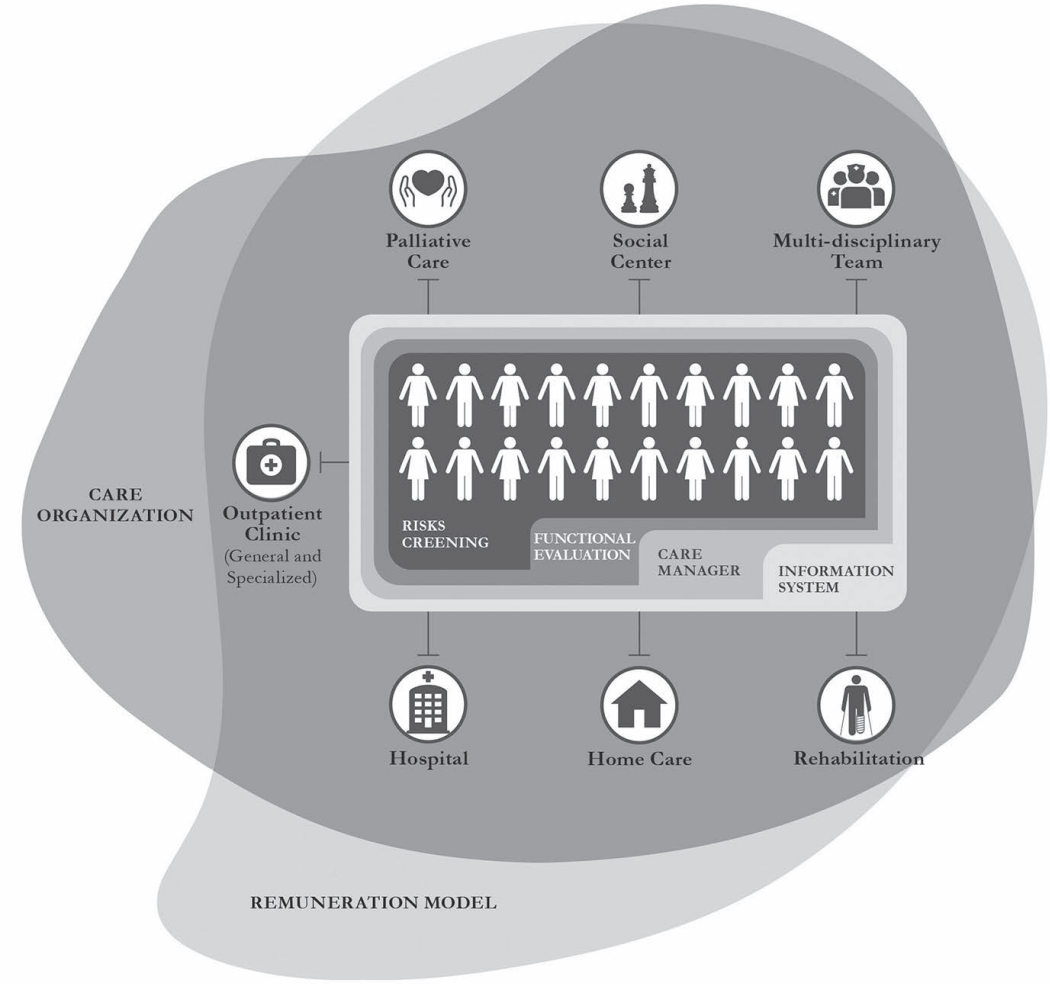


Figure 2. Well Cared for Elderly Person Project. Rio de Janeiro, RJ, 2016.

Figure 1 shows a graphic summary of the model developed by the Universidade Aberta da Terceira Idade (the University of the Third Age) (UnATI/UERJ). There are a number of key elements in the center of the diagram. It is important to include the elderly person and his or her family and highlight the care support manager and the "GerontoLine", or in other words, structures that reinforce the centrality of the client and his or her family and the ease of communication between the health professionals and the client. The model is structured in five segments, with different colors for groups 1 to 3 (lower intensity levels of care) and for groups 4 and 5 (higher intensity care). A detailed description of the five groups allows a better understanding of the philosophy based on functionality, not disease.

In this first diagram, in level 2, there is the Integrated Care Center, a unit that is characterized as the central care point of the network. It includes support systems for autonomous and independent living, with meals, family support services, the "GerontoLine", a social and coexistence center (a place where facilities for the elderly can be acquired – different types of equipment, the purchase of tourism packages, tickets and transportation for leisure activities, such as theaters and visits to museums, or in other words, everything that makes life easier for the elderly and their families), as well as rehabilitation services and support for care and self-care. It is the heart of the model, where the articulations to the other units will take place, based on evaluations. The actions carried out in the

Integrated Care Center aim to facilitate an active life for autonomous and independent elderly persons, as well as offering support facilities to assist families with dependent elderly relatives. In addition, there are other support systems to support self-care, including supervision for the administering of medication and appointment scheduling[21].

The elderly person who is at low and moderate risk will receive care on an outpatient basis. Depending on the evaluation performed, it will be possible to decide if the necessary intervention is at a clinical or geriatric outpatient level. Clinical outpatient care located at level 2 will treat elderly persons with a pathology requiring low-intensity intervention. Level 3 is for elderly persons with multiple pathologies who need more robust geriatric support.

The third level (specialized or geriatric outpatient clinic) is structured to serve elderly people with geriatric syndrome who are frail or in the process of becoming frail, who need specialized, more detailed and more complex care. Care should be provided by geriatric physicians and a multidisciplinary health team.

At the geriatric level, care is carried out by a multiprofessional team, aimed at the maintenance and rehabilitation of functionality. It is a geriatric outpatient clinic, aimed at the frailest and most at-risk elderly who require this type of intervention. These actions aim to interrupt/reduce the evolution of frailty, in parallel with a reduction in costs. Home care (consultation and procedure) also belongs this care level.

As already mentioned, it is essential to understand how chronic diseases prevent the elderly from exercising their routine activities autonomously and independently. It is at level 3 that multidimensional geriatric assessment is applied, an important tool to determine a suitable diagnosis, prognosis and clinical judgment for effective care planning. Medical practice shows that the decline in the functional capacity of the elderly makes them dependent on a more complex level of care. It can be caused by the evolution of the underlying pathology itself, by its maladministration and sequelae, or by the inadequate care received - be it familial, social or institutional.

Home care is a care modality that is substitutive or complementary for modalities that already exist, characterized by a set of actions to promote health, the prevention/treatment of diseases and home-based rehabilitation, with a guarantee of continuity and integration with care networks. Home care can be made available in three different categories:

a) home care level 1: suitable for elderly patients who live alone and have difficulty walking. In this case, if the service is not home-based, the elderly person is left without care and his/her condition tends only to worsen. This level 1 modality is similar to an outpatient visit;

b) home care level 2: uses relatively simple technology and is recommended when the patient needs a procedure that can be performed at home, such as rehabilitation after fractures, wounds and other types of convalescence after hospitalization;

c) homecare level 3: uses a structure similar to that of the hospital and is effective for elderly persons, who remain in their homes and bedrooms, without the risk of hospital infection and in an environment to which they are accustomed..

The fourth and fifth levels of the model should be used sparingly, at specific moments and always accompanied by the project team. We divided the "highest-intensity" care settings (brown on the chart) into two groups: short and long duration[22].

The third and fourth level of home care is where the most complex homecare is found, based on the theory that using hospital facilities and spaces for ultra-specialized treatments runs the risk of serious loss, whether economic or from a care perspective. The technological advancement of recent decades has resulted in the miniaturization and automation of high-tech equipment, such as mechanical respirators, infusion pumps, dialysis machines and drug delivery equipment, making them more common, simpler to use and cheaper. We can therefore transfer part of the hospital equipment into the patient's home.

Surgical procedures requiring several days of hospitalization have been reduced by half. Several procedures that previously required hospitalization

are performed in doctor's surgeries/outpatient clinics, resulting in more comfort, a reduced chance of hospital infection, as well as lower costs. These factors lead to reduced hospital use, with the consequent expansion of the procedures performed in one's own home (home-care).

We will always need good hospitals, and not all patients and households are suited to home treatment. It is not our aim, therefore, to suggest a nihilistic approach. What is unreasonable is to turn hospitals into the entry point to the health system, when more contemporary medicine shows that this care setting, besides being more expensive, should be restricted to specific indications. Home care is not a fad, just a more contemporary mode of caring. In fact, the "invention" of the modern hospital is something recent. Until very recently, care was performed in the home[23].

Similar to previous levels, level 4 also works with preventive logic and aims to reduce the progression and complications of an already symptomatic disease. As such, it is an important part of therapy and rehabilitation. We know the importance of the hospital and do not wish to underestimate its ability to play a part in the patient recovery process, but this setting must be reserved for very specific and defined cases and for the shortest period possible. After remission of the acute phase, home care may be the best place to continue treatment. We would reserve hospices or palliative care for the terminal phase and for a short period and specific cases. The same applies to other instances of Level 4 care, which are characterized by short-term monitoring and referral to a more suitable area as quickly as possible. In level 4, the length of hospitalization should be short, whether in the hospice or in the Palliative Care Hospitalization Unit, and should be used only in the terminal phase to alleviate all possible forms of suffering.

A great contradiction in care logic is observed in level 5. Although recognized in the health field, long-term care settings are not covered by the private sector. In the public sector, meanwhile, the management of these settings is transferred to philanthropic or religious institutions or to the social segment of government. Unfortunately, long-term care facilities are seen as deposits for sick elderly people, particularly asylums, places that, for the most part, function as a repository of social problems, neglect, and very little health care.

This should not be the case. The fifth level contains the rehabilitation unit for cases requiring long-term care. Assisted residences are potential alternatives to maintaining the elderly under family protection, in a non-institutionalized location, preserving affective ties and more intense affective support. Long-term care facilities for the elderly, although not a priority option, may be the only solutions for elderly persons without family members or with financial difficulties. This structure ends up being the only option for the care of a patient with these characteristics. In short, level 5 care requires a more inclusive policy and more effective participation of the public and private sectors to avoid abandonment in the last stage of life. As these are long-term actions, the fundamental discussion concerns the structuring of a financing mechanism, otherwise little progress will be achieved.

For the success of this model, therefore, it is necessary that clients are guided towards participation in the proposed programs and actions, instead of the current logic of using a health plan only when undergoing tests or entering a hospital with disease already in an advanced stage. The model includes all care settings, excludes absolutely nothing in relation to the care required - in fact, includes new units not usually offered to the clients of many healthcare providers - and prioritizes the logic of care in "lower-intensity" settings. These offer the best possible care, with trained and qualified professionals, based on the modern scientific conceptions of treatment. In short, our proposal is to invest in health, to reduce spending on disease.

Specificities and characteristics of the model

Care models of the elderly population need to people-centered, taking into account their characteristics and needs. Care must be managed from the moment of entry into the system to the

end of life, with all services and actions offered in a planned manner, with constant monitoring. We know that the elderly have specificities due to their age, such as chronic diseases and physical and social frailty, resulting in higher care costs. Faced with so many adverse situations, the care of the elderly must be structured in a different and special way.

Some aspects of the model are fundamental and are described in more detail below:

a) Upon reaching level 1, at the moment of reception, the model is described to new users and they are given the opportunity to clarify any doubts. This first appointment must be carried out by a health professional, who will explain the care pathway and its various care settings, establishing a relationship of trust between the user, his or her family and the proposed model of care. This professional will give a broad exposition of the proposed actions, emphasizing, above all, the promotion of health and the prevention of diseases, in addition to describing the care pathways of the network, providing a comprehensive understanding of the model. It is necessary to detail to users in a clear and didactic way the various procedures that will be performed, a differential which we believe to be beneficial and which has the aim of improving the quality of life and health of the elderly. In the same way, the participation of the elderly person should be encouraged, as it is part of this model of health care.

b) An organized and resolutive health system should include an Electronic Health Record (EHR), which is an electronic repository of information regarding the health of users. Ideally, this repository needs to have the minimum standard of being accessible in any setting of the system and by the patients themselves. The confidentiality and privacy requirements of the personal data of the patients should be considered in the conception and implementation of the EHR, with different levels of access depending on the nature of the information provided, in accordance with federal legislation on the subject. An important differential is the proposal to record the patient's "care pathways through a comprehensive information system that not only records the clinical evolution of the elderly person, but also their participation in individual or collective prevention actions. Likewise, the support of the care support manager and the calls made to or by what we call the "GerontoLine" allows information sharing, enabling a more complete evaluation of the individual, including the medical records of the hospital.An organized and resolutive health system should include an Electronic Health Record (EHR), which is an electronic repository of information regarding the health of users. Ideally, this repository needs to have the minimum standard of being accessible in any setting of the system and by the patients themselves. The confidentiality and privacy requirements of the personal data of the patients should be considered in the conception and implementation of the EHR, with different levels of access depending on the nature of the information provided, in accordance with federal legislation on the subject. An important differential is the proposal to record the patient's "care pathways through a comprehensive information system that not only records the clinical evolution of the elderly person, but also their participation in individual or collective prevention actions. Likewise, the support of the care support manager and the calls made to or by what we call the "GerontoLine" allows information sharing, enabling a more complete evaluation of the individual, including the medical records of the hospital.

c) A functional evaluation is the definition of stratification and the correction allocation of the patient in his or her care pathway, and allows their care behavior to be anticipated.

There are a number of evaluation tools which have been validated and translated into Portuguese that are available for risk screening and the organization of the entry point to the health system. For this first contact, we suggest using Prisma-7. We know that functional autonomy is an important predictor of the health of the elderly, but systematically evaluating the entire elderly population using long and comprehensive scales is not ideal. The two-step approach, which provides a full assessment only for at risk elderly persons, captured by a screening process, is more effective and less burdensome.

Therefore, for this first phase (of rapid screening), we must use an instrument with the following criteria:

- simple and safe;
- short application time and low cost;
- sufficiently precise to detect the risk investigated;
- validated for the population and the condition to be evaluated;
- have acceptable sensitivity and specificity;
- have a clearly defined cutoff point.

The process of the validation and cross-cultural adaptation of the Prisma-7 questionnaire for Brazil showed that the cutoff point for score 4 (four or more positive responses) is ideal. The instrument does not require special material, qualifications or training. The application time is three minutes and sociocultural and educational levels do not influence the understanding of the questions.

Prisma-7 has been used systematically at the entry point of the Canadian health system and the British Geriatrics Society and the Royal College of General Practitioners in England as a screening tool for functional loss and frailty.

After the application of this rapid screening instrument at level 1, the result obtained is input into the information system. The elderly individual will undergo further functional assessments in other care settings. In level 1 only the Prisma-7 will be used. At levels 2 and 3, the patient will be submitted to the other instruments that are part of this functional evaluation. The Katz Scale, which evaluates self-care activities in daily life, and the Lawton Scale for instrumental activities of daily living, are examples of universally adopted instruments. In our proposal, we will use some of the most significant protocols already translated and validated in Brazil.

d) The "GerontoLine" is a differential feature; a call center that serves as a support service for the elderly and their families. Its role is to maintain a direct relationship with users and to meet their needs.

e) The care support manager is a health professional (usually a nurse) who accompanies the elderly person and his/her family from level 2 (Integrated Care Center) onwards. The brief functional evaluation made at the entry point provides a monitoring ground zero and serves as a parameter for monitoring the effects of the treatment plan between the different points in the network. This professional is responsible for the transition of care between services and will annually, or when necessary, reevaluate the functional capacity of the elderly person, encouraging them to participate in the process. The care support manager's role is extremely important for the proposed model and follows the same logic as the navigator, created to guide cancer patients through the care network and to follow protocols in the US healthcare system.

The navigator role is central to this proposal. According to the American Medical Association, this professional is responsible for managing the care of the user through the different levels of complexity of the health system, verifying that prescriptions and guidelines are being met.

f) The patient's physician, the old-style family doctor, provides care in the outpatient clinic located in level 2 of the model, but accompanies the elderly in all the care settings. If the patient is admitted to the hospital, the doctor will not provide treatment in this setting, but as the person in charge and the patient's reference point, he or she will be informed of everything that happens, alongside the nurse, and will maintain contact with the hospital or homecare doctor or physicians from any other care setting. It is vital that every client retains his or her doctor, regardless of the location of the care. The relationship between physician, care support manager and patient should be close.

Although the complete model is composed of 5 levels, it is in the first 3 that the difference is made. For this reason, emphasis is placed on the

first three levels of care. Our focus, therefore, is for a more resolutive and welcoming model, based on integral care and the most current and contemporary scientific knowledge. We do not deny and we do not oppose, nor do we abandon other care settings, but the "newness" of the model is neither in the hospital nor in the shelter.

Tendency for change

The desire for higher quality and more effective elderly care model is not solely a Brazilian concern. The whole world is debating the issue, recognizing the need for change and proposing improvements in their health systems.

The same thing happened among us, when we presented the work carried out at UnATI/UERJ and within the framework of the Idoso Bem Cuidado (Well Cared For Elderly Person) project. The diagrams that summarize these studies summarize perfectly the model we are seeking. There is no single model, but a logic that favors low-intensity care, constant monitoring, an efficient telephone service, a doctor responsible for a portfolio of clients who accompanies them through all the care settings, a nurse who works in partnership with the doctor, teamwork, the use of epidemiological tools to monitor functionality, and a quality electronic medical record. All these elements contrast with the model based around specialist doctors, the disarticulation of professionals, the priority use of the hospital, the high consumption of drugs and the excess of laboratory and image exams[24].

In summary, there are suggestions for models of care pathways. The important thing is for each health institution to be aware of its population, their profile and their needs, to construct the best way of organizing the delivery of its service. One thing is certain: without the organization of elderly care and the elaboration of a care plan, population aging and the increased prevalence of chronic diseases in the public or supplementary health sector in Brazil may no longer be seen as opportunities, but become obstacles to the sustainability of the system.

CONCLUSION

The proposal of this model of integrated care for the elderly is based on the flow of actions of education, health promotion, the prevention of preventable diseases, the postponement of illnesses, early care, and rehabilitation from sickness. In other words, a care pathway for the elderly within an articulated, referenced network, with an information system designed in keeping with this logic.

Transforming the logic of health care in Brazil is both a great challenge and a necessity. And it becomes even more important when discussing the health care of people in situations of greater vulnerability, such as the elderly. This type of change and innovation needs to be built into day to day health services, the training of health professionals, the way the health system is managed and organized for care, and its funding. It is impossible to talk about reorganizing the provision of services without mentioning remuneration models, as one determines the other. We need to address this issue to move towards a higher quality of health care and to be able to adequately compensate different care settings and new ways of producing health – such as the Integrated Care Centers and transitional care settings – indispensable in a scenario with a prevalence of chronic diseases.

We believe that it is possible to grow old with health and with quality of life, provided that all the actors in the sector see themselves as responsible for the necessary changes and allow themselves to innovate through innovation in care, in forms of remuneration and in evaluating the quality of the sector[25].

We must always remember that innovation can often mean recovering the simplest care and values that have been lost within our health system. We have already lost a lot of time; we must now start constructing this new way of caring for the elderly. We can wait no longer.

Expert Comment

Aging: A triumph of our society; now we need to guarantee it occurs with health and quality of life!

Martha Oliveira[1]

Commenting on this important text of Professor Renato Veras is an honor for me. His studies and proposals for a better health system for the elderly in Brazil are fundamental if this achievement of our society – greater life expectancy – is to be enjoyed in full.

The current care model in Brazil favors a low quality of services and inefficiency, remuneration by volume, and a fragmented and disjointed system.

We have an excess of some technologies while other health devices have simply have not developed in Brazil, especially in supplementary health, such as home care and palliative care.

Elderly persons, because of their greater vulnerability and greater use of the health system, are among the most affected by the current care model.

As Don Berwick wrote in Institute for Healthcare Improvement (IHI), "Every health system is perfectly designed to achieve the results it achieves". Our health system has achieved a demographic transition (aging), an epidemiological transition (we now have a triple burden of diseases), a nutritional transition (we have moved from malnutrition to obesity), but we have not been able to make the much needed transition in our health institutions, which remain organized to treat acute, infectious diseases.

Some elements are necessary in a system if it is to change health outcomes, such as evaluation and remuneration based on quality and an information system that can facilitate the care pathway of the patient.

In order to change this model, we need to guide these changes along the axes that are described in Professor Renato's text: functional evaluation, a centralized care doctor, a care support manager, and a multiprofessional team.

The importance of hierarchical levels of care are also highlighted, as these organize the route of care of the elderly individual, according to their care pathway.

The entire model proposes a reorganization of care that has already been shown to be much more effective and cheaper for the health system. It means simply doing what is necessary, in the right way, focusing on the most important element of every process, which is the patient.

Another key point is the participation of the elderly person in the model, using strategies that can help to convince these individuals of the importance of preventive care, such as the rewards that can be offered by health plans.

Finally, the time has come to include the debate over healing and caring in our discussions about professional training and service organization. We need to organize ourselves to take care of people in a health system that has so far focused on curing patients. This will make a great difference at this time of population aging.

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Received: November 28, 2016
Reviewed: December 1, 2016
Accepted: December 6, 2016

http://dx.doi.org/10.1590/1981-22562016019.160023

Suicide and suicide attempts by the elderly in film: related factors as shown in feature films

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Abstract

Objective: to analyze cases of suicide and suicide attempts by elderly persons in feature films. *Method:* a survey of specialized internet cinema portals was carried out. A total of 19 feature films produced between 1950 and 2014 were identified. After the authors watched the films, synopses were written describing the circumstances of the suicide and dialogue that described the profile of the elderly character was transcribed. *Results:* films that described suicide among the elderly were classified as follows: male gender in 13 films (68%), depression with hopelessness in 12 (63%), existence and efficiency of health services, physical illness and absence of familiar support in ten (for each category) (53%), cognitive rigidity in eight (42%), suicidal thinking in seven (37%), dysfunctional assumptions and a self-perception of negativity in six (32%), problem-solving deficits in five (26%) and a lack of social support in five (26%). *Conclusion:* the portrayal of suicide among the elderly in films helps to raise awareness of this subject and prevent it.

Keywords: Suicide. Suicide Attempt. Elderly. Films.

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INTRODUCTION

Suicide is a global public health problem that is currently responsible for more than one million deaths worldwide, and is an especially serious issue among the elderly[1]. According to the World Health Organization, the number of suicides increases steadily over the life span of both men and women, reaching its highest rates among those with a more advanced age[2].

One of the ways of understanding the phenomenon of suicide among the elderly is through its representation in cinematographic art. Cinema optimizes the possibility of seeing, hearing and experiencing something experienced in reality in a protected manner[3]. However, the number of films showing elderly suicidal characters does not correspond to reality[4]. A survey carried out of cinematographic works from 1900 to 2014 showed that most films portray the experience of young people, as this is the preference of the consuming public[4].

The objective of the present study was to analyze the various representations of suicides and suicide attempts among the elderly population in feature films, highlighting the characteristics that could be considered related factors.

METHOD

Brazilian and international titles were surveyed, with all films produced between 1950 and 2014 that portrayed elderly persons with suicidal ideation or that had committed suicide included. The following portals specializing in cinema were accessed in February and March 2015 : www.imdb.com (Internet Movie Data Base), www.nfb.ca (National Film Board of Canada), www.cinema10.com.br, www.adorocinema.com, www.cinemateca.gov.br, www.filmesdecinema.com.br, www.cineplayers.com, www.interfilmes.com, www.cineclick.com.br and www.revistaforum.com.br. The terms "suicide and the elderly" and "suicide and aging" were used, along with their respective equivalents in English and Spanish.

The selected films were watched separately by each of the authors of the study. After screening, synopses were written describing the construction of the suicides of the elderly characters. Whenever possible, quotes from the characters with a suicidal profile were transcribed. The characters were classified according to the following related factors: depression with hopelessness, a negative self-concept, cognitive rigidity and dysfunctional presuppositions, problem solving deficit, physical illness, lack of family and social support, existence and efficiency of health services, and gender.

RESULTS AND DISCUSSION

Table 1 shows the 19 films analyzed in chronological order of production in the period from 1950 to 2014.

There follows a synopsis of each of the films, focusing on the factors related to the suicidal conduct of the elderly persons.

Sunset Boulevard

The film describes the relationship between Joe and Norma, an aging silent movie star who dreams of returning to the cinema screens. Joe realizes that Norma lives in a fantasy world, sustained by her butler, and uses this relationship for financial gain. Egocentric, histrionic and disconnected from reality, Norma suffers from frequent depressive episodes during which she tries to kill herself.

Humberto D

Set in Italy in the 1950s, where retired people protest in the streets seeking an increase in their pensions. Umberto Domenico is one such pensioner, and sells his few possessions to get the rent for the room where he sleeps. To avoid eviction, he tries unsuccessfully to borrow from his friends and begs in the street, eventually abandoning the lodging house with his dog. The character then attempts suicide.

to be continued

Table 1. List of 19 films produced between 1950 and 2014 which dealt with the subject of suicide among elderly individuals. Brasília, Federal District, 2014.

• Sunset Boulevard (USA, 1950) dir. Billy Wilder
• Umberto D (Italy, 1952) dir. Vittorio De Sica
• Harold and Maude (USA, 1971) dir. Hal Ashby
• The Ballad of Narayama (Narayama bushikô, Japan, 1983) dir. Shôhei Imamura
• Right of Way (USA, 1983) dir. George Schaefer
• Antonia's Line (Antonia, Holland, 1995) dir. Marleen Gorris
• Gods and Monsters (USA, 1998) dir. Bill Condon
• Space Cowboys (USA, 2000) dir. Clint Eastwood
• Spring, Summer, Fall, Winter... and Spring (Bom yeoreum gaeul gyeoul geurigo bom, South Korea, 2003) dir. Ki-duk Kim
• The Bridge (UK, 2006) dir. Eric Steel
• Whatever Works (USA, 2009) dir. Woody Allen
• You Don't Know Jack (USA, 2010) dir. Barry Levinson
• Poetry (Shi, South Korea, 2010) dir. Lee-Chong-Dong
• Wrinkles (Arrugas, Spain, 2011) dir. Ignacio Ferreras
• The Suicide Shop (Le magasin des suicides, France, 2012) dir. Patrice Leconte
• Amour (Amour, France, 2012) dir. Michael Haneke
• The Artist and the Model (El artista y la modelo, Spain, 2012) dir. Fernando Trueba
• August: Osage County (USA, 2013) dir. John Wells
• Getulio (Getúlio, Brazil, 2014) dir. João Jardim

Harold and Maude

The film tells the story of the loving relationship between Harold, a depressed 20-year-old, and Maude, a 79-year-old woman who teaches him to love life. They both fall in love and decide to get married. To Harold's surprise, however, Maude had already made the decision to commit suicide when she turned 80, considering herself "an old woman" and carries out her plan.

The Ballad of Narayama

The film portrays a rural region of 19th century Japan, where there is a tradition of taking elderly people, at the age of 70, to the summit of Narayama Mountain where they are left to die. According to the tradition, at the end of their lives, everyone arrives metaphorically on the summit of this mountain and finds their deaths there. The elderly characters accept death as the end of a cycle, not wishing to live an old age with physical limitations and dependence. They also sacrifice themselves to help with the distribution of food, which is insufficient for everyone.

Right of Way

The story of an elderly couple who are happy until the woman is diagnosed with a terminal illness. Even though the husband is healthy, the couple decide to commit joint suicide, apparently fully aware of their situation. They explain the decision to their only daughter: "We've lived our whole life together and have decided that we want to die together." They are approached by a representative of the town who decides to provide them with legal representation. "We just want to be together. Why is that so hard to understand?" says the elderly character. The couple commit suicide.

Antonia's Line

The film tells the story with death as a central theme, as well as the suicide of the character Crooked Finger, a lonely elderly person, who says: "We ourselves invented time…old people stink of the time that has passed." Crooked Finger's speech is loaded with negativity. At one moment, he says: "Disgrace is the rule. Not the exception. I have never been able

to accept the simple concept that everything will improve one day. Nothing will improve. Nothing will be better, or worse, it will only be different." Finally, Crooked Finger hangs himself.

Gods and Monsters

The film tells the story of James Whale, director and creator of the film Frankenstein, when he is old and retired. It describes his stroke and subsequent suffering from a serious neurological condition. James had a poor upbringing and, as an adult, was never able to accept his past. Now, when he is old, his memories trouble him: "I've spent most of my life outrunning the past. Now it's flooding all over me." These memories sadden him, and he decides to commit suicide.

Space Cowboys

Agents are called in to fix a malfunctioning satellite, which can only be repaired by sending a team of elderly workers to carry out the work in space. "Well ... this old man's all you got...I can't fill a space shuttle with geriatrics!" They discover that one of the pilots has incurable cancer. At one point in the mission, someone needs to guide the satellite with his own body, and so will inevitably be lost in space. The sick pilot accepts the mission, in an altruistic suicide.

Spring, Summer, Fall, Winter... and Spring

A portrayal of two unnamed Buddhist monks. The elderly monk, who lives by a lake in the wilderness, receives a child, to whom he teaches respect and discipline. However, when the young monk becomes an adult, he moves to the city where he commits a serious crime and is arrested. The monk now lives alone and, with the passage of time, decides to commit suicide through self-immolation. The suicide of the elderly character appears to be socially and religiously accepted, representing the resumption of a cycle, the beginning of a new life through transformation into an animal (snake). The young monk returns home and lives alone until he takes in a child to raise, just as his predecessor did before him.

The Bridge

A documentary about suicides on the Golden Gate Bridge, San Francisco, USA in 2004. In the opening minutes, a man, who appears to be around 70, stares at the horizon, then jumps into the sea 67 meters below. The coastguard retrieves the body. The documentary is produced through a camera that for one year recorded events from the side of the bridge. Although there are numerous testimonials from relatives, there are no interviews with relatives of the elderly character described

Whatever Works

Boris is a grumpy elderly character who suffers from panic attacks. He is confident in his intellectual capacity and makes frequent pessimistic reflections on humanity. "A bigger part of your existence is luck than you'd like to admit," he says. Near the end, he is disappointed in love with a woman who had loved him as a young man. Boris seems to accept the situation, but hours later, he jumps out the window in a failed suicide attempt. " Everybody's life is still worth saving? (...) They've had to install automatic toilets in public restrooms, because people can't be entrusted to flush a toilet."

You Don't Know Jack

Documentary on the assisted suicide and bibliography of Dr. Jack Kevorkian. Among the patients described is a debilitated elderly person with chronic obstructive pulmonary disease. The patient abandons his self-extermination attempt and then requests to start again. Although several actual cases of suicide are shown in the film, the characteristics of the patients are poorly explored.

Wrinkles

An animation about the elderly Emilio, who lives in a long-term care facility for the elderly (LTCFE). He has difficulty adapting to his new environment, where

he has nothing to do and rarely receives visits from family members. Although his suicide attempt does not succeed, in one of the scenes a depressed Emilio walks fully dressed and alone into the swimming pool of the gymnasium.

The Suicide Shop

The film tells the story of a family that sells things to help people commit suicide. An old woman wants to buy a gun which does not make noise or create a mess, while another old woman wants to buy rope to kill herself. A suicide bomber goes to the store accompanied by an elderly character who explains that he is not suicidal, rejecting the expectation that he is the natural candidate to perform such an act. Other notable lines of the characters include: "What's the point of resisting when life isn't rosy, and when our state of mind is sad? What's the use of fighting against pessimism?"

Amour

Tells the story of the octogenarian couple Georges and Anne. She suffers from a stroke and refuses to be cared for outside her home. The task falls upon her husband, who initially hires a formal caregiver who psychologically abuses the patient. Anne progressively develops vascular dementia. They have a small social network, living partially isolated from society, eventually interacting with their daughter. Georges performs euthanasia on Anne and the story suggests that he then commits suicide.

The Artist and the Model

Marc is an elderly artist who lives in the French countryside, creating drawings, paintings and sculptures. One day, his wife gives shelter to a young refugee, who becomes a model for Marc. The artist begins to feel sexual attraction for the model, a desire which is frustrated when he confesses this fact to his wife. He had no expectations for the future, and so he has made no plans. "Where do you want me to go? I'll die soon enough," he says, adding "When we start to figure things out it's because it's time to go." He says goodbye to the model before committing suicide.

Poetry

The film tells the story of Agnes, a 65-year-old woman diagnosed with Alzheimer's disease, whose life revolves around taking care of her grandson. She is informed that he has participated in the gang rape of a 16-year-old girl, and turns him over to the police. She works as a formal caregiver for a brain-damaged man who tries to seduce her. She participates in a poetry club, but cannot write, stating, "To write a poem, you must have a heart," Progressively, she becomes depressed, cutting herself off and clinging to the memories of the dead girl, unable to find a meaning to live. The film ends with her disappearance, suggestive of suicide: "Now it's time to say goodbye, like the wind that remains and then goes. Exactly like the shadows."

August: Osage County

The film tells the story of an elderly couple. He is an alcoholic and she is undergoing treatment for cancer. They live in the countryside, isolated and removed from their children, until one day he decides to leave his wife and commit suicide. The characteristics of this elderly suicidal character are not explored in depth. However, the family environment in which he is inserted leads one to believe that the act was motivated by the few family ties that surrounded him.

Getúlio

The story of the former Brazilian president who died at the age of 72 after living with pressure from the political enemies and journalists who persecuted him with a series of personal attacks. As a result, opinion turned against him, and he was the subject of hostile demonstrations whenever he appeared in public. His daughter found a draft of a farewell letter and suspected he had suicidal intentions. When she confronted him, however, Getúlio denied this was his intention. He planned his death, recording a posthumous message which read: "I follow my destiny. There is nothing more I can give you except my blood. I was a slave to the Brazilian people, and today I am freeing myself for eternal life. I leave life to enter history."

Cognitive factors and psychiatric disorders

Suicidal individuals often suffer from mental illnesses, whether depressive and/or personality disorders or conditions involving alcohol or other drug abuse[5].

Risk factors for suicide among the elderly involve suffering that crosses social, cultural, psychological, environmental and biological dimensions. Such factors combine with the unique experience of the deceased[6]. It is the negative interpretation of risk factors makes the individual more vulnerable, rather than the simple existence of the same.

The 19 films analyzed highlighted factors related to the suicide of the elderly. They showed: dysfunctional assumptions (n=6; 32%); Cognitive impairment (n=8, 42%), problem solving deficit (n=5, 26%), negative self-concept (n= 6, 32%), previous suicidal ideation (n=7; 37%), depression with hopelessness (n=12; 63%), the male gender (n=13; 68%), existence and efficiency of health services (n=10; 53%), physical illness (n=10; 53%) and lack of family (n=10; 53%) and social support (n=5; 26%).

Focusing on the reasons that lead the elderly to suicidal behavior allows the visualization of the relevance of the existential dynamics and the sufferings that they consider to be unbearable. Thus, the analyzed films visualize scenarios in which these factors combine and overlap with each other. Each of these characteristics is discussed below.

Depression and hopelessness

Depression in the elderly is often associated with suicidal behavior,[6] as those in a depressive state lose their ability to cope with stressors, compared to those who do not present such symptoms[7]. It is the most important element in a significant portion of suicide attempts, arising from the emptiness, discomfort and sense of worthlessness it produces[8].

Hopelessness is a key psychological variable in suicide, being a related factor as well as a predictor[9]. It is an omnipresent theme in Umberto D, in which Umberto does not imagine that his life can improve. In the film Poetry, Agnes sees no reason to live after the arrest of her grandson, just as Georges, in Amour, sees no meaning in life without the company of the wife.

The alcoholic husband of August: Osage County has no hope living in a damaged family environment. Getúlio does not see any possibilities in his presidential career. Maude, from Harold and Maude, glimpses a gloomy future after turning 80 and does not believe that life can be enjoyed in old age. In The Artist and the Model, the elderly character is hopeless, though not unhappy, which also occurs in some of Dr. Jack's patients in You Don't Know Jack. In the latter, all the patients lack a reason to live and do not believe that it is possible to overcome their diseases.

In The Suicide Shop, Carmel and other characters synthesize hopelessness, as for them the present and future worlds do not offer hope, and they see suicide as the only alternative for relieving suffering. In Whatever Works, Boris apparently believes that with the end of his relationship, it is no longer possible to be happy, seemingly also believing that resuming the courtship is impossible. In Right of Way, when the woman receives the diagnosis of terminal illness, the couple opts for suicide in the hope of remaining together in the afterlife.

In Wrinkles, Emilio thinks that he will never leave the LTCFE due to his chronic condition. Some chronic diseases are presented in literature as a risk factor for suicide[9]. The same occurs with James Whale in Gods and Monsters, who suffers depression after a stroke, the physical disease that is most often associated with this condition[10]. In the film Antonia's Line, Therese reads a letter written by Crooked Finger in which his hopelessness is evident. Finally, the association between hopelessness and suicidal desires in psychiatric outpatients is illustrated by Norma Desmond in Sunset Boulevard, and by Boris in Whatever Works, who had previously attempted suicide.

Negative self-concept

The exaggerated importance given to the constant multiplication of economic sources causes the elderly to be seen as an unproductive

population group. In addition, the concern with aesthetics and permanent youth leads them to feel ashamed of themselves, presenting negative self-concept[5]. This is an indicator of suicide risk in adults, independent of hopelessness, although literature does not specifically indicate this risk in the elderly[9].

The negative cinematic accounts of old age, as expressed by Maude in Harold and Maude and Crooked Finger in Antonia's Line, probably denote a negative self-concept. In these cases, they demonstrate shame at being old and sick. Getúlio, in the film of the same name, also suggests negative self-concept, as the rejection that he suffers from the crowds affects him more than simple popular rejection. In Gods and Monsters, Whale blames himself for developing and nurturing a loving feeling for another man. What afflicts him most is that he believes himself to be unfaithful to his deceased former boyfriend, with whom he had been in love. Perceiving oneself as a burden on others or being considered worthless also reflects negative self-concept,[6] being emblematic, in this sense, of the elderly characters in The Ballad of Narayama and Harold and Maude.

Cognitive rigidity and dysfunctional presuppositions

In depression, thinking becomes more rigid and distorted, judgments become absolute, and the individual's basic beliefs about the self, the real world, and the future become negatively restricted. Logical errors negatively distort perceptions and inferences, contributing and leading to false conclusions[11]. In The Artist and the Model, the elderly character suffers from cognitive rigidity, as he is unable to evaluate something as average, but only as very good or terrible, with this rigidity being a factor related to suicide[11]. Boris, in Whatever Works, is also rigid, reacting catastrophically at the end of the courtship.

As depression is controlled, in most cases, so cognitive flexibility is regained and negative thoughts are diminished. For others, however, negative assumptions persist and favor the increasing severity of depression and, in some cases, the possibility of suicide. This seems to have been Norma Desmond's experience in Sunset Boulevard. Apparently suffering from a personality disorder, in situations in which she was distressed due to the loss of affective objects, she sees no alternative to the discomfort she experienced, other than suicide, which she achieves by cutting her wrists. There is a similar situation in Right of Way, in which the old woman does not show sadness, and may be exhibiting a profile of depression. Georges, the elderly husband in Amour, in turn, could be hiding symptoms of depression or, also, be selfless in his suicide so that his wife can have him by her side.

Dysfunctional presuppositions predispose suicidal ideation,[12] as illustrated in The Ballad of Narayama, in which the characters believe that the final journey in life should be made by road to where God will be found at the end, i.e. at the summit of Narayama Mountain.

Problem Solving Deficit

There is a relationship between poor problem-solving skills and suicide[11]. In Brazil, a study with 20 elderly people who attempted suicide and began to overcome the impulse to take their own lives, identified coping strategies based on five nuclei: religiosity and religious practices; social and family support; support of health services; contact with pets (as observed in Umberto D) and resumption of the autonomy to manage one's life[13].

Among the strategies for coping with crisis situations, there is a positive association with the religious dimension[14]. Religiosity exercises a function of protection, and comfort and offers answers to the adversities of life, as well as creating possibilities of interaction with others, when shared at community events. Support from religion, or a relationship with God, regardless of association with religious practices, is mentioned as fundamental to overcoming suicidal thoughts[13]. Religious institutions are also environments where new relationships and the learning of new activities arise, encouraging occupancy of time and the departure from places that represent suffering and, thus, enabling the reassuming of the capacity to make decisions, allowing focus to be shifted from the zone of discomfort and discontent represented by their problems, to new life projects[15].

Suicides have difficulties in producing new ideas, identifying solutions and generating alternatives, and are less likely to engage when required[11]. The

elderly artist character in The Artist and the Model has difficulty establishing relationships with his neighbors. When children approach, he frightens them with his carbine so they run away and do not come back. In Amour, when Georges kills his wife, he opts for a solution that allowed him to evade contact with her suffering. In Whatever Works, Boris is used to reacting explosively when put in an unpleasant situation. He does not attempt to persuade his ex-girlfriend to resume dating and then attempts suicide.

Physical illness

APhysical illness is a risk factor for suicide among the elderly[6]. Functional deterioration and type of disease (mainly cardiac and joint disease) are independent predictors for depression among this group[16]. What most affects them is the loss of autonomy and intimacy which, together with the desire for a greater number of daily activities, emerges as an insistent demand of elderly people at risk of suicide[5]. Association with the abusive use of alcohol and other drugs increases the risk of suicide[8].

The cure or treatment of diseases, so improving quality of life is important for the elderly to regain the desire to live and overcome suicidal ideation. Improved health helps them to think about new life plans, which is fundamental for maintaining good self-esteem[13].

This theme appeared in several the films analyzed, such as Right of Way, Space Cowboys, Gods and Monsters, You Don't Know Jack, Wrinkles, The Suicide Shop, Amour, Poetry and August: Osage County. As the majority of diseases are degenerative, they can also be accompanied by hopelessness.

Family and social support

Family support is embodied in the protection offered to the elderly by family members who demonstrate understanding, empathy and stimulate positive experiences[17]. By social support, we mean attitudes and actions of emotional, instrumental and material support, offered by institutions and professionals from the social and health areas, or by people in the community, to keep the elderly person independent and active. However, the quality of such relationships seems to be more important than the quantity[17]. Literature establishes a connection between the family and social context and suicide, as well as the impact of the same on families and the social circle[18-20].

Globally, suicide is a more serious issue in low- and middle-income countries, with 75% such deaths occurring in these areas[21]. In older people, the restrictions imposed by their financial situations are even more severe, as they usually overlap with other types of problems, such as deprivation of living space, abandonment, either conscious or due to a lack of conditions to care for them on the part of relatives, dependency, difficulties due to illness or problems of age and the loss of their property,[22] as in the case of the character of Umberto D.

The prevention of suicide among the elderly is linked to the enrichment of social networks, increased support and intervention against family dysfunction, and help to deal with the challenges of life in old age[2]. Social disconnection has potentially negative effects on the mental health of the elderly, fueling a desire to detach themselves from society and to consider suicide[23].

Lack of family support

The independence of elderly persons to make decisions about daily living, their assets and life itself is often restricted by the decisions of family members. This coercion is part of the circumstances that can be, for some, a trigger for the desire to die[24].

The impact of intergenerational violence is often associated with suicidal ideation and acts[8]. Interviews with 63 elderly persons in 14 locations in Brazil showed that, in order of relevance, the influences of family problems and conflicts on suicidal ideations and attempts were: significant family losses, family and intergenerational conflicts, and explicit and concealed violence[22].

A family history of suicides is strongly associated with the risk of self-inflicted deaths among the elderly[1]. The suicide of a relative brings, especially

for the elderly, feelings ranging from sadness to desperation at not being able to do something about the death[20].

In August: Osage County, the weak links between the suicide victim and the family and repetitive conflict appear linked to the suicide, just as the family violence is linked to the alcoholism of the couple. In the film Wrinkles, institutionalization, solitude and isolation are evident, with a scarcity of visits and a lack of attention from relatives. Residency in a LTCFE can lead to distancing from relatives, at a time in life when frailty is greater, and family visits decrease as the time of institutionalization increases. In these cases, affective ties are undone, increasing isolation, abandonment, emptiness and loss of the meaning of life[8,25,26].

Cohabitation with pets is considered a relevant alternative interaction, especially when the elderly person lives with an animal as though it were a member of the family. The individual-animal relationship is perhaps more intense and profound in old age than in any other life cycle,[27] and thus the affective attachment of the elderly person with suicidal behavior towards a pet facilitates the overcoming of death wishes[13]. Faced with family distancing and loneliness, attachment to pets, as in Umberto D, stands out as a resumption of functional capacity – caring, not only being careful, feeling useful and loved, as well as filling the time.

Lack of social support

A lack of social support is a risk factor for suicide[5]. Social support deals with subjects ranging from forms of welcoming old people to institutional care. Relationships of friendship are significant elements in situations of risk for suicide attempts, highlighting the importance of extra-family social ties in everyday life28. Although many older people feel excluded and misunderstood by family members, they may find among their friends the welcome they need to continue their lives and carry out their plans. Hence, cultivating these relationships is a protective factor against ideation, attempts, and effectuation of self-inflicted death1. The relationships of friendship and companionship were also highlighted by the elderly persons living in LTCFE, where they create new emotional bonds that give them emotional support, particularly in the absence of relatives.

In Poetry, the protagonist raises her grandson without help from anyone, while in the movie Amour, the elderly character takes care of his wife alone. In Umberto D, Umberto does not have enough money to support himself and has no one to turn to. In Wrinkles, the elderly character is institutionalized and develops new friendships in the home.

Existence and efficiency of health services

Studies have indicated a relationship between a precarious or non-existent mental health care network and a higher incidence of suicide among the elderly[29]. In another study, the elderly described how they are received in health services as important, particularly in Centros de Atenção Psicossocial (Psychosocial Care Centers) (CAPS), identified as appropriate spaces for the provision of integral care for people with psychic suffering and a death wish[13].

The provision of care is not mentioned in The Ballad of Narayama, Umberto D, The Artist and the Model and Spring, Summer, Fall, Winter... and Spring. In Poetry, when providing the diagnosis of Alzheimer's disease, the doctor neither expresses interest in the repercussion of the news, nor mentions the potential follow-up treatment by health professionals to the patient.

Gender

The question of gender is the most significant distinguishing factor among suicide cases in terms of severity, the methods used, and the associated factors[8].

A Brazilian study showed that most suicidal elderly women had suffered violence in each of their life cycles (childhood, youth, adulthood and old age), committing suicide after rigidly fulfilling the gender role imposed by the patriarchal society[29]. The following gender inequalities were found: beginning in childhood, with education differentiated by gender; continuing through youth, in sexual initiation, marriage and maternity; through adulthood, with violence perpetrated by an intimate partner and/or other family members; and culminating in old age when deprived of autonomy, with the loss of ties, assets and references[29].

Of the 19 films analyzed, seven patients were female, while 14 were male. Thus, cinema seems to mirror the prevalence of the male gender in cases of elderly suicidal characters.

CONCLUSION

Considering the vulnerability of the elderly population to death by suicide, it is important to gain a better understanding of suicide attempts and ideations, as well as thoughts and behaviors related to such attempts and ideation. The cinematographic treatment of the subject represents a useful contribution, providing comprehensive images of the antecedents of the suicide, thus indicating effective and efficient methods of detection and prevention of deaths that are avoidable.

In Brazil, there are no public policies aimed at the elderly that dialogue with the phenomenon of suicide, which hinders access to adequate health care for those with such a need. The lack of these policies intensifies the problems of the elderly, especially those who do not have a healthy family life and who have few options in coping with and solving conflicts. With the discussion of the theme through cinema, one obtains knowledge of the characteristics of suicide and suicide attempts, enabling the implementation of strategies of prevention, detection and intervention in primary health care aimed at elderly persons with ideas of suicide or a history of suicide attempts, to reduce the chance of them becoming suicidal.

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Received: March 7, 2016
Reviewed: September 26, 2016
Accepted: October 25, 2016

http://dx.doi.org/10.1590/1981-22562016019.160031

Oral health conditions and activities of daily living in an elderly population in Brazil

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Abstract

Objective: To analyze the relationship between the oral health status and functional capacity in performing basic activities of daily living of a population of elderly persons. *Method:* A cross-sectional population-based study with 441 individuals aged 60 years or over both genders was performed in the municipality of Macaíba, Rio Grande do Norte. From intraoral epidemiological examination, the degree of caries attacks (CPO-D index), periodontal condition (CPI and PIP indexes), the use and need for dental prosthesis and the presence of oral lesions were evaluated. Independence in Activities of Daily Living was used to evaluate functional capacity. Socioeconomic and demographic characteristics were surveyed using a structured questionnaire. *Results:* Oral health variables were subjected to factor analysis, which resulted in four indicators. There was no association between these indicators and the functional capacity of the elderly. Gender, age, presence of caregiver, dominant area of residence, time of last visit to the dentist, type of care sought during such visit and self-perception regarding prosthesis replacement were significantly associated with oral health indicators. *Conclusion:* Given the non-identification of the effect of functional capacity on the oral health of the elderly, the time of measurement of the events investigated should be considered. It is suggested that dependency among the elderly occurs at different times from when the consequences of oral problems are observed, considering the cumulative effects of a previous history of invasive dental care.

Keywords: Oral Health. Elderly. Disabled Persons.

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INTRODUCTION

Population aging is one of the greatest challenges facing contemporary public health. Functional incapacity, characterized by restrictions in the performance of normal activities[1], is one of the most serious problems resulting from this chronological process. The oral health of elderly persons, in turn, is widely recognized as precarious due to the cumulative effects of oral diseases, in addition to the prevalence of an invasive model of dental care. This area merits further research, in particular through population-based epidemiological studies, as tooth loss, the main issue affecting the oral health of elderly persons, often results in the development of significant incapacities that are not always perceived as relevant functional problems[2,3].

Analysis of the dimensions of the functional capacity and oral health of elderly persons, with the aim of identifying the possible effects of different levels of dependence on the oral health status of these individuals and facilitating the diagnosis of these populations with a view to strategic planning based on specific public policies, is also important in order to identify associations, the consequences of which can be detrimental to the state of general health and to the quality of life of individuals[4-7].

Few Brazilians studies have been dedicated to the investigation of such associations. In addition, none of the relevant studies employ a methodology that confers population representativeness. One study carried out in the city of São Paulo aimed to estimate the prevalence of oral problems among elderly persons, identifying that frailer individuals were more in need of dental prostheses[8]. Another example was a study carried out with elderly persons living in small geriatric care facilities in Porto Alegre, in the state of Rio Grande do Sul, which identified a lower average number of teeth with biofilm among independent individuals than among those who were moderately or totally dependent[9].

The present study proposed to analyze the relationship between the oral health status of an elderly population and the level of dependence of these individuals, based on their ability to perform basic activities of daily living. The study aimed to evaluate the hypothesis that loss of functional capacity in the performance of basic activities of daily living is associated with an inferior oral health profile among elderly persons.

METHOD

Population, sample and ethical conditions

A cross-sectional study was carried out with a representative sample of the elderly population of Macaíba, a municipality located in the north east of Brazil, 21 km from Natal, in the state of Rio Grande do Norte. The total population of this municipality in 2010 was 69,467 inhabitants, of whom 6,620 were aged 60 years or over[10].

The calculation of the sample size of the study was based on the prevalence of edentulism among elderly persons in Brazil, according to a national survey on oral health carried out in 2003 (60.8%)[11], as well as the size of the elderly population of the municipality in 2000. Edentulism was chosen as a prevalence parameter as it represents the most common oral health problem among elderly persons. A 10% error margin, 95% confidence level, design effect of 1.5 and 20% non-response rate were applied. Calculation of the sample was concluded with finite population correction, resulting in an estimated sample of 428 individuals. However, 466 individuals were identified as eligible for the study, of which 441 were elderly. This discrepancy was due to the use of the year 2000 in the sample calculation as a reference for the size of the elderly population of the municipality, in addition to census sector data from the year 2007. Individuals of both genders aged 60 years or over were eligible to participate in the study.

The protocol of the study was approved by the Research Ethics Committee of the Universidade Federal do Rio Grande do Norte (the Federal University of Rio Grande do Norte) under expert opinion no. 340/2009-CEP/UFRN. Prior to data collection, participants, along with their caregivers, received instructions for the survey and signed a Free and Informed Consent Form (FICT).

Sampling Procedures

A probabilistic base is a fundamental condition for the representativeness of a sample study[12]. For the enrollment of individuals in the present study,

the technique of probabilistic cluster sampling was applied, with two stages of random draws, the first corresponding to the census sectors and the second to households.

For the first draw, it was determined that there would be 30 sectors, as this was considered an ideal number of points from which a good dispersion of data can be achieved[13]. In addition, two other supplementary sectors were drawn in case of any operational impediment.

The second stage of the draw corresponded to households and was carried out in loco at the time of data collection. For this purpose, a fraction of the sample corresponding to the range of households to be visited by the researchers was calculated. This calculation resulted in a fraction approximately equal to 7.

Data collections

Data was collected between March 2010 and March 2011, by means of interviews and intraoral epidemiological examinations. Individuals who participated in the study were those who were at home at the time of data collection, or on one of up to three subsequent visits by the researcher.

The clinical record form was based on the model used in the most recent survey of the oral health status of the Brazilian population[12]. In the oral exams, previously sterilized oral mirrors and periodontal probes recommended by the World Health Organization (WHO) were used. In these examinations, the caries attack rate was evaluated using the DMFT index (number of decayed, missing and filled permanent teeth) while periodontal condition was assessed using the community periodontal index (CPI) and periodontal attachment loss index (PALI). The use and need for dental prosthesis and the presence of soft tissue alterations were also verified.

Interviews were carried out and a questionnaire applied concerning socioeconomic and demographic variables related to general health, self-care and access to oral health services. The evaluation of functional capacity was based on the Katz Index of Independence in Activities of Daily Living (Katz Scale), which classifies an individual as independent or dependent in the performance of six functions: feeding, bathing, dressing, transferring, toileting and continence[14].

In order to ensure the reliability and reproducibility of the data, the four examiners participating in the study were trained and calibrated. This procedure consisted of discussions regarding the data collection instruments and addressed theoretical aspects regarding the variables, codes and criteria of the indices used in oral exams. In addition, the examiners were calibrated for the oral examinations. The Kappa coefficient values of between 0.61 to 1.00 obtained were considered acceptable in literature, and therefore indicative of the good reproducibility of the data[12].

Statistical analysis

A descriptive analysis of the variables was carried out to characterize the sample, according to the dimensions investigated and oral health status. The oral health variables were submitted to factor analysis, identifying common factors, in order to synthesize the relations observed between them[15]. These factors, in turn, were dichotomized by the median value of the factorial loads.

Some independent variables were dichotomized by median values (age, education, medication expenditure, diseases reported, family income and household density) while data distribution was considered for dichotomization of the variables with more than two categories. Finally, the functional capacity variable, originally consisting of eight categories, was dichotomized between individuals totally independent in the performance of activities of daily living and those dependent in the performance at least one of the activities.

Associations between the dependent and independent variables were verified using the chi-squared and Fisher's exact tests, with a significance level of 5%. Simultaneous logistic regression was used to identify the associations of the independent variables with the study outcome. In the final

model, all the variables with a p value below 0.2 in the bivariate associations were included. It should be noted that the sample was considered to be complex in nature due to use of the probabilistic sampling method (by clusters), which is recognized as a complex sampling design[16]. Finally, in order to test the consistency of the results obtained from the statistical analysis carried out prior to the sample treatment, as well as the population representativeness of these results, new descriptive and bivariate analyzes were carried out for the set of variables used in the study.

RESULTS

A total of 441 elderly persons were registered for participation out of 466 individuals eligible for the study. Some characteristics from the investigated sample are presented in Table 1. None of the individuals had more than two full years of study, while for marital status, individuals with stable partners, whether married or unmarried, predominated, (57.4%). The percentage of widowed individuals (32.4%) was also noteworthy. There was also a greater prevalence of individuals who shared their household with a spouse plus other relatives (42.6%), or only other relatives (35.1%). These individuals generally remained in the company of the elderly individuals, occupying the role of family caregiver or financial provider (Table 1).

A caregiver was considered present in cases where an individual characterized as caregiver and/or responsible person and/or daily care provider for the elderly person was present, whether or not this individual was paid. For this variable, elderly persons who did not have caregivers or who did not report the need for daily care predominated (86.4%). Regarding the area of residence of the elderly individuals, the great majority reported residing in urban areas in the countryside of the state for most of their lives (51.7%).

Table 1. Sociodemographic characteristics, health status and oral health of study participants (n=441). Natal, Rio Grande do Norte, 2011.

Sociodemographic characteristics	Mean (sd)
Age	71.7 (±8.76)
Education	2.17 (±2.74)
Family income (minimum salaries)	2.00 (±1.19)
Household crowding	0.65 (±0.37)
Socioeconomic and demographic characteristics	(%)
Female	68.3
Single	4.8
Married	57.4
Widowed	32.4
Separated	5.4
Live alone	6.6
Live with spouse	15.6
Live with spouse and other relatives	42.6
Live with other relatives	35.1
Receive retirement pension	77.1
Live in own house	83.4
Health status	Average (sd)
Self-reported illnesses	1.5 (±1.2)
Health status	(%)
Dependency in at least one ADL	10.4
Regular use of medication	72.8
Recent fall	11.8
Bone fracture post 60 years of age	9.5
Current smoker	21.3
Former smoker	49.3
Current alcohol dependency	7.0
Former alcohol dependency	24.4
Oral health variables	Average (sd)
Average DMFT	28.1 (±5.77)
Oral health variables	(%)
Edentulism	50.8
Positive self-perceived need for prosthesis replacement	26.5
Use of public dental service for last visit	63.9
Coverage through the Family Health Strategy	82.5

sd: standard deviation of mean; ADL: Activities of daily living; DMFT: Number of decayed, missing and filled teeth.

Regarding the socioeconomic condition variables, most individuals received a retirement pension, with the majority receiving the minimum amount (U$315.02), which to a certain extent accounts for the low average family income of twice the minimum salary (U$630.05) since, in most cases, the elderly person was the only provider of support for the family. Most of the individuals resided in their own home (83.4%) and were not included in government aid programs (90.0%). Among those who did receive such aid, the most common program was Bolsa Família (Family Welfare) (70.5%). As regards household crowding, measured by the number of people per room, there was an average of slightly more than 0.6 people/room in the households of the individuals interviewed.

Finally, the most reported form of medication acquisition was the receipt of free products at health units or centers in the municipality. The general health status of the individuals was analyzed using certain variables related to systemic conditions, as well as habits of smoking and alcohol dependency. The average number of diseases for which each individual took daily medication was 1.2 (±1.1) on average. The regular consumption of medicines among the studied population was notable, with the majority of individuals reporting regular use. Antihypertensive (57.2%) and antidiabetic (16,3%) were the most common forms of medication.

It was observed that, in the majority of cases, individuals had not suffered a fall in the four weeks prior to the time of the investigation, nor had they suffered a bone fracture after the age of 60. The majority of individuals were also found not to have current or previous habits of smoking or alcohol dependency. However, the high percentage of the elderly individuals who had formerly used tobacco is worth noting. Regarding functional capacity, among the individuals who were dependent in at least one function, the most prevalent were those who needed assistance in the performance of five functions (30.4%), or in other words, individuals close to becoming dependent in all activities of daily living.

Regarding oral health characteristics, the last visit of individuals to the dentist was over two years before in the majority of cases (62.4%), with the public dental service being most utilized (63.9%). The average DMFT value of the investigated sample revealed that the majority of individuals had missing teeth (94.3%). Total loss of teeth was observed in more than half of the studied sample and functional edentulism (absence of up to 20 teeth - functional dentition) was encountered in 92.7% of individuals. Root caries, a common condition among the elderly population, were present in 28.1% of the study participants.

The periodontal condition of the elderly persons was evaluated by the observation of gingival bleeding, dental calculus and periodontal pockets, which were present in 66.3%, 77.9% and 19.3% of the individuals studied, respectively. Regarding the use and need for a prosthesis, it was observed that 46.7% of the individuals used an upper prosthesis, whereas only 27.8% used a lower prosthesis. The need for such prostheses was, however, observed in 80% of the individuals for the upper arch and in 86.4% for the lower arch.

Prior to the tests of association, factor analysis was employed to reduce the number of dependent variables used in the study. Using the principal components analysis method, four representative factors were chosen to represent the oral health status of the studied population. One of the justifications for using this number was the fact that together the chosen factors accounted for 77.41% of total variance for the variables included in the analysis model. The dependent variables of this study were therefore composed of these four factors. Figure 1 presents the results of factor analysis with the percentage of variance displayed for each factor, as well as for each set of variables, grouped according to their correlations.

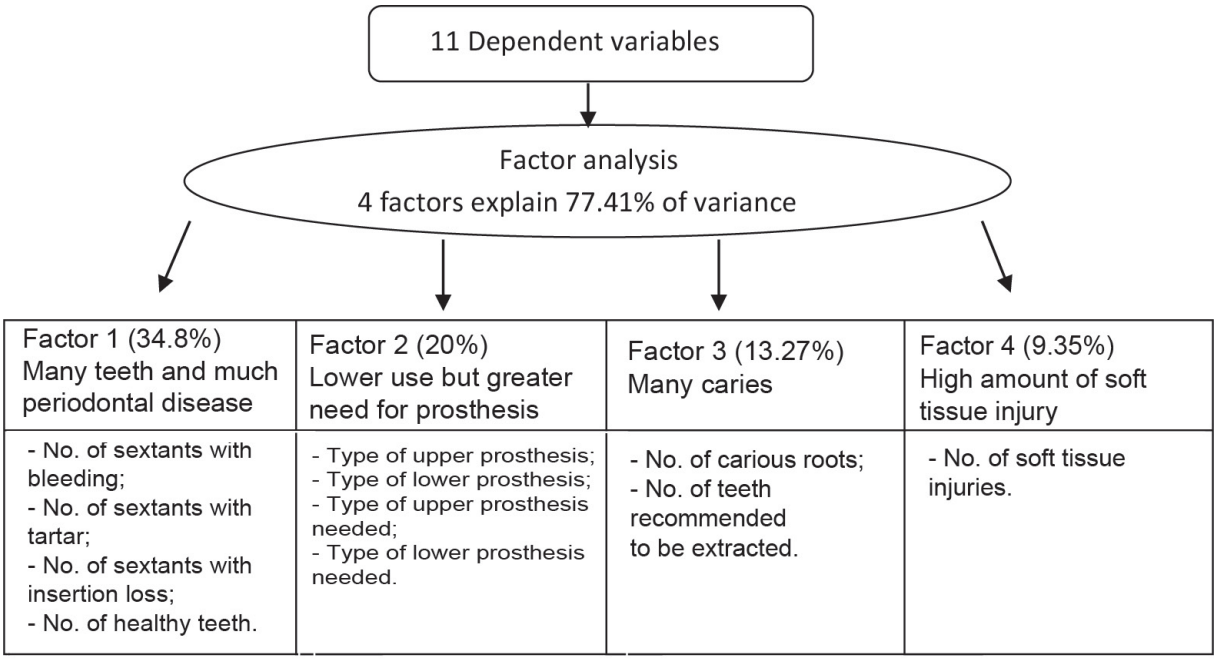

Figure 1. Results of the factor analysis process in the study of oral health conditions and functional capacity in a population of elderly persons. Natal, Rio Grande do Norte, 2011.

Bivariate analysis exhibited a significant association between the functional capacity of the elderly persons and the factorial variables of oral health related to the presence of caries (factor 3) and to the use or need for a prosthesis (factor 2). There was a lower incidence of dental caries among the majority of individuals who were dependent in at least one activity of daily living, while these individuals also presented a greater need for and less use of dental prostheses. The lower presence of dental caries in dependent individuals is most likely a result of their higher levels of tooth loss.

These associations, however, lost their statistical significance when adjustment was made for some confounding variables, combined in different models for each indicator. Some of the independent variables, on the other hand, did maintain their association with the factorial variables, for example: gender, age, presence of caregiver, main area of residence, time since last visit to dentist, type of service sought at said visit and self-perception regarding prosthesis replacement. The results of the association tests are presented in Table 2.

Table 2. Association between variables and the presence of conditions represented by factorial variables of oral health among the elderly population of Macaíba, northeastern Brazil. Natal, Rio Grande do Norte, 2011.

Variables	n	Teeth and periodontal disease		n	Need for dental prosthesis		n	Teeth and caries		n	Oral injuries	
		Gross OR (95% CI)	Adjusted†		Gross OR (95% CI)	Adjusted†		Gross OR (95% CI)	Adjusted†		Gross OR (95% CI)	Adjusted†
Female (reference: male)	121	2.36 (1.57–3.57)*	2.53 (1.56-4.09)*	141	1.55 (1.03–2.33)*	1.56 (0.98–2.48)	117	1.44 (0.99–2.22)	1.74 (0.91 – 3.31)	–	–	–
>70 years of age (reference: ≤70 years)	89	1.39 (0.95– 2.03)	1.15 (0.75–1.77)	126	0.46 (0.31–0.68)*	0.55 (0.35–0.87)*	–	–	–	83	1.65 (1.13–2,41)*	1.18 (0.63–2.21)
>1 full year of study (reference ≤1 year)	–	–	–	91	1.59 (1.09–2.32)*	1.04 (0.67–1.61)	–	–	–	102	0.78 (0.53–1.13)	1.28 (0.72–2.29)
Presence of spouse (reference: absence)	128	0.70 (0.48–1.03)	1.00 (0.64–1.55)	–	–	–	–	–	–	–	–	–
State capital as main residence (reference: interior)	34	0.63 (0.36–1.10)	0.84 (0.45–1.56)	–	–	–	–	–	–	–	–	–
Urban zone as main residence (reference: rural zone)	116	0.72 (0.49–1.04)	0.71 (0.46–1.11)	95	2.06 (1,41–3.02)*	1.82 (1.19–2.79)*	106	0.67 (0.46-0,99)*	0.79 (0.45–1.38)	–	–	–
Receives retirement pension (reference: does not receive)	–	–	–	180	0.63 (0.40–0.99)*	1.10 (0.65–1.86)	–	–	–	151	1.38 (0.88–2.15)	0.86 (0.45–1.64)
Presence of caregiver (reference: absence)	18	2.29 (1.27–4.13)*	1.92 (0.98–3.76)	42	0.38 (0.21–0.69)*	0.46 (0.23–0.91)*	20	1.52 (0.86–2.71)	1.90 (0.71–5.10)	23	1.45 (0.83–2.54)	1.41 (0.54–3.65)
≤0.6 persons/room in residence (reference: >0.6)	–	–	–	114	1.61 (1.10–2.36)*	1.29 (0.85–1.97)	99	1.29 (0.88–1.89)	1.12 (0.64–1.96)	128	0.65 (0.44–0.95)*	0.59 (0.33–1.06)
Resident in own house (reference: not resident in own house)	–	–	–	–	–	–	147	1.63 (0.98–2.70)	1.46 (0.68–3.12)	165	1.41 (0.85–2.33)	1.41 (0.62–3.21)
Independence in ADL (reference: dependency in at least 1 ADL)	191	0.57 (0.30–1.07)	0.83 (0.39–1.76)	190	2.46 (1.27–4.76)*	1.37 (0.63–2.97)	172	0.51 (0.26-1.00)*	0.34 (0,09–1,27)	–	–	–
Presence of ≤1 disease (reference: >1 disease)	–	–	–	–	–	–	110	0.76 (0.51 - 1,11)	0.68 (0.37 – 1.24)	105	1.36 (0.93–1.98)	1.03 (0.59–1.79)

Continued from Table 2

Variables	n	Teeth and periodontal disease		n	Need for dental prosthesis		n	Teeth and caries		n	Oral injuries	
		Gross	Adjusted†		Gross	Adjusted†		Gross	Adjusted†		Gross	Adjusted†
		OR (95% CI)			OR (95% CI)			OR (95% CI)			OR (95% CI)	
No regular use of medication (reference: regular use)	–	–	–	–	–	–	58	0.70 (0.45-1.06)	0.95 (0.47–1.93)	–	–	–
Not a current smoker (reference: smoker)	157	1.37 (0.87–2.17)	1.20 (0.72–2.01)									
No current alcohol dependence (reference: current alcohol dependence)	188	1.87 (0.88–3.95)	1.10 (0.48–2.53)	–	–	–	–	–	–	–	–	–
No self-perceived need for prosthesis replacement (reference: self-perceived need)	–	–	–	–	–	–	71	0.33 (0.19-0,56)*	0.30 (0.17-0.53)*	64	3.39 (2.27-6.83)*	3.99 (2.23–7.12)*
Last visit to dentist ≤2 years ago (reference: >2 years)	85	0.56 (0.37–0.83)*	0.61 (0.39–0.95)*	58	2.08 (1.39–3.11)*	2.06 (1.32–3.23)*	–	–	–	–	–	–
Private service at last visit (reference: public)	58	1.70 (1.13–2.56)*	1.67 (1.07–2.59)*	64	1.60 (1.07–2.40)*	1.83 (1.17–2.87)*				78	0.73 (0.49–1.08)	0.78 (0.43–1.41)
Covered by FHS (reference: absence of coverage)	–	–	–	–	–	–	144	1.74 (1.06-2.85)*	1.29 (0.63–2.64)	–	–	–

* p value <0.05; † Adjusted for the covariates that presented p values <0.02 in chi-square test; OR: Odds Ratio; ADL: Activities of daily living; FHS: Family Health Strategy.

DISCUSSION

The results of the present study revealed there was no association between dental health status and functional capacity (increasingly important for the prognosis of the health status of the geriatric population[17]). This finding may be due to the fact that the condition of dependency among elderly individuals occurs at a different time of life from that at which oral problems are observed, with such issues representing the cumulative effects of a previous history of care deficiencies and invasive dentistry in these individuals.

The results of the present study are representative in terms of population due to the sampling procedures used as well the procedures and parameters employed in the calculation of the sample size. In addition, the results were corroborated when the sample was treated as complex, with compatible estimated mean and percentage values obtained. This treatment was performed due to the fact that a complex sample design, cluster sampling, was used in the study. It involved the assignment of individual weight values, representing the probability of each individual forming part of the study sample, considering their relevance to certain clusters (residence and census sector). Acceptable design effect values were also observed for the number of clusters considered in the sampling method, thus confirming the representativeness of the data for the population in question.

The first indicator of oral health, interpreted as "many teeth and much periodontal disease", was associated with gender, with a higher prevalence of males in this category. This association suggests elderly men neglect their oral health more than elderly women, who are generally more careful with their overall health. One study that analyzed the association between sociodemographic factors and the use of dental services among elderly Brazilians identified such negligence by men, finding an association between being male and never having visited a dentist[18].

Time since last visit to the dentist was also associated with the first indicator, with a higher incidence of individuals whose last visit was more than two years ago in the many teeth and much periodontal disease category. This association demonstrates the importance of regular visits to the dentist for elderly persons, with a view not only to keeping their teeth, but also to maintaining healthy conditions. In this perspective, data from the national oral health survey conducted in 2002-2003 and presented in 2008 revealed a greater procuring of dental care among individuals with teeth remaining than among those who had no teeth[19].

Finally, type of care sought on last visit to dentist was also associated with the first indicator, with a higher prevalence of periodontal disease among elderly persons who used a public service than those who sought out private care. This association is linked to the cumulative effects of the historical unreliability of the public model of dental care, based on iatrogenic-invasive, biologic, technical-centered and generally ineffective practices used with the general population and predominant in Brazil until the 1980s[20].

The second indicator of oral health provided by the factor analysis referred to the lower use and greater need for dental prosthesis. This indicator was associated with age, with more use and less need for a prosthesis among those elderly individuals aged up to 70 years. This suggests that there is a greater concern on the part of younger elderly persons regarding prosthetic rehabilitation, with a view to maintaining the functions that are lost when teeth are lost. On the other hand, older individuals tend to focus their concerns on other, more comprehensive and disabling health problems that give rise to greater debilities.

In this sense, Roncalli in 2006[21] emphasized that among elderly individuals the presence of teeth may constitute an additional self-care difficulty, especially for those with functional limitations, and that the replacement of teeth with artificial teeth is not a cause for major concerns. Considering the practice of invasive dental treatment to which the elderly have been submitted, many of these individuals view tooth loss and edentulism as a normal and unavoidable stage of the evolution of their oral condition[21,22,23].

There was also an association between the main area of residence category and the lower use and greater need for a dental prosthesis variable, with individuals who resided predominantly in rural areas showing a greater need for and lower use of prostheses. The cause of this association is most likely related to access to dental services, particularly the specialized services for dental prosthesis production that, despite being made available in Brazil through the Unified Health System as part of the National Oral Health Policy of 2006, are concentrated in urban centers, often making access difficult for rural residents[24].

Presence of a caregiver was also associated with the second indicator of oral health, with greater use and a lower need for a prosthesis presented by individuals who did not have such care support. The presence of a caregiver is generally associated with more dependent individuals, enabling this variable to serve as a proxy for functional capacity. With this in mind, the use of a prosthetic device could represent another aspect of the care needs of an individual as the prosthesis may require daily maintenance and hygiene skills on behalf of the user. Saliba et al in 2007[25] and Simões and Carvalho in 2011[26] indicated that the oral condition of elderly persons influences the type of care they are provided with and considered it important that caregivers are motivated to give proper attention to oral health.

Regarding the type of care sought on last visit to the dentist, individuals from the category of lower use and greater need for dental prosthesis were those most likely to have opted for a public service. This tendency is another that can be attributed to the unreliable dental care model, which in the public sector was characterized by public policies that excluded adult and elderly patients and ignored rehabilitative treatment[21]. The indicator of use of and need for prosthesis was also associated with time since last visit to the dentist, indicating that the majority of individuals whose last visit occurred more than two years ago used prostheses less and needed them more. This association demonstrates a relationship between self-care and oral health, with individuals who seek dental services more likely to have better oral health[18], represented in this case by the timely replacement of lost teeth.

The oral health indicator related to the presence of caries was associated with self-perception regarding the need for the replacement of dental prosthesis, with a lower prevalence of caries among the majority of individuals who considered it necessary to replace their prosthesis. The probable cause of this is the precariousness of the oral health situation of the elderly persons, with individuals who thought prosthetic replacement unnecessary having more remaining teeth, and therefore more likely to be affected by an oral ailment such as caries or periodontal disease.

The above-mentioned variable (self-perception of the necessity of dental prosthesis replacement) was also associated with the presence of the soft tissue alterations indicator, with the majority of individuals who perceived a need to replace their prosthesis forming part of the group with a higher prevalence of injuries. The cause of this association may be that, in many cases, individuals perceived a need to replace their prosthesis because of an injury, such as prosthetic stomatitis and fibrous hyperplasia, which had been caused by a poorly fitted prosthesis[27].

The absence of a direct effect caused by functional capacity on oral health conditions may be related to the limitations of the study with regards to the measurement of the dimensions investigated. It is likely that the condition of dependence experienced by elderly persons occurs at a different time of life from that when the consequences of oral problems are observed, with said problems in these individuals representing the cumulative effects of a history of deficient and invasive care. As with oral problems, dependency, characterized as a functional limitation, can be the result of a cumulative process, with chronic diseases that induce functional limitation, or else the presence of any chronic condition that does not receive proper care in order to maintain an acceptable physical balance. On the other hand, dependence may also result from an acute disabling condition, with individuals facing a sudden and progressive functional deficit[4,8].

Therefore, in seeking associations between oral health status and functional capacity among elderly individuals, the present study found that identification of the point when an elderly person passes into a condition of dependence in some activities of daily living represents an important aspect to be considered in the possible identification of the effect of dependency on the oral health of said persons.

CONCLUSION

When associated with the oral health status of elderly persons, functional capacity did not display a direct effect. Associations with some other characteristics were, however, observed to be relevant among the individuals investigated, for example: age over 70 years, female gender, time since last visit to the dentist and type of service sought. These should be taken into consideration in clinical practice, with a view to achieving greater effectiveness in solving oral problems among elderly persons. It should be emphasized that in the search for associations between the dimensions investigated, identification of the point when each elderly person became dependent is a fundamental step and one that can, therefore, be considered as a limitation of the present study.

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Received: March 5, 2015
Reviewed: September 6, 2016
Accepted: November 7, 2016

http://dx.doi.org/10.1590/1981-22562016019.150211

Prevalence of depressive symptoms among elderly women from a Center of Reference and Care for the Elderly in the city of Passo Fundo, Rio Grande do Sul

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Abstract

Objective: To analyze depressive symptoms and factors associated with this pathology among elderly women. *Method:* A cross-sectional study nested in the longitudinal study of the Care and Reference Center for the Elderly of the Universidade de Passo Fundo (Passo Fundo University) in Rio Grande do Sul, Brazil, was carried out. Standardized questionnaires, pre-coded with sociodemographic information, were applied. The Geriatric Depression Scale was used to assess the outcome of depression. The International Physical Activity Questionnaire was used to evaluate the level of physical activity and parameters of Body Mass Index were used to assess nutritional status. The chi-squared test or the Fisher exact Test were applied to verify the association between outcome and exposure. *Results:* 313 elderly women were assessed. They were aged from 60 to 89 years, and most (284 - 91.3%) belonged to economic classes B and C. Depression was present in 22 (7.1%) of the elderly women. In bivariate analysis, depression was associated with non-white elderly women (14.6%; p=0.039) who were classified as insufficiently active (10.6%; p=0.033). *Conclusion:* The results indicate the need to encourage the elderly to perform physical activities to contribute to the prevention of geriatric depression.

Keywords: Aging. Health of the Elderly. Depression.

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INTRODUCTION

Aging is a gradual and irreversible physiological process which causes a decrease in functional capacity in individuals[1], as well as psychological and motor disorders and an increase in the prevalence of diseases[2-4]. Depression is one of the most serious diseases among the elderly population and its presence can lead to functional disability[5]. In Brazil, more than 10% of the elderly population suffers from depressive disorders, which are one of the most significant global public health problems[6]. In a recent study, Roncon et al.[7] reported that depression was the disease that most affected the physical and psychological life of the elderly.

Psychological, social and biological changes throughout life can make the elderly vulnerable to developing certain diseases. Literature has established a direct relationship between social relationships, quality of life and functional capacity and an inverse relationship between these factors and depression[8].

Depressive symptoms involving biological, psychological and social aspects have a serious functional impact on the lives of individuals of all ages. In old age, they may be associated with various losses, such as limiting access to activities that promote satisfaction and well-being, in addition to an increased risk of the onset and worsening of chronic diseases. A sedentary lifestyle, obesity, and lifestyle habits detrimental to health are risk factors for this population[9,10].

Factors associated with depressive symptoms in the elderly include the female gender[7,11-15], advanced age[7,12-15] and living alone[7,13,14]. Among sociodemographic characteristics, factors associated with a greater occurrence of depression are the use of medication[14,15], commorbidities[7,15], functional disability[7], a negative perception of health[12] and physical inactivity[12,15].

Maintaining the functional capacity of the elderly is one factor that affects the quality of life of this population. Physical activity should therefore be encouraged among this age group as it is an important means of achieving this goal, which brings physical and psychosocial benefits and improves resistance to disease and stress[3,16].

Groups for the elderly, when properly structured, are an example of a space for coexistence with people of the same age and an opportunity to enjoy physical and cognitive activities[16]. Ferreira and Barham[17] state that the less the individual is involved in pleasurable activities, the greater the chance of experiencing discouragement, which can lead to depression.

The high prevalence of depressive symptoms and subsyndromal depression among the elderly reinforces the importance of scientific research, as these disorders are associated with other medical conditions and the risk of progression to more serious depression[18]. Regional, population based studies are required so the identified variables can be addressed in a more effective and immediate manner by health managers and all healthcare areas serving this population. Given the above, the objective of this study was to analyze the prevalence of depressive symptoms among the elderly and factors associated with this disease, in a Center of Reference and Care for the Elderly in the city of Passo Fundo, Rio Grande do Sul.

METHOD

A cross-sectional study based on a convenience sample was performed. The study was nested in the longitudinal study of the Centro de Referência e Atenção ao Idoso (Center of Reference and Care for the Elderly) (Elo-Creati). The study was realized at Creati, which is linked to the Universidade de Passo Fundo (Passo Fundo University), in Rio Grande do Sul. The center offers workshops in foreign languages, information technology, origami, choir singing, memory and a number of types of physical activities.

According to the 2010 census, 21,245 elderly persons live in the urban area of Passo Fundo, of whom 8,865 are men and 12,560 are women[19]. Around 600 of such elderly individuals participate in activities at Creati. All women aged 60 or older, enrolled in one or more workshop, between August 2014 and August 2015 and who agreed to participate were included in the study. The decision was made to study women only, as the majority of Creati students are female, and to characterize only those aged at least 60 as elderly, as this center admits people aged 55 years old and older.

Data was collected for a year based on a strategy to encourage greater adherence to the survey. The elderly women were made aware of the importance of education through lectures and posters in the center and addressed before and/or after the workshops, in order not to change the flow of their activities at the center.

As is characteristic of a cross-sectional study, the questionnaires were applied only once to each participant, by ten students and three professors from the University of Passo Fundo connected with the research, and distributed at times when there were activities at the center. All the interviewers were previously trained and received a manual with general instructions and guidelines about each question to assist in the collection and coding of responses. Additionally, a professor was always available as a proofreader following collection to deal with any questions from the interviewers. For response collection, the interviewers and interviewees were arranged in several classrooms to create a calm and quiet environment. Each interview session lasted between 20 and 30 minutes.

It was calculated that a sample of 307 elderly women would be required, based on a 95% confidence level, a statistical power of 80%, an exposed: unexposed ratio of 1:1.5 and a prevalence ratio of 2. This number was similar to the number of elderly women surveyed. Statistical power was also tested to verify the associations, and all the exposure variables had a power greater than 90%.

The outcome of depression was measured with the Geriatric Depression Scale (GDS). This instrument has 15 questions with objective answers about how the elderly person has felt over the past week. The GDS is not a substitute for a diagnostic interview conducted by professionals in the mental health field. It is a rapid assessment tool to facilitate the identification of depression among the elderly. Questions cannot be changed, and must be asked exactly as described in the instrument. The evaluation was made as follows: a score between 0 and 5 meant without depression, while 6 or more represented depression[20].

The exposure variables were age, marital status, skin color/ethnicity, economic status, body mass index (BMI) and physical activity level. Economic class was identified by the Critério de Classificação Econômica Brasil da Associação Brasileira de Empresas de Pesquisa (the Economic Classification Criteria of the Brazilian Association of Research Companies) in 2013[21]. This instrument consists of questions about the ownership and quantity of certain items, such as color television, radio and a bathroom, among others, and the educational level of the head of household. After the scores are totaled, respondents are classified according to cutoff points into economic class A, B, C, D and E.

BMI was calculated by dividing weight in kilograms by height in meters squared (kg/m2). The cutoff points used to assess nutritional status were proposed by Lipschitz22: underweight (<22 kg/m2), normal weight (22-27 kg/m2) and overweight (>27 kg/m2). Body weight was measured using a Tanita® brand portable digital scale. To evaluate height a Seca® brand stadiometer was used with a precision of 0.1cm.

The short version of the International Physical Activity Questionnaire (IPAQ)[23] was used to measure physical activity. Levels of physical activity were calculated based on the Guidelines for Data Processing and Analysis of the IPAQ, using days of physical activity and applying the metabolic equivalent of task (MET) value that corresponded to the activity, with 3.3 MET for walking; 4.0 MET for moderate physical activity and 8.0 MET for intense physical activity. In this manner, the individuals were classified as insufficiently active (those that did no physical activity or who were not included in the other categories), sufficiently active (those that achieved a minimum of 600 MET) and highly active (those that reached a minimum of 1,500 MET).

The statistical power of the database was calculated to determine the association between outcome and exposure. All the exposure variables had a statistical power greater than 90%. For the quantitative variables measures of central tendency and dispersion were calculated while the qualitative variables were presented as simple absolute and relative frequencies. The chi-squared test or Fisher's exact test were applied to verify the association between outcome and exposure.

The present study was approved by the Ethics Research Committee of the University of Passo Fundo under registration nº 741.214.

RESULTS

A total of 313 elderly women aged between 60 and 89 years, with a mean age of 69.24 (+6.85) years, were evaluated. A total of 292 (93.3%) of the elderly women were aged less than 80 years; 195 (62.3%) did not have a partner; 262 (84.5%) described their skin color as white and 284 (91.3%) elderly women belonged to economic classes B and C (table 1).

In terms of nutritional status, it was found that 46 (15.8%) elderly women were underweight and 92 (31.5%) were overweight. The sufficiently active and highly active levels of physical activity were found in 181 (57.9%) of the elderly women, due in large part to the workshops offered by the center. Depression was present in 22 (7.1%) elderly women (table 2).

In bivariate analysis, the greatest prevalence of depression was associated with non-white elderly persons (14.6%; p=0.039) who were classified as insufficiently active (10.6%; p=0.033) (table 3).

Table 1. Description of demographic and socioeconomic characteristics of elderly women from the Reference and Care Center for the Elderly. Passo Fundo, Rio Grande do Sul, 2015.

Variables	n (%)
Age (years)	
60 to 69	179 (57.2)
70 to 79	113 (36.1)
80 to 89	21 (6.7)
Marital status*	
Divorced/Separated	37 (11.8)
Widowed	117 (37.4)
Married	114 (36.4)
Civil union	4 (1.3)
Single	41(13.1)
Skin color**	
White	262 (84.5)
Brown	33 (10.6)
Black	10 (3.2)
Indigenous	1(0.3)
Asian-Brazilian	4 (1.3)
Economic class***	
A	17 (5.5)
B	162 (52.1)
C	122 (39.2)
D	10 (3.2)

*n=313 (valid responses); **n=310 (valid responses);

***n=311 (valid responses).

Table 2. Description of nutritional state, level of physical activity and depression among elderly women of the Reference and Care Center for the Elderly. Passo Fundo, Rio Grande do Sul, 2015.

Variables	n (%)
Body mass index*	
Underweight	46 (15.8)
Normal weight	154 (52.7)
Overweight	92 (31.5)
Level of physical activity**	
Insufficiently active	132 (42.2)
Sufficiently active	147 (47.0)
Highly active	34 (10.9)
Geriatric Depression Scale***	
Without depression	288 (92.9)
With depression	22 (7.1)

*n=292 (valid responses); **n=313 (valid responses); ***n=310 (valid responses)

Table 3. Description of association between depression and demographic and socioeconomic characteristics, nutritional state and level of physical activity of elderly women of the Reference and Care Center for the Elderly. Passo Fundo, Rio Grande do Sul, 2015.

Variables	Depression		*p-value*□
	Yes	No	
	n (%)	n (%)	
Age (years)*			0.551
60 to 69	162 (91.5)	15 (8.5)	
70 to 79	107 (94.7)	6 (5.3)	
80 to 89	19 (95.0)	1 (5.0)	
Marital status*			0.216
With partner	178 (91.8)	16 (8.2)	
Without partner	110 (94.8)	6 (5.2)	
Skin color**			0.039■■
White	244 (94.2)	15 (5.8)	
Non-white	41(85.4)	7 (14.6)	
Economic class***			0.081
A and B	168 (94.9)	9 (5.1)	
C and D	118 (90.1)	13 (9.9)	
Body mass index*			0.640
Underweight	44 (95.7)	2 (4.3)	
Normal weight	140 (92.1)	12 (7.9)	
Overweight	83 (91.2)	8 (8.8)	
Level of physical activity*			0.033■■
Insufficiently active	118 (89.4)	14 (10.6)	
Sufficiently active and highly active	170 (95.5)	8 (4.5)	

*n=304 (valid responses); **n=301 (valid responses); ***n=302 (valid responses);

●n=283 (valid responses);□Chi-squared test; ■■Fisher's exact test.

DISCUSSION

The socioeconomic and demographic data of the present study revealed that the majority of the sample consisted of younger elderly women. In studies aimed at this population group, samples formed only of women are common, and when samples are mixed, the number of women frequently exceeds the number of men[4,7,11,13]. These findings reinforce the fact that on average women live longer than men and that more women attend specific programs specifically aimed at the elderly [2,11-15,24].

Regarding marital status, most of the sample (62.3%) had no partner, or were single, divorced or widowed. Studies have indicated that the elderly population in general live without partners[25] while a study in Paraná found that approximately 34% of respondents were widowed[26]. At the age of 80 years old or more, this figure rises to approximately 63%7,[13,27]. It has been found that when facing widowhood women are less likely than men to seek a new relationship[26].

Regarding the financial condition of the group studied, the fact that the majority of elderly persons belonged to economic classes B and C is characteristic of Brazil, where personal financial situations change with retirement, resulting in a social decline, a lowering of housing standards and a diminishing of the productive role, which can result in a reduction in status[2,12,24,28].

Regarding the prevalence of depression in this group of elderly women, only 22 (7.1%) had depression, less than half the prevalence found in studies by Oliveira et al.[26] (24.2%) and Borges et al.[12] (17 4%), both of which studied elderly persons living in a family environment. Another study conducted in Passo Fundo, Rio Grande do Sul, by Borges and Dalmolin[29], which evaluated 151 elderly persons receiving care through the Estratégia de Saúde da Família (the Family Health Strategy), using the same data collection instrument, the GDS, found that 18.0% had mild depression and 3.3% had severe depression, values greater than those of the present study. Casagrande et al.16 assessed a group of elderly persons and found that only 12.0% of respondents had symptoms of depression. This result is similar to that found in the present study, suggesting a reduced prevalence of depression in those who belong to specific groups for the elderly, probably because they are more socially, culturally and physically active[4-6,12]. In addition, health education activities in groups allow professionals and care recipients to grow closer and contribute to offering information to people undergoing through a shared experience, and a space to express their feelings, doubts, anxieties, and to obtain answers to questions1.

In this context, a high prevalence was verified by Suassuna et al.28 in elderly persons in a geriatric clinic, where 53.0% of the population studied had depressive symptoms, with greater impairment of health than elderly persons living in the community.

Brazilian studies related to the prevalence of depression in the elderly often obtain different results to international studies. This can be explained by the use of different measuring methodologies among the studies, in addition to possible sociodemographic differences in each country[9,13,19].

Depression among the elderly is a worldwide problem and highlights the need for research to identify the factors associated with this public health issue. It should also be noted that cross-sectional studies based on associations should be evaluated carefully due to the great variability of methodological criteria[5,8,12-14,24,30].

With regard to the nutritional status of the study group, the results showed that 92 (31.5%) of the elderly women were overweight. Duarte and Rego31 evaluated 1,120 elderly persons, of whom 19.0% were underweight and more than half (54.0%) of whom were classified as normal weight31. Magro et al.[32] found that 50.0% of elderly persons were overweight. Andrade et al.[33] found a high prevalence of overweight and obesity, with 41.8% and 23.4%, respectively. The results of the present study found that most of the elderly persons surveyed (n=181; 57.9%) carried out physical activities and were considered as highly active or sufficiently active, which may have contributed to the relatively low frequency of overweight compared to other studies[3-5].

However, when bivariate analysis was performed, the data showed that depression was associated with elderly persons classified as insufficiently active (p=0.033). This reinforces the belief that physical

inactivity can contribute to increased levels of depression in the elderly. The relationship between exercise, health, quality of life and aging is being increasingly discussed and analyzed scientifically by professionals from different areas[3-6,24,28].

Data from a Vigitel[34] study showed that 51.7% of women over 65 years old do not practice physical activities. Silva et al.[35], when comparing the physical activity and quality of life of sedentary and active elderly persons reported that elderly practitioners of physical exercise have a better quality of life. Ferreira et al.[36] also found that regular physical exercise contributes to preventing depression.

Maintaining the functional capacity of elderly persons contributes to an improved quality of life for this population. Physical activity in the elderly is a means of achieving this goal, providing psychosocial improvement[3], a decrease in the occurrence of depressive symptoms, and an increase in self-esteem and motivation[5], as well as reducing the effects of aging and preventing coronary and degenerative diseases[4].

Therefore, identifying the characteristics of this sample of active women and the associations with depression can provide a warning and add to our knowledge, enabling a deeper understanding of this theme, as it deals with a different segment of the aging population which is more active than those who are institutionalized or restricted to their homes. One limitation of the study may be the fact it is a cross-sectional study with a possibility of recall bias, since the variables investigated occurred in the past.

CONCLUSION

The results revealed a low prevalence of depression in the investigated sample. Depression was higher among non-white elderly women with lower levels of physical activity. These findings suggest that the fact that the elderly persons are active, in this case through participation in a Reference and Care Center for the Elderly, is relevant.

The conditions of health care, social security and social services in Brazil are still considered poor, with most of these responsibilities transferred to the elderly persons themselves, causing feelings of fear and worry. In this sense, planning by health professionals and programs of actions aimed at this population, which will grow considerably in the coming years, is increasingly important.

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Received: February 26, 2016
Reviewed: September 14, 2016
Accepted: October 31, 2016

http://dx.doi.org/10.1590/1981-22562016019.150189

Sexuality through the eyes of the elderly.

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Abstract

Objective: to identify the perception of elderly persons about sexuality. Methods: a quantitative, observational and analytical cross-sectional study was performed in an institution specializing in elderly care in Belém, in the state of Pará. A questionnaire, produced by the authors, was applied to 200 elderly persons, aiming to identify issues related to sexuality both in their youth and today, as well as stimulant strategies and sexuality inhibiting factors among the elderly, among other issues. Data was statistically analyzed through the G-Test for adherence. Results: The researched elderly had an average age of 72 (±5.92) years. The majority said they were not prepared for the beginning of sexual activity when young (62.5%), and had little knowledge about sexually transmitted diseases or methods of preventing them (42.3%). Today, the majority (84%) did not understand the distinction between sexuality and sex, even though most (69.5%) believed that they can stimulate their own sexuality. They also identified family (16.5%) and religion (15.5%) as inhibitory factors for their sexuality. A total of 28.5% of those interviewed reported having a sexual dysfunction and more than half (52.5%) did not seek medical support. They believed that health professionals are prepared to deal with the issue, although such professionals are almost the last information source consulted (17.5%) in relation to sexuality. Conclusion: many factors support the myth that older people are asexual: limited access to information from their youth to the present day, the physiological changes connected to aging itself, religious precepts and family oppression. However, further studies and actions directed at this population are important to promote the health of the elderly.

Keywords: Sexuality. Sexual heath. Elderly. Quality of life.

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INTRODUCTION

Increasing life expectancy will result in an estimated trebling of the elderly population of Brazil over the next twenty years[1-3]. This increase is accompanied by greater attention being devoted to aging, a complex process that goes beyond the age gap[4-6], involving aspects related to health, including sexuality as a variable that influences quality of life[7]. Bearing this in mind, the World Health Organization (WHO) defines quality of life 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"[8]. It is essential to understand aging as a natural process and one that can be influenced by a comprehensive approach to health.

Quality of life encompasses the domain of the perception of the individual regarding sexuality, a complex variable due to its multidimensionality. Sexuality can be expressed through interaction with others and manifest itself in social relations through the body. It can also be described as a "way of existing in the world through Eros, which permeates daily human life"[9]. In this way, sexuality can be distinguished from sex which itself embodies only one form of the expression of human love[7,10].

Aging does not mean becoming asexual, but sociocultural myths and taboos regarding sexuality in old age inhibit elderly persons from fully exercising this side of life, as the physiological alterations of aging, religious precepts, family oppression and individual aspects strengthen this social stigma[11-13].

In terms of the natural physiological changes of aging, the Caderno de Atenção Básica (Basic Health Care Report) of the Ministry of Health describes the presence of erectile dysfunction in men and sexual dysfunction in women, with these physical changes causing a reduction in sexual libido and lubrication. Among other bodily alterations, flaccid skin, grey hairs, loss of teeth and chronic diseases may all negatively interfere with the expression of sexuality[7,12,14].

In the religious context there are prohibitive aspects that impose a lack of sexuality on elderly persons, who could be considered as "sinners" and pejoratively regarded as vulgar and lacking in personal values in the case of women and "dirty old men" in the case of men[13].

As for family and social oppression, a reversal of roles occurs in which elderly individuals lose control in the home and must adapt to this new reality, moving from active to passive subjects as they await the end of their lives. In addition, the children of such individuals often view sexuality in old age in a derogatory manner, seeing it as a sign of second childhood or dementia[13,15].

With respect to widowhood, there are misconceptions that restrict sexuality, with religion, for example, impeding the continuity of romantic life when one partner dies, as it allows one marriage and considers family as the foundation of global society[13]. In addition, when they live without a partner, whether due to widowhood or other reasons, elderly women feel there is no space for a romantic life, experiencing only an unbroken silence. With this silence problems such as loneliness and somatic illnesses can also arise. As a result, women, who for most of their lives subjugate themselves to the needs of others, reach the apex of maturity, when they could be enjoying their freedom and autonomy, and find themselves bound by the judgments, stereotypes and prejudices imposed by their own families and society[16]. Because of the myths and taboos surrounding sexuality, it is not acknowledged that elderly persons still have sexual interests. One example of this is that the lack of campaigns to prevent sexually transmitted infections (STIs) aimed at this age group, as is sexual education and sexual health promotion. The consequences of this neglect are demonstrated by the increase in the occurrence of STIs among this population, for example Acquired Immunodeficiency Syndrome (AIDS), demonstrating the fragility of our understanding of the multidimensionality of human sexuality[16-18].

The complexity of the theme explains the relevance of the present study, as does the fact that human sexuality is indispensable for the whole of life and in every part of the life cycle[19]. In an attempt to instigate reflection and discussion of the theme, this study aimed to identify the perceptions of elderly persons themselves regarding sexuality.

METHOD

A quantitative, observational, analytical, cross-sectional study was conducted in a public institution specializing in outpatient care for elderly persons in the metropolitan area of Belém, in the state of Pará. Elderly individuals aged 60 years or older, of both genders, who were registered at the unit and who agreed to participate in the study by signing a Free and Informed Consent Form (FICF), were included in the study, which was carried out between January and February 2014.

Individuals who had an objective clinical diagnosis of cognitive alterations and/or dementias, reported either by a companion or a medical or nursing professional, were subjectively excluded from the study, as were those who subjectively showed difficulty in understanding and/or provided incoherent responses during application of the questionnaire.

Sample calculation was performed with the aim of securing a sample of 10% of the elderly individuals who attended the institution and met the inclusion and exclusion criteria. The calculation was based on the number of elderly persons registered at the unit and individuals were selected in a non-probabilistic manner "by convenience", based on the elderly people who attended consultations at the institution during the research period and who were invited to participate by the researchers.

The study was initially performed with 211 elderly individuals However, the final sample was reduced to 200 (146 women and 54 men) after the application of the inclusion and exclusion criteria, meeting the sample calculation requirements for this study.

For data collection, a questionnaire with questions written by the authors was used. This was developed following question calibration based on a pilot study conducted with elderly persons during supervised practices in primary care. Because of the elderly status of the population and with the aim of including individuals with different educational levels, the instrument was applied in an individualized and isolated manner in which the researchers read the questions and possible answers, allowing respondents to indicate the answer that best represented their knowledge regarding their experiences of sexuality during their youth and at the present time.

The instrument was composed of 16 questions that focused on: a) Youth of respondents: preparation for the initiation of sexual life, main sources of information, knowledge about STIs and their prevention; b) The present day: differences between sex and sexuality; level of stimulation, form of stimulation and factors that make it difficult to experience sexuality; regarding the association between aging and sexual dysfunctions, the presence of dysfunctions; and finally, how well professionals are prepared to address these issues with elderly persons.

For each item investigated, the possible responses varied between yes and no, with a graded scale of 'not at all/a little/somewhat/reasonably/very' with some exceptional items containing additional options pertinent to the question.

Descriptive analysis was used to identify and describe the data, and percentage values of the results were obtained and reported, as were measures of central tendency and dispersion, where relevant. The G adhesion test was performed in order to analyze the significance of the results. This is a nonparametric test applied to samples with data measured on a nominal scale and arranged in two or more mutually exclusive categories. This test verified whether there was a significant difference between the expected and observed categorical variable of the evaluated sample. For the analysis, a value of $p<0.05$ was allowed.

The present study was funded by the authors themselves and complied with the standards for research involving human subjects from Resolution 466/12 of the National Health Council. The study obtained the approval of the Municipal Health and Environment Department of Belém and was subsequently submitted and approved by the Research Ethics Committee, under number 439.844/13, while the individuals involved in the research signed a Free and Informed Consent Form.

RESULTS

This study investigated 200 individuals, 54 (27%) men and 146 (73%) women, with a mean age of 72 (±5.92) years.

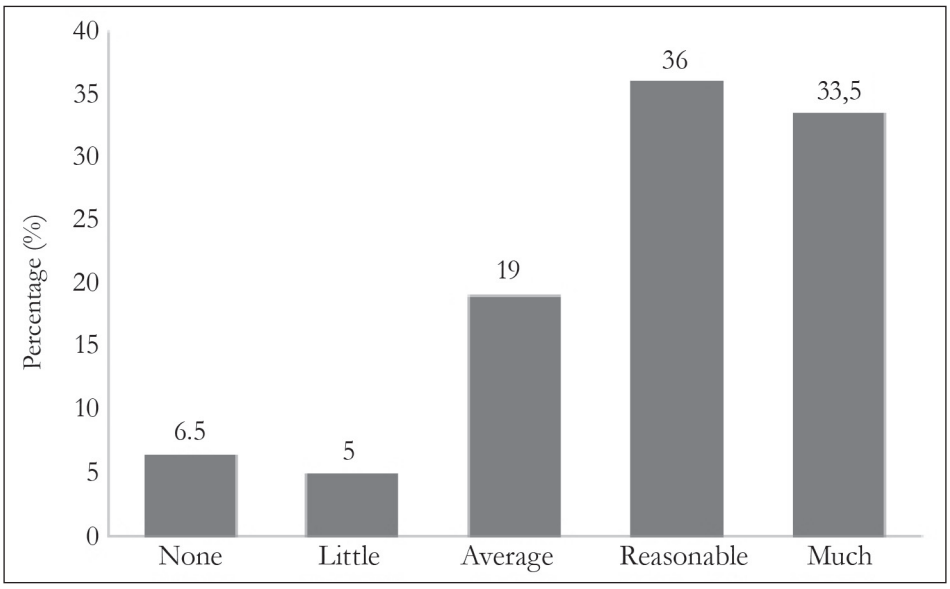
The responses to the questions regarding sexuality during the youth of the individuals revealed a significant difference in results, with the majority of respondents admitting that they had not felt prepared to begin their sexual life and describing friends (others) as their main sources of information. The responses also demonstrated a lack of available information about STIs and forms of prevention during youth (Table 1).

It was also noted that at the present time the majority (84%) of the elderly persons were unable to distinguish sex from sexuality, although most believed that they stimulate their sexuality to a reasonable or high degree (Figure 1). Regarding factors that influence sexuality (Table 2), a gender analysis (data not shown in the table) highlighted certain stimuli such as shaving for men (67.96%) and dressing up for women (42.46%). In terms of inhibition factors, most elderly persons dismissed the existence of barriers, however a minority considered family, religion and lack of information aimed at their age group to be limiting factors.

Table 1. Perceptions of elderly persons regarding the initiation of their sexual life during their youth (n=200). Belém, Pará, 2014.

Variables	Total n (%)	*p-value*
Did you feel prepared?		
Not at all	125 (62.50)	<0.0001* (Test G)
A little	14 (7)	
Somewhat	25 (12.50)	
Reasonably	22 (11)	
Very	14 (7)	
Sources of information?[1]		
Radio	20 (10)	NA
Television	13 (6.50)	
Newspapers	10 (5)	
Parents	24 (12)	
Others	81 (40.50)	
No one	69 (34.50)	
Knowledge of sexually transmitted infections		
None	82 (41)	<0.0001* (Test G)
Little	40 (20)	
Average	36 (18)	
Reasonable	19 (9.50)	
Much	23 (11.50)	
Information on prevention of sexually transmitted infections[2]		
None	50 (42.37)	<0.0001* (Test G)
Little	25 (21.19)	
Average	11 (9.32)	
Reasonable	20 (16.95)	
Much	12 (10.17)	

* Statistically significant difference (p<0.05); NA: Statistical test not applied; [1]For this variable more than one answer could be obtained; [2]Only those who answered yes to the previous question.



G Test, *p*-value <0.0001.

Figure 1. Perceptions of elderly persons regarding the stimulus of sexuality in their current life (N=200). Belém, Pará, 2014.

Table 2. Perception of elderly persons (n=200) regarding the factors that influence sexuality in old age. Belém, Pará, 2014.

Difficulty / Problems	Total n (%)
Forms of sexual stimulation[1]	
Taking care of hair	67 (33.50)
Use of new perfume or aftershave	66 (33)
Dressing up	90 (45)
Dancing	40 (20)
Sexual act	45 (22.50)
Shaving	34 (17)
Dating	50 (25)
Meeting with friends	64 (32)
Others	30 (15)
None	3 (1.5)
Factors that inhibit sexuality[1]	
Society	23 (11.50)
Family	33 (16.50)
Religion	31 (15.50)
Lack of information	30 (15)
Changes to the body	16 (8)
Widowhood	18 (9)
Others	7 (3.50)
No factor	95 (47.50)

[1] For this variable more than one answer could be obtained.

In relation to sexual dysfunctions during old age (Table 3), most of the elderly persons believed that the occurrence of these at this time of life is not normal, and only a minority reported suffering from any such dysfunction themselves. Of those who claimed to suffer from some sexual dysfunction, more than half had not sought guidance from a health professional. It is clear that there are still elderly individuals with sexual dysfunctions who do not seek care, even though most considered that health professionals are prepared to deal with sexuality in their patients. However, the main source of information regarding sexuality reported by the elderly persons was television, with health professionals being almost the least common response, demonstrating that despite being prepared professionals may not address this theme frequently enough.

Table 3. Perception of elderly persons regarding sexual dysfunction in old age (n=200). Belém, Pará, 2014.

Variables	Total n (%)	*p-value*
Consider it normal to have some dysfunction?		
Yes	63 (31.50)	<0.0001* (G Test)
No	137 (68.50)	
Do you have any dysfunction?		
Yes	57 (28.50)	<0,0001* (G Test)
No	143 (71.50)	
Sought professional health guidance[1]		
Yes	27 (47.37)	0.6910 (G Test)
No	30 (52.63)	
How prepared are health professionals?		
Not at all	18 (9)	<0.0001* (G Test)
A little	16 (8)	
Somewhat	50 (25)	
Reasonably	59 (29.50)	
Very	57 (28.50)	
Sources of information[2]		
Family	61 (30.50)	NA
Friends	51 (25.50)	
Health professionals	35 (17.50)	
Church	49 (24.50)	
Television	115 (57.50)	
Magazines	39 (19.50)	
Internet	12 (6)	
Others	22 (11)	

* Statistically significant difference ($p<0.05$); [1]Only those who answered yes to the previous question;[2] For this variable more than one answer could be obtained; NA: statistical test not applied.

DISCUSSION

The global population is aging rapidly[3,20] and society and elderly persons themselves still retain prejudices, myths and sociocultural taboos when it comes to sexuality, with resultant consequences and influences on the lives of old people[1,11-13,21].

Sexuality is understood as "experience", a result of culture, history, fields of knowledge and subjectivity. It is not a static and definitive phenomenon and it comes with an uncountable range of forms of the expression and experience of pleasure[22]. Sexuality is related to love, tenderness and affection and is not just the sexual act itself, as erroneously believed by society[7,10,21]. In the present study, the elderly individuals did not know how to differentiate between sex and sexuality, restricting their definition to the sexual act and reproduction. This is a misconception, since all human beings are born as sexual subjects and enjoy sexuality differently in accord with each phase of their life, including the elderly stage[7,10,21].

As a result of a historical process, sexuality is influenced by the actions of institutions such as school, church and the media. It has historically been viewed as impure, with sex, for example, being seen as related only to reproduction and not to pleasure[23]. Conceptions such as these can limit dialogue between parents and children and between health professionals and patients, making this an obscure topic, one which is experienced but not spoken of. Corroborating this idea, the present study observed that the elderly persons investigated had not felt prepared to begin their sexual life and did not discuss sex and sexuality with their parents or relatives, instead seeking information on the subject from "others". Qualitatively, these others were friends, because they were normally in the same age group and going through similar experiences. They represented a limited source of information, however.

Linked to this limited information during youth was the finding in the present study that most of the elderly persons had no knowledge about STIs at that time. In this respect, it is important to note that gonorrhea, for example, is among the oldest known human diseases[24,25].

The sexual education of the elderly persons was not created under the shadow of STIs and, therefore, the habit of condom use was not established in their early relations[24,26]. In the present study, the majority of elderly persons reported that during their youth they had no knowledge of STI prevention. In addition to not receiving this information during their youth, elderly persons must deal with the fact that present day STI prevention campaigns are directed almost exclusively at young people, suggesting that the increase in AIDS cases in this population (42.8% between 1998 and 2010) is linked to a lack of information regarding sexuality[16,18].

People have been unconsciously conditioned to believe that they should not or do not need to continue exercising their sexuality in old age, however its suspension or abandonment can accelerate the aging process with resultant negative effects on the health of elderly persons[27,28]. However, this study found that elderly persons believe that they stimulate their sexuality to a reasonable or great extent, mainly by dressing up and shaving, thus contributing to their well-being and increasing their disposition for life. Although society still conceives the exercise of sexuality as being for the young and does not sufficiently motivate elderly persons, they still seek to manifest their sexuality in other ways[29].

The repression of sexuality in old age comes mainly from family, religion and society, with elderly persons having their pleasures suppressed and having to settle for a tedious future in order to fit in with the way of life imposed on them by society[16]. Due to role reversal, elderly persons lose their control of the home and need to readapt to this reality, moving from active subjects to passivity as they await death[12,13]. In this period, individuals can only assume the role of grandfather or grandmother. Their children ask them to look after their grandchildren in the expectation that they monitor them while performing activities such as knitting and watching television, enjoying their retirement[15]. These taboos and psychosocial

blocks have repercussions in current society, for although most of the elderly persons in this research reported that there was no current factor limiting the exertion of their sexuality, there were a number who reported family, religion and a lack of information as such.

The aging process can lead to some physical changes, both in men and women, which induce sexual dysfunctions[27]. Biological factors limit sexual development, affecting desire, sexual functioning and, indirectly, sexual satisfaction. They cause hormonal changes, mainly taking the form of reductions in levels of testosterone for men and progesterone for women, with resultant changes in these relationships of these individuals with themselves and with society[30]. In this context, this study showed that approximately one third of the elderly individuals believed that it is normal to suffer from sexual dysfunctions, with slightly fewer reporting having a dysfunction themselves. In men, the principal dysfunction reported was sexual impotence, while in women it was a lack of sexual desire. This is complemented by the findings of the Basic Health Care Report of the Ministry of Health14, in which 64% of men reported erectile dysfunction and 65% of women reported reduced sexual libido and lubrication due to menopause. However, the sexual lives of both genders continue to be active[12].

The majority of the elderly persons who reported suffering from some sexual dysfunction had not sought advice from a health professional, suggesting that there are still some professionals who are not prepared to discuss such matters with their patients. As the therapist-patient relationship is reciprocal in nature, it is up to health professionals to investigate the sexual history of their patients. Therefore, there appears to be some negligence in this area of health care, with care being focused solely on the complaint or illness of the individual, rather than on his or her health in its entirety[7,26].

Due to this negligence, health professionals were cited by only one fifth of the elderly respondents in the present study as a main source of information on sexuality, with "television" instead being the most common information source. However, the media reinforces the idea that sexuality is related only to the bodies of the young, while elderly persons are portrayed as asexual. Considering the need for integral care, it is important that elderly persons intensively experience all the dimensions of life, that society welcomes them and that health professionals are aware of the important role they must play in promoting the health of human beings in all phases of life[31-33].

The results highlighted in the present study are not intended to conclude this discussion. The data should not be taken to be generally applicable, as the results and conclusions may not relate to other populations because of the sample used. Thus, the present study presupposes the reality of the issue within the context of public health and encourages the carrying out of further research. Given the large volume of details informally reported by respondents in the present study but not noted or considered due to being outside the scope of the study, it is advisable that new studies, especially involving qualitative research, be carried out with the aim of providing evidence regarding the views of elderly persons themselves on sexuality. In addition, it is necessary to incentivize the validation of quantitative instruments that deal not only with the sexual satisfaction/frequency of elderly persons, but also with aspects involved in individual sexuality. Further research on this theme is essential to foster the necessary socio-cultural changes and to assist with how professionals care for overall health.

CONCLUSION

In conclusion, the perceptions of elderly persons on sexuality have suffered from limitations, both during their youth and today. These limitations relate to various aspects of the knowledge of elderly persons, for example their inability to distinguish between sex and sexuality, which can reduce sexuality to the sexual act itself. This mistaken belief follows on from the youth of the individuals, where the beginning of their sexual lives was accompanied by insufficient information supplied by "friends", as demonstrated by the paucity of information regarding STIs and the preventive methods which they had access to.

Currently, although some elderly persons believe that the presence of sexual dysfunctions in old age is "normal" and some suffer from such dysfunctions, they did not discuss the matter with health professionals for further clarification. On the other hand, even with so many inaccurate opinions, elderly individuals seek to stimulate their sexuality, mainly by dressing up, and recognize family, society and religion as factors that inhibit the exercise of their sexuality.

The results of the present study do not conclude the discussion regarding the topic of sexuality among elderly persons, instead highlighting the need for the study of several aspects inherent to sexuality, such as: of the degree of satisfaction of elderly persons, the level of training for professionals and even the perceptions of society regarding the subject. It is precisely through such studies that the myths and taboos surrounding the issue will be broken, granting dignity to human beings from birth to old age.

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Received: December 3, 2015
Reviewed: July 11, 2016
Accepted: November 7, /2016

http://dx.doi.org/10.1590/1981-22562016019.160040

Impact of a three-month resistance training program for elderly persons with knee osteoarthritis residing in the community of Santa Cruz, Rio Grande do Norte, Brazil

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Abstract

Objective: to evaluate the impact of a three-month resistance exercise program on the pain and functionality of elderly patients with knee osteoarthritis from the city of Santa Cruz, Rio Grande do Norte. *Method*: a quasi-experimental study was performed with 13 elderly patients diagnosed with knee osteoarthritis, who underwent a resistance training program twice a week for 12 weeks. Pain, muscle strength, functionality, quality of life and patient satisfaction were evaluated using the following instruments: the visual analog scale, one repetition maximum testing, the Western Ontario and McMaster Universities Osteoarthritis Index, the Timed Up and Go Test, the 6-minute walk Test, the Short Form (36) Health Survey and the Likert scale. The paired T-test and ANOVA for repeated measures were used for statistical analysis. *Results*: the mean age of the patients was 62.0 (±10.0) years. At the end of the study, the pain, muscle strength, functional status and some areas of quality of life of the elderly had improved. *Conclusion*: resistance exercises were an effective and safe method of improving the pain, muscle strength, functionality and quality of life of the population studied. The elderly should be encouraged to perform supervised strength training therapy.

Keywords: Resistance training. Elderly. Knee. Osteoarthritis.

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INTRODUCTION

Osteoarthritis (OA) is the most common joint disease in the world, with the knee the most affected joint. It is a multifactorial disease which involves inflammatory, degenerative, genetic, hormonal and mechanical factors. Several risk situations have been identified: anterior cruciate ligament rupture, meniscectomy, knee injuries, knee varus or valgus deformity, and obesity. It is essential to promote anti-obesity programs by targeting priority patients who have other risk factors such as a history of meniscectomy or knee injuries, or poor knee alignment[1].

Among rheumatic diseases, OA represents about 30-40% of medical consultations in rheumatology outpatient clinics, and affects more than 250 million people worldwide[2]. Statistics suggest that over the next 20 years, the number of people affected by the disease in the USA will grow from approximately 43 million to 60 million, increasing chronic disease spending by more than 25%[3]. In Brazil, it is estimated that 4% of the population suffers from OA, with the knee being the second most affected joint, representing 37% of cases[4].

According to the American College of Rheumatology (ACR), OA is characterized by degeneration of the articular cartilage, crepitation, pain that worsens with weight support and improves with rest, joint stiffness, movement limitation, muscular weakness and varying degrees of local inflammation, and negatively interferes in the quality of life of these patients[5,6].

Regarding functional status, approximately 80% of individuals with knee or hip OA have movement limitation and 25% cannot perform the majority of their activities of daily living[7]. A qualitative review of a group of women aged 65 to 92 years showed that the main daily activities that are impaired in patients with OA of the lower limbs are: hygiene, dressing, locomotion, personal care and home maintenance[8-11].

Muscle weakness of the quadriceps is also a common occurrence in the majority of patients with OA of the knees[12,13]. Perhaps because of this, studies investigating the use of strengthening exercises in these individuals have generally emphasized muscle strengthening through resistance exercises.

Osteoarthritis of the knee is therefore a major public health problem and may lead to severe disability. Based on the fact that there is no single protocol of effective resistance exercise for improving muscle function and strength for the treatment of elderly persons with this disease, the objective of this study was to evaluate the impact of a three-month program of resistance exercises on the pain and functionality of elderly patients with osteoarthritis of the knees in the city of Santa Cruz, Rio Grande do Norte.

METHOD

A quasi-experimental study was carried out in the Clínica Escola de Fisioterapia da Faculdade de Ciências da Saúde do Trairi (the Clinical Physiotherapy School of the Trairi Health Sciences College) (FACISA), of the Universidade Federal do Rio Grande do Norte (Rio Grande do Norte Federal University) (UFRN), in the city of Santa Cruz, in the rural part of the state of Rio Grande do Norte.

We evaluated 13 elderly patients, selected for convenience, with a medical diagnosis with unilateral or bilateral primary knee OA according to the criteria of the ACR5, and who presented pain between 3 and 8 centimeters in the 10-cm visual analogue scale (VAS)[14] for pain in one or both knees. Data was collected in the second half of 2015.

This research emerged from an extension project carried out based on the need to expedite the care of these patients, who were on the waiting list of the Physiotherapy Medical School of FACISA/UFRN. The study was approved by the Research Ethics Committee of Trairi Health Sciences College, under opinion No. 1,376,142, according to Resolution No. 466/2012 of the National Health Council. All patients read and signed a Free and Informed Consent Form.

Patients with inflammatory diseases or any medical condition that did not allow physical activity, who had suffered infiltration in the last three months, had performed regular physical activity in the last three months, or had a trip planned in the next 12 weeks were excluded.

The patients were evaluated at week 0 (T0), week 4 (T4), week 8 (T8) and week 12 (T12), and the following instruments were applied based on these periods:

- Visual analogue scale (VAS) for evaluation of pain at T0, T4, T8 and T12. The pain scale ranges from zero centimeters (without pain) to 10 centimeters (unbearable pain)[14].

- The one repetition maximum (1RM) muscle strength test to evaluate the muscular strength of the quadriceps, hamstring, adductor and abductor muscles of the hip at T0, T4, T8 and T12. This was performed by calculating the 1RM, which indicates the maximum load sustained in a single repetition. The test was performed by incrementally adding load according to the pain limit of the patient. Up to five attempts were allowed to identify the maximum load the patient could sustain when executing the movement. A rest period of up to five minutes between the trials was applied. The maximum load was determined considering ease and the proper pattern of movement execution[15].

- The Likert scale for assessing patient satisfaction with the proposed treatment at T4, T8 and T12. This is a scale used to evaluate the patient's satisfaction with the treatment that addresses the following: a) I feel much worse, b) I feel a little worse, c) unchanged, d) I feel a little better and e) I feel much better[16].

- Timed Up and Go (TUG) test to evaluate functionality at T0 and T12. This is a functional test which consists of getting up from a chair, without using the arms, then walking for three meters, turning, and walking back. At the beginning of the Test, the patient should have his or her back resting on the back of the chair. The patient received a "go" instruction to perform the test and the timing was calculated from this voice command until the moment he or she again rested his or her back on the back of the chair[17].

- Six-minute walk test (6MWT) to evaluate functionality at T0 and T12. Although this test developed to evaluate the physical capacity of patients with cardiopulmonary diseases, this test has also been used (with some adaptations) to measure the walking performance of patients with motor difficulties. The test was performed on a 20-meter marked lane in a sports court closed to the movement of other people. Patients were instructed to walk the entire lane and could interrupt the Test if they did not feel able to continue[18].

- *Western Ontario McMaster Universities Osteoarthritis Index* (WOMAC) to evaluate functionality at T0 and T12: a three-dimensional questionnaire assessing pain, joint stiffness and function. It is specific for the evaluation of patients with knee OA and scores vary from 0-96, with the higher the final score, the worse the condition of the individual. This questionnaire was translated into Portuguese and validated in 2003[19].

- *Short Form-36* (SF-36) to evaluate quality of life at T0 and T12. This is a generic questionnaire with 36 items divided into domains such as functional capacity, physical limitation, pain, general health, vitality, social aspects, emotional aspects and mental health. A score ranging from 0-100 is provided, with 100 being the best state of health possible and 0 being the worst[20].

The exercise program was specifically based on muscle strengthening and lasted 12 weeks, as shown in Figure 1.

Figure 1. Exercise program carried out. Santa Cruz, Rio Grande do Norte, 2015.

Muscles trained:
- Quadriceps / Hamstrings / Hip adductors / Hip abductors

Protocol:
- Week 0 to 4: three series of 12 repetitions, with 60% of 1MR
- Week 4 to 8: three series of 12 repetitions, with 70% of 1MR
- Week 8 to 12: three series of 12 repetitions, with 80% of 1MR

1MR: one maximum repetition test for muscle strength

In statistical analysis, repeated measures analysis (ANOVA) was performed to compare the VAS, Likert and 1MR Test, with Bonferroni post hoc. The paired t-test was used for the 6MWT, TUG, WOMAC and SF-36 results. For data analysis, Shapiro-Wilk statistical treatments and analysis of distribution by the Q-Q normality graph was performed. The results obtained in the analysis of the distribution indicated normality for all variables for $p<0.05$.

RESULTS

The mean age of the patients was 62.0 (±10.0) years and the mean body mass index (BMI) was 30.9 (±3.7) kg/m2. Only two of the elderly persons were male. Six declared themselves their skin color/ethnicity to be white/Caucasian, five said they were black/Afro-Brazilian and two said they were brown/mixed race. The elderly persons had an average of six years of schooling. Five were retired, four said they had a non-manual job and four said they had a manual job.

A significant statistical difference ($p=0.02$) was observed between the first week (T0) and the fourth and eighth weeks (T4 and T8), in the improvement of knee pain (Table 1).

The behavior of the Likert scale results did not show a significant difference between the assessment times.

Following 12 weeks of intervention there were improvements in load for the one maximum repetition (1MR) test for all the muscles trained (Table 2).

The results for the 6MWT did not differ significantly ($p=0.7$) after 12 weeks of intervention. The TUG variable exhibited the same behavior ($p=0.7$) over the same period. The scores of the WOMAC variables: pain, function and total exhibited a significant difference ($p=0.01$) after 12 weeks of intervention. However, the variable stiffness did not differ significantly ($p=0.08$) over the intervention period (Table 3).

The functional capacity, pain, vitality, mental health and emotional aspects domains displayed a significant difference when the before and after time periods were compared. The domains social aspects, limitation by physical aspects and general health status did not exhibit significant alterations (Table 4).

DISCUSSION

As observed, the resistance exercise program of the present study was effective in improving pain in the knees of the surveyed elderly persons, although no difference in satisfaction with treatment was found using the Likert scale. Other studies[21] corroborate these findings, showing that weight exercises are effective in improving the pain of these patients.

There was also improvement in muscle strength for the four trained muscle groups, which again proved the effectiveness of this training program. It is important to emphasize that these exercises are easy to perform, although supervision is necessary, especially in the studied age group.

In addition to quadricep weakness, recent studies have shown that individuals with knee OA have lower isokinetic hip performance than do healthy controls[22-24]. Corroborating this finding, a cohort study with a three-year follow-up showed that the decrease in the muscular strength of the hip abductors together with the presence of comorbidities are prognostic factors for increased

Table 1. Description of visual analog scale for pain (VAS) of the 13 elderly persons during 12 weeks of resistance exercises. Santa Cruz, Rio Grande do Norte, 2015.

Weeks	Mean (sd)	Confidence Interval 95%	
		Lower	Upper
T0: initial assessment	5.15 (±1.72)	4,11	6.20
T4: assessment in week 4	3.08 (±2.53)*	1,55	4.61
T8: assessment in week 8	2.62 (±2.26)*	1,25	3.98
T12: assessment in week 12	3.31 (±2.02)	2,09	4.53

* p=0.02; Repeated measures ANOVA.

Table 2. Behavior of load represented in kilograms for each muscle group during training program. Santa Cruz, Rio Grande do Norte, 2015.

Muscles	Weeks				
	T0: Initial assessment	T4: Assessment in week 4	T8: Assessment in week 8	T12: Assessment in week 12	
	Mean (sd)	Mean (sd)	Mean (sd)	Mean (sd)	*p*
Quadriceps	10.4 (±4.9)	16.5 (±7.7)	17.1 (±9.8)	20.4 (±11.3)	0.03*
Hamstring	5.0 (±1.7)	8.0 (±3.0)	9.5 (±3.2)	11.0 (±3.3)	0.01*
Adductors	5.0 (±1.9)	8.6 (±2.8)	9.5 (±3.0)	11.3 (±3.0)	0.01*
Abductors	4.8 (±2.0)	8.0 (±2.4)	10.1 (±3.1)	11.7 (±3.2)	0.01*

* p<0.05; Repeated measures ANOVA; sd: Standard-deviation.

Table 3. Results of tests and functional assessment of 13 elderly persons after 12 weeks of resistance exercises. Santa Cruz, Rio Grande do Norte, 2015.

Variable	Weeks		
	T0: Initial assessment	T12: Week 12 assessment	
	Mean (sd)	Mean (sd)	*p*
TC6min	395.3 (±69.5)	404.2 (±90.9)	0.7
Timed Up and Go	11.1 (±2.7)	10.9 (±2.3)	0.7
Womac domínio dor	9.5 (±3.0)	6.1 (±4.0)	0.01*
Womac domínio função	34.3 (±1.9)	23.1 (±13.1)	0.01*
Womac domínio rigidez	3.9 (±1.6)	3.1 (±1.9)	0.08
Womac *escore* total	49.1 (±14.8)	33.2 (±18.6)	0.01*

* p<0.05; Paired t-test; 6MWT: Six-minute walk test; WOMAC: Western Ontario McMaster Universities Osteoarthritis Index; sd; standard deviation.

Table 4. Results for Short Form-36 (SF-36) domains for 13 elderly persons submitted to 12 weeks of resistance exercises. Santa Cruz, Rio Grande do Norte, 2015.

	T0: initial assessment	T12: week 12 assessment	
Domains	Mean (sd)	Mean (sd)	*p*
Functional capacity	37.7 (±17.9)	60.4 (±22.9)	0.01*
Pain	10.1 (±7.0)	17.7 (±7.2)	0.03*
Vitality	40.0 (±16.3)	55.4 (±22.1)	0.04*
Mental health	62.1 (±22.7)	74.8 (±24.7)	0.02*
Social aspects	66.5 (±28.1)	79.9 (±29,0)	0.06
Emotional aspects	30.3 (±44.0)	66.7 (±43,0)	0.02*
Limitation by physical aspects	17.3 (±25.8)	34.6 (±41.5)	0.30
General health status	53.1 (±20.8)	62.3 (±22.6)	0.11

* p<0.05; Paired t-Test; sd: standard deviation.

functional limitation[25]. There is also evidence that muscle weakness of the hip abductors in patients with knee OA is associated with more rapid progression of disease[22] and that each unit of increase during adduction increases the risk of disease progression[26] and the intensity of pain[27,28] 6.5 times.

These exercises have proven benefits in restoring range of motion, strengthening the muscles, improving pain and promoting improvement in day-to-day activities such as walking, climbing and descending stairs and even participating in sports[29,30].

A study by Jorge et al.[31], evaluated the effectiveness of a progressive resistance exercise program in women with knee OA. The justification for the study was the fact that few studies to date had included the strengthening of hip muscles in rehabilitation programs for patients with knee OA. The study therefore evaluated the strengthening of the hip abductor and adductor muscles, with a gradual increase in load for patients with knee OA. The results of the study showed positive effects in relation to pain, function, some aspects of quality of life and in all measures of strength from the sixth week of training onwards.

Although muscle strength increased, no differences were found in the 6MWT and TUG. This can be explained by the small sample size and the fact that the elderly persons demonstrated good functional performance in pre-testing. It was expected that, with stronger muscles, they would walk greater distances and be faster in the TUG Test.

The WOMAC questionnaire is most used scale for the functional evaluation of patients with knee OA in global literature, as it is specific for this disease. Functional improvement was found in the patients studied, both in the total WOMAC value and in the pain and function domains, except for joint stiffness, again showing the importance of performing these exercises[31].

Quality of life also improved in five of the eight domains of the SF-36 questionnaire, with recent studies showing that OA is associated with a lower quality of life[32]. The fact that no improvement was found in the other domains may be related to the small sample size, as well as the great variability of the responses of the patients.

The exercises of the training program used in this study can be considered effective, safe, utilize low cost materials, do not require large structures and can be easily performed in controlled environments.

It should be emphasized that the patients in this study were evaluated under specific conditions, which resulted in some limitations, such as: the small number of participants, the lack of sample calculation as the sample was convenience-based, and the lack of a control group with which to compare the results. However, the importance of encouraging the practice of physical activity focusing on muscle strengthening among the population is evident.

CONCLUSION

The proposed resistance exercise program was effective in improving the pain, muscle strength of the quadricep, hamstring, and hip adductor and abductor muscles; functional capacity, vitality, mental health and emotional aspects of quality of life in the elderly with osteoarthritis of the knees of the city of Santa Cruz, Rio Grande do Norte, Brazil.

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Received: March 1, 2016
Reviewed: October 31, 2016
Accepted: November 8, 2016

http://dx.doi.org/10.1590/1981-22562016019.150133

Psychometric evidence of the transcultural adaptation of the Vulnerability Abuse Screening Scale (VASS) for the detection of violence against the elderly

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Abstract

Objective: to present preliminary psychometric evidence of the cross-cultural adaptation of the Vulnerability to Abuse Screening Scale. Method: The steps of cultural adaptation verified conceptual, item, semantic and measurement equivalence. For measurement equivalence and verification of the psychometric data of the study samples of 30 and 66 elderly persons, respectively, were used. Descriptive and inferential statistics (KR-20, T-Student Test, Pearson correlation, univariate ANOVA and the Fleiss' Kappa Index) were used for analysis of results. Results: It was found that the age of the participants ranged between 60 and 84 years, with a majority of older women participants (n=38). The KR-20 value for the overall score of the instrument was 0.688. The values for the four dimensions proposed by the authors of the instrument were 0.528, 0.289, 0.552 and 0.303, respectively. Only the values of the subscales Vulnerability and Coercion proved to be close to those of the original study (0.550 and 0.390). Conclusion: The internal consistency values found in the present study ranged from moderate to good, indicating that the results were satisfactory, despite being initial findings.

Keywords: Violence. Elderly. Elder Abuse. Questionnaire. Psychometrics.

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INTRODUCTION

Population aging is a global phenomenon. Simultaneously, there is a need to guarantee opportunities for health, social participation and social security in a continuous manner throughout life, with the development of public policies aimed at comprehensive care for the elderly. These should provide assistance in the fields of social security, pensions, health, education and all the other fundamental rights established by relevant legislation[1]. However, comprehensive protection for the elderly is not currently guaranteed, especially in the context of ill-treatment and violence against this population.

Violence is growing worldwide, permeating, in an expressive manner, interpersonal relationships and relations between groups. As a social and systemic phenomenon which is subjective and triggers social contradictions, violence needs to be understood both in its expression and in terms of the impact on those affected by it. The World Health Organization (WHO) promulgated a classification that has been widely used by elderly care services[2,3], according to which violence against the elderly can be classified as physical, psychological or emotional – which includes verbal violence – sexual, economic or financial, and as neglect and self-neglect[4].

In addition, despite being a growing phenomenon with increasing social and media visibility, difficulties are still encountered in screening, identifying and preventing violence. Among the reasons for the difficulty in screening, arising from a shortage of information and problems in registering complaints, and which are listed in literature as the main agents that create an underreporting of violence, are a degree of proximity and/or kinship between the aggressor and the victim, or the presence of an affective-emotional, caregiving, or financial type dependent relationship[3,5].

It is worth noting that violence against the elderly is usually only verified when a complaint is made and verified by means of examinations that assess, in an exaggerated manner, signs and indications of physical ill-treatment only. Factors that suggest the evidence of violence of other kinds, such as psychological or financial aspects and/or neglect and self-neglect, are not considered.

As there is a clear lack of instruments available in Portuguese for the detection of domestic violence against the elderly, it seems opportune and relevant to make available and adapt Lusophone versions of tools derived from consistent research programs[6]. One of the programs recognized for developing a tool for violence tracking[7-9] produced the Vulnerability Abuse Screening Scale (VASS), based on studies by Schofield et al.[10] and Schofield and Mishra[11], in Australia. This scale is the object of the proposal of the current study.

The VASS instrument was created based on modifications of the Hwalek-Sengstock Elder Abuse Screening Test. The VASS contains twelve dichotomous items that, through the self-reports of the elderly, establish the risk of domestic violence. Data collection is based on the perception that the elderly person has regarding everyday situations that can indicate if they are a victim of violence. The point score of the scale is obtained through the sum of the values assigned to each affirmative answer, except for items 4, 5 and 6, which score in the event of a negative answer.

The items seek to identify the phenomenon through four domains, namely Vulnerability (items Nº 01 to Nº 03), Dependence (Nº 04 to Nº 06), Dejection (Nº 07 to Nº 09) and Coercion (item Nº 10 to Nº 12). These, in turn, try to explain four of the six WHO classifications: physical, psychological and financial violence and neglect. VASS is therefore a short screening tool for abuse of the elderly, which can be used in a clinical and home context, and aims to establish the risk of violence.

The psychometric evidence studies of validity and precision were examined in a longitudinal research process[11]. The psychometric findings of the instrument in question were found to be satisfactory and adequate for the adaptability of the scale to other cultural contexts[6].

In this context, the present study aims to present preliminary psychometric evidence of the cross-cultural adaptation of VASS, which investigates the risk of domestic violence against the elderly. Specific objectives were applied to evaluate the equivalence measurement of the Brazilian version, including: 1) Evidence of validity based on the internal structure of the Brazilian version of the instrument, through

analysis of the internal consistency of this version compared with the original instrument; 2) Evidence of apparent or face validity, by measuring the statistical agreement between the evaluation of the judges; 3) An initial evaluation of factors related to evidences of validity based on the correlations (convergence patterns) and differentiations (discriminant patterns) with the variables studied .

METHOD

A study with a methodological, transversal and analytical design was performed. The steps for cross-cultural adaptation followed the proposals of Herdman, Fox-Rushby and Badia[12,13] and used the methodological propositions of other authors about adaptation, such as Beaton, Bombadier, Guillemin and Ferraz, Guillemin, Bombadier and Beaton[14,15]. This model is based on the evaluation of conceptual, item, semantic, operational and measurement equivalence, and has been widely disseminated throughout Brazil, especially in research involving the elderly[16]. Data about the sub-stages of conceptual, item and semantic equivalence can be seen in a recent publication[17].

Operational equivalence

With respect to the operational equivalence sub-stage, which involves performing a pre-test of the proposed synthesized version, we sought to evaluate the degree of comprehension and acceptability of the Brazilian version of the instrument among a group of specialist judges who had participated in the previous stages. This group was formed by postgraduate students in Psychology, who are familiar with the cross-cultural adaptation method, as well as being knowledgeable in gerontology, human development and instrument validation studies, and a group of elderly people. A population of elderly people with different social, economic and educational characteristics was chosen, so that a final or revised synthesis-version could be confirmed and thus the final formatting of the adapted instrument confirmed.

Measurement equivalence

Next, the measurement equivalence, although partial, of the instrument was undertaken. At this stage, the preliminary psychometric evidence of the instrument was investigated with a larger population of elderly persons, statistically verifying its internal consistency and preliminary validity evidence.

Sample

The samples of the elderly persons participating in the two stages were independent. In other words, the elderly participants of the operational equivalence stage were different from those of the measurement stage. These individuals were selected for convenience from services of health, social care and organized civil society. All were located in the metropolitan area of the municipality of Natal, Rio Grande do Norte. To define the sample participants the suggestion of the authors of the Transcultural Adaptation proposal was considered in the pre-test stage. This recommends the use of around 30 to 40 participants[14], to delineate the participant sample from the operational equivalence stage of the study. In view of this, 30 elderly people participated in this study.

For the measurement equivalence step, the proposals of five respondents per item, on average, was followed[18]. In the case of the present study, the sample group of this stage should total 60 subjects. In practical terms, however, a total of 66 elderly persons were evaluated, adding 10% to the value suggested above. In both above steps, the sample comprised those aged 60 years or older who consented, in a clear and free manner, to participate in this research, and who had retained their mental functions. Elderly persons who did not meet the previously mentioned criteria and which interrupted the interview because they were emotionally affected by the subject matter were excluded from the study.

Data collection, protocols and instruments

Data was collected through interviews, carried out by two previously trained interviewers with a background in psychology. The data of the operational equivalence stage was collected between November and December 2014. The data for the measurement equivalence stage were obtained in January and February 2015. The study was carried out in health and social care units and organized civil

society centers located in the metropolitan region of the city of Natal, Rio Grande do Norte.

The following instruments were used as protocols: a) A sociodemographic questionnaire, which investigated data such as age, gender, place of birth, years of schooling/educational level, marital status, religion, as well as clinical health characteristics and the self-evaluation of perception of interpersonal relationships; b) The Mini Mental State Exam (MMSE), for screening of cognitive impairment, as this instrument is designed for a rapid and practical clinical evaluation of the cognitive state of geriatric patients, for the application of the inclusion criteria of the study; and c) The Vulnerability Abuse Screening Scale (VASS).

Data analysis

Regarding data analysis, the Fleiss' Kappa (k) measurement was used to evaluate the judges of the panel of experts, as well as the elderly persons, regarding the comprehension and acceptability of the items, beyond consensus. This evaluates the reliability of the agreement in the evaluations of the judges and measures the apparent or face validity of the instrument. The interpretation of the Kappa coefficient can be classified as: a) Almost perfect agreement, where values are between 0.81 and 1.00; b) Substantial agreement, where they are between 0.61 and 0.80; c) Moderate agreement, between 0.41 and 0.60; d) Fair, between 0.21 and 0.40; e) Slight agreement, between 0.0 and 0.20 and no correlation, where values are less than zero (0), indicating an absence of agreement[19].

The data obtained in the interviews was categorized and analyzed through descriptive statistics, including frequency, percentages, central tendency and dispersion, with the aim of characterizing the participant sample and the other quantitative results. In the case of dichotomous items, internal consistency analysis was performed using the Kuder-Richardson reliability coefficient (KR-20) to evaluate the internal consistency of the instrument. Inferential statistics were applied to verify discriminant and convergent patterns of the studied data using Student's t-Test, univariate ANOVA and Pearson's correlation, respectively, which were chosen through the verification of the normality of the data, using the Shapiro-Wilk test. Statistics software was used for the analysis of data. The value of statistical significance adopted was equal to or less than 0.05 ($p<0.05$).

Ethical aspects

The study was performed following the approval of the Ethics Research Committee of the Universidade Federal do Rio Grande do Norte (Rio Grande do Norte Federal University) (Nº 97.186/2012; CAAE: 05563712.8.0000.5537), and all the participants signed a Free and Clear Consent Form.

RESULTS

Operational equivalence was satisfactory, with an acceptability of 92.5% among the elderly population studied, which was a total of 30 elderly people, aged between 60 and 81 [Mean (M): 68.07, Standard Deviation (sd): 5.687] years. The reliability of agreement between the judges of the stages was 0.625 (non-elderly expert judges) and 0.585 (elderly judges), respectively. In general, the results presented were acceptable, with values varying from moderate to high, suggesting the surface or apparent validity of the instrument.

Regarding the measurement equivalence stage, the age of the participants ranged from 60 to 84 years old, with elderly respondents (n=38), representing 57.6% of the sample studied. The number of people sharing a residence with the elderly ranged from one to seven people (M: 4.32; sd: 1.511). The households that the elderly persons lived in have, on average, four to nine rooms (M: 5.80; sd: 0.980). The other sociodemographic data can be seen in Table 1.

Health data, regarding the hospitalizations, falls and disabilities of the elderly population studied, can be seen in Table 2.

Data of the evaluation of the perception of the relationship of the individual with different people in their social environment can be visualized in Table 3.

Table 1. Sociodemographic data of the population of elderly persons studied, Natal, Rio Grande do Norte, 2015.

Variables	n	%
Gender		
Male	28	(57.6)
Female	38	(42.4)
Age range		
60 to 64	18	(27.3)
65 to 69	14	(21.2)
70 to 74	8	(12.1)
75 to 79	15	(22.7)
≥80	11	(16.7)
District		
North	15	(22.7)
East	19	(28.8)
West	9	(13.6)
South	9	(13.6)
Rural areas	14	(21.2)
Marital status		
Single	1	(1.5)
Married	45	(68.2)
Widowed	18	(27.3)
Divorced	2	(3.0)
Level of schooling		
Never Studied	13	(19.7)
Primary (Complete or not)	33	(5.,0)
High School (Complete or not)	14	(21.2)
Higher Education (Complete or not)	6	(9.1)
Spend most of the day alone?		
Yes	14	(21.2)
No	52	(78.8)
Receive pension or benefits?		
Yes	54	(81.8)
No	12	(18.2)
Family income (minimum salary)		
Up to 1	3	(4.5)
Between 1 and 6	39	(59.1)
More than 6	24	(36,4)

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Table 2. Aspects related to the hospitalization, falls and disabilities of the population of elderly persons studied, Natal, Rio Grande do Norte, 2015.

Aspects	n	%
Were you hospitalized in the last 12 months?		
Yes	6	(9.1)
No	60	(90.9)
Have you suffered a fall in the last 12 months?		
Yes	10	(15.2)
No	56	(84.8)
Have you stopped your regular activities in the last 15 days for health reasons?		
Yes	9	(13.6)
No	57	(86.4)
Have you been bedridden in the last 15 days?		
Yes	9	(13.6)
No	57	(86.4)
Reason for hospitalization, being bedridden or stopping regular activities for health reasons.		
Does not apply	50	(758)
Respiratory problems, musculoskeletal and/or cardiovascular diseases and/or problems and/or external causes	11	(167)
Doenças e/ou problemas osteomusculares, cardiovasculares e/ou causas externas	5	(7.6)

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Table 3. Evaluation of perception of relationships with different people in the social environment of the elderly person, Natal, Rio Grande do Norte, 2015.

Evaluation of perception	n	%
Relationship with partner		
No partner	21	(31.8)
Poor	8	(12.1)
Regular	21	(31.8)
Good	16	(24.2)
Relationship with children		
No children	1	(1.5)
Poor	27	(40.9)
Regular	29	(43.9)
Good	9	(13.6)
Relationship with grandchildren		
No grandchildren	3	(4.5)
Poor	13	(19.7)
Regular	32	(48.5)
Good	18	(27.3)
Relationship with other people who live in the home		
No other people in home	28	(42.4)
Poor	26	(39.4)
Regular	10	(15.2)
Good	2	(3.0)

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A minimum variance of zero and a maximum variance of 10 points (M: 3.71; sd: 2.404) were observed for total VASS score. If the scores of international studies are taken as a reference, there is a prevalence of 13.6% of elderly people with scores that may indicate a risk of violence.

The KR-20 value for the overall instrument score was 0.688 (Table 4). The KR-20 values for the four subscales proposed by the authors were 0.528, 0.289, 0.552 and 0.303, respectively. Only the internal consistency values of the Vulnerability and Coercion subscales, 0.550 and 0.390 respectively, were approximate to those found in the original study.

Table 4. Reliability: internal consistency of Brazilian version of Vulnerability Abuse Screening Scale (VASS) instrument. Natal, Rio Grande do Norte, 2015.

Scale	Item	Internal consistency		Subscales	Item	Internal consistency	
		KR-20 (IC 95%)	KR-20 (k-1)			KR-20 (IC 95%)	KR-20 (k-1)
Total		0.688 (0.670)		Vulnerability		0.548 (0.526)	
	01		0.632		01		0.536
	02		0.647		02		0.335
	03		0.641		03		0.417
				Dependence		0.289 (0.252)	
	04		0.707[$]		04		0.161
	05		0.667		05		0.104
	06		0.698[$]		06		0.244
From item Nº 01 to 06		0,518		Dejection		0.552 (0.538)	
	07		0.673		07		0.305
	08		0.647		08		0.252
	09		0.638		09		0.694
				Coercion		0.303 (0.288)	
	10		0.696[$]		10		0.035
	11		0.681		11		0.061
	12		0.682		12		0.509
From item Nº 07 to 12		0.485					

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The removal of items Nº 04, Nº 06 and Nº 10 resulted in an increase in the internal consistency index of the total scale. In terms of the internal consistency of the subscales, only the removal of items no. 09, from the Dejection scale, and no. 12, from the Coercion subscale, led to an increase in these values.

Regarding the verification of psychometric properties, the discriminant patterns of the items and external variables were verified in relation to the total VASS score. The Student's t-test was used to verify if there is difference in the total VASS score between certain demographic and social variables, including gender, being alone for most of the day, and hospital admission. Variables such as gender, being alone for most of the day, receiving a pension and/or benefit, hospitalizations in the last 12 months, having been bedridden in the last 15 days, as with items Nº 01, Nº 03, Nº 06, Nº 07 and Nº 09, did not exhibit significant differences in the total score of the scale. The other variables were significant (Table 5).

There was also evidence of the convergent validity of items and external variables in relation to the total score of the scale, which can be seen in table 5. Pearson correlations were used to verify the covariance of the data of each of the items of the instrument with the total VASS score. As expected, to the extent the items on the scale had a positive score, so there was a tendency towards a significant increase in the total score ($p<0.05$), except for item no. 06, which did not exhibit this behavior (Table 6).

Table 5. Mean of Vulnerability Abuse Screening Scale (VASS) and significance of difference with variables studied. Natal-Rio Grande do Norte, 2015.

Variable	n	%	VASS Mean (sd)	*t* (*p*)
Did you suffer a fall in the last 12 months?				3.010 (*p*=0,004)
Yes	10	(15.2)	5.70 (±2.983)	
No	56	(84.8)	3.36 (±2.127)	
Have you stopped your regular activities in the last 15 days for health reasons?				2.244 (*p*=0.028)
Yes	9	(13.6)	5.33 (±3.122)	
No	57	(86.4)	3.46 (±2.196)	
Item Nº 02				6.003 (*p*=0.000)
Yes	10	(15.2)	7,10 (±1.729)	
No	56	(84.8)	3,11 (±1.970)	
Item Nº 04				2.271 (*p*=0.026)
Yes	47	(71.2)	4.74 (±2.023)	
No	19	(28.8)	3.30 (±2.440)	
Item Nº 05				4,589 (*p*=0.000)
Yes	19	(28.8)	5,58 (±2.090)	
No	47	(71,2)	2,96 (±2,105)	
Item Nº 08				5.990 (*p*=0.000)
Yes	11	(16.7)	6.91 (±1.814)	
No	55	(83.3)	3.07 (±1.961)	
Item Nº 10				2.704 (*p*=0.009)
Yes	16	(24.2)	5,06 (±2.594)	
No	50	(75.8)	3.28 (±2.195)	
Item Nº 11				3,441 (*p*=0.001)
Yes	13	(19.7)	5.62 (±2.534)	
No	53	(80.3)	3.25 (±2.147)	
Item nº 12				3.264 (*p*=0.002)
Yes	11	(16.7)	5.73 (±2.573)	
No	55	(83.3)	3.31 (±2.176)	

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Table 6. Result of significant correlations between sociodemographic variables, subscales and items of instrument with the total score of the Vulnerability Abuse Screening Scale (VASS). Natal, Rio Grande do Norte, 2015.

Correlation	*Total VASS Score*	
	Coefficient	*p*
Age range	0.259	0.036
Level of schooling	-0.366	0.003
Did you suffer a fall in the last 12 months?	-0.281	0.022
Item Nº 01	0.704	0.000
Item Nº 02	0.543	0.000
Item Nº 03	0.635	0.000
Item Nº 04	0.298	0.015

to be continued

continued from table 6

Item Nº 05	0.489	0.000
Item Nº 07	0.459	0.000
Item Nº 08	0.538	0.000
Item Nº 09	0.689	0.000
Item Nº 10	0.298	0.015
Item Nº 11	0.359	0.003
Item Nº 12	0.349	0.004
Vulnerability	0.883	0.000
Dependence	0.573	0.000
Dejection	0.777	0.000
Coercion	0.532	0.000

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DISCUSSION

The agreement of the evaluations carried out during the semantic equivalence stage, as verified by the Fleiss kappa measure, was 0.625 and 0.585, which indicates a substantial and moderate agreement, respectively, among the judges[19]. The results of the cross-cultural adaptation of the VASS were satisfactory, indicating the apparent validity of the instrument, which suggests that it is apparently satisfactory for the taking of measurements[20].

In the measurement equivalence step, a minimum variance of zero and a maximum variance of ten points (mean=3.71; sd=2.404) were observed in the total VASS score. If the score values of international studies are taken as a reference, there is a prevalence of 13.6% of elderly persons with scores that may indicate a risk of violence. The prevalence found here is low compared to the international studies cited, which range from 15% to 35%[21-25]. This prevalence is within the averages found in Brazilian studies, which vary from 0% to 21%[26-28].

As Streiner and Norman point out, internal consistency values on the scale of those found in this study, which showed moderate to good internal consistency, are commonplace for brief screening instruments. Values higher than those of the present study can only be obtained with the addition of items to the instrument[29]. Urbina points out that estimates below 0.70 may suggest that the score derived from the test may not be reliable[30]. Therefore, it can be inferred that the increase of internal consistency indices due to the withdrawal of an item may indicate that the test may not be precise for the measurement of the desired construct.

The previously described result (Table 3) seems to indicate that the items with significant results (Nº 02, Nº 04 Nº 05, Nº 08, Nº 10, Nº 11 and Nº 12) are more sensitive for the detection of the phenomenon in question. On the other hand, the non-significance of the difference of the scores of the five other items (Nº 01, Nº 03, Nº 06, Nº 07 and Nº 09) may indicate the reverse (Table 1).

For Cohen, these results emphasize the care the interviewer must take regarding false negative or positive results which can exist among respondents of the screening scale in question, especially due to the number of items on the scale. The author concludes that this type of tool should be used with parsimony and only as a preliminary step in the screening and identification of cases that merit in-depth investigation[7,8].

As expected, to the extent the items on the scale had a positive score, so there was a tendency towards a significant increase in the total score, except for item no. 06, which did not exhibit this behavior. The same behavior was observed for the subscales and the total score. This covariance behavior is

logical and expected. However, the low values, or the nonexistence of a correlation, other than between items Nº 01, Nº 03 and Nº 09, highlights the care that must be taken with the results of the scale, regarding the possibility of false negative and/or positive results[7,8].

It should be noted that falls correlated negatively with the score, although in a very weak manner. Such behavior diverges from the findings in literature, as falls have been related to the phenomenon of violence and/or mistreatment of the elderly[31].

The main limitation of the study is the lack of a gold standard instrument to test the reliability, sensitivity and specificity of the instrument in question. Despite this limitation, the cross-cultural adaptation and verification of the preliminary psychometric properties of the instrument as a self-reporting measure that addresses the indication of domestic violence against the elderly is relevant, and the results were satisfactory.

CONCLUSION

It should be noted that these are preliminary results. Following the verification of suitability and the initial psychometric patterns regarding the use of the instrument for the elderly population, there remains a need to continue with the verification of its robust psychometric properties[32,33]. This can be carried out, for example, through analysis of the evidence of reliability in a test-retest situation, and the validity of the construct and criterion. It should be noted that the internal consistency values found in the present study ranged from moderate to good, indicating that the results are satisfactory, even if initial. Finally, it should be emphasized that when the instrument in question becomes available for practical use, it should not be used in isolation in the investigation of violence against the elderly. Instead it should be contextualized and comprise part of an evaluation protocol, which brings together various procedures, instruments and technologies to assist in the detection of violence against the elderly.

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Received: June 18, 2015
Reviewed: January 28, 2016
Accepted: November 11, 2016

http://dx.doi.org/10.1590/1981-22562016019.160035

Dietary patterns of the elderly: characteristics and association with socioeconomic aspects

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Abstract

Objective: To investigate the association between dietary patterns and the socioeconomic aspects of elderly patients registered with the Family Health Strategy in Viçosa, Minas Gerais. Method: A cross-sectional study with a probabilistic sample was employed. To identify dietary patterns, dietary intake was assessed through a Food Frequency Questionnaire (FFQ) adapted for an elderly population. From the FFQ dietary patterns were identified by factor analysis. After the identification of the dietary patterns, logistic regression was performed considering each different dietary pattern and the related socioeconomic variables. Results: The consumption of a Fat and sugar pattern was greater among women and lower in elderly persons who considered themselves as mixed race. The consumption of the Balanced pattern was also lower among mixed race, married individuals, with one to four years of schooling and from the CDE economic classes. The Fruit and fish pattern was less consumed by elderly persons with 1-4 years of schooling, while the opposite was observed among those with five years or more of study. But the consumption of a Leafy vegetables pattern was lower among those with five or more years of schooling. Conclusion: The evaluation of the consumption of dietary patterns and the establishment of a relationship with the socioeconomic aspects of the elderly helps to achieve a better understanding of risk and protective factors for health.

Keywords: Food Consumption. Health of the Elderly. Socioeconomic Factors.

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INTRODUCTION

Understanding the implications and consequences of the growth of the elderly population in Brazil is a major challenge for public health[1,2]. The health profile of this population group is characterized by the replacement of acute or fatal illnesses with an increase in the number of individuals affected by chronic noncommunicable diseases (CND) and their complications, which have a direct relationship with dietary intake[3-7]. A better understanding of the reality of the diet of the elderly is possible through the development and use of dietary patterns that establish different relationships between nutrition and health processes[8-10].

Evaluating the dietary patterns of the elderly and their association with the social and economic environment in which they are inserted is important to establish a better representation of the reality of the Brazilian elderly with regard to food and health determinants[5,11,12]. Therefore, the present study aimed to investigate the association between dietary patterns and the socioeconomic aspects of the elderly population registered with the Family Health Strategy (FHS) in the municipality of Viçosa, Minas Gerais.

METHOD

An epidemiological cross-sectional study with a random sample was performed of elderly persons of both genders receiving care at all the FHS units in Viçosa, Minas Gerais, from August 2011 to June 2012. The sample size calculation considered a confidence level of 95%, a 65% prevalence of metabolic syndrome and a variability of 5%. The sample therefore contained 331 elderly persons, to which was added 20% to cover potential losses, giving a total of 398 elderly persons. The final sample comprised 402 elderly individuals.

The data was collected through visits to units of the FHS, where a structured and standardized questionnaire, which had been pre-tested in a pilot study, was applied. The socioeconomic and self-reported and demographic variables analyzed were gender, age, skin color/ethnicity, marital status, education (years of study) and economic class. Economic class was assessed and categorized according to the Critério de Classificação Econômica da Associação Brasileira de Empresas de Pesquisa (the Economic Classification Criteria of the Brazilian Association of Research Companies)[13].

To assess food patterns, the Food Frequency Questionnaire (FFQ), a qualitative tool validated for the elderly, was used[14]. This includes a list of foods containing 93 items and the frequency of intake (daily, weekly, monthly, rarely or never). In order to minimize errors in the study, the name of each food on the FFQ and its frequency was read aloud, and it was emphasized that consumption over the previous year was being discussed. No feelings or opinions regarding the responses of the elderly about the consumption of certain foods were expressed.

From the FFQ variables, the dietary patterns of the population were identified. The validity of the construction of food patterns was investigated by exploratory factor analysis to test the relationship between the different foods. The Kaiser-Meyer-Olkin (KMO) coefficient was calculated and Bartlett's sphericity test was applied to assess the applicability and appropriateness of correlations between the variables.

Principal component analysis of the FFQ was carried out, followed by an orthogonal rotation (varimax) to examine the exploratory factor structure, improving the interpretation of the data. The number of factors was defined as the variance graph of the number of components (screen plot), where the steepest points indicate the appropriate number of components to be retained. Foods with a consumption equal to or less than 25% were excluded from the FFQ. Foods that contributed to the characterization of each pattern exhibited factorial loads with values equal to or greater than 0.2, as per Schulze et al.[15]. From this analysis, we identified four patterns of consumption, namely Fat and sugar, Balanced, Fruit and fish and Leafy vegetables. The names of the patterns were created to represent the main components found.

After the extraction of each food pattern, four logistic regressions were performed, considering in each a different food pattern as the dependent variable and the socioeconomic variables as the independent variables. These models were adjusted considering $p<0.05$.

The study fully complied with the guidelines for research involving human beings, in accordance with Resolution n0 196/96 of the National Health Council.

The elderly persons participated voluntarily and signed a Free and Informed Consent Form. The present study was approved by the Ethics Research Committee of the Universidade Federal de Viçosa (the Federal University of Viçosa) (record nº 039/2011).

RESULTS

A total of 402 elderly persons participated in the study, the majority of whom were female (60.56%), brown-skinned/mixed race (48.76%) and married (56.72%). Most had an educational level between one and four years (58.21%) and were classified as being of the lowest economic class, CDE (89.3%) (Table 1).

In Table 2 shows the distribution of the factor loads of the food consumption patterns, extracted from the food present in the FFQ of the elderly persons, as well as the type of food that was part of each pattern and its factor load.

The final multiple logistic regression model for each dietary pattern, according to the socioeconomic variables, is described in Table 3. It was noted that women were 14% more likely to have a dietary pattern of Fat and sugar. With regard to ethnicity/skin color, it is noted that describing oneself as brown-skinned/mixed race reduced the probability of consuming this dietary pattern.

The consumption of a Balanced diet was lower in brown-skinned/mixed race individuals. The same relationship was observed among married elderly persons, with one to four years of schooling and from CDE economic class.

The consumption of the Fruit and fish pattern was lower among elderly persons with one to four years of schooling, with the opposite being observed in those with five or more years of study. But the Leafy Vegetables pattern of consumption was lower among those with five or more years of education.

Table 1. Characterization of sample based on socioeconomic and demographic variables. Viçosa, Minas Gerais, 2012.

Variable	Categories	n (%)
Gender	Male	159 (39.55)
	Female	243 (**60.45**)
Skin color/ethnicity	White/Caucasian	109 (27.11)
	Brown/Mixed Race	196 (**48.76)**
	Black/Afro-Brazilian	97 (24.13)
Marital Status	Single	28 (6.97)
	Married	228 (**56.72)**
	Divorced/separated	19 (4.73)
	Widowed	127 (31.59)
Economic class	AB	43 (10.7)
	CDE	359 (**89.3**)
Level of education	Illiterate	111 (27.61)
	1 to 4 years	234 (**58.21)**
	5 or more years	57 (14.18)

Table 2. Distribution of factor loads of food consumption patterns of elderly persons. Viçosa, Minas Gerais, 2012.

Foods	Food patterns			
	Fat and sugar	Balanced	Fruit and fish	Leafy vegetables
French fries	0.2341	-	-	-
Yucca fries	0.2557	-	-	-
Pork	0.2431	-	-	-

to be continued

continued from table 2

Sausage	0.2242	-	-	-
Crackling	0.2335	-	-	-
Sugar	0.2639	-	-	-
Soda	0.2338	-	-	-
Biscuit and salt Water	-	0.2158	-	-
Chicory	-	0.2014	-	-
Pumpkin	-	0.2640	-	-
Chayote	-	0.2317	-	-
Orange	-	0.2909	-	-
Banana	-	0.2165	-	-
Apple	-	0.2685	-	-
Boiled beef	-	0.2105	-	-
Ground beef	-	0.2167	-	-
Broccoli	-	-	0.2514	-
Watermelon	-	-	0.2772	-
Papaya	-	-	0.2026	-
Pear	-	-	0.3227	-
Cauliflower	-	-	0.2203	-
Fish	-	-	0.2130	-
Cabbage	-	-	-	0.2316
Milkweed	-	-	-	0.3436
Mustard	-	-	-	0.3660

Table 3. Analysis of multiple logistic regression for each dietary pattern, according to socioeconomic variables. Viçosa, Minas Gerais, 2012.

Variables	Dietary pattern							
	Fat and sugar		Balanced		Fruit and fish		Leafy vegetables	
	OR	*p*	OR	*p*	OR	*p*	OR	*p*
Gender								
Male	1.0		---		---		---	
Female	1.14	0.001						
Skin color								
White/Caucasian	1.0		1.0		---		---	
Brown/Mixed race	0.82	0.001	0.53	*0.04*				
Black/Afro-Brazilian	0.36	0.23	0.24	0.42				
Marital status								
Single	---		1.0					
Married			0.93	*0.02*				
Divorced/separated			0.52	0.39				
Widowed			0.66	0.13				
Level of education								
Illiterate	---		1.0		1.0		1.0	
1 to 4 years			-1.08	*0.001*	0.49	*0.01*	0.29	0.12

to be continued

continued from table 3

5 years or more		0.20	0.41	1.62	*0.001*	-0.59	*0.02*
Economic class							
AB	---	1.0		1.0		---	
CDE		0.99	*0.001*	-1.06	*0.001*		

OR: odds ratio.

DISCUSSION

It is observed that food intake among the elderly is mainly influenced by physiological factors related to appetite reduction, deglutition disorders, and decreased gustatory and olfactory ability, which all contribute to the decreased absorption of vitamins, minerals and other nutrients, causing the depletion of nutritional status and health[5,16,17].

The factorial analysis extracted from the FFQ was performed to identify dietary patterns which represent the food intake patterns of the population of the study. Such a methodology has been used in many studies[10,12,18]. Of the four patterns identified, the first, entitled Fat and sugar was considered harmful to health as it consisted of foods high in fat and sugar. The second pattern was composed of carbohydrate-rich foods, fruits, vegetables and meats, and was entitled Balanced; the third had lots of fruit and was also composed of fish, being referred to as Fish and fruit; and the fourth was comprised of leafy vegetables and tea, and was known as Leafy Vegetables.

The Fat and sugar dietary pattern was more common in females, while being brown-skinned/mixed race reduced the probability of the consumption of this dietary pattern. Different studies report that the food consumption of the elderly is marked by a high intake of foods that are rich in fat and sugars and low in the consumption of fruits and vegetables[19,23]. Data from Vigitel revealed the consumption of fruit and vegetables in Brazil is below 400 g/day, the amount recommended by the World Health Organization (WHO)[24].

The reduced consumption of foods that are a source of vitamins and minerals or the adoption of a monotonous diet by elderly can lead to a depletion in the intake of nutrients that are essential for maintaining health and controlling disease[7,25,26]. It is noteworthy that the process of nutritional transition is marked by the excessive consumption of sugars, fats, soft drinks, and the insufficient consumption of fruits, vegetables and fiber, which contributes to the occurrence of unfavorable consumption patterns[5,20].

Maintaining a balanced food intake with the presence of foods such as fruits, vegetables and the low intake of fried foods and fats minimizes the development of cardiovascular diseases among the elderly[27,28]. Among the nutritional strategies to improve nutrition and health are the control of cardiovascular risk factors that accompany lifestyle change, as different dietary patterns modulate various aspects of atherosclerosis and cardiovascular risk factors, such as plasma lipid levels, systemic insulin resistance and glucose metabolism, blood pressure, oxidative phenomena, endothelial function and vascular inflammation[27].

Increased consumption of food sources of saturated fats and sugars is directly associated with a higher prevalence of cardiovascular diseases and obesity[29], and it has been found that cardiovascular disease is 40% more prevalent in areas with lower socioeconomic levels. Similar findings of inadequate intake and overweight were observed in a study by Nascimento et al[30]. When considering these factors as indicators of inadequate dietary habits, studies relating to household surveys have found a heightened growth of overweight and obesity, especially in social strata of lower income[20,28,31].

The Fruit and fish pattern of food consumption was lower in elderly persons with one to four years of study, a finding which was not observed among those with five or more years of study. Recent national data has revealed that elderly Brazilians have an inadequate diet, with a high prevalence of insufficient intake of vitamins A, C, D, E, thiamine and pyridoxine, and the minerals calcium, magnesium, zinc and copper,

as well as the habitual consumption of excessive sodium31. Proper nutrition, with a high consumption of fruit and fish, brings health benefits, reducing the prevalence of NCDs[32].

It should be noted that the present study was based on non-institutionalized, low-income elderly persons. Other studies have shown that this population has a lower calorie diet than those with a high income. It is known that income is a key factor in diet quality, as, because of insufficient economic resources, elderly persons have an inferior dietary pattern than those with greater purchasing power[3,33,34].

The comparison between dietary patterns and socioeconomic aspects in the present study is limited compared to other scientific studies, as works that consider these factors are scarce. The absence of a gold standard to assess food intake, especially among the elderly, is a major limiting factor. In addition, the cross-sectional design of the study makes it impossible to establish a cause-and-effect relationship between the measures assessed.

CONCLUSION

The findings of this study indicate that the Fat and sugar pattern of food consumption was more prevalent among women and less prevalent among those who considered themselves brown-skinned/mixed race. The Balanced pattern of consumption was also lower among brown-skinned/mixed race individuals, as well as those who were married, with one to four years of schooling, and those from the CDE economic class. The Fruit and Fish pattern was consumed less by elderly persons with an education level of from one to four years of schooling, while the opposite was observed among those with five or more years of study. The Leafy Vegetables pattern of consumption, however, was lower among those with five or more years of education.

It is important to emphasize the need for constant monitoring of dietary patterns and the encouraging of healthy eating practices. Such actions can mitigate the effects of poor diet on general health and the incidence of morbidities among the elderly. Studies correlating the dietary patterns and socioeconomic aspects of the elderly should also be encouraged, as the results show strong correlations with risk and protective factors for health. They also provide greater knowledge of the subject and broaden the discussion about the different factors associated with the food consumption of the elderly.

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Received: February 24, 2016
Reviewed: August 22, 2016
Accepted: October 7, 2016

http://dx.doi.org/10.1590/1981-22562016019.160046

Factors associated with metabolic syndrome among the elderly in the northeast of Brazil

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Abstract

Objective: To determine the prevalence of metabolic syndrome (MS) and associated factors in 348 elderly residents of Campina Grande, Paraíba. *Method:* A household survey and clinical/laboratory assessment was conducted. The diagnosis of MS was based on the criteria of the Third Report of the National Cholesterol Education Program Expert Panel on the Detection, Evaluation and Treatment of High Blood Cholesterol in Adults (NCEP-ATP III). The association between MS and socio-demographic factors, health status and lifestyle habits was investigated. The crude and adjusted prevalence ratios were obtained by Poisson regression. Variables with a significance lower than or equal to 0.2 (20%) were tested in a multivariate model. A p value$\leq$0.05 was adopted for the acceptance of the associations in the final model. *Results:* MS was more prevalent among women (64.7%) and those with heart trouble. It was also found that, specifically for women, there was a higher prevalence of MS among those with osteoarthritis. *Conclusion:* The higher prevalence of MS among women and the association of MS with osteoarthritis in this group deserves attention, as this condition can cause functional limitation, affecting the quality of life of the elderly.

Keywords: Metabolic Syndrome. Elderly. Chronic Disease.

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Research funding: Conselho Nacional de Desenvolvimento Científico e Tecnológico (National Council for Scientific and Technological Development) (CNPq) and Ministério da Ciência e Tecnologia (Ministry of Science and Technology) (MCT). Process No. 479579/2007-5. Bid Application Process MCT/CNPq 15/2007.

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INTRODUCTION

Noncommunicable chronic diseases such as heart disease, strokes, diabetes mellitus and cancer account for two-thirds of total global deaths. This is mainly due to an aging population and the clustering of risk factors associated with globalization and urbanization[1].

The physiological changes that occur during the aging process favor the emergence of alterations that make up metabolic syndrome (MS), such as high blood pressure, the abnormal deposition of abdominal fat, changes in lipid levels and, in some cases, blood sugar levels[2,3]. These changes may be associated with a prothrombotic and proinflammatory state[3,4].

Due to the chronicity of the condition, early identification and preventive intervention against risk factors is important in individuals with MS or its components to reduce morbidity and mortality and promote a change in lifestyle[3,4].

In a systematic review, which aimed to determine the prevalence of metabolic syndrome in the elderly, the lowest overall prevalence was 23.2% among elderly Chinese individuals, while the highest prevalence recorded was 67.9% in Mexican elderly persons. Studies have shown a higher prevalence in women and among older elderly persons[5].

Vidigal et al.[6], in a systematic review of different MS prevalence rates in Brazil, found that such rates varied depending on the characteristics of the groups studied, based on the ethnic, cultural and epidemiological variability of the country. The authors found that the overall weighted average for the prevalence of MS was between 28.9 and 29.6%, according to the criteria used to define metabolic syndrome. Specific data on the prevalence of this condition among the elderly population is still scarce in Brazilian studies.

Epidemiological studies on adults and elderly persons have found that MS is associated with age, gender, educational level[3,7], race or ethnicity, hypercholesterolemia, high concentrations of C-reactive protein (CRP), microalbuminuria and hyperinsulinemia[7]. In addition, MS impacts health spending, as its components lead to chronic conditions, burdening the health system[8]. This makes it important to ensure the adequate treatment and control of risk factors, as the chronicity of their components causes irreversible consequences[9].

Given the importance of MS as a risk factor for cardiovascular disease, and as differences in the different population groups surveyed make it difficult to compare results, there is a clear need for further studies on the prevalence of MS, not only among the general population, but especially among elderly people in Brazil. Therefore, the present study aimed to determine the prevalence of metabolic syndrome and associated factors in elderly persons enrolled in the Estratégia Saúde da Família (the Family Health Strategy) in a municipality in the northeast of Brazil.

METHOD

This study is part of a larger study entitled "Multidimensional evaluation of the health of elderly persons attended by the Family Health Strategy in the city of Campina Grande, Paraíba, and degree of satisfaction with the services offered." A cross-sectional home-based study was performed.

The sample was calculated by estimating the prevalence of outcomes of at least 25%. To calculate the sample, the following equation was used: $\{[E^2 x\ p\ (1-p)]\ x\ c\}\ /\ A^2$, where E is the level of confidence (1.96), c is the sample correction coefficient (2.1) for sample by clustering, and A is the acceptable precision for the estimated prevalence (6%). The sample was proportional to each health district of the city and constituted 420 elderly persons. Elderly individuals who did not attend blood collection sessions were excluded from the study, resulting in a sample of 348 elderly persons. A confidence interval of 95% was applied.

The sampling was carried out in multiple stages using clusters. The primary sampling units were six health districts from the city, from which six Basic Family Health Units (BFHU) were randomly drawn. The number of registered elderly persons in each unit was identified and random sampling was performed using a list with all their names. After every elderly person selected for interview the next four names on the list were skipped and the following elderly person selected. This interval was defined by the ratio between the total number of individuals registered and the number selected to participate in

the interview. This step was repeated successively for improved distribution and to ensure that the entire list was covered.

Individuals aged 60 or older of both genders were selected for the sample. Excluded from the study were elderly persons with a severely debilitated clinical state without treatment possibilities, namely those in the terminal stage of disease. Elderly persons without assistants, if assistance was required when answering questions; and those who were absent during the field research in the catchment area of the BFHU where they were registered were also removed from the sample. Those excluded were replaced by the next elderly person in the systematic selection.

Data was collected between August 2009 and May 2010 by three pairs of interviewers who were trained and calibrated in the pilot study. After signing a Free and Informed Consent Form the participants were interviewed at home and were instructed to attend the BFHU at a predetermined time and date for the collection of blood for biochemical assessment. They were also told to fast for 12 hours before blood collection.

The diagnosis of MS was based on the criteria of the revised Third Report of the National Cholesterol Education Program Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults (NCEP–ATP III)[10], which involves the presence of three or more of the following factors: abdominal obesity, hypertriglyceridemia, low levels of high density lipoproteins (HDL), hypertension and high fasting glucose[4]. Abdominal obesity was verified by abdomen circumference (AC), measured using the techniques of Callaway et al[11]. Biochemical evaluation consisted of the analysis of lipid profile and fasting glucose.

In addition to this information, data was collected on gender, skin color/ethnicity (white or non-white), socioeconomic status (A/B, C, D/E), marital status (single, married, widowed, separated), age group (60 to 69 years, 70-79 years or 80 years or more), self-rated health, morbidities (heart problems, osteoporosis, osteoarthritis, chronic lung disease, cancer), smoking (never smoked, smoker, ex-smoker) and regularly practiced exercise (yes, no).

Socioeconomic status was verified by the Critério de Classificação Econômica Brasil of the Associação Brasileira de Empresas de Pesquisa (ABEP) (the Brazilian Economic Classification Criterion of the Brazilian Association of Research Companies)[12] which consists of information on the educational level of the elderly person and family ownership of consumer goods. Each piece of information is related to points which are added to generate a score on the economic stratification scale, corresponding to the economic class to which the elderly person belongs. The elderly persons were classified as belonging to class A/B (17-34 points), C (11-16 points) and D/E (0 to 10 points).

For the self-reported health variable, the elderly individuals were asked how they considered their health and, based on the Likert scale, responded excellent, very good, good, fair and poor. The variable was dichotomized into good (excellent, very good, good) or poor (fair and poor) self-evaluation of health. For the physical exercise variable, an elderly person was considered physically active if he or she regularly performed physical activity for at least thirty minutes three times a week or more[13,14].

The data was tabulated and analyzed using Poisson regression, with the calculation of Exp(B) interpreted as the prevalence ratio (PR_{gross} for bivariate and $PR_{adjusted}$ for the multivariate model) with 95% confidence intervals. For this, the robust estimator in the covariance matrix was used to obtain more robust standard errors. In bivariate analysis, variables with a significance of lower than or equal to 0.2 (20%) were tested in a multivariate model. Finally, a moderation model was used to test the prevalence ratio ($RP_{controlled}$) between osteoarthritis and a change in MS based on gender. A value of $p<0.05$ was adopted for the acceptance of the associations investigated in the multivariate and moderation models.

The study was approved by the Ethics Research Committee of the Universidade Estadual da Paraíba (Paraiba State University) (CAAE: 0228.0.133.000-08).

RESULTS

A total of 348 elderly persons participated in the study, of whom 67.8% were women. The age of the participants varied from 60 to 104 years, with a mean of 71.57 (+9.1) years. The results of bivariate analysis

showed the prevalence of MS and its association with the variables studied. There was a statistically significant association between MS and gender and MS and reports of osteoarthritis. The prevalence of MS was greater among women (PRgross=1.75; CI95%=1.37-2.25) and among elderly persons who reported suffering from osteoarthritis (PRgross=1.26; CI95%=1.05–1.50) (Table 1).

Variables included in the multivariate model were those with a significance of less than or equal to 0.2 in bivariate analysis. These were sex, skin color/ethnicity, heart problems, osteoporosis, osteoarthritis and smoking. Analysis of the results presented in Table 2 shows that only the variables gender and reports of a heart condition were statistically significant for MS. The highest prevalence of MS was found among women (PRadjusted = 1.71, 95% CI 1.31 to 2.22) and among elderly persons who reported a heart problem (PRadjusted=1.20; 95% CI = 1-1,44). In the multivariate model osteoarthritis ceased to have a significant effect. A third model was therefore created to verify that the initial effect of the osteoarthritis variable was due to gender.

An interaction term was therefore created between the variables osteoarthritis and gender (an interaction term is performed by multiplying the two variables)15 and inserted in the multivariate regression together with the variables osteoarthritis and gender. The results showed that only the interaction and the osteoarthritis variable had a significant effect ($p<0.05$), suggesting the lack of significance of osteoarthritis presented in the multivariate model was due to the variable gender.

Table 3 presents a moderation model between osteoarthritis and metabolic syndrome, verifying that the prevalence ratio of osteoarthritis (PRcontrolled) changes depending on gender. The results show that among elderly women only, the osteoarthritis variable demonstrated statistically significant results for the occurrence of MS (PRcontrolled=1.23; 95% CI=1.03 to 1.46).

Table 1. Bivariate Poisson Regression (PRgross) in relation to the outcome of metabolic syndrome and associated factors. Campina Grande, Paraíba, 2010.

	Metabolic Syndrome				
	No	Yes	RP_{gross}	CI 95%	*p*
	n (%)	n (%)			
Gender					
Male	69 (61.6)	43 (38.4)			
Female	77 (32.6)	159 (67.4)	1.75	1.37 – 2.25	<0.01
Skin color/ethnicity					
White	63 (37.5)	105 (62.5)			
Non-white	83 (46.1)	97 (53.9)	1.16	0.97 - 1.39	0.10
Socio-economic level					
A/B	71 (43.6)	92 (56.4)			
C	61 (39.9)	92 (60.1)	1.17	0.77 - 1.49	0.69
D/E	14 (43.8)	18 (56.3)	0.98	0.81 - 1.43	0.41
Marital status					
Single	11 (50.0)	11 (50.0)			
Married	97 (47.7)	107 (52.5)	1.05	0.68 – 1.62	0.83
Widowed	29 (28.2)	74 (71.8)	1.44	0.93 – 2.22	0.21
Separated	9 (47.4)	10 (52.6)	1.05	0.58 – 1.91	0.87
Age group					
80 years or more	26 (44.8)	32 (55.2)			
70 to 79 years	53 (46.1)	62 (53.9)	0.97	0.73 – 1.30	0.87

to be continued

continued from table 1

	Metabolic Syndrome				
	No	Yes	RP_{gross}	CI 95%	*p*
	n (%)	n (%)			
60 to 69 years	67 (38.3)	108 (61.7)	1.12	0.86 – 1.45	0.40
Self-related health					
Good self-evaluation	48 (41.0)	69 (59.0)			
Poor self-evaluation	98 (42.4)	133 (57.6)	0.97	0.81 – 1.18	0.80
Heart problems					
No	115 (44.4)	144 (55.6)			
Yes	31 (35.8)	58 (65.2)	1.17	0.97 – 1.4	0.11
Osteoporosis					
No	126 (43.8)	162 (56.3)			
Yes	20 (33.3)	40 (66.7)	1.19	0.97 – 1.46	0.10
Osteoarthritis					
No	105 (46.7)	120 (53.3)			
Yes	41 (33.3)	82 (66.7)	1.26	1.05 – 1.50	0.01
Chronic lung disease					
No	135 (41.8)	188 (58.2)			
Yes	11 (44.0)	14 (56.0)	0.96	0.67 - 1.39	0.85
Cancer					
No	142 (42.3)	194 (57.7)			
Yes	4 (33.3)	8 (66.7)	0.15	0.77 – 1.74	0.49
Smoker					
Never smoked	57 (37.0)	97 (63.0)			
Smoker	20 (46.5)	23 (53,.5)	0.85	0.62 - 1.15	0.29
Ex-Smoker	69 (45.7)	82 (54.3)	0.96	0.71 - 1.04	0.12
Regular physical exercise					
No	103 (42.2)	141 (57.8)			
Yes	43 (41.1)	61 (58.7)	0.98	0.80 - 1.18	0.80

Table 2. Multivariate Poisson Regression (PRadjusted) in relation to the outcome of metabolic syndrome and associated factors. Campina Grande, Paraíba, 2010.

	$RP_{adjusted}$	CI 95%	*p*
Gender			
Male		--	
Female	1.71	1.3 - 2.22	<0.01
Skin color/ethnicity			
White		--	
Non-white	1.10	0.92 – 1.31	0.28
Heart problems			
No		--	
Yes	1.20	1.00 – 1.44	0.05

to be continued

continued from table 2

Osteoporosis			
No		--	
Yes	0.92	0.73 – 1.15	0.45
Osteoarthritis			
No		--	
Yes	1.15	0.96 – 1.38	0.14
Smoker			
Never smoked		--	
Smoker	0.92	0.68 – 1.26	0.61
Ex-Smoker	0.96	0.80 – 1.16	1.16

Table 3. Poisson Regression Analysis (PRcontrolled). Campina Grande. Paraíba. 2010.

Gender	Osteoarthritis	$RR_{Pcontrolled}$	CI 95%	*P*
Male	No			
	Yes	0.66	0.32 – 1.37	0.27
Female	No			
	Yes	1.23	1.03 – 1.46	0.02

DISCUSSION

A SSM comprises the pathophysiological changes related to the metabolic disorders that have a major influence on the life of the elderly, due to the impairment caused by the limitations imposed by its components. These can directly impact the quality of life of elderly individuals through the emergence of associated chronic conditions[16].

Among the main factors associated with MS are obesity, diabetes mellitus, cardiovascular diseases, renal diseases, osteoarticular diseases and hypertension. The combination of these factors and metabolic syndrome among the elderly has so far been investigated both in Brazil[9,16,17] and in other countries[18,19] in an incipient manner, as the studies in question considered heterogeneous age samples. There is therefore a lack of scientific evidence about the role of MS in different health outcomes in the elderly population.

In the present study, there were no significant associations between MS and socioeconomic status, marital status, age group, health self-assessment, chronic pulmonary disease, reports of cancer or regular physical exercise. However, surveys of the elderly have described the importance of some of these variables as risk factors for MS[3,9,17].

It is therefore advisable to encourage health education strategies for self-care, including the adoption of a healthy diet and changes in lifestyle, such as stopping smoking, for the prevention of the individual components of MS.

The results of multivariate analysis showed a higher prevalence of MS in women and elderly persons who reported heart problems. Other studies of the elderly have also found a higher prevalence of MS among women with[20] and without cardiac problems[21] and differences btween genders when considering the components of the syndrome either in isolation or in combination with other cardiovascular risk factors[22].

This higher prevalence of MS among elderly women may be due to the fact they have a greater deposition of body fat, which, in addition to the reduction in estrogen levels that comes with advancing age, influences the onset of dyslipidemia and abdominal fat[23]. The termination of the production of estrogen causes physiological changes, raises levels of lipids and provides a risk for certain diseases. It can therefore

impact on health, compromising the quality of life of women[24].

As the deposition of body fat, hyperglycemia and dyslipidemia are significant for the involvement of MS, actions of prevention and control are encouraged, including physical exercise and the adoption of healthy eating habits, which impact on reducing weight and levels of lipids and glucose. Thus, in addition to preventive aspects, the evaluation of patients based on their metabolic profile, with early recognition of risk factors, is desirable to identify and treat patients at high cardiovascular and metabolic risk[3].

The present study verified an association between heart problems and MS. In general, MS is associated with twice the risk for cardiovascular diseases such as myocardial infarction, strokes and cardiovascular mortality, as well as resulting in a 1.5 times greater risk for all-cause mortality[3].

The relationship between the pathophysiology of MS and increased cardiovascular risk is not conclusive, but there is evidence that insulin resistance is the main factor behind the progression of the condition to hyperinsulinemia and hyperglycemia, causing peripheral vasoconstriction and sodium retention. Furthermore, the development of the pathophysiology of MS brings increased production of triglycerides, cholesterol, low density lipoprotein (LDL) and apolipoprotein B, predisposing the individual to the onset of atherosclerosis, as well as hypertension and hyperlipidemia[3].

A systematic review found that the components of MS are independent risk factors for the development of atherosclerotic cardiovascular disease. The diagnostic criteria of this syndrome are based on the principle that its risk factors can interact synergistically, or increase the risk of coronary artery disease and atherosclerosis[16].

As the morbidity and mortality caused by these diseases have repercussions on the epidemiological profile of Brazil and, consequently, represent a financial cost to the health system, there is a need for monitoring and prevention of MS through intervention actions in the health sector and specific programs of the Sistema Único de Saúde, aimed at reducing risk factors through the control of obesity, regular physical exercise, improvements in the lipid and glucose profile and control of blood pressure levels.

The alteration in the prevalence ratio due to gender was observed in these results after the inclusion of the interaction term in the analysis, with the osteoarthritis variable found to have a significant effect on the presence of MS among women. Studies show that osteoarticular diseases, including osteoarthritis, are comorbidities that are associated with MS[18,19]. This is the most prevalent form of arthritis and a leading cause of disability in people aged 65 or more. Its symptoms appear after 40 years of age and affect more women than men after 50 years of age[25].

It is believed that its relationship with MS is due to alterations in metabolism and inflammation, as the pathogenesis of the diseases involves common metabolic abnormalities, including low grade inflammatory conditions with the elevation of systemic inflammatory markers. There are clear pathogenic roles for inflammatory mediators such as tumor necrosis factor alpha (TNFalfa) and interleukin 1 beta (IL1β) in both MS and osteoarthritis. Leptin, a pro-inflammatory hormone produced by macrophages in adipose tissue, is a key mediator of metabolic dysregulation associated with obesity and has also been associated with the pathogenesis of osteoarthritis[18].

These findings are relevant because the chronic outcomes reported by the elderly are causes of functional limitations, which are common at this stage of life, yet preventable. In addition to the risk related to metabolic disorders and to the associated factors investigated here, the functional limitations caused by osteoarthritis, which greatly affects this age group, lead to an impaired quality of life and functional capacity.

The present study has some limitations that should be considered when analyzing the results, including sample loss due to the non-attendance of elderly persons for blood collection and the inability to establish the causality of the associations obtained, as the study has a cross-sectional design. The possibility of recall bias for the variables mentioned, in addition to survival bias, should be considered. These biases are common when working with the elderly and can reduce the strength of the associations.

CONCLUSION

The association of metabolic syndrome with osteoarthritis among women suggests a need to focus more closely on prevention, considering the differences observed between the genders and the prevalence and the severity of the associated problems.

There are many issues involving metabolic syndrome that remain unclear, including the importance of early diagnosis, studies that compare the difficulty of using different diagnostic criteria, the characteristics of the population and the different clinical aspects involving the syndrome in both the young and the elderly. It is therefore suggested that studies with more representative samples of the Brazilian elderly population are carried out, including of population groups from different regions of the country, as the aging of the Brazilian population occurs in different manners, being either slow or fast depending on the level of development of the region in question.

Metabolic syndrome is related to chronic diseases, and thus constitutes an important public health problem. Determining the prevalence of this syndrome in specific groups and the general population contributes to the adoption of effective preventive measures.

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Received: March 6, 2016
Reviewed: August 17, 2016
Accepted: October 11, 2016

http://dx.doi.org/10.1590/1981-22562016019.150227

Correlations between low back pain and functional capacity among the elderly

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Abstract

Objective: To investigate the association between low back pain and functional capacity among non-institutionalized elderly persons. *Method:* A cross-sectional observational study of non-institutionalized elderly persons was performed. The Timed Up and Go (TUG) and Sitting-Rising Test (SRT) functional tests were used, together with the Roland Morris Disability Questionnaire (RMDQ). *Result:* A total of 99 elderly persons of both genders were included. Kendall's Correlation analysis showed a significant correlation between the RMDQ and the SRT scores for the act of sitting (p=0.001) and the act of lifting (p=0.028). Despite the statistical significance, these two variables were weakly correlated (r=-239;r=-163). The results also identified a statistically significant correlation between the TUG and SRT tests for the act of sitting (r=-222; p=0.003) and the act of lifting (r=-206; p=0.006). *Conclusion:* It was observed that most of the non-institutionalized elderly persons had good functional capacity. It is also possible to affirm that there is an association between low back pain and functional capacity.

Keywords: Low Back Pain. Motor Activity. Quality of Life. Aging. Elderly.

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INTRODUCTION

Low back pain is highly incidental, can be triggered by several factors and interferes with the functionality of adults and the elderly[1]. Yet its presence without the existence of associated orthopedic or rheumatic diseases is increasingly common. This symptom has been shown to be related to changes in muscle function[2,3].

The static and dynamic stability of the spine is made possible by the joint action of passive tissues and contractile elements[4,5]. Impaired function of the spinal muscles can result in muscle fatigue, due to the excessive overloads that are imposed on the passive elements of the lumbar spine (intervertebral discs, capsules and ligaments) promoting the plastic deformation of these structures, which are sensitive to distension, and triggering low back pain[6].

Pain-related disability affects emotional, psychosocial, and functional capacity, and mainly affects the elderly. The functional health of the elderly has been associated with quality of life (QoL), social interaction, intellectual status, emotional state and the attitude of the individual about the world. Functional capacity has attracted increasing attention in recent years, as disability can lead to an increase in the number of chronic diseases and cause difficulties in maintaining autonomy, which is strongly linked to quality of life, during old age. This decline can make the elderly individual dependent on other people or some type of care[7-10]. Considering the growing global elderly population, this dysfunction has generated a great deal of discussion about healthy aging.

According to Collucci[11], the population over 60 will more than triple in the next 20 years, from the current 22.9 million (11.34% of the population) to 88.6 million (39.2%). Positions such as those of Spirduso[12], who conceptualized aging as "a process or set of processes that occur in living organisms and that with the passage of time lead to a loss of adaptability, functional deficiency, and, finally, death" and Rossi et al[13], who related aging to bodily deterioration, decline and disability, are relevant to the discussion of this issue.

Low back pain is a major cause of complaints among these individuals, triggering excessive negative beliefs and fears, characterized by increased pain associated with the practice of any physical activity, where elderly individuals feel the algia means they are incapacitated and prevented from performing simple activities of daily living such as sitting, rising and walking. The insertion of the elderly into physical activities results in a greater capacity for autonomy, which, in turn, can improve their QoL[14].

Physical exercise promotes improvement in functional capacity and physical fitness. The benefits from increased levels of regular physical activity range from improved functional capacity to the regulation of blood pressure and a reduced risk of cardiovascular disease, osteoporosis, diabetes, and certain types of cancer[15].

A great deal of research has recently been undertaken regarding the aging process, from its causes to ways of minimizing the degenerative effects that occur with increasing age, in order to provide the elderly with a healthy and quality aging process16. This study described the importance of understanding aspects related to functionality and low back pain in the elderly, as such knowledge can contribute to the construction of public policies and activities in general that can contribute to the health of the elderly.

Therefore, the objective of the present study was to verify the association between low back pain and functional capacity in non-institutionalized elderly persons, using functional tests and the Roland Morris Disability Questionnaire (RMDQ) to measure to what extent they are affected by this dysfunction.

METHOD

An observational cross-sectional study of elderly persons was carried out. The study was submitted and approved by the Ethics Research Committee of the Universidade de Cuiabá (The University of Cuiabá) under CAAE number 33829114.7.0000.5165.

Based on a proportion of functional disability in the exposed population of 60%, a proportion of functional disability in the non-exposed population of 45%[17], a significance level of 5% (two-tailed test) and 80% test power, the minimum sample required was calculated as 84 participants. A further 20% of elderly persons were included to cover eventual

losses, giving a calculated sample size was 100 participants. One of the participants did not agree to sign the Free and Informed Consent Form (FICF), resulting in a final sample of 99 elderly people of both genders, who attended the Maria Ignês França Auad and Padre Firmo Duarte Social Centers, both located in Cuiabá. All the individuals were initially consulted about the study proposal and asked if they were interested in participating in the research. After agreeing, they signed the FICF. Those who refused to participate were free to go. Those with dysfunctions caused by stroke, traumatic orthopedic injuries or other pathologies that prevented them from carrying out the functional tests were excluded. Data was collected between September and November 2014.

All those selected in the study were interviewed and completed an identification form containing data about their age, gender and educational level. Three tests were then carried out:

1) Application of the Portuguese language version of the RMDQ for quantification of low back pain, with 24 items with scores of zero or one (yes or no), the sum of which can range from zero (suggesting no disability) to 24 (severe disability). This questionnaire has a cutoff score of 14, that is, individuals with a score greater than 14 have a disability[18].

2) Teste Timed Up and Go (TUG) to assess balance, risk of falls, and functional capacity. The test consists of the observation of a subject as they get up from a chair, walk three meters in a straight line, return to the chair and sits down. This course is timed in seconds and the performance of the subject is graduated according to the time required to complete the task. A time of up to ten seconds is considered normal for healthy, independent adults with no risk of falling; between 11 and 20 seconds is considered normal for the frail or disabled elderly, with partial independence and a low risk of falls, who tend to be independent in most activities of daily living; and over 20 seconds indicates a significant decline in physical mobility and a risk of falls[19].

3) Sitting and Rising Test (SRT) assesses flexibility of the lower limb joints, balance, motor coordination and the relationship between muscle power and body weight, in what can be characterized as minimum muscular fitness. To perform the test the following instruction is given by the evaluator: "Without becoming unbalanced, try to sit and then to rise from the floor, using the minimum support that you believe is needed". Once the act of sitting has been completed, a score is awarded and the subject is asked to stand up so the evaluator can check the note. Crossing the legs when sitting or standing is allowed, but the individual is not permitted to throw themselves backwards while trying to sit. The SRT measure consists of quantifying how many supports (hands and/or knees or hands on knees or legs) the individual uses to sit and get up from the floor, with one point subtracted for each support. Independent scores are assigned for each of the two actions - sitting and rising. The maximum score is 5 for each of the two actions. A further half a point is removed for any perceptible imbalance[20].

Descriptive (mean, standard deviation) and inductive (Kendall Correlation Coefficient Test) statistics were used, adapted to the specific conditions of the results obtained.

RESULTS

A total of 99 individuals were evaluated, of whom 18 were men with a mean age of 68.3 (±5.3) years and 81 were women with a mean age of 73.3 (±5.35) years. A total of 27% of the sample had completed high school. The rest had a lower educational level.

The mean, standard deviation and confidence intervals of the mean (95%) RMDQ score and the time spent in the TUG and SRT tests are shown in table 1.

In analysis of the RMDQ score, 81 elderly persons (81%) reported low back pain, with a mean duration of 9.7 (±10.74) years and a mean score of 7.26. These individuals did not suffer from a disability related to the presence of low back pain. On the other hand, nine (12%) had a cutoff score (>14) indicating functional disability related to low back pain.

When SRT score was analyzed the same elderly patients with pain had a mean score of 1.94 when sitting and a mean score of 1.41 when rising, indicating a decrease in minimum muscular fitness.

Table 2 presents the time-weighted TUG scores. Of the 99 individuals, 66% of could be considered independent and did not have a risk of falls. However, one of the elderly persons had a score associated with an increased risk of falls.

Table 1. Results of Ronald Morris Disability Questionnaire (RMDQ), Timed Up and Go (TUG) and Sitting and Rising Test (SRT). Cuiabá, Mato Grosso, 2014.

Variables	Mean ± sd	CI 95%
RMDQ	7.26 (±5.27)	6.18-9.49
TUG	12.21 (±12.18)	9.78-14.64
SRT-S	2.13 (±1.28)	1.87-2.39
SRT-R	1.57 (±1.16)	1.34-1.80

sd: Standard Deviation; CI95%: Confidence Interval of 95%.

Table 2. Distribution of Timed Up and Go Scores. Cuiabá, Mato Grosso, 2014.

Time (sec)	n	*Score*
<10	66 (66%)	Normal – independent
11 to 20	32 (33%)	Partial Independence and low risk of falls
20 to 29	1 (1%)	Mobility impairment and risk of falls

Correlation Analysis

Roland Morris Disability Questionnaire X Sitting and Rising Test

Kendall's correlation analysis revealed a significant negative correlation between the RMDQ score and the SRT score for sitting (r= -239, p=0.001) and rising (r=-163, p=0.028). Despite the statistical significance, these two variables were weakly correlated. It was found that the less serious the disability related to low back pain of an individual is, the better his or her physical fitness will be. Below are the dispersion diagrams for the action of rising with the RMDQ (Figure 1) and the action of sitting with the RMDQ (Figure 2).

Timed Up and Go v Sitting and Rising Test

The results show that there was a significant negative correlation between the TUG and the SRT for both the action of sitting (r=-222, p=0.003) and the action of rising (r=-206, p=0.006). This indicates that the lower the physical capacity of the elderly person, the lower their physical fitness. The dispersion diagram for the analysis of TUG and SRT is below (Figure 3).

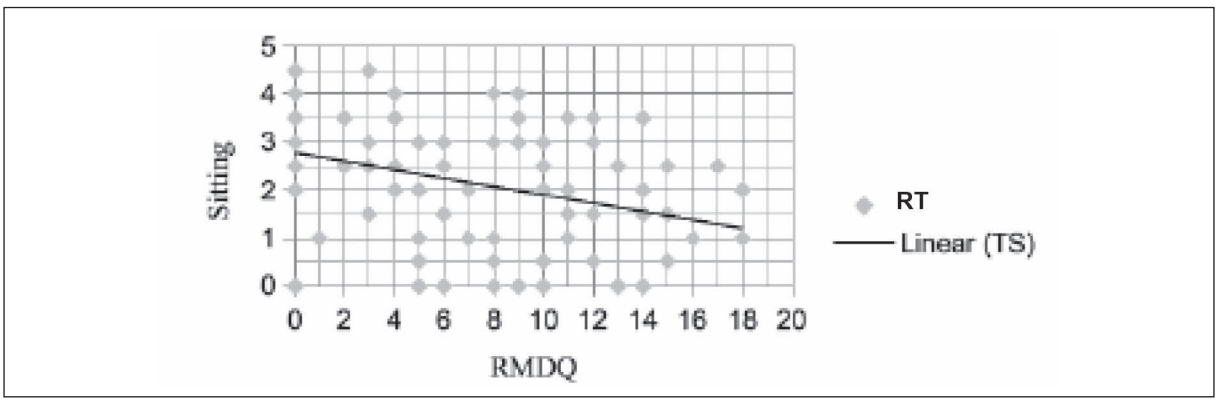

Figure 1. Dispersion Diagram of Sitting and Rising Test (Rising) and Ronald Morris Disability Questionnaire (RMDQ). Cuiabá, Mato Grosso, 2014.

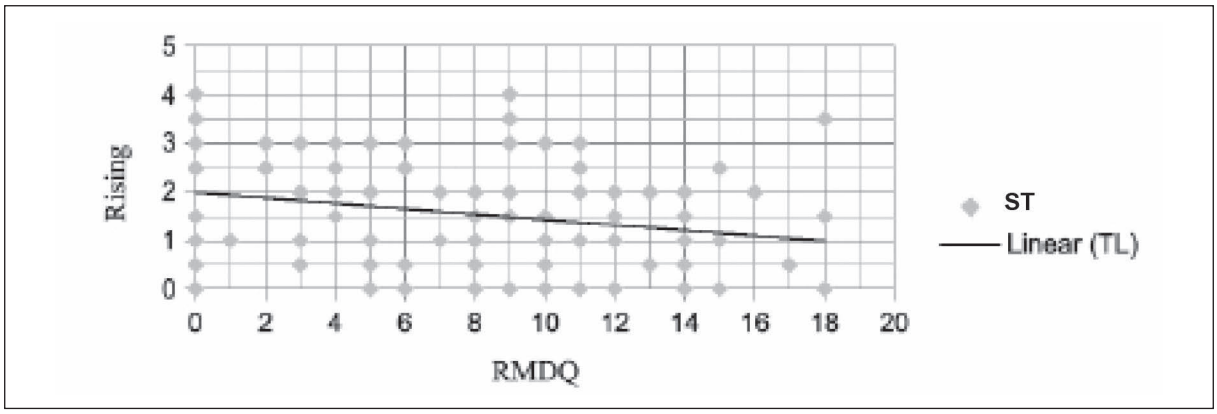

Figure 2. Dispersion Diagram of Sitting and Rising Test (Sitting) and Ronald Morris Disability Questionnaire (RMDQ). Cuiabá, Mato Grosso, 2014.

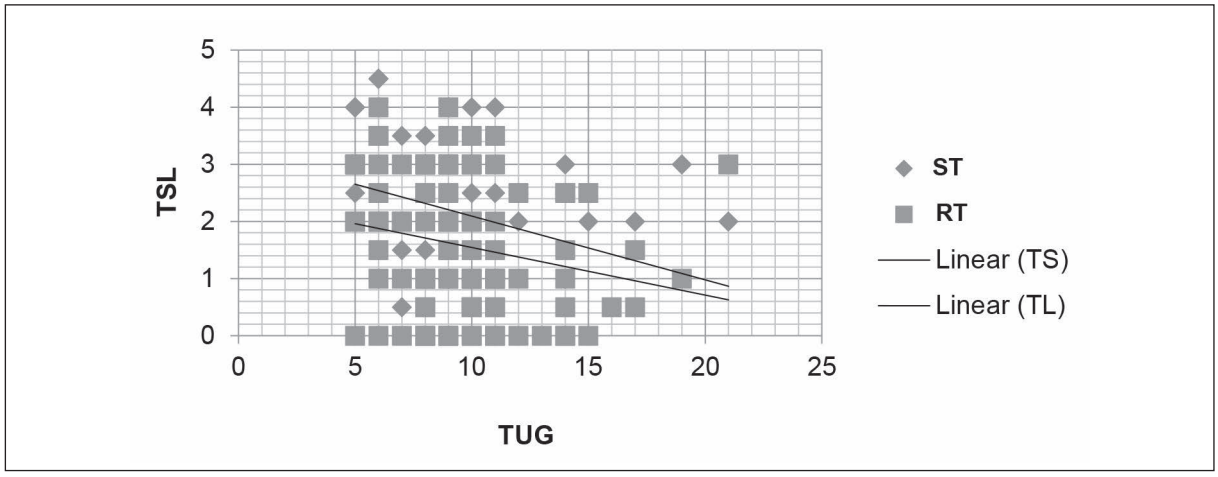

Figure 3. Dispersion Diagram of Timed Up and Go (TUG) and Sitting and Rising Test (SRT). Cuiabá, Mato Grosso, 2014.

DISCUSSION

Among the findings of the present study, it was notable that there was a high incidence of low back pain (81%) among elderly persons evaluated with the RMDQ, despite having an active life. Trellha[21], in a similar study, found a prevalence of low back pain of 50%. The high susceptibility of this population to this symptomatology is evident, as only 12 individuals of the sample of this study presented a score equal to or greater than 14 in the RMDQ. The other individuals may have physical disability due to low back pain[18].

As with other studies, there was an association between low back pain and functional limitation, which mainly restricted occupational and leisure activities[22,23]. According to Ocarino et al.[24], low back pain can lead to a deficiency in both functional and physical performance.

Another result identified in the present study was the low educational level among the elderly. This is an important finding, as according to Gomes et al.[25], educational level affects the overall capacity of an individual to deal with the challenges of

everyday life. Generally, elderly persons with a low educational level have limited financial resources, less access to health care and few sources of knowledge, resulting in a poorer health condition and greater susceptibility to falls.

While the evidence of a positive association between the RMDQ and SRT results requires further research, the findings of the present study allow the observation that flexibility is a physical capacity that conditions the individual for the performance of activities of daily living, as several studies have already demonstrated that its loss may be harmful to individuals[26]. Other studies have shown that aging accompanied by a loss of flexibility can result in the partial loss of the independence of movements.[27]

A significant negative correlation was found between the time spent on the TUG test and the SRT for sitting (p=0.003), while there was weak correlation for rising (p = 0.006). According to Roorda et al.[28], sitting and rising are among the most routinely practiced activities in daily life and performance in these actions is closely related to the risk of falls. Gomes et al.[29] emphasized the decline in physical fitness, explaining that this factor is related to the reduction of levels of muscle strength, impaired walking performance and changes in balance, which together increase the risk of falls.

Considering the high incidence of low back pain with physiological changes, such as the loss of strength and flexibility, impaired body balance, and a high risk of falls, in the aging process, it can be inferred that exercise, in addition to combating physical inactivity, contributes significantly to the maintenance of the physical fitness of the elderly, both in terms of health and functional abilities[30].

One of the limitations of this study One of the limitations of the present study was the sample size, which was small considering the total number of people who used the social centers. However, the right of the elderly to refuse to participate in the study was guaranteed. A second limitation was the lack of multivariate analysis. The bivariate analysis performed in the study, however, was sufficient to validate the applicability of the results found, as it allowed the associations between the complaints of low back pain and the functional tests of this population to be identified.

CONCLUSION

While it can be concluded that most of the non-institutionalized elderly persons who were evaluated had good functional capacity, it is possible to affirm that there is an association between low back pain and functional capacity. It is also possible to affirm that there is an association between low back pain and functional capacity.

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Received: March 29, 2015
Reviewed: May 10, 2016
Accepted: October 31, 2016

http://dx.doi.org/10.1590/1981-22562016019.160034

Prevalence of falls and evaluation of mobility among institutionalized elderly persons

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Abstract

Objective: The present study aimed to estimate the prevalence of falls among institutionalized elderly persons and identify associated factors. *Method:* A cross-sectional study of elderly residents of Care Facilities For the Elderly in Natal, Rio Grande do Norte, was carried out. The elderly persons could walk independently and did not have severe cognitive impairment. Data was obtained about the institution and socio-demographic and health information was collected. A physical examination was performed to evaluate frailty, mobility and balance (Timed up and go, Berg Balance Scale, Gait speed and Sitting-rising Test - SRT). Statistical analysis was performed using the Chi-squared Test for a 5% significance level. *Results:* Sixty-three elderly persons were within the search criteria. Of these 22.2% had fallen in the past year. Only the SRT was associated with these falls. *Conclusion:* It was concluded that the studied population has a low prevalence of falls, and the ability to perform less than 5 repetitions in the SRT was associated with episodes of falling.

Keywords: Elderly. Accidental Falls. Movement. Homes for the Aged

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INTRODUCTION

The current epidemiological trend in Brazil is of an aging population, with a substantial increase in the number of elderly persons and a declining birth rate. With the growing number of individuals aged over 60 and many families unable to provide caregivers for specialized care, Long Term Care Facilities for the Elderly (LTCFEs) have emerged as a common housing option. However, many elderly persons living in these institutions are more frail or suffer from poorer health. In addition to these intrinsic characteristics, a lack of mobility and leisure stimuli within LTCFEs means residents are often less active than they would otherwise be, with resultant complications for health[1,2].

Complaints of postural instability are among the most common problems affecting these individuals[3]. A meta-analysis4 published in 2012 reported a prevalence rate of 3% for falls among the elderly, most of which could have been prevented or controlled. The risk factors for these falls were musculoskeletal diseases, metabolic disorders, depression and vestibular, neurological and cardiovascular diseases, as well as the presence of sedentarism, polypharmacy and large numbers of comorbidities[4,5].

As it affects mobility, lack of postural balance determines the dependence of individuals in the performance of activities of daily living. It also has psychological consequences (fear of falling and social isolation) and results in an increased risk of falls and poor quality of life. Elderly persons with limited mobility face a greater risk of falls during their daily activities[6], while the onset of dependence represents one of the greatest fears of this population[3]. In this context, it should be noted that other than high levels of morbidity, complications resulting from falls are the main cause of death for elderly persons over 65 years of age[7].

The mobility of elderly persons is, therefore, an important factor to be studied to prevent falls and their consequences. One of the most common methods for assessing mobility is by using physical performance tests to study posture, gait and transfer[6]. The justification for the present study is the possible determination of the profile and characteristics of the institutionalized elderly people who are most susceptible and have the greatest propensity to falls, with a view to establishing prevention strategies and reducing the risks arising from these incidents.

The present study aimed to estimate the prevalence of falls among elderly residents in ten Long Term Care Facilities For the Elderly registered with the Health Surveillance Department of the city of Natal in the state of Rio Grande do Norte. An additional aim was to establish an association between the mobility of elderly persons and falls.

METHOD

A cross-sectional study was performed with elderly persons living in LTCFEs in the city of Natal. All the institutions were registered with Vigilância Sanitária (VISA) (the Health Surveillance Department), and included both private and non-profit institutions. Of the 14 LTCFE registered with VISA four refused to participate in the study, leaving a total of ten participating institutions (five private and five non-profit organizations).

Included in the study were all the elderly persons who were present in the LTCFE when the research took place, providing they were able to walk, with or without assistance, and did not suffer from severe cognitive impairment, measured using the Pfeiffer questionnaire8. Bedridden patients and those in wheelchairs were excluded due to their inability to perform the physical tests for functional evaluation. Individuals with severely impaired communication, who did not speak Portuguese or who were disorientated or agitated at the time of the research were also excluded. The data was collected between the months of October and December in 2013.

Data collection was divided into two parts. First, a questionnaire was completed by the elderly individuals and caregivers and complemented with data collected from medical records. This was followed by a physical evaluation of the elderly persons.

Data regarding the occurrence of falls during the previous year was obtained from several sources through the direct questioning of each elderly person and their responsible caregiver or health professional. The responses were confirmed by searches of medical and nursing records to minimize recall bias and make the data as reliable as possible.

The descriptive variables, collected with the purpose of characterizing the study sample, were assessed using a data collection form with questions directed at the elderly individuals and caregivers, as well as using information collected directly from the medical records of said individuals. The variables were as follows: general variables related to each institution (type of institution, time resident in institution and elderly/caregiver relationship), sociodemographic data (gender, race, age, marital status and education) and health of patient (presence of illnesses, use of medications, presence of nocturia, dependence, fragility, depressive symptoms, fatigue, nutritional status, cognitive level and performance of physical exercises).

After the collection of this data, the following tests were performed to assess risk of falls: Timed Up and Go (TUG)[9], Sitting and Rising Test (SRT)[10], Gait Speed Test (GST)11 along with the tests which form the Berg Balance Scale (BBS)[12].

For the TUG[9] the values used were: performed in less than 20 seconds (low risk of falls); between 20 and 29 seconds (medium risk of falls); and 30 seconds or more (high risk of falls). For the SRT[10], the number of successive times that each elderly person was able to repeat the action of sitting then rising from a chair in 30 seconds was recorded. The results for this test were categorized based on median value. For the GST11, the time it took for each individual to walk a course of 4.6 meters was calculated. For statistical analysis, the results were converted into meter/second (m/s) units and adjusted by the median height for men and women.

To assess frailty, the five criteria proposed by Fried et al.[11] were considered: unintentional weight loss (more than 4.5 kg) in the past year; muscle weakness, using the Jamar® hand dynamometer and measured in kilogram-force (KGF); level of physical activity, measured using the short version of the International Physical Activity Questionnaire (IPAQ)[13]; exhaustion, evaluated by respondents' own reports of fatigue in response to questions seven ("I felt that everything I did was an effort") and twenty ("I could not get going") of the Center for Epidemiological Studies Depression Scale[14]; and GST[11]. Using this data, the frailty variable was classified and categorized into 'frail + pre-frail' and 'non-frail', as presented in the study.

Cognitive capacity was evaluated using the Pfeiffer[8] questionnaire and categorized into: absence of cognitive decline, slight, moderate or severe cognitive decline. Individuals with severe cognitive decline were excluded.

Symptoms of depression were evaluated using the Geriatric Depression Scale[15] and classified by the presence or absence of depressive symptoms.

Functional capacity was described using the Katz Scale16 and classified as either dependent or independent. Nutritional status was described using body mass index (BMI) and classified as underweight, healthy or overweight.

After data collection, descriptive analysis was performed to characterize the group, in addition to bivariate analysis using the Chi-squared test with a significance level of 5%.

The research conformed with all the criteria and requirements established by Resolution 466/2012 of the National Health Council and obeyed the recommendations of the Research Ethics Committee of the Universidade Federal do Rio Grande do Norte (Federal University of Rio Grande do Norte) (UFRN). It was approved under No. 013/2014 and CAAE No. 0290.0.051.000-11. All the elderly individuals involved consented to participate by signing a Free and Informed Consent Form.

RESULTS

The total number of elderly persons from the ten LTCFEs was 386. Following application of the inclusion and exclusion criteria of the study, 63 elderly people were classified and evaluated, as shown in Figure 1.

The majority of the elderly individuals who suffered falls were white women who resided in non-profit LTCFEs. They had been resident in such facilities for less than 42 months (Table 1) and were frail or pre-frail. They suffered from nocturia, were independent, and exhibited cognitive decline and signs of fatigue. They were also overweight, performed low levels of physical activity and made use of polypharmacy (Table 2). However, this data was only descriptive and did not identify differences between groups.

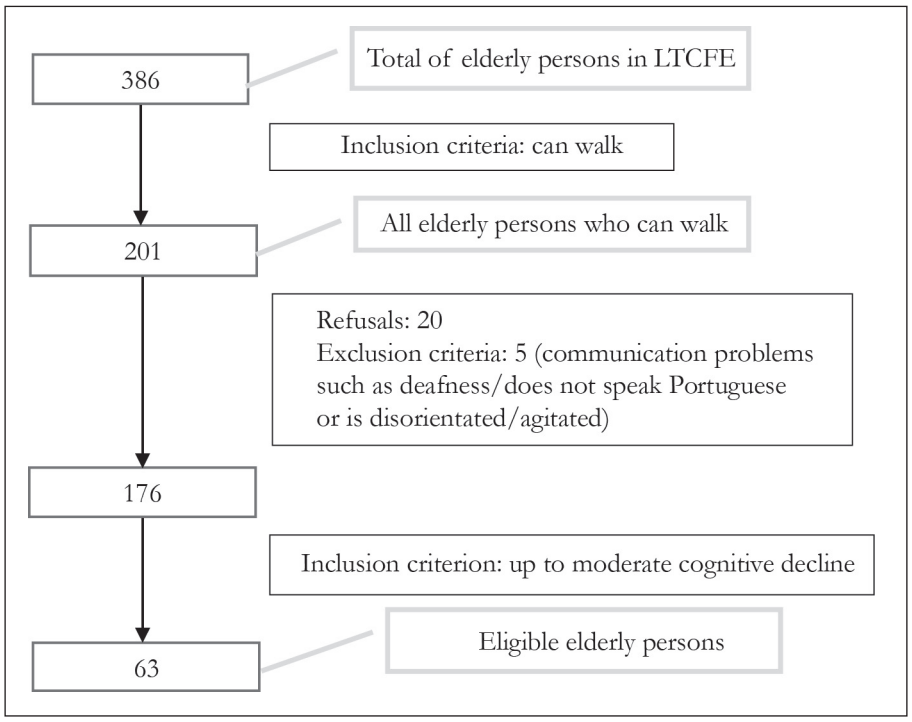

Figure 1. Flowchart of application of inclusion and exclusion criteria and total number of elderly persons eligible for the study. Natal, Rio Grande do Norte, 2013.

The median age for the studied population was 79 years, and those who suffered falls were between 65 and 92 years old with a median of 80.5 years. The prevalence of falls among the elderly persons evaluated was 22.2% (95% CI=11.94-32.46). Of the physical examinations used to evaluate the mobility of the elderly, only SRT was associated with falls (Table 3).

Table1. Characterization of institutionalized elderly persons according to sociodemographic data and information from the institution. Natal, Rio Grande do Norte, 2013.

	Falls n (%)	No Falls n (%)
Sociodemographic data		
Gender		
Female	10 (71.42)	40 (81.63)
Male	4 (28.57)	9 (18.36)
Schooling		
Illiterate-PSI	3 (21.42)	32 (65.30)
PSII and upwards	11 (78.57)	17 (34.69)
Skin color/ethnicity		
White/Caucasian	10 (71.42)	24 (48.97)
Others	4 (28.57)	25 (51.02)
Marital status		
Single, widowed or separated	14 (100)	46 (93.87)
Married	0 (0)	3 (6.12)
Data from institution		
Elderly person/caregiver relationship		

To be continued

Continued from Table 1

	Falls n (%)	No Falls n (%)
>7.5	6 (42.85)	33 (67.34)
Between 1 and 7.5	8 (57.14)	16 (32.34)
Time of residence		
43 months or more	5 (35.71)	28 (57.14)
42 months or less	9 (64.28)	21 (42.85)
Type of institution		
Non-profit/public	10 (71.42)	39 (79.59)
Private/commercial	4 (28.57)	10 (20.40)

PSI: Primary School I; PSII: Primary School II.

Table 2. Characterization of institutionalized elderly persons according to health parameters. Natal, Rio Grande do Norte, 2013.

	Falls n (%)	No Falls n (%)
Health data		
Nocturia		
Yes	11 (100)	34 (69,38)
No	0 (0)	6 (12,24)
Frailty		
Frail + pre-frail	12 (85.71)	42 (85.71)
Non-frail	2 (14.28)	7 (14.28)
Katz		
Dependent	4 (28.57)	12 (24.48)
Independent	10 (71.42)	37 (75.51)
Pfeiffer		
With cognitive decline	10 (71.42)	40 (81.63)
Without cognitive decline	4 (28.57)	9 (18.36)
Geriatric depression scale		
With depressive symptoms	6 (42.85)	17 (34.69)
Without depressive symptoms	8 (57.14)	32 (65.30)
Fatigue		
Yes	11 (78.57)	33 (67.34)
No	3 (21.42)	16 (32.34)
Nutritional scale		
Underweight	1 (7.69)	8 (17.77)
Eutrophic	4 (30.76)	16 (35.55)
Overweight	8 (61.53)	21 (46.66)
Level of physical activity		
Medium/Low	10 (71.42)	27 (55.10)
High	4 (28.57)	22 (44.89)
Number of illnesses		

To be continued

Continued from Table 2

2 or more	9 (64.28)	28 (57.14)
0 or 1	5 (35.71)	21 (42.85)
Number of medications		
5 or more	8 (57.14)	27 (55.10)
0 to 4	6 (42.85)	22 (44.89)

Table 3. Bivariate analysis: association between mobility and falls among institutionalized elderly persons. Natal, Rio Grande do Norte, 2013.

	Falls n (%)	No falls n (%)	*p*	PR (CI)
Risk of falls (Berg)				
Yes	7 (35)	13 (75)	0.107	2.69
No	7 (16.7)	35 (83.3)		(0.79-9.17)
Sitting-Rising Test				
<5	8 (38.1)	13 (61.9)	0.032*	3.69
>6	6 (14.3)	36 (85.7)		(1.07-12.68)
Gait Speed				
0 to 0.59	9 (29)	22 (71)	0.201	0.45
>0.6	5 (16.1)	26 (83.9)		(0.13-1.54)
Timed Up and Go				
Mean/high risk	8 (28.6)	20 (71.4)	0.182	2.32
Low risk	5 (14.7)	29 (85.3)		(0.66-8.13)

*p<0.05; Chi-squared test.

DISCUSSION

Falls among the elderly can be considered common events, with a lower occurrence among those living in the community than among institutionalized elderly individuals[18]. However, the prevalence of falls found in the present study (22.2%) was low in relation to the values found in several studies of elderly persons living in the community and in LTCFEs, which varied from 30 to 39%4,19-21. Possibly, the low mobility stimuli in the sample in the present acted as a decisive factor for a lower prevalence than those described in literature (the elderly persons fall less as they move little).

Several factors are associated with a greater risk and incidence of falls in the elderly population. Among these, living in a LTCFE assumes great prominence and relevance, considering the characteristics of the institutionalized elderly, who have a greater tendency to frailty and reduced functional capacity[21]. Frailty is predictive for the loss of functional capacity, and a prospective study determined that it is a marker for recurrent falls[22].

The female gender, as the study shows, is described in literature as a factor that increases the chance of falls among the elderly[5,19,23,24]. However, the causes that can explain and/or justify this finding are scarce and controversial, leading to discussion that the greater frailty of elderly women is the result of reduced muscle strength and lower lean mass[19]. Another justification may be related to the higher incidence of chronic diseases among elderly women and the greater exposure to behaviors considered as risk, linked to the role of women in the social and family context[19]. Despite this evidence, other studies have not identified

a significant difference between men and women for the risk of falls[25].

The high number of comorbidities is an important characteristic of the profile of the elderly who suffer from falls, with hypertension, diabetes and dyslipidemias the most common such diseases[23]. In this study, the majority of elderly people who had fallen in the last year had two or more associated diseases.

The use of polypharmacy was another characteristic of the elderly persons who suffered falls in the present study. Data has shown that polydrug use is considered a powerful risk factor not only for falls but also for fractures among the elderly[23], although this finding is not unanimous among studies[26]. The use of certain medications, such as opioids, antipsychotics, anxiolytics, hypnotics and antidepressants, may be associated with the presence of symptoms which can influence the occurrence of falls, such as dizziness, instability and fatigue.

Independent elderly persons fall more as they move around without help, and self-confidence is often the factor that leads to falls[27]. Gait itself is also considered a risk factor for falls among the elderly[28]. In this study, the prevalence of falls was higher among independent elderly persons, confirming that independence and mobility are closely associated.

Similarly, elderly persons with greater cognitive decline are more susceptible to falls as they do not adopt an adequate risk-protective posture. Dementia has been identified as a factor that increases the risk of falls[29]. In this study, it was found that the majority of elderly people who suffered falls had some degree of cognitive decline.

Other findings of this study were the greater prevalence of falls among overweight and fatigued elderly persons and those with a low level of physical activity, which explained the low body stimulation and instability. Elderly physical activity programs improve balance, flexibility, and gait speed, preventing falls[30].

In terms of physical state, mobility, balance and postural control disorders are considered the main contributors to the occurrence of falls[23]. Institutionalized elderly people with a mobility deficit, even if mild, are at risk for falls, and it is necessary to institute prevention strategies[31] that avoid the morbidities that arise from episodes of falling.

The present study used three instruments to evaluate the body and postural balance of the elderly, simulating activities of daily living, self-care and mobility: SRT, GS and TUG. The BBS was used to assess the possible risk of falls. However, the data found in bivariate analysis showed that episodes of falls are statistically associated to only one mobility test, the SRT, and that there was no difference in risk of falls compared to the BBS. A similar[32] study carried out in a LTCFE in Brazil also found that there was no association between the TUG and the BBS for the risk of falls.

The SRT shows that a lower ability to perform the requested repetitions in the test equated to a greater possibility of the individual falling. In this study, most elderly people who suffered falls performed fewer than five repetitions of sitting and rising movements, confirming their characteristics of frailty and movement limitations.

In contrast, some studies found associations between the BBS and the TUG regarding falls among the elderly[32,33], including that older an individual, the worse their functional balance and, consequently, the greater the risk of falls[33]. Also, in relation to GS, studies have found an association between change in gait and the occurrence of falls. It is likely that the reduced sample in this study was not able to reflect the situation of immobility and physical limitation of the institutionalized elderly in all the physical tests, and, therefore, the associations were not significant.

Some limitations were identified in this study, such as the possible memory bias of the elderly and/or caregivers when questioned about the presence of falls, bias related to the possible insufficient recording of the chronic diseases of the elderly in medical records, and the reduced number of elderly persons who underwent physical-functional evaluation, either due to physical limitations or refusal to participate in the study, thus impairing statistical analyzes. Despite this, the study of a common collective health event, as well as the functional evaluation of frail elderly persons, makes this study important.

As this is a cross-sectional study and therefore cannot infer cause-and-effect situations, it is suggested that further longitudinal studies are performed to evaluate the true influence of physical-functional deficits on falls among institutionalized elderly persons.

CONCLUSION

The institutionalized elderly population of Natal, Rio Grande do Norte, exhibited a prevalence of falls of 22.2%, and the capacity to perform fewer than five repetitions in the sitting and rising mobility test was associated with episodes of falling. Therefore, measures to stimulate mobility and activities that promote body balance should be established in such institutions with a view to improving spatial and corporal perception and as a form of prevention of falls and their complications.

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Received: February 26, 2016
Reviewed: September 14, 2016
Accepted: October 31, 2016

http://dx.doi.org/10.1590/1981-22562016019.160043

Factors associated with the institutionalization of the elderly: a case-control study

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Abstract

Objective: to identify the factors associated with the institutionalization of the elderly. *Method:* a case-control, population-based study was performed with 387 elderly people. The study considered cases of elderly people (n=191) living in long-term care facilities, and a control group (n=196) who lived in homes in urban areas of the city. Both groups were identified from the records of the Family Health Strategy and were randomly selected. Institutionalization was considered a dependent variable, and sociodemographics, clinical factors, functional status, and cognitive impairment were considered independent variables. Comparison between groups was analyzed using the Chi-squared and Pearson tests and the logistic regression model was used in adjusted analysis, with measurements of effect expressed as odds ratio with a 95% confidence interval. Variables with $p \leq 0.20$ were considered for entry in the multiple model. *Results*: variables that remained associated with institutionalization in multiple analysis were: not having a partner (OR=9.7), not having children (OR=4.0), presenting cognitive impairment (OR=11.4), and depending on others to perform basic activities of daily living (OR=10.9). *Conclusion*: cognitive impairment and dependency for basic activities of daily living were more strongly associated with institutionalization. Home care strategies and preventive actions for risk factors should be stimulated to delay the referral of elderly people to Long Term Care Facilities for the Elderly, and to develop strategies that allow the elderly to remain socially active.

Keywords: Elderly. Homes for the Aged. Risk Factors. Dementia. Activities of Daily Living.

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INTRODUCTION

The prolongation of life has become a reality in Brazil due to the reduction of mortality rates and infectious diseases and a significant evolution in health care. However, with a greater proportion of elderly people, the importance of conditions of dependency, which will at some point require greater care, increases[1].

A number of complications, such as the presence of chronic diseases and limitations in activities of daily living, mean there is a need for professional monitoring of health, including referral to long-term care facilities for the elderly (LTCFE)[2].

Today, LTCFE operate with practically all their beds occupied, and growth of between 100% and 500% in the number of elderly people in need of non-family care can be expected in the next decade. Therefore, institutions will have to absorb much of this demand[3]. The need for care outside the home is due to the installation of chronic diseases and their complications and the unavailability of family members to provide the continuous support that elderly dependents need, either because of the difficulty of staying at home full time or due to the impossibility of hiring specialized professionals[4].

A number of reasons for institutionalization have been reported. In a study by Perlini et al.[5], the factors most cited by relatives when deciding to institutionalize an elderly person were the reduced number of family members, the absence of physical, financial and psychological conditions for the provision of home care and the desire of the elderly to not disturb their family members. Relationship problems with relatives, widowhood, multiple diseases and dementia syndrome were the reasons identified by Fonseca et al.[6].

Understanding the factors that lead to institutionalization are fundamental if family members and health professionals are to be aware of prevention possibilities and can identify when institutionalization is truly required. The administrators, legislators and supervisory bodies of the LTCFE can, through greater knowledge of indicators of institutionalization, organize measures to better receive and manage this population. The present study therefore aimed to identify the main factors associated with the institutionalization of the elderly.

METHOD

A population-based case-control study with 387 elderly residents was carried out in a medium-sized municipality, located in the north of Rio Grande do Sul, 293 km from the state capital. The estimated population was 187,298 thousand inhabitants. Of these, 22,222 were elderly, being aged 60 years or over[7].

The case group was represented by 191 individuals aged ≥60 years living in an LTCFE, and a control group made up of 196 individuals aged ≥60 years living in urban households of the municipality. Institutionalized elderly people from other municipalities were excluded in order to maintain the same origins for cases and controls.

At the time of collection, the municipality had 16 LTCFE, which housed 363 elderly persons. Of these, 13 of those selected agreed to participate (288 elderly), of which three were philanthropic and ten were private. The sample calculation indicated that 186 elderly people would be needed for the case group, plus 10% to compensate for possible losses (refusals and ineligibility), totaling 205 interviews. Individuals aged ≥60 years were selected from each LTCFE based on the proportion that each facility represented of the total.

Controls were selected from the urban territorial division demarcated by the Coordenadoria de Proteção Social Básica (Basic Social Protection Coordination) of the municipality of Passo Fundo, Rio Grande do Sul. This body divides the municipality into four major sectors: Sector I: northeast region; Sector II: northwest region; Sector III: southeast region; Sector IV: southwest region. Based on these territorial divisions, a Unidade Básica de Saúde (Basic Health Unit) (UBS) was drawn from each of the sectors, from which the records (name and address) of all individuals aged ≥60 years were obtained. From the list of these elderly persons, 52 subjects were drawn from each quadrant, to ensure one control for each case, giving a total of 208 elderly people.

The data was collected from April to August 2014 in households and the LTCFE by a trained team composed of six scholarship students and volunteers from the undergraduate nursing course of the University of Passo Fundo, Rio Grande do Sul. A structured questionnaire was applied under the continuous supervision of the researcher responsible.

The elderly were interviewed individually, in specifically reserved locations, both in the LTCFE and in their homes. If it was the randomly selected elderly person was unable to respond, the information was obtained from the caregiver or guardian in the household and by the responsible staff member in the LTCF.

Elderly persons who were hospitalized on the day of the interview were excluded. The losses were individuals who were not found in the household after three attempts by the interviewers on alternate days and times.

The defined outcome was institutionalization. The following variables were investigated to identify the possible factors associated with institutionalization in an LTCFE: gender; age; skin color/ethnicity; marital status; schooling; monthly income; number of children; practice of physical activity and self-reported health status; use of medication; presence of cognitive impairment and disability for basic activities of daily living (BADV). We investigated the presence of chronic diseases, including dementias. Among the possible dementias, Alzheimer's and other unspecified dementias (cases in which dementia was diagnosed but not classified) were found in medical records.

In order to investigate the presence of cognitive impairment, the Mini mental State Exam (MMSE) was used with the following cutoff points: 13 points for illiterate elderly people, 18 points for those with low and medium schooling (up to eight years of schooling) and 26 points for elderly persons with high levels of schooling (above eight years of schooling)8. The Pfeffer functional activities questionnaire (PFAQ)9, a scale applied to the caregiver/responsible person when the elderly person is unable to respond, whether due to severe dementia, aphasia, deafness, etc., was also used. This consists of verifying the presence of cognitive impairment from the capacity of the individual to perform certain functions, for example: if they are able to heat water, make a cup of coffee and turn off the stove after use; if they are able to greet friends properly; or pay attention to and discuss a television or radio program, among other activities. There are 11 questions with a maximum score of 33 points and a higher score represents a greater degree of dependence, which suggests the presence of cognitive impairment. The answers must conform to the standard of: yes, is capable (0); never did but could do now (0); has difficulty but does by self (1); never did and would have difficulty doing now (1); requires assistance (2); dependent (3). Scores greater or equal to 6 suggest cognitive impairment10.

The Katz Index11 was used to evaluate the performance of BADL. This evaluates the functional capacity to perform some basic daily activities, such as bathing, dressing, going to the bathroom, transferring from bed to chair and vice-versa, sphincter control and unassisted feeding. The elderly with a classification of A were considered independent, or in other words, independent for all activities, while those classified as B, C, D, E, F, G and Other, or in other words dependent for at least one activity, were considered dependent.

Pearson's Chi-squared and Fisher's exact tests were used to compare the groups. In the multivariate analysis, logistic regression was used, with measures of effect expressed in odds ratio (OR) and 95% confidence intervals (95% CI). Variables with $p \leq 0.20$ were considered for entry into the model.

The research project was approved by the Research Ethics Committee of the Universidade de Passo Fundo, under opinion nº 504.100/2014. The elderly individuals or their carers signed a Free and Informed Consent Form before the interviews were carried out.

RESULTS

A total of 387 people aged ≥60 years old were divided into 191 (49.4%) elderly people living in LTCFE and 196 (50.6%) elderly persons living in areas covered by the BHU. The majority were between 70 and 79 years old (34.6%). The mean age was 75.1 years (± 9.9), and 64.6% were female, 81.1% were white/Caucasian and 69.6% lived without partners (Table 1). In 27.9% of the interviews, help from third parties was necessary to complete the questionnaire.

Distribution by gender was similar between the institutionalized and non-institutionalized groups. In terms of income, the proportion of those earning above three minimum wages was four times greater in the institutionalized group ($p=0.003$). The percentage of elderly persons who did not attend

school was higher in the institutionalized group (p <0.001) (Table 1).

A total of 90.5% of the institutionalized elderly and 49.5% of the elderly who lived in their homes had no partner (p<0.001). When analyzing age group, 49.2% of the institutionalized elderly persons were over 80 years old, compared to 16.8% (p<0.001) of the elderly who lived at home. Of the institutionalized elderly, 37.7% had no children, compared with 9.2% of the elderly who lived in households (p<0.001) (Table 1).

The practice of physical activity was significantly lower among the institutionalized elderly (30.4%). In the institutionalized group, 50.3% needed support when walking or did not walk, while among those who lived at home the proportion was 12.2% (p<0.001) (Table 2). Among the difficulties or disabilities for walking, those who used wheelchairs or were bedridden (65.7%) prevailed in the institutionalized group (p=0.003).

In the search for chronic diseases and disabilities, the institutionalized elderly persons had higher and more significant percentages of Alzheimer's (26.3%), Parkinson's (9.5%), other unspecified dementias (13.7%) and stroke motor sequelae (13.7%). Of those who lived at home, hypertension (69.9%), heart disease (27.0%) and cancers (10.7%) were the most common (Table 2).

There were symptoms suggestive of dementia (using the MMSE and PFAQ tests) in 81.2% of the institutionalized elderly and 12.8% of those resident in households (p<0.001). At least one basic activity of daily living was dependent (75.9% among the institutionalized and 9.7% among the elderly living in households) (p<0.001) (Table 2).

Table 1. Distribution of institutionalized elderly persons (cases) and elderly persons resident in households (controls) for sociodemographic variables (N=387). Passo Fundo, Rio Grande do Sul, 2014.

Variables	Cases n (%)	Controls n (%)	Total n (%)	*p*
Gender				
Male	59 (30.9)	78 (39.8)	137 (35.4)	0,067
Female	132 (69.1)	118 (60.2)	250 (64.6)	
Age group (in years)				
60 to 69	35 (18.3)	91 (46.4)	126 (32.6)	<0,001
70 to 79	62 (32.4)	72 (36.7)	134 (34.6)	
≥80	94 (49.2)	33 (16.8)	127 (32.8)	
Schooling				
None	171 (90.5)	21 (10.9)	65 (17.3)	<0,001
Some	18 (9.5)	172 (89.1)	311 (82.7)	
Marital status*				
Without partner	119 (62.3)	97 (49.5)	268 (69.6)	<0,001
With partner	72 (37.7)	99 (50.5)	117 (30.4)	
Children				
Yes	119 (62.3)	178 (90.8)	297 (76.7)	<0,001
No	72 (37.7)	18 (9.2)	90 (23.3)	
Income* (minimum salary)				
Up to 1	102 (60.7)	98 (51.9)	200 (56.0)	0,003
1 to 3	52 (31.0)	86 (45.5)	138 (38.7)	
+ 3	14 (8.3)	5 (2.6)	19 (5.3)	

* Missing information (interviewees could not respond).

A total of 2.6% of the institutionalized elderly persons did not use medication, while among those living at home the proportion was 11.8% (p=0.001) (Table 2). The percentage of institutionalized elderly persons that used six or more drugs was 57.4, compared to 22.5% (p<0.001) of those who lived at home. There was no significant difference in self-reported health between institutionalized and non-institutionalized elderly.

In terms of estimated risk, crude analysis showed that as age advances, the chance of institutionalization increases. Elderly people who did not have a partner, who were illiterate, who did not have children, who did not practice physical activity, who needed assistance to walk or did not walk, who used medication, who had been diagnosed with Alzheimer's disease, other non-specified dementias, Parkinson's, or stroke motor sequelae had greater chances of institutionalization. The elderly persons who exhibited cognitive impairment (in the MMSE and PFAQ Tests) and were dependent for BADL presented a statistically greater risk of institutionalization (Table 3).

The following variables remained significant after adjusted analysis: without a partner (single, separated, widowed) (OR=9.7 – CI95%: 4.03-23.46), absence of children (OR=4.0 - CI95%:1.73-9.28). Cognitive impairment (OR=11.4 – CI95%: 5.59-23.40) and dependence in BADL (OR=10.9 - CI95%: 5.26-22.72) (Table 3).

Table 2. Distribution of institutionalized elderly (cases) and those living at home (control) for clinical variables (N=387). Passo Fundo, Rio Grande do Sul, 2014.

Variables	Cases n (%)	Controls n (%)	Total n (%)	*p*
Performs physical activity				
Yes	58 (30.4)	110 (56.1)	168 (43.4)	<0,001
No	133 (69.6)	86 (43.9)	219 (56.6)	
Difficulty walking				
Yes	96 (50.3)	24 (12.2)	120 (31.0)	<0,001
No	95 (49.7)	172 (87.8)	267 (69.0)	
Alzheimer's*				
Yes	50 (26.3)	1 (0.5)	51 (13.2)	<0,001
No	140 (73.7)	195 (99.5)	335 (86.8)	
Parkinson's*				
Yes	18 (9.5)	4 (2.0)	22 (5.7)	0.002
No	172 (90.5)	192 (98.0)	364 (94.3)	
Other dementias				
Yes	26 (13.7)	2 (1.0)	28 (7.3)	<0.001
No	164 (86.3)	194 (99.0)	358 (92.7)	
Stroke motor sequelae				
Yes	26 (13.7)	5 (2.6)	31 (8.0)	<0.001
No	164 (86.3)	191 (97.4)	355 (92.0)	
Arterial hypertension				
Yes	84 (44.2)	137 (69.9)	221 (57.3)	<0.001
No	106 (55.8)	59 (30.1)	165 (42.7)	
Arterial hypertension				
Yes	26 (13.7)	53 (27.0)	79 (20.5)	0.001

continua

Continued from Table 2

Variables	Cases n (%)	Controls n (%)	Total n (%)	*p*
No	164 (86.3)	143 (73.0)	307 (79.5)	
Cancer				
Yes	6 (3.2)	21 (10.7)	27 (7.0)	0.004
No	184 (96.8)	175 (89.3)	359 (93.0)	
Medication				
Yes	186 (97.4)	172 (88.2)	358 (92.7)	0.001
No	5 (2.6)	23 (11.8)	28 (7.3)	
Cognitive impairment				
Yes	155 (81.2)	25 (12.8)	180 (46.5)	<0.001
No	36 (18.8)	171 (87.2)	207 (53.5)	
Dependent for BADL				
Yes	145 (75.9)	19 (9.7)	164 (42.4)	<0.001
No	46 (24.1)	177 (90.3)	223 (57.6)	
Self-reported health				
Excellent / good	94 (49.2)	105 (53.6)	199 (51.4)	0.391
Regular/poor/very poor	97 (50.8)	91 (46.4)	188 (48.6)	

* Missing information was excluded (interviewees who could not respond); CVA: Cardiovascular Accident (stroke); BADL: basic activity of daily living.

Table 3. Gross and adjusted analysis of factors associated with the institutionalization of elderly persons. Passo Fundo, Rio Grande do Sul, 2014.

Variables	OR* (IC95%)	*p*	OR┼ (IC95%)	*p*
Gender		0.067		
Male	1.00			
Female	1.47 (0.96-2.25)			
Age (year)		<0.001		
60-69	1.00			
70-79	2.23 (1.32-3.79)			
≥80	7.40 (3.95-13.88)			
Marital status		<0.001		<0.001
Partner	1,00		1.00	
Without partner	9.69 (5.17-18.15)		9.72 (4.03-23.46)	
Schooling		<0.001		
With schooling	1.00			
Without schooling	2.59 (1.45-4.60)			
Children		<0.001		0.001
Yes	1.00		1.00	
No	5.98 (2.38-6.70)		4.01 (1.73-9.28)	
Physical activity		<0.001		
Yes	1.00			
No	2.93 (1.90-4.52)			

To be continued

Continued from Table 3

Variables	OR* (IC95%)	*p*	OR┼ (IC95%)	*p*
Independent gait		<0.001		
Yes	1.00			
No	7.24 (4.12-12.72)			
Medication		<0.001		
No	1.00			
Yes	4.97 (1.81-13.60)			
Alzheimer's		<0.001		
No	1.00			
Yes	69.64 (8.06-601.81)			
Other dementias				
No	1.00	<0.001		
Yes	15.37 (3.42-68.94)			
Parkinson's		0.001		
No	1.00			
Yes	4.50 (1.52-13.29)			
Stroke motor sequelae		<0.001		
No	1.00			
Yes	6.05 (2.22-16.49)			
Cognitive impairment		<0.001		<0.001
No	1.00		1.00	
Yes	29.45 (13.73-63.15)		11.43 (5.59-23.40)	
BADL Independence		<0.001		<0.001
Yes	1.00		1.00	
No	29.36 (13.46-64.01)		10.94 (5.26-22.72)	

*OR: Gross Odds Ratio; ┼OR: Adjusted Odds Ratio calculated by multiple logistic; BADL: Basic activity of daily living. a.

DISCUSSION

When the groups of institutionalized and non-institutionalized elderly persons were compared, a higher concentration of elderly individuals aged over 80 years was observed in the care facilities, a finding that corroborates those in literature[12,13]. One survey reported that the risk of institutionalization is 9.5 times greater among elderly persons aged over 80 years[12]. However, the analyzes of the present study allowed us to conclude that advanced age is not associated with institutionalization, but rather with the dependencies that accompany it. Factors that may explain this finding are that, with increasing age, situations of dependence increase, whether due to physical or mental decline, frailties, or a greater chance of presenting chronic noncommunicable diseases and their complications, which often motivates the process of institutionalization[14].

In terms of marital situation, the institutionalized group had a high proportion of elderly people without a partner (90.5%), a common finding in surveys carried out in institutions[15-17]. The absence of children was also relevant in the process of institutionalization. In such situations, when the elderly confront difficulties in daily living or have other dependencies, they also face difficulties in receiving care at home due to changes in family profile (absence of children or children

who emigrated). The decision to remain single, the absence, whether by widowhood, separation or divorce, of a spouse, who are traditionally shown to be the main caregivers at home, increases the risk of institutionalization[17]. There are reports in literature that people living alone have a greater chance of institutionalization, with men having a 70% greater chance, and women a 30% greater chance. Those with spouses are protected from institutionalization by the fact that, on average, they have a higher education and income, their own home and better housing conditions[18].

The proportion of physical inactivity identified in the institutionalized elderly was in agreement with other studies[13,15]. However, the physical activity variable lost significance when the walking related variable was entered in the multiple model. This is because, for the performance of most physical activities, it is necessary for the individual to be able to walk, with proper functioning of the cardiovascular, respiratory, neuromotor and metabolic systems, among others[19].

The main diseases and complications initially associated with institutionalization in the gross analysis were Alzheimer's disease, Parkinson's disease, other unspecified dementias and stroke motor sequelae, or in other words, cognitive and functional impairments. However, in multiple analysis, these variables lost their significance when BADL dependence and cognitive impairment entered the model. This is because the sequelae of a stroke can interfere strongly with performing the basic activities of daily life[20], which can be extended to diseases that damage neuromuscular function, such as Parkinson's and the advanced stages of Alzheimer's.

Joint wear and loss of muscle strength often occur during the aging process, and can impede stable mobility. Diseases of the central nervous system and musculoskeletal and cardiovascular diseases also make walking difficult[21]. Therefore, difficulty in walking due to chronic diseases and complications reduces the practice of physical activity and directly interferes in the performance of BADL. It is worth emphasizing that physical activity can promote benefits at any age, leading to improvements in quality of life and the maintenance of functional capacity and preserving the physical and mental abilities acquired throughout life[22]; Thus, the practice of physical activity reduces the installation of several factors related to institutionalization, mainly dependence in BADL.

The identification of cognitive impairment was associated with institutionalization. In a comparative study of cognitive impairment and functional capacity with institutionalized and non-institutionalized elderly people, MMSE performance was lower and there was greater impairment of functional capacity in the institutionalized group[23].

Diagnosed dementia affects between 2 and 8% of the population over 60 years of age[24], which is close to the proportion found in the community in the present study (1.5% of individuals had dementia recorded in their medical records). However, the results in institutions are substantially higher. One of the reasons that explains the higher percentage of dementias diagnosed in LTCFE is advanced age, as after 65 years of age the proportion doubles with each five year incremement[24]. Moreover, the factor of dementia is strongly associated with institutionalization[25,26] as the proportion of this disease tends to be higher in such settings.

In a longitudinal study in Hong Kong[27], it was observed that of the 749 individuals aged ≥65 years, 80 were institutionalized, and that cognitive impairment was indicative of institutionalization, which corroborates the findings of this study. The occurrence of institutionalization practically triples when associated with functional disability[27].

The reasons that lead those responsible for elderly persons to institutionalize such individuals are related to the worsening of health conditions. A study conducted at the University of Indiana[28], USA, indicated that elderly persons with Alzheimer's are more prone to institutionalization, as home care is more complex and exhausting because of dependencies and the need for continued attention. An American cohort study[29], which used the same instrument as this study (MMSE), reported that lower scores are associated with institutionalization in all the periods investigated, including a risk of institutionalization at the beginning of symptoms of cognitive impairment.

As for dependence in BADL, the institutionalized group displayed significantly higher proportions than the group of elderly persons residing at home. The percentage of 75.9% is close to that found in other studies[12,14,30]. Some factors contribute to dependence, such as the advanced ages found in LTCFE, which is accompanied by motor deficit, muscle weakness, cognitive impairment and the presence of chronic non-communicable diseases[30]. In a Brazilian cross-sectional study[31] performed in LTCFE of the southeast and center-west regions, it was found that functional dependence is associated with chronic diseases (hypertension, diabetes, joint problems), walking difficulties and cognitive impairment. The authors identified that, among the institutionalized elderly with BADL dependency, 82.2% had severe mobility loss. Furthermore, 86.5% of those dependent for BADL had a low MMSE score.

As in the findings of the present study, other studies have demonstrated the association between BADL dependence and cognitive impairment in institutions[23,31,32]. Another study[33] states that, both in the community and in LTCFE, cognitive impairment demonstrates a direct association with dependencies in daily activities. Elderly persons with cognitive impairment, therefore, have a greater dependency in BADL and, consequently, are more likely to be institutionalized[34].

Moreover, the results of a Brazilian study on the factors associated with institutionalization[12] showed that the variables gender, age, marital status, schooling, functional disability and physical activity were associated with referral to LTCFE. The present study differed in its findings for gender, age, schooling and physical activity but agreed in finding an association with marital situation and functional incapacity, and added the risk factor of not having children. This study also adds to the investigation of cognitive impairment, which has become an important factor in predisposing individuals to institutionalization.

Among the limitations of the study, it is believed that the possibility of the underreporting of chronic diseases, especially among elderly persons living in households, was ameliorated by the consultation of the records of the Basic Health Unit and the patient's medical records in the LTCFE.

CONCLUSION

The present study found that the factors that predispose the elderly to institutionalization were the absence of a spouse, not having children, exhibiting cognitive impairment and dependence for basic activities of daily living.

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Received: March 6, 2016
Reviewed: October 3, 2016
Accepted: October 31, 2016

http://dx.doi.org/10.1590/1981-22562016019.150053

Evaluation of functionality and disability of older elderly outpatients using the WHODAS 2.0

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Abstract

Objectives: To analyze the level of functionality and disability of older elderly persons receiving care at a university hospital in Curitiba, Paraná, and identify functional differences between men and women. *Method:* A descriptive, cross-sectional study with a quantitative approach, based on a convenience sample of elderly persons receiving outpatient care, was undertaken. The Brazilian version of the World Health Organization Disability Assessment Schedule (WHODAS 2.0). *Results:* A total of 28 people with a mean age of 86.21 (±4.17) were evaluated. Of these 50.0 % were male, 46.4 % were widowed, and 57.1 % performed the evaluated activities independently. There were no significant differences between genders in terms of age ($p \leq 0.635$) or years of study ($p \leq 0.329$), although women showed a higher level of disability than men in general ($p \leq 0.16$). *Conclusion:* The WHODAS 2.0 proved to be a sensitive tool for the analysis and comparison of the level of functionality of the older elderly. However, it is important to develop prospective studies, with non-convenience samples, for a better reflection on the disability and functionality of older elderly persons.

Keywords: Aged 80 and over. Longevity. Ambulatory Care. Aging. Chronic Limitation of Activity.

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INTRODUCTION

Research has indicated that the increased prevalence of chronic diseases influences the functional status of the elderly, reducing autonomy and independence[1,2]. Functionality is defined as the ability of an individual to manage their life or take care of themselves and is the basis of the concept of health for elderly persons, as well as the starting point for the assessment of their health[3].

Today, functionality is the great paradigm of geriatrics, as it is necessary to understand how the impairment of physical and mental health, autonomy, social integration, family support and economic independence can affect the functional capacity of older elderly persons[2].

This paradigm fits neatly with the expanded concept of health proposed by the World Health Organization (WHO), through the International Classification of Functionality, Disability and Health (ICF), which indicates the dynamic relationship between the health conditions, environmental factors and personal factors that ensure functionality[4].

Several studies have been conducted on this theme with the elderly population. However, most of these only cover elderly persons aged to 60 and 80 years, and studies of older elderly persons are lacking[1].

The present study aimed to evaluate the level of functionality and disability among older elderly persons at the Ambulatório de Saúde do Idoso do Complexo Hospital de Clínicas da Universidade Federal do Paraná (the Elderly Outpatient Clinic of the Paraná Federal University Clinical Hospital Complex) (CHC-UFPR), identifying the most prevalent functional limitations, the possible differences in functional profile between genders and the most frequent diseases.

METHOD

A descriptive, cross-sectional study with a quantitative approach was performed based on subjects receiving care at the Outpatient Clinic of a University Hospital. The study was approved by the Ethics Research Committee of the Paraná Federal University Clinical Hospital Complex (record nº 33507914.8.0000.0096) and followed the ethical principles guiding human research.

The study was carried out in the Elderly Outpatient Clinic of CHC-UFPR, which treats elderly persons aged 80 or older or those aged over 60 who have at least one of these characteristics: polypathologies, polypharmacy, partial or total immobility, urinary or fecal incontinence, postural instability, recurrent falls, cognitive disability, history of frequent hospitalizations, or are dependent in activities of daily living (ADL).

The study included subjects of both genders, aged over 80 years, with multi-morbidities who attended the Elderly Outpatient Clinic of CHC-UFPR during the data collection period (August 2014 to January 2015). The subjects agreed to participate by signing a Free and Informed Consent Form. A convenience sample with consecutive selection was used and general health information was obtained from medical records. Data analysis was described in terms of frequency, distribution and comparison.

In the comparison, the Shapiro-Wilk normality test for small samples was applied for analysis of the sameness or difference between the means of the domains evaluated by the World Health Organization Disability Assessment Schedule 2.0 (WHODAS 2.0). Normal distribution was observed only for the means of the domains Mobility, Participation and Overall Mean, and the means of Cognition, Self-care, Getting Along and Life Activities were not normally distributed. Due to the differences in the distribution of the domain means, it was decided to compare the means using the t-test for independent samples, with the null hypothesis being no differences in the domains between genders, with $p \leq 0.05$.

To analyze disability the Brazilian version of the WHO WHODAS 2.0 was used, translated and adapted for Portuguese by Silveira et al.[5].

The WHODAS 2.06 was developed from the ICF, which is a generic instrument that measures the level of health and disability of the population and assists clinical practice. This instrument evaluates disability in six life domains: Cognition, Mobility, Self-care, Getting Along, Life Activities and Participation. In the present study, we used the full version of the questionnaire, which was applied by a single

interviewer in interview form with the research participant in the presence of their caregiver.

Each WHODAS 2:0[6] item evaluates the amount of difficulty the patient had, during the previous month, in carrying out their activities. The complex score was used for data analysis, which, after the recommended recoding, converts the results into a measure ranging from 0 to 100 (where 0=no disability and 100=complete disability)[6].

RESULTS

The sample consisted of 28 subjects, of whom 14 were men and 14 were women, with a mean age of 86.21 (±4.17) years, with no significant difference between the genders (p≤0.635).

Most elderly persons claimed to be independent (57.14%), and the condition of hospitalized was not indicated, as data collection was performed on an outpatient basis. In terms of years of study, the men attended regular school for an average of 5.00 (±5.17) years, while the women had only 2.36 (±2.023) years of schooling, although the difference between the genders was not significant (p≤0.329) (Table 1).

The research subjects had at least one, and no more than 12 health conditions (mean 4.5), with Systemic Arterial Hypertension (20 subjects), heart disease (13 subjects) and Diabetes Mellitus (11 subjects) the most frequent.

Regarding performance in the questioned activities, it was observed that the mobility domain presented the highest average difficulty (38.03%) and the cognition domain the lowest (11.75%) (Table 2).

In general, women had greater difficulty performing the activities than men, with an overall mean of 25.76% (±3.09) compared to 14.80% (±2.47) for men, with a significant difference between the genders of (p≤0.016) (Table 3).

Table 1. Sociodemographic characteristics of participants. Curitiba, Paraná, 2015.

Gender	Men (n=14)	Women (n=14)
Mean age	85.71 (±3.51)	86.71 (±4.82)
Age distribution		
80 to 89 years	11	11
90 to 99 years	3	3
Mean years of schooling	5.00 (±5.17)	2. 36 (±2.023)
Living condition		
Independent	10	6
Assisted	4	8
Marital status		
Never married	0	3
Married	8	3
Widowed	5	8
Cohabiting	1	0
Work activity		
Housewife	0	1
Retired	14	11
Other	0	2

Table created by authors of study.

Table 2. Characterization of sample based on domain means. Curitiba, Parana, 2015.

Domains	Mínimo	Maximum	Mean	Standard-deviation
Cognition Domain	0,0%	45.83%	11.75%	13.42%
Mobility Domain	0,0%	80.00%	38.03%	21.91%
Self-care Domain	0,0%	56.25%	17.63%	16.58%
Getting along Domain	10,00%	40.00%	16.07%	10.30%
Life Activities Domain	0,0%	62.50%	18.97%	19.28%
Participation Domain	0,0%	43.75%	19.19%	12.04%
Overall Mean	1,67%	43.68%	20.27%	11.68%

Table created by authors of study.

Table 3. Comparison of domains and age between genders. Curitiba, Parana, 2015.

Gender	Men	Women	(p≤0.05)
Age	85.71 (±3.51)	86.71 (±4.82)	0.635
Years of study	5 (±1.0)	2 (±1.0)	0.329
Cognition Domain	6.65% (±1.73)	16.96% (±4.42)	0.137
Mobility Domain	27.50% (±5.54)	48.57% (±4.84)	0.008
Self-care Domain	11.16% (±2.94)	24.11% (±5.07)	0.094
Getting along Domain	16.79% (±2.99)	15.36% (±2.59)	0.769
Life Activities Domain	12.05% (±3.31)	25.89% (±6.07)	0.137
Participation Domain	17.73% (±2.90)	23.66% (±3.17)	0.050
Overall Mean	14.80% (±2.47)	25.76% (±3.09)	0.016

Table created by authors of study.

DISCUSSION

Population aging is accompanied by several challenges. The WHO has stated that healthy aging should be a global priority, and warned that the development of strategies to address the health problems of the elderly population and the impact of chronic disease on quality of life is essential[7]. The organization also states that "although people are living longer, they are not necessarily healthier" as longevity is accompanied by chronic diseases that directly affect the quality of life and functional performance of this population[7].

The present study evaluated the level of functionality and the differences in functional profile between older elderly men and women attending the Elderly Outpatient Clinic of the CHC-UFPR. While those attended by the clinic were predominantly female, the distribution by gender and age group was symmetric, a coincidence arising from the sample, which was selected by convenience and consecutive methods.

Literature has described a feminization of old age. With respect to functionality, in general, women exhibit greater levels of disability than men. Female aging is associated with an increased prevalence of chronic diseases. Most of the population of older elderly women have a lower socioeconomic status than men, as many of them did not attend school and did not have formal jobs. Moreover, women tend to be widowed before men, as they seek health services less and take on social roles of higher external risk of morbidity and mortality[8,9].

As found in literature[1,2,10], the older elderly persons included in the survey had several chronic diseases.

Literature also describes a high frequency of auditory and visual deficit among the elderly [11,12], a fact that while not quantified in the present study, was observed, though not described. Reports of embarrassment at initiating and maintaining conversations and avoiding leaving home were constant, which can lead to social isolation, loss of occupational roles, mobility limitations, fragility and dependence.

The instrument used for functional analysis, the WHODAS 2.0, is a relatively new instrument and is little used, especially among the very old, who exhibit levels of disability not yet described in Brazilian literature. Only two articles with these characteristics allowed comparative analysis with the results of the present study. The first,[13] undertaken in Cinco Villas in Spain, featured the participation of 258 older elderly persons, living in the community, of whom 163 were women and 95 were men. When comparing the results, it is observed that the older elderly women from CHC-UFPR performed worse in the domains of self-care, life activities and participation. Perhaps this can be explained by differences in socioeconomic conditions and access to health services among the European and the Brazilian publics. No comparison for men was possible as this information was not available. These results show the need for an improvement in the care of this population provided by health teams, prioritizing the preservation of functionality, security and autonomy, as the prevention of disability should be a priority in the care of older elderly persons[2]. However, few studies exist to allow further comparisons.

The second study, carried out in Portugal, analyzed 329 institutionalized elderly persons with a mean age of 83.6 (±7.1) years. The majority were women diagnosed with dementia, and the worst result was obtained in the domain of mobility14. In the same manner, the mobility domain presented the greatest percentage of difficulty among subjects in the CHC-UFPR study. This result suggests the need for further adaption of this question, as it evaluates a distance that is excessively long compared to scales traditionally used to assess the functional capacity of the elderly.

In general, the level of functionality of the older elderly persons could be considered satisfactory. An overall mean of 43.68% was obtained, which corroborated with findings in literature[1,7,8,15]. However, research on the older elderly population remains scarce, and further investment in this area is required, as the aging process has been occurring in an accelerated form.

The present study has some limitations, such as the fact it is based on a small convenience sample. The application of the WHODAS 2.0 in probabilistic samples and prospective studies is therefore required.

CONCLUSION

The use of the WHODAS 2.0 scale proved that it can be recommended to analyze and guide the promotion of the health of the population, even though disability is an individual condition and may be influenced by multidimensional factors, suggesting a person-centered approach.

Further studies are required to analyze the application of WHODAS 2.0 with this and other populations, including comparative studies using the functional scales traditionally used in geriatric health.

Comprehensiveness in the care of older elderly persons should be a priority for the health system, together with the development of public policies that guarantee access to health services, which include the increase of strategies and tools that allow referral and counter-referral, as well as the training of specialized multi-professional teams[2].

To provide a foundation for the development of public policies aimed at this reality, further research involving the older elderly population is required, to guarantee access to care and the treatment of their needs.

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Received: January 29, 2015
Reviewed: July 8, 2016
Accepted: October 17, 2016

http://dx.doi.org/10.1590/1981-22562016019.150162

Alzheimer's desease: challenges faced by family caregivers

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Abstract

Gaps identified in Brazilian health policies and the need to develop and implement strategies for the empowerment and monitoring of family caregivers support the development of care proposals aimed at the family. The present study aimed to analyze the challenges faced by family members providing day to day care of patients with Alzheimer's disease in the city of Chapecó, Santa Catarina. The method employed was the qualitative approach through semi-structured interviews. The speeches were grouped, categorized and analyzed using the hermeneutic method. The results showed that during the period of Alzheimer's disease, caregivers experience a range of situations, including: a need to learn about the disease; dealing with guilt; and handling situations of pain, addiction and physical and psychological suffering. In conclusion the study described the challenges of the daily lives of these families, explaining the importance of and highlighting the need to adopt tools and strategies that provide physical, emotional, psychological and financial support to family caregivers of patients with Alzheimer's disease.

Keywords: Caregivers. Alzheimer Disease. Aging.

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INTRODUCTION

The phenomenon of epidemiological transition, conditioned by the process of population aging, is determinant on the emergence of chronic-degenerative diseases, among them Alzheimer's Disease (AD), demanding continuous care and new organizational structures for networks and health services[1-3].

In Brazil, AD is responsible for 50% to 60% of dementia cases among the elderly population. It is considered to be a neurological and degenerative disease and a type of senile dementia with a progressive and complex evolution[4].

The exact cause is unknown, but the decrease in acetylcholine, cranial traumas, viral infections, genetic factors and the presence of beta-amyloid protein are suggestive of its emergence. Progressive and irreversible, AD results in memory and cognition disorders, incapacitating the individual for self-care[5].

According to the Associação Brasileira de Alzheimer (the Brazilian Alzheimer's Association) (ABRAZ), AD is a dementia characterized by three major phases. It starts with forgetfulness and subtle loss of memory and difficulties at work. It can be confused with depressive states, and progresses through more severe memory loss and the inability to perform complex tasks such as calculations and planning. The third stage is manifested by the marked impairment of functional capacity, such as difficulty in eating, dressing and bathing[4].

Prospective studies show that by 2050 AD may affect 14 million people worldwide. It is considered the fourth leading cause of death in adults[6].

In this context, the role of the caregiver emerges as a fundamental element of home care, responsible for caring for the patient, providing for his or her basic needs, performing/assisting with activities of daily living, and caring for themselves and often many other members of the family, such as children, wives, or grandchildren[7].

Caring for elderly people with Alzheimer's is an arduous task. The caregiver often does not devote sufficient attention to their own needs, due to the daily demands of care, including comfort, safety, help in activities of daily living (ADL) and tasks related to domestic chores.

The primary caregiver is directly responsible for all these actions. In contrast. While secondary caregivers may perform the same tasks as the primary caregiver, they do not have the same level of responsibility and decision-making authority. Tertiary caregivers are supportive, replacing the primary caregiver for short periods, and usually perform specialized tasks such as shopping, assisting in patient transportation, collecting pensions, and paying bills. While all play an important role in care, it is clear that the responsibility for providing care and attention rest with the primary caregiver.

In this context, the aim of the present study was to analyze the main difficulties of family caregivers of sufferers of Alzheimer's Disease in the city of Chapecó, in the state of Santa Catarina.

METHOD

A qualitative, descriptive study was performed of eight family caregivers of patients with AD living in the municipality of Chapecó, in the state of Santa Catarina. All were participants of the Support Group for Caregivers of Alzheimer Patients. The inclusion criteria adopted were: having been a family caregiver of elderly persons with AD for one year or more, while living in the same household.

The study was approved by the Ethics Research Committee of the Universidade Comunitária da Região de Chapecó (the Community University of the Chapecó Region) (UNOCHAPECÓ), under record nº 216/12. The hermeneutics[8] method was used to analyze the discourses, following four steps: initial reading of the text, distancing, structural analysis, deeper understanding and appropriation[9].

From the analytical model adopted, the data was organized into four analysis categories to enable the grouping of the answers obtained and discussion about the discourses. In each of the four categories different aspects of care were perceived, which were organized into subcategories. The identity of the participants was preserved and it was decided to denominate their discourses with names of flowers.

The results will be presented based on the socioeconomic and demographic profile of the caregivers of family members with AD (Table 1). Subsequently, results will be presented through the analysis of a category and its subcategories.

RESULTS AND DISCUSSION

The caregivers participating in this study were aged between 47 and 80 years, and the primary family caregivers were predominantly women. There were equal numbers of married and divorced women, and the Catholic religion predominated. In terms of income, most caregivers received from one to four minimum wages. It should be emphasized that socioeconomic variables increase the physical, emotional, social and financial difficulties of caregivers (Table 1).

Another factor exhibited was the religion professed by the attending caregivers. All had a basis in Christianity. Knowing the religion of each person is important because, in general, it is through religious practices that caregivers express their spirituality (Table 1).

Table 1. Socioeconomic and demographic profile of caregivers of family members with Alzheimer's Disease. Chapecó, Santa Catarina

Data	Gender	Age	Marital Status	Schooling	Income (minimum salary)	Religion
Daisy	F	64	Widowed	Elementary Incomplete	1 to 4	Evangelical Protestant
Clove	M	80	Married	Elementary Incomplete	1 to 4	Catholic
Hydrangea	F	53	Divorced	Graduation incomplete	5 to 9	Catholic
Dahlia	F	51	Married	Masters	5 to 9	Catholic
Violet	F	55	Divorced	Graduation incomplete	1 to 4	Catholic
Orchid	F	61	Married	Graduation Incomplete	5 to 9	Lutheran
Rose	F	52	Divorced	Post-graduate	1 to 4	Catholic
Begonia	F	47	Single	Post-graduate	1 to 4	Spiritualist

F: female; M: male

In a study carried out at the geriatrics and neurology outpatient clinic of the Base Hospital of São José do Rio Preto, São Paulo, eight Alzheimer's caregivers were predominantly female and 50% were married, with elementary education and advanced age[10].

The fact that caregivers are mostly female can be attributed to the historical division of labor between men and women and the gender differences that attribute the care of other family members to women. In this sense, women themselves may consider care as a mission and the focus of their existence, related to giving birth, which connects them to all aspects of life and care[11]. In addition, female dominance occurs because the female population of the planet is greater. This affirmation also follows the cultural norms that expect men to provide sustenance and authority and women to care for the children, the house and the elderly[12].

In the opinion of Boff[13], care is,

> More than an action: it is an attitude. Therefore, it covers more than the moment of attention, of zeal and care. It represents an occupation and attitude of concern, responsibility and involvement with another.

Care has an existential character and arises when the caregiver understands their own subjectivity and that of the individual receiving the care, with this relationship expressing itself in such a way that the individuality, autonomy and freedom of the other are respected[14].

Waldow[15] added that

> OThe Human Being is a Being of care, born with this potential. Everyone, therefore, is able to take care of someone and also needs to be cared for.

Following the general characterization of the profile of the participants, the analysis of the discourse of the interviews was categorized as follows:

Category I – Difficulties in the care of family members with Alzheimer's disease

Regarding the difficulties encountered in the care of individuals with AD, the data analysis revealed three main aspects: hygiene and comfort, a constant need for attention and a lack of knowledge about the disease.

Subcategory I. Hygiene and Comfort

The limitations of patients with AD involve an inability to perform activities of daily living (ADL) and require the family caregiver to be constantly present in tasks of hygiene and comfort, exacerbating feelings in the caregiver that oscillate between anger, due to the stubbornness of the patient, and pity, due to having a family member with a progressive and irreversible disease[16].

In this subcategory, bathing, combined or not with the resistance of the patient, stood out, as can be seen in the following statement:

> "It's my mother's resistance to bathing, she resists and fights a lot, she does not want to bathe at all" (Begonia).

> "It's giving her a bath, when she's calm, it's fine, if she gets upset she resists, so I have to let her do some little things" (Clove).

> "The most demanding task is her personal hygiene, helping her bathe, it's what worries me the most and is the most demanding" (Orchid).

Other difficulties with personal hygiene (teeth) were discussed, while the musculoskeletal problems of the caregiver also make the provision of care difficult:

> "The greatest difficulties I have with taking care of my brother with Alzheimer's are brushing his teeth because he forgets, and bathing, because I have to lower myself and I have spinal problems and a lot of pain in my body" (Daisy).

There are other difficulties arising from secondary complications of the pathological processes of the AD patient which also make care difficult:

> "Well, I don't think there is a specific task, it is the group of small tasks that go on all day, personal hygiene and food, because she recently underwent bowel surgery and had an ileostomy. This further aggravated her health" (Dahlia).

The daily tasks of the caregiver are influenced by the limitations imposed by AD, by the additional pathological processes of the AD sufferer, and especially by the health conditions of the caregiver themselves.

Subcategory 2. Constant need for attention

This subcategory identifies the constant attention required by elderly relatives with AD as one of the challenges faced by caregivers, as the discourses confirm:

> "Manage what she does. Accept what she does. Follow her closely, stay close to her. You have to be constantly supervising what she does, because she no longer sees the extent of the danger of what she is doing" (Violet).

> "What requires the most from me is caring for her when she has crises. This is a very difficult type of care, because you have to stay on top of it 24 hours a day" (Hydrangea)

> "My greatest difficulty is paying constant attention because she is very forgetful and often puts herself at risk when she is near cleaning products. A few days ago we found her wanting to drink detergent. So I believe that my main difficulty is having to always pay attention so as not to let her get into danger" (Dahlia).

A study of family caregivers carried out at the neurology department of the Hospital de Clínicas in Porto Alegre, Rio Grande do Sul, found that intensive care and attention are necessary in ADL mainly due to the impairments caused by the disease and the loss of autonomy and independence that result from it[17].

The dependency that makes a caregiver necessary is revealed by an inability to care for oneself satisfactorily without the help of others, as well as in the loss of decision-making capacity[18].

According to the International Classification of Functioning, Disability and Health (ICF), activity limitations are difficulties that an individual may have in performing activities, and the capacity and ability of an individual to perform a task or action[19]. Dependence is a condition of elderly persons, the basic characteristic of which is the degeneracy resulting from chronic diseases or other pathologies, which threatens their physical, social and economic integrity, diminishing or impeding the individual's ability to meet his or her needs[20].

Another aspect highlighted in the discourse presented was the shocks that the caregiver suffers due to the situations of risk in which the patient is involved, which generates anguish, fears and ambivalent feelings towards the individual receiving care. This situation is reinforced by Brum et al.[21].

In the dependency phase, the changes that take place in the new life dynamic of the caregiver completely change his or her daily life. These include preparing food, administering medications, establishing a routine for exercises and activities of comfort, including personal hygiene, hair combing, teeth brushing, fingernail cutting, dressing, undressing, moving from one place to another, climbing stairs, sitting, getting up, and lying down, among many other activities.

Subcategory 3. Lack of knowledge about disease

This subcategory revealed a fundamental difficulty for family caregivers regarding the caring process. It refers to knowledge of the disease and its evolution.

The interviews frequently expressed the view that their difficulties would be lessened if they had known in advance about the possible situations that could occur and how to act when faced with each one of them. This fact is evidenced in the statements of three participants.

> "The main difficulty is to understand how this works in her mind. [...] to understand how things go through her mind and the best way to coexist, in order not to cause her any more pain than she has already suffered. We do not understand many things that have happened to her" (Rose).

> "My worry is knowing when I should take her to the doctor. Because if she doesn't urinate, I have to give her medicine to make her do it. It's the same thing with defecation. She refuses to eat and we worry about whether it's time to take her to the doctor or not" (Begonia).

> "I don't know if I'm doing exactly what we set out to do. I'd like to serve her, to know and understand better what's going on in her head. How best to care for her and how best to maintain the little she has when she is living with us" (Orchid)..

The exercise of caring for an elderly patient at home is a constant learning process, based on the physical and biological needs of the individual and his or her level of dependence. In most cases, it is difficult, due to the inexperience of the caregiver, to meet the demands that arise during the process of caring and which must be learnt to meet the challenges of everyday life. Activities that seem simple to those who have already developed them become arduous for those who have never had to confront them.

As the data indicates, ignorance of AD is a crucial point for caregivers, especially as care in Brazil is curative and centered on the individual, with teams working in a fragmented manner, which devalues the family situation and the sociocultural context[1].

In this sense, it is imperative that caregivers are constantly monitored and receive guidance on the evolution of the disease, as well as on the care needed at each stage. This is necessary for efficient care, which results in safety and support, to be provided, and can foster an information exchange network capable of minimizing the stress of the family caregiver[15].

Better informed and more experienced caregivers are less anxious and more secure in their provision of care, which is reflected in a greater capacity and availability to take care of the patient. Health and social institutions should make all their information available to the caregiver. Nurses can jointly propose a care plan to delay the degenerative effects of AD and allow the elderly person to live with the signs and symptoms in the best possible way.

Studies[22,23] have indicated a significant gap in the life and health of the caregiver, specifically the need for health professionals to provide understandable explanations, exchange experiences, and promote openness and dialogue about the disease so that care can be performed safely at home.

Thus, getting to know families that welcome subjects with AD, who they are, what they do, where they work and other characteristics, can help in the organization of their routines, reducing situations of conflict and supporting the frailties imposed by the disease.

During the interviews, it was perceived that each caregiver of AD patients presented individual peculiarities in their discourses about care, as the singularity of the disease in each patient, the length of time each caregiver has cared for their family member and even the time of discovery of the diagnosis are limiting factors for a generalization about the challenges faced in everyday life. Thus, it is important to consider the specific profiles of patients with AD and the contexts involved in the exercise of care for the elderly. This information would be of great value for future studies. In the present study, all the interviewees had at least one year of experience and the technique used data saturation to guarantee the reliability of the results of the discourses presented and analyzed.

CONCLUSION

This study provided information about part of the daily life of those who act as caregivers of elderly people with Alzheimer's Disease, as well as the difficulties, emotions, limitations, and stress they face, but also the dedication with which they take care of their family member. The participants of this study were predominantly women, married or divorced, descendants of Italians, Catholic, with a family income of one to four minimum wages and with differentiated levels of schooling.

Greater life expectancy brings with it greater risks of developing dementias such as Alzheimer's Disease, patients of which require home care, resulting in changes in the daily lives of many families. The present study found that, when caring for a family member with Alzheimer's Disease, the caregiver experiences different feelings and requires attention and care from health professionals and public policies. While secondary and tertiary caregivers deserve our attention, it is the primary caregiver who carries the greatest burden and needs the most support. Caring for a family member with Alzheimer's Disease requires the caregiver to learn to live with the suffering of another, often having to disguise their own pain and needs. They are required to do almost everything, whilst knowing almost nothing. In addition, cohabitation with a family member with Alzheimer's Disease requires that the caregiver renounces many aspects of his or her personal life for the benefit of another, which increases the risk of personal and family illness.

It is the responsibility of health professionals to develop practices that seek and enable dialogues, respecting the knowledge, beliefs and environments of caregivers while providing training to caregivers with the purpose of guaranteeing quality care for Alzheimer's Disease patients and support for the caregiver. In this sense, by providing assistance to caregivers, professionals who are capable of guiding and intervening in the face of family conflicts and challenges, contribute to supporting those experiencing moments of frailty.

The current reality in Brazil, especially in relation to increasing population aging, requires urgent

government measures of social and health care that encourage the family as a place of care. What can be verified, however, is that Brazilian public policies still exclude and marginalizing the poorest and neediest sectors, including those with Alzheimer's Disease.

There is, however, an urgent need for attention to be paid to these family caregivers, especially from public authorities, through the provision of trained professionals to deal with families, and not just patients. This issue is crucial for the family caregiver, since it requires health professionals to provide clear information, as well as objective and comprehensible skills related to the disease, its symptoms and its progression. In this way, the caregiver will be prepared to provide safer and less stressful home care.

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Received: January 24, 2016
Reviewed: August 1, 2016
Accepted: November 7, 2016

http://dx.doi.org/10.1590/1981-22562016019.160017

Social networks and quality of life of elderly persons: a review and critical analysis of literature

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Abstract

Several studies have documented the importance of social networks for quality of life (QL) in old age. This article presents a review and critical analysis of the literature on the relationship between the social networks of the elderly and their QL/well-being. A survey using interdisciplinary search engines [Web of Knowledge, Scopus, Scholar Google, Science Direct and Online Knowledge Library (b-on)], followed by an in-depth examination of the 37 documents subsequently identified, selected based on content, the geographical context of the study and its publication date, suggested a number of tendencies. In the first place, networks of friends have a greater impact on the QL/well-being of elderly persons than family networks. Secondly, the positive effect of the existence of more than one type of relationship was revealed (such as simultaneous friendships and family relationships). Finally, literature suggests emotional closeness has a positive impact on QL/well-being. The present study exposed the lack of longitudinal studies into the causality between network characteristics and QL/well-being. It also revealed the lack of research on the relationship between social networks and QL/well-being in elderly persons living alone. One problematic aspect relates to the fact that few studies provide a definition of the QL measures they adopt, or the rationale behind the manner of their operationalization of the concept.

Keywords: Elderly. Social Networking. Quality of Life. Well-Being. Review.

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INTRODUCTION

Social networks are considered to be an important determinant of the quality of life (QOL) of the elderly, notably by allowing them to deal with stressful environments or difficult life experiences1. They can, for example, enable elderly persons with reduced income and/or health problems to reduce the potential negative effects of such factors[2], thus promoting the maintenance or elevation of the QOL of these individuals. However, although literature emphasizes the positive effects of social networks on well-being[3-5], they can also have a negative effect on individuals[6,7], when, for example, the elderly are maltreated by one or more elements of their social networks.

The present literature review is part of a PhD research project within the framework of the Survey of Health, Aging and Retirement in Europe (SHARE) project, focusing on the impact of social networks on the QOL of individuals aged 50 or over in mono-residential contexts in Portugal.

The concepts used in the present study are derived from its insertion SHARE, being those included in the database of the fourth wave of this longitudinal project, the data collection of which took place in 2010-2011 in 16 European countries. The characteristics of the social networks that were taken into account are their size (number of individuals in the social network); the type of relationship (relationship of friendship, family relationship, neighborhood relationship, among other types of relationship); the geographical proximity of the elements of the social network (geographical distance between the residence of the respondent and those of the members of their social network); the frequency of contact (frequency of face-to-face, telephone or other type of contact with elements of the social network); and emotional closeness (level of emotional closeness to network members).

Another important concept in this work is QOL, which is also included in this database. In the SHARE project, QOL is defined by the level of satisfaction of needs in the areas of control, autonomy, self-realization, and pleasure. Since QOL is a measure of well-being, other welfare measures have been included in this literature review which refer to one or more dimensions of the concept of QOL.

This article aimed to review and critically analyze the literature on the relationship between the characteristics of the social networks of elderly persons on the one hand and their quality of life or other indicators of well-being on the other, in several European and North America countries. It also aimed to identify gaps in the level of scientific knowledge about this subject..

METHOD

Procedure

In order to identify the scientific publications to be included in this review and analysis, five search engines were used in order to allow access to the largest number of existing publications on the relationship under analysis: Web of Knowledge, Scopus, Scholar, Science Direct and Biblioteca do Conhecimento Online (Online Knowledge Library) (b-on). These search engines were selected due to their interdisciplinary nature, in order to cover several disciplines involved in aging and the relationship between social networks and QOL (or other indicators of well-being).

The following keywords were inserted in the search engines, in both the English and Portuguese languages: social networks; size of the social network; type of relationship; composition of the social network; geographical proximity of the social network; frequency of contact; emotional closeness; QOL; well-being; elderly persons; old age. In addition, the bibliographical references of articles found using these terms were consulted, in order to select references to further research into the subject related to the study.

The studies included in this integrative review were selected based on their content, the geographical context of the study and the date of publication. In terms of content, each publication selected for this literature review included results based on empirical data on the relationship of at least one of the social network characteristics already mentioned and QOL,

or other indicators or measures of well-being in old age. Taking into account the purpose of this study, the possible influence of sociodemographic variables was not considered in this article. Regarding the second selection criterion, given that this literature review forms part of the European SHARE project, the European geographical context was favored and, given the comparability of this project with the Health and Retirement Survey (HRS) in the USA, studies carried out in North America were also included. Lastly, with regard to publication date criteria, the study focused on scientific works published in the period from 1980 to 2014. The temporal distribution of the 37 publications identified according to the stated criteria was not uniform. A total of 5.4% were included from the period between 1980 and 1990; 18.9% covered the period between 1991 and 2000; 43.3% represented the period between 2001 and 2010; 32.4% were from the period between 2011 and 2014. The largest proportion of studies identified in recent years, or in other words since 2001, is due to the fact that scientific studies of social networks, with the identification of their morphological characteristics, only began in the second half of the 20th century, with scientific production on this theme intensifying from this period onwards[8].

Defining the fundamental concepts

The concept of social networks emerged in Sociology and Social Anthropology in the 1930s and 1940s of the last century, and enjoys growing popularity today[9]. Mercklé[9] considers a social network to consist of a set of social units and of the relationships between these social units, be they individuals or groups of individuals. The term social network used in this article designates a group of people or groups that are connected by some type of social relationship[10].

There are two ways of approaching a social network: the direct approach and the indirect approach. In the indirect approach the researcher identifies the elements that are part of the social network of the respondent, through their social relationships. The mere existence of a social relationship authorizes the investigator to consider it significant. In contrast, in the direct approach to social networks, which is the approach preferred by the SHARE project, it is the respondents who identify the members of their social network they consider to be important.

The concept of QOL is also a fundamental concept in this work, although defining it is not an easy task. There is no consensus among researchers on the definition of the concept and the appropriate criteria to operationalize it[11,12]. The World Health Organization (WHO) approach is one of the most frequently observed in literature, defining QOL as the individual's perception of their position in life, in the context of the culture and value system in which they live and in relation to their goals, standards, expectations and concerns. The WHOQOL-OLD instrument, for use with the elderly, covers seven domains of QOL: sensorial functioning; autonomy; present, past and future activities; social participation; death and dying; intimacy; family[13].

The approach in terms of satisfied/unsatisfied needs in the areas of control, autonomy, self-realization and pleasure has also been highlighted by studies that feature the elderly as a target population[14], and has been adopted by the SHARE project. In this approach, the Control, Autonomy, Self-Realization, Pleasure (CASP) scale is used to evaluate QOL in its CASP-12 or CASP-19 versions. Control consists of the capacity of an individual to intervene actively in their environment; while autonomy is a person's capacity to be free of the unwanted interference of other people[15]. The self-realization and pleasure domains aim to capture the most active and reflexive dimensions of being an elderly person[7]. The diversity of approaches to measuring QOL does not allow for a single, universal definition of the concept. Given this impossibility, the approach in terms of satisfied/unsatisfied needs is chosen as adequate for the evaluation of the QOL of the elderly. This approach has advantages over the others. The CASP instrument for measuring QOL allows a multidimensional and global approach, rather than an assessment of only one domain

of life[16]; has been validated for Europe and was specifically developed for use among the elderly. It is also an instrument that, unlike other measurement instruments, evaluates QOL and not the factors that influence it. In addition, CASP allows us to capture the more active and reflexive dimensions of the elderly (self-realization and pleasure), dimensions that have been ignored in many studies[7].

Considering that some researchers partially or totally overlap the concept of QOL with other concepts that refer to the notion of well-being, it was considered appropriate that this literature review should consider certain other indicators of well-being, as long as they refer to some of the dimensions of the concept of QOL. It should be noted that well-being in the elderly is a state that can result from a diversity of conditions, from physical health to subjective perception of QOL[17].

Indicators of the level of well-being considered in this review include level of positive (includes positive indicators, such as joy, a good mood, happiness, calm) and/or negative affect (includes negative feelings felt by individuals such as sadness, nervousness, agitation)[18]; level of depressive symptomatology (includes symptoms such as depressed mood, feelings of guilt, uselessness, impotence, hopelessness, sleep disturbances, and loss of appetite)[19,20]; level of self-esteem (cognitive evaluation of the person and of the self)[21]; level of anxiety (state of the individual who presents a catastrophic view of events, believing that something dangerous and threatening may happen)[22]; physical health; health-related QOL (perception of mental and physical health, commonly measured by health-related quality of life assessment instruments such as SF-12 and SF-36); subjective health (perception or subjective appreciation of general health status); and general well-being, assessed through qualitative research techniques or Likert scales.

The levels of affect (positive and/or negative), depressive symptomatology, self-esteem and anxiety refer to the level of well-being at the psychological level, which is important for the satisfaction of needs in the pleasure and self-realization domains of QOL; physical health allows the satisfaction of the needs of the elderly in the areas of control and autonomy; The QOL related to health and subjective health refer to the level of satisfaction of needs in the areas of control, autonomy, pleasure and self-realization. The concept of general well-being is a comprehensive concept that can refer to any of the domains of the concept of QOL (control, autonomy, pleasure and self-realization).

Other indicators of well-being, such as satisfaction with life and happiness, were excluded because they were more subjective concepts and subject to rapid fluctuations/changes, unlike the other concepts considered, which express more constant conditions of individuals.

RESULTS

The 37 publications included in this literature review were analyzed according to the following categories: author(s)/year; local; methodology; sample representativeness; characteristics of the social network; measure of well-being; implementation of the well-being measure (Table 1). Five of the 37 results that composed the final sample of the integrative review carried out on the relationship between the social network and the well-being/QOL of the elderly person are described below.

Table 1. Analysis grid with illustrative publications from literature review. Portugal, 2015.

Author/Year	Location	Methodology	Sample representativity	Characteristics of social network	Well-being measure	Operationalization of welfare measure
De Belvis AG, Avolio M, Spagnolo A, Damiani G, Sicuro L, Cicchetti A et al. (2008a)	Lazio, Italy	Quantitative	Yes	Frequency of contact; geographical proximity of social network elements	Health-related quality of life	SF-12 Questionnaire
Fiori KL, Smith J, Antonucci TC. (2007)	Berlin, Germany	Quantitative	Yes	Size of social network; frequency of contact; emotional closeness	Level of depressive symptomatology + physical health (objective and subjective)	Hamilton Scale (1960)+ Overall subjective assessment of the present health of respondents with responses varying from 1 (poor) to 5 (excellent) + no. of serious chronic diseases diagnosed according to a new review of the "International Statistical Classification of Diseases codes".
Hellström Y, Andersson M, Hallberg IR. (2004)	33 municipalities in southern Sweden	Quantitative	Yes	Size of social network	Quality of life	*Life-quality Gerontology Centre (LGC) scale (only present quality of life e life span quality) and SF-12.*
Webb E, Blane D, Mcmunn A, Netuveli G. (2011)	England	Quantitative	Yes	Frequency of contact; emotional closeness	Quality of life	CASP-19 Instrument
Zaninotto P, Falaschetti E, Sacker A. (2009)	England	Quantitative	Yes	Type of relationship; emotional closeness	Quality of life	CASP-19 Instrument

Scientific literature on the impact of social networks on the QOL/well-being of the elderly

Some specific characteristics of the social network are considered nuclear: the size of the social network; the type of relationship; the frequency of contact; the geographical proximity of the elements of the social network and emotional proximity. Litwin and Stoeckel[23] constructed a social network indicator based on these characteristics of the network of confidants (members of the social network considered by the individual/respondent as important, and with whom they often talk about matters that are important to them, such as worries or positive events they have experienced). An analysis of the main components allowed the authors to propose an index that takes into account these five characteristics.

It should be noted that not all the investigations allowed conclusions to be drawn about cause and effect relationships, meaning it was only possible to verify if there was an "association" between certain social network characteristics and the QOL/well-being of the elderly. Only three of the studies analyzed were longitudinal[24-26], with the remaining cross-sectional in design, making it impossible to establish causality between the networks and the QOL/well-being of the elderly.

Size of social network and QOL/well-being

With regard to the size of the social network, it is known that, with advancing age, the social networks of the elderly tend to be smaller[4]. This reduction in the size of social networks with age can be explained by the death of people close to the elderly person, health problems, children leaving home and by events that deprive the elderly of their social networks at work, but also by the theory of social-emotional selectivity. Such a theory postulates that elderly persons become increasingly aware of the limitations of the future time available to them and are motivated to be more selective in choosing social partners, favoring emotionally significant relationships over more peripheral ones[27].

The size of social networks has been, in general, positively associated with QOL/well-being[21,23,28-30], both in European countries and in North America. However, some investigations carried out in European countries show that there is no association between the size of the social network and QOL[31,32]. According to Bowling and Gabriel31, individuals value social support and the emotional closeness that relationships can provide them more than the size of the network.

In summary, much of the literature indicates that larger networks are associated with greater well-being among the elderly population[21,23,28-30]. It should be noted that, in general, the social networks of the elderly are small, and this may be associated with a low quality of life/well-being among these individuals. However, this data should be read in conjunction with the following information regarding the impact of other characteristics of the social network on QOL.

Type of relationship and QOL/well-being

The type of relationship also seems to influence well-being, with friendship and neighborhood networks documented as having a more positive effect than family networks[21,33-35], given the voluntary nature of the former in contrast to the latter[35]. In addition, as advocated by Larson et al.[34], referring to a study of the elderly in Canada, activities performed with family members are usually routine, while the time spent with friends is commonly devoted to activities based on common interests and characterized by spontaneity. According to Pinquart and Sörensen[21], friends are often members of the same age group, sharing personal characteristics, experiences and lifestyles. Another potential motive, argued by Cheng et al.[33] based on a review of the literature, is that negative interactions are more frequent among family members than among friends. In addition, conflict with family members can have a highly negative effect on the well-being of the elderly, since the bonds established with family members cannot be easily undone[6].

On the other hand, studies in Europe and North America have shown a positive contribution or association between more than one type of relationship at the same time (e.g. relations with spouse and children, concomitant with relations of friendship with individuals outside the family) and QOL/well-being[23,26,36,37].

Geographic proximity of social network and QOL/well-being.

Literature on the relationship between the geographic proximity of the social network and the QOL/well-being of the elderly is scarce. In the restricted set of studies in which this analysis is carried out, the works by De Belvis et al.[38,39] in Italy show that there is a positive association between the geographic proximity of the family network and the health-related QOL of elderly persons aged 60 or over, controlling the effect of sociodemographic and health variables. The results presented by Litwin and Stoeckel[37], based on data from the fourth wave of the SHARE project, on individuals aged 65 and over in 16 European countries, indicate that low or moderate geographical proximity of social network elements is associated with the greater QOL of these individuals,

once the effect of sociodemographic variables and the state of health is controlled. Such control is necessary to avoid cases in which geographical proximity is a choice of families with elderly people needing care and who therefore have a lower QOL. It is not possible to give a satisfactory explanation of this discrepancy in the results. Moreover, with the reduced number of studies, it is not possible to identify any pattern or trend regarding the relationship between this characteristic of the social network and the well-being of the elderly.

Frequency of contact and QOL/well-being.

Frequency of contact is one of the most commonly used indicators to describe interaction. High contact frequencies have been commonly associated with higher levels of QOL or other indicators of well-being in North America and European countries[21,29,38-41]. However, some studies have associated frequency of contact with lower well-being[42] or have concluded that there is no association between contact frequency and the QOL/well-being of the elderly[7,31,43,44]. Distinguishing between contact with family and with friends, Netuveli et al.[5] detected a positive association between the frequency of contact with friends and QOL and, contrastingly, a negative association between the frequency of contact with family members and QOL. Similarly, based on data from a longitudinal study, Webb et al.[25] found that the QOL of elderly residents in England was positively associated with the frequency with which they contacted their friends, whereas, on the contrary, a high frequency of contact with family members reduced QOL. It is likely that the explanations for this difference between contact with family and contact with friends are those already mentioned in the previous section on the type of relationship and QOL/well-being.

Despite some discrepancy in results, which may be due to the different geographical contexts and samples, and to different ways of operationalizing the concept of well-being in the surveys discussed, the results suggest a positive association between frequency of contact and well-being. It is possible that with the tendency for the size of the social network to reduce in old age, due in particular to the death of peers, contact with the elements that make up this network is of greater significance and importance for the elderly, making frequency of contact with the social network positive for their well-being. However, it can also be assumed, conversely, that elderly persons with greater well-being establish more contacts precisely because they feel well.

Emotional closeness and QOL/well-being.

Emotional closeness is a feature of the social network that has been operationalized in different ways: as the degree of emotional proximity of the elderly person to the members of their social network[37] or as the number of emotionally close people[5].

Overall, one can say that a high degree of emotional closeness has been associated with high levels of QOL/well-being in old age[5,7,21,25,26,37]. The theory of social-emotional selectivity, already mentioned in this article, contributes to explaining the positive contribution of emotional closeness to the well-being of the elderly. This theory of social-emotional selectivity derives from the theory of compensatory optimization45, which also allows us to understand these results. According to this model, optimization means the acquisition, application, coordination and maintenance of internal and external resources involved in achieving higher levels of functioning, while compensation implies the adoption of alternatives to maintain functioning46. In fact, elderly persons can compensate for age-related social barriers and optimize their social interactions by focusing their limited time and energy on a few social partners who are better able to meet their main social needs[27].

DISCUSSION

The present review of scientific literature on the relationship between social networks and QOL or other indicators of well-being for elderly persons has identified several trends related to methodological content. These tendencies relate to approaches to and the operationalization of QOL, as well as to results regarding the relationship between the characteristics of social networks and QOL/well-being in old age.

In terms of methodology, the general use of quantitative methodology of social research is notable, with much less use made of qualitative methodology

or a combination of the two. The samples that have been employed tend to be made up of more than 30 individuals, while more than half of the studies analyzed in this review[7,25,26,29,30,37,38,42] made use of representative samples. Thus, probabilistic selection of the elements to be studied within a determined temporal and geographical context was preferred.

The concept of QOL has been approached and operationalized in a variety of ways. It is fair to say, however, that regardless of how the concept of QOL is defined and operationalized in each study, research has consistently demonstrated the beneficial effect of social and family relationships, and therefore social networks, on the QOL/well-being of elderly persons.

Regarding the relationship between the characteristics of social networks and QOL/well-being in old age, it has been observed that: a) in general, the size of a social network has been positively associated with the QOL/well-being of elderly persons, although some studies show that there is no association between these factors; b) overall, literature has found evidence that networks of friends contribute more to the QOL/well-being of elderly persons than those made up of family members, while the positive contribution of enjoying more than one type of relationship (for example, the joint importance of relations with friends and with neighbors) was also noted; c) the low number of studies on the impact of the geographic proximity of a social network on QOL/well-being in old age does not allow the identification of any pattern or trend regarding the effect or influence of this characteristic; d) in general, frequency of contact is positively associated with the well-being of elderly persons, although some studies indicate that there is no association between the variables; e) literature clearly indicates a positive association between emotional closeness with elements of social networks and the QOL/well-being of elderly persons.

The discrepancy in the results observed is possibly due to the use of different samples, which are based on cross-sectional analyzes rather than longitudinal surveys, making it impossible to establish relations of cause and effect between social networks and well-being[47], as well as the different geographical contexts and distinct ways of defining and operationalizing QOL/well-being employed. Discussion among researchers regarding the definition of QOL and ways to operationalize this measure would greatly help to mitigate these differences and add rigor to scientific research on this subject. In fact, researchers often do not define the concept of QOL in their publications and rarely justify the selection of the measuring instrument they use, resulting in a proliferation in the number of approaches to the operationalization of the concept.

Other omissions have been identified in the level of scientific knowledge on this subject. Firstly, associations between the characteristics of social networks and QOL/well-being have been demonstrated, but researchers seldom investigate the factors that lead to these associations. Secondly, there is a lack of longitudinal studies that would enable causality between the characteristics of social networks and QOL/well-being to be established. Thirdly, there is a clear lack of studies on more specific elderly populations, such as those living alone or those residing in rural areas. Although the proportion of people living alone in European societies has grown considerably in the last four decades[48], becoming an increasingly common behavioral pattern among elderly persons on the continent[49], there is a lack of research focusing on this population.

The limitations of the present literature review derive from the criteria used in the selection of bibliographic material: the fact that studies based on research carried out in Europe and North America have been prioritized, as well as the selection of only some of the characteristics of social networks, namely those considered nuclear[23].

Nevertheless, analysis of the studies considered in this article shows how the concept of QOL has been defined and operationalized and evidences the latest research on the relationship between the main characteristics of the social networks of elderly persons and their QOL. This analysis could be used by students and researchers interested in this subject, as well as contributing to the formulation of public policies aimed at improving the quality of life of elderly persons.

CONCLUSION

Scientific literature shows that networks of friends contribute more than family networks to the quality of life/well-being of elderly persons. The positive contribution of having more than one type of relationship (e.g. simultaneous friendship and family relationships) to the quality of life/well-being of elderly persons has also been demonstrated. Finally, the studies analyzed indicate the positive impact of emotional closeness on quality of life/well-being.

The present literature review allows us to make suggestions for the development of future research. Firstly, it is necessary to prioritize longitudinal analyzes, given their scarcity. It is also important to make use of a combination of quantitative and qualitative methodologies. On one hand, quantitative methodologies make it possible to work with large and representative samples, while on the other, qualitative methodologies make it possible to deepen, enrich, and explain/understand the information collected using quantitative methodology on the associations/effects of social networks on quality of life. Finally, given the scarcity of verified information, more research should be done on specific populations, with particular emphasis on elderly persons living alone.

ACKNOWLEDGEMENTS

We are grateful for the support of the Fundação para a Ciência e Tecnologia (Foundation for Science and Technology) (FCT), who awarded one the authors of this work with a PhD scholarship under QREN-POPH-Typology 4.1-Advanced Training, supported by the European Social Fund and Brazilian Ministry of Education funding.

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Received: January 24, 2016
Reviewed: August 1, 2016
Accepted: November 7, 2016

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