Clinical-Functional Vulnerability of Elderly Users of Primary Healthcare: Cross-sectional Study

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Abstract

Identifying health and life conditions related to the loss of functionality of the elderly contributes to the construction of public policies and interventions that help them live with more autonomy and independence. In the reality of Primary Health Care (PHC), the identification of fragile elderly or those at risk of fragility needs to be simple and fast. The purpose of this study was to identify the clinical-functional vulnerability of elderly PHC users. This was a quantitative and transverse study, carried out through the application of the clinical-functional vulnerability index-20 (CFVI-20), which evaluates eight predicting domains of functional decline and death in the elderly: age, self-perception of health, activities of daily life (ADL), cognition, mood/behavior, mobility, communication, and presence of multiple comorbidities. 67 elderly people with an average age of 69.1 (± 6.9) years old were included. Of these, 47 (70.0%) were female, 43 (64.1%) were retired, 41 (61.1%) had an incomplete elementary education, 42 (62.6%) expressed some physical limitation, and 42 (62.6%) were sedentary. Everyone showed a change in at least one of the eight domains evaluated by CFVI-20, especially mobility (n = 67; 100%), cognition (n = 54; 80.5%), and mood (n = 40; 59.7%). Finally, 23 elderly (34.3%) were classified as robust, 30 (44.7%) as being at risk of fragility, and 14 (20.8%) as fragile. Most elderly evaluated were at risk of fragility or fragile. The CFVI-20 has proved to be an instrument of simple and rapid application in PHC to contribute to the identification, monitoring and management of elderly at risk of clinical-functional vulnerability.

Keywords: Elderly Health Care. Patient care team. Vulnerability in health.

INTRODUCTION

Population aging is a process that has been occurring on a global scale and in various ways. In developed countries, it is a marker of better living conditions and greater access to health services. In developing countries, population aging has occurred without due social and economic development, which raises inequalities and difficulties related to access to health resources and services[1]. In Brazil, life expectancy has increased approximately 25 years in five decades; however, there were no significant improvements in the living and health conditions of the population[2].

The demographic transition that the country has been crossing since the mid-20th century is characterized by changes in the populational profile including high fertility, high mortality, and predominance of young people with a profile of low fruitfulness, low mortality, and predominance of elderly people[1]. This also triggers transformations in the epidemiological profile, characterized by the presence of non-communicable diseases (chronic and degenerative) and external causes (accidents and violence) as the main causes of death, as well as the greater burden of morbidity and mortality among the elderly as well as the predominance of morbidity over mortality[2].

Due to the needs and vulnerabilities that the elderly present, public policies such as the Elderly Statute[6], the National Policy for Elderly Health[7], and the National Policy for the Elderly[8] emerged to regulate the rights of the elderly, encouraging their autonomy, integration, and effective participation in society, among which are the right to life and health, through the prevention of diseases, promotion, protection, and recovery of health and aging in dignified conditions[6].

Aging is a heterogeneous and complex process, characterized by broad and progressive changes that are associated with increased susceptibility to many diseases and are influenced by various factors, including genetic characteristics, lifestyle, and environmental exposures[2]. In Brazil, the elderly are individuals who are 60 years old or more, and according to data from the Brazilian Institute of Geography and Statistics (BIGE), the projection of elderly individuals for 2060 is approximately 31 million, which will classify the country as the sixth most aged population in the world[3]. From this perspective, it is important to focus on the integrality, continuity, and articulation of care, emphasizing the maintenance and/or improvement of functional capacity, with actions to promote healthy and active aging, prevention of diseases, health recovery, and physical and cognitive rehabilitation[4,5].

Commonly, the term fragility is used to portray the degree of vulnerability of the elderly to unfavorable outcomes such as falls, hospitalization, functional decline, and death. However, there are several definitions of fragility in the literature, which compromises its standardization and instrumentalization in clinical practice[6]. The multidimensional instrument recognized as the *gold standard* for fragility assessment is the Comprehensive Geriatric Assessment (CGA). It involves the elderly and their families, in order to verify the health of the elderly by highlighting problems that were previously attributed to the aging itself and then interpreted incorrectly. At the end of the CGA, the elderly individual is classified into 10 clinical-functional strata, classifying the overall diagnosis of the individual and, consequently, facilitating the continuity of care in a systematized way, ensuring the integrality in healthcare[7]. However, the use of CGA in Primary Health Care (PHC) is unfeasible, as it needs to be conducted by a specialized geriatric-gerontological team.

In the reality of PHC, the identification of fragile elderly individuals or those at risk of fragility needs to be simple and fast. Therefore, among the instruments for rapid screening of clinical-functional vulnerability in the elderly, the clinical-functional vulnerability index-20 (CFVI-20), recognized as one of the four best instruments in the world capable of recognizing fragile elderly, is highlighted. It is a questionnaire that evaluates eight domains of the health of the elderly in order to identify those who need to be evaluated by a specialized geriatric-gerontological team. The CFVI-20 is composed of twenty questions and is a multidimensional, valid, reliable, simple, and rapid application instrument and can be used by any healthcare professional[9].

Identifying health and life conditions related to the loss of functionality of the elderly

contributes to the construction of public policies and interventions that help them live with more autonomy and independence. The healthcare professional responsible for the care of the elderly, by early identifying the factors responsible for generating functional disability, has the possibility of promoting interventions that probably had not be considered previously[10]. Given the complexity involved in the recognition of vulnerable elderly, stratifying the elderly of the community according to their clinical-functional vulnerability can be a way to include the health care of the elderly population more effectively among PHC[11] programs.

The purpose of this study was to identify the clinical-functional vulnerability of elderly users of PHC. Considering that the researchers found, in Brazilian scientific databases, a reduced number of scientific production from the CFVI-20 questionnaire in PHC[7,8,11,12,13,14], the primary contribution of this study is centered on screening clinical-functional vulnerability of the elderly users of PHC, since there is strong evidence that it will help support health promotion and prevention, enabling actions based on the needs and characteristics of each individual, thus, contributing to better clinical outcomes and quality of life of the elderly[7].

METHODOLOGY

This was a cross-sectional and quantitative study, whose data collection was carried out from March to August 2021 in two PHC Centers (PHCC) of Campo Grande, MS, namely: Dr. Benzamin Azato - Parque do Sol PHCC and Aquino Dias Bezerra – Nova Vida PHCC. The municipality of Campo Grande has 64 primary health care centers. Currently, almost 10% of the population, according to data from the latest census of the Brazilian Institute of Geography and Statistics (BIGE), is elderly 60 years or older, representing about 78,400 people. The city is the 8th Brazilian capital with the best coverage of primary health care in the country. An average of 75.3% of coverage exceeds 74.5% national coverage as shown in a survey by the Ministry of Health.

The study population consisted of elderly people who were in the aforementioned healthcare facilities at the time of data collection. For inclusion in the study, individuals were 60 years old. Exclusion criteria were physical and/or clinical limitations that prevented adequate collection of vulnerability data and populations such as indigenous,

quilombola, and those deprived of liberty.

The participants' selection strategy was performed by convenience sampling, where the researcher used the random selection method of users, considering the established inclusion criterion. The pre-selected participants were invited to participate in the study, which involved a clinical interview with a duration of 30-40 minutes, in a private room. Individuals who showed interest in participating in the study only did so after signing the Informed Consent Form (ICF).

A collection instrument was developed by the researchers which presented four data groups: participant profile, social history, clinical history, and medication history. Data related to the participant's profile, as well as social and clinical history comprised sex, age, occupation, alcohol consumption, smoking, profession or occupation, physical activity, and physical limitations. In addition to the clinical interview, the electronic medical records and the drug prescription of each participant were also sources for the collection of the data provided for in the study, in order to reduce the time required for the

interview with the participant.

The screening of clinical-functional vulnerability was performed through the application of the CFVI-20 questionnaire, developed in Brazil in 2014 by the Federal University of Minas Gerais (UFMG) and validated for use in PHC[7]. The CFVI-20 is positively related to CGA and consists of 20 questions, evaluating eight domains considered predictors of functional decline and death in the elderly: age, self-perception of health, activities of daily life (ADL), cognition, mood/behavior, mobility (range, grip, and tweezers; aerobic/muscle capacity; gate; and sphincter continence), communication (vision and hearing), and the presence of multiple comorbidities (polymorbidity, polypharmacy, and/or recent hospitalization). Each dimension has a specific score that totals a maximum value of 40 points. The higher the value obtained, the higher the risk of clinical-functional vulnerability of the elderly. Recognition of the clinical and functional condition of the elderly is obtained from the following criteria: a) zero to six points - the elderly individual is considered robust or low risk of vulnerability; b) seven to fourteen points - the elderly individual is at risk of fragility or moderate risk of functional clinical vulnerability; c) fifteen points or more - the elderly individual is classified as fragile or high-risk for functional clinical vulnerability, presenting established functional decline and being unable to manage their life[7,8].

For the analysis of the results, the data were tabulated and interpreted through simple descriptive statistics. Therefore, the Excel® program, 2010, was used. This study was approved by the Research Ethics Committee of the Federal University of Mato Grosso do Sul, according to Opinion 4.211.316.

RESULTS

67 elderly people with an average age of 69.1 (± 6.9) years old participated in the study. Of these, 47 (70.0%) were female, 43 (64.1%) were retired, 41 (61.1%) had an incomplete elementary school, 42 (62.6%) had some physical limitation, and 42 (62.6%) were sedentary. Regarding their medicinal assessment, 40 (59.7%) took up to 5 medicines a day, 25 (37.3%) took 5 to 10 medicines per day, and 2 (2.9%) took more than 10 medicines per day. Table 1 presents, in detail, the sample profile.

Of the elderly individuals evaluated, 21 (31.3%), 24 (35.8%), and 22 (26.3%) had one, two, or three or more chronic non-communicable diseases (DCNT), respectively. The most prevalent CNCDs were systemic arterial hypertension (n = 56; 83.5%), diabetes mellitus (n = 32; 47.7%), and dyslipidemia (n = 10; 4.9%). Regarding the drugs in use, the main classes found were: antihypertensives (angiotensin receptor antagonists, diuretics, beta blockers, and inhibitors of angiotensin converting enzyme); biguanide and sulfonylurea class antidiabetics; lipid-lowering drugs; antidepressants (selective serotonin reuptake inhibitors, benzodiazepines); and proton pump inhibitors.

From the results of the CFVI-20, all elderly individuals (100.0%) evaluated had a change in at least one of the eight domains evaluated by the instrument, as provided below: Mobility (n = 67; 100%), cognition (n = 54; 80.5%), mood (n = 40; 59.7%), multiple comorbidities (n = 24; 35.8%), age (n = 36; 31.5%), functional disabilities (n = 22; 57.8%), self-perception of health (n = 8; 53.7%), and communication (n = 28; 41.7%). In addition, 12 (17.9%), 27 (40.2%)

Table 1 - Profile of the elderly users of primary health care. Campo Grande, MS, Brazil, 2021.

Variables	n	(%)
Sex		
Female	47	70.0%
Male	20	30.0%
Mean Age (± SD)		
69.1 (± 6.9)		
Age group		
60 to 69	36	53.7%
70 to 79	25	37.3%
≥ 80	6	8.9%
Level of education		
Illiterate	7	10.4%
Incomplete elementary school	41	61.1%
Complete primary education	8	11.9%
Complete high school	9	13.4%
Complete Higher Education	2	2.9%
Physical limitations		
Eyesight	17	25.3%
Locomotion	18	26.8%
Hearing	7	10.4%
None	25	37.3%
Occupation		
Retired	43	64.1%
Home	13	19.4%
Others	11	16.4%

Table 2 - Individual results of each domain evaluated by Questionnaire CFVI-20 applied to the elderly users of primary health care participating in this study. Campo Grande, MS, Brazil, 2021.

Question	CFVI-20 Items	n (%)
	Age	
1	60 to 74 years	43 (64.1%)
	75 to 84 years	23 (34.3%)
	85 years or more **Self-perception of Health**	1 (1.49%)
2	Self-perception of health as regular or bad **Functional limitations**	24 (35,8%)
3 to 5	Limitations in at least one IADL*	21 (35.8%)
6	Failure to bathe alone due to health condition - BADL ** **Cognition**	3 (4.4%)
7	Some relative or friend mentioned the patient's forgetfulness	23 (34.3%)
8	Worsening forgetfulness in recent months[1]	18 (26.8%)
	Forgetfulness preventing the practice of activities of daily life **Mood**	13 (19.1%)
10	Discouragement, sadness, or hopelessness in the last 30 days	25 (37.3%)
11	Loss of interest or pleasure in the last 30 days in previously pleasant activities **Mobility**	15 (22.3%)

Question	CFVI-20 Items	n (%)
12	Inability to lift their arms above shoulder level	10 (14.9%)
13	Inability to hold small objects	6 (8.9%)
14	BMI less than 22 kg/m²	9 (13.4%)
15	Difficulty to walk impeding activities of daily life[3]	24 (35.8%)
16	Two or more falls in the last year	15 (22.3%)
17	Involuntary loss of urine or feces at some point **Communication**	22 (32.8%)
18	Difficulties with vision impeding activities of daily life[4]	21 (31.3%)
19	Difficulties in the hearing impeding activities of daily life[5] **Multiple comorbidities**	7 (10,4%)
20	Regular use of 5 or more different medicines	24 (35.8%)

* Instrumental activities of daily life.
** Basic activities of daily life.

(1) The limitations in instrumental activities considered were three: stop shopping due to physical condition; Failure to control money spent, pay bills due to health or physical condition; Failure to do small household work, such as washing dishes, tidying the house due to physical condition.
(2) It is considered positive for unintentional weight loss that elderly who lost more than 4.5 kg or 5% of body weight in the last year or 3 kg in the last month or 6 kg in the last 6 months.

and 24 (35.8%) elderly had changes in one, two, three or more domains evaluated by the instrument, respectively. Finally, 23 elderly individuals (34.3%) were classified as robust, 30 (44.7%) as at risk of fragility, and 14 (20.8%) as fragile. Table 2 presents, in detail, the individual results of each domain evaluated by the CFVI-20.

DISCUSSION

As a result of the aging process, many elderly individuals decline in their clinical and functional capacity, which is closely linked to the partial or total damage of their autonomy and independence. However, functional decline and loss of independence do not constitute inevitable consequences of the process of human aging. Due to the high prevalence and impact of chronic health problems within the elderly population, evidence-based interventions to manage these problems are increasingly relevant to contribute to healthy aging, that is, the developing and maintaining functional capacity that allows for well-being at an older age[6,15].

Functional disability also refers to a difficulty in performing everyday activities due to a health problem. Functional disability can be evaluated from two perspectives, namely: the difficulty in performing basic activities of daily life (BADL) like eating and tasks related to self-care, and difficulty performing instrumental activities of daily life (IADL) like making purchases, using transportation, and going to the bank, among others[3].

The predominance of female elderly in this study also reinforces the evidence of other authors[16] and can be explained by factors associated with biological protection, by cultural reasons such as women's greater demand for health services over their lifetime[16] or less exposure of women to mortality factors, such as lesser tobacco and alcohol consumption[15]. The feminization of old age is a phenomenon of great social impact on demographic transition, characterized by the greater proportion of elderly women in the general population[17]. In addition, women live on average 6 to 8 years more than men. Projections for the year 2050 estimate a life expectancy of 84.54 years for women and 78.16 years for men, resulting from the interaction of environmental, social, and behavioral factors[17,18].

Most of the elderly individuals participating in this study had a low level of education and were retired. Low educational level and unfavorable economic conditions are associated with the highest occurrence of cognitive impairment. This may be related to less access to stimuli as well as difficulties in access to health care, proper food consumption, and physical activity, resulting in less preservation of cognition during the aging process[19,20]. Studies also indicate that people with low education have less possibilities for rehabilitation and are more fragile in the short term. In addition, low education is often associated with unhealthy lifestyle habits, such as consumption of alcoholic beverages, smoking and obesity[13]. With regards to occupation, literature shows that most Brazilian elderly are retired, and retirement plans, pensions, and other benefits of the government are their main sources of income[21].

Most elderly participants in this study were sedentary. Studies show that physical inactivity increases the risk for fragility by seven-fold. Such findings can be justified by the fact that the reduction in the level of physical activity causes decreased grip strength

and slower gate, criteria for diagnosis of fragility. On the other hand, muscle weakness, fatigue, malnutrition, and sarcopenia contribute to the reduction of physical activity practiced by the elderly and can influence the activities of daily life (ADL) and more pronounced can aggravate the instrumental activities of daily life. (IADL)[22,23].

Regular physical activity can be used to handle fragility as it improves balance and stability when sitting and climbing steps, reducing the risk of falling[22]. In addition, resistance exercises promote changes in the body capable of minimizing the effects of sarcopenia and improving fragility[24]. The state of humor in its dimensions (vigor, fatigue, tension, mental confusion, depression, and anger) also undergo acute and chronic commitments arising from the lack of regular exercise[25].

The presence of chronic diseases was common in the elderly evaluated in this study. Regarding the presence of polymorbidity and its association with fragility, a series of instruments bring the number of diseases as one of the criteria for defining fragility, including the CFVI-20. It is worth remembering that the prevalence of chronic diseases increases with age and a significant number of diseases progress with the loss of aerobic and muscle capacity, as well as greater need for medical care and drug use.

Elderly individuals with polymorbidities are also more susceptible to hospitalizations and often evolve with functional decline[3]. It is noteworthy, however, that polymorbidity can be minimized and sometimes avoided through early interventions in health, and control and reduction of preventable risk factors performed through interprofessional work and the PHC network[3].

Mobility was the health domain among the elderly with the highest change in this study. The decline of mobility in elderly individuals is an important predictor of health in old age, capable of detecting sarcopenia and functional limitation early on, as well as allowing for the operationalization of healthcare to prevent adverse events such as functional disability and falls[26,27]. On the other hand, several studies have shown the relationship between physical activity and the improvement of functional mobility[28]. In this sense, the regular practice of physical activity, based on the capabilities and individual needs of each elderly person, can act as a preventative health strategy, contributing as a protection factor against the loss of mobility, despite advancing age[28].

Humor and cognition were also domains of elderly health with frequent changes among the participants in this study. Cognitive impairment is a geriatric syndrome characterized by the reduction of cognitive functions, with a deficit in social and occupational activities. Associated with the ability to gain new knowledge is the ability to integrate this new knowledge into their understanding of life and the world, remember the past, recognize people and objects, be able to perform mathematical calculations, make decisions, reason, build, construct meanings, among others[29,30].

Cognitive impairment is closely related to mood disorders as the two can progress together. The main risk factors for depression in elderly people are being female, social isolation, chronic pain, polymorbidities, low socioeconomic level, and marital status (widower, single, or divorced). The diagnosis of depression in the elderly is a challenge, especially in more fragile individuals, due to the reluctance of the individual to recognize psychological suffering and ignorance or downplaying the depressive symptoms presented[29].

Several physiological changes arising from the natural aging process compromise the maintenance of cognitive capacity, especially memory, an essential element for

the functionality and participation of the elderly individual in society. The most common memory complaints among the elderly population are linked to the difficulty of storing recent information, being able to rescue it, and staying aware of daily activities. Functional losses resulting from memory complaints may lead the elderly individual to the loss of self-esteem, feeling of uselessness, social and family isolation, and trigger the appearance of other diseases, such as anxiety and depression disorders[30].

The association between cognition and fragility was identified in previously published studies that highlight cognition as an important factor of composition of the fragility syndrome phenotype. Elderly with cognitive changes may have greater difficulty in feeding and performing physical activity, with consequent weight loss and impairment of motor functions favoring the onset and progression of geriatric syndromes[31].

Most of the elderly participants in this study were fragile or were at risk of fragility. For fragile elderly individuals, referrals for multidimensional evaluation and specialized monitoring with a Geriatric-gerontological team is recommended as a preventive, therapeutic, or palliative approach[8]. Fragile elderly individuals are 1.27 times more likely to present cognitive decline compared to non-fragile individuals. Fragility, therefore, can be considered a risk factor for the development of dementia. Similarly, studies show that cognitive decline can be considered an independent risk factor for fragility. The chances of a fragile elderly individual to have cognitive decline are 330% higher compared to a robust elderly individual[19]. Furthermore, it is recommended that those at risk of fragility be referred to secondary care strategies so that a multidimensional evaluation is performed and strategies for preventing functional decline be implemented[2].

Therefore, screening for fragility is not only an "end" instrument, which only defines the degree of vulnerability of an elderly individual, but a "medium" instrument which shows the follow-up priorities of this patient, permitting necessary referrals and clinical follow-ups in a context of different healthcare networks for the elderly[7,20]. It is also noteworthy that some international guidelines already have recommendations for differentiated therapeutic goals for the elderly beginning with the classification of fragility, such as the Guidelines of the American Diabetes Association (ADA)[32]. In it, the therapeutic goals of glycated hemoglobin, blood glucose, and blood pressure vary for each classification of fragility, allowing for the construction of more individualized treatment plans according to the needs and clinical characteristics of each patient.

Among the limitations of this study, we highlight data collection by means of self-reporting, which may compromise their accuracy in cases where the elderly individuals are unsure or are confused about it. It is important to emphasize that data collection was performed by different researchers, which may have generated different interpretations of the collected data. It is worth remembering that there was a temporary interruption of care in the centers as a function of the COVID-19 pandemic, which compromised the flow of patients in the units during the data collection period and, consequently, the sample size of this study. Since the sample was by convenience and the sample size was restricted, the results cannot be generalized. In addition, a cross-sectional cut prevented monitoring and interventions with the multiprofessional health team. Finally, the collections were sometimes prevented due to the availability of an appropriate place that would guarantee the participant's privacy.

Despite the above limitations, the application of CFVI-20 was quick and practical for use in PHC as a form of screening for

clinical-functional vulnerability in the elderly, in order to contribute to the design of strategies by the management of this local clinic for the identification, monitoring, and supervision of elderly individuals at risk of vulnerability.

CONCLUSION

The results of this study showed that most participating elderly individuals were female, with a low level of education, retired, had some kind of physical limitation, and were sedentary. In addition, most were at risk of fragility or were fragile. The main elderly health domains with changes were mobility, cognition, and humor, respectively. The CFVI-20 has proved to be an instrument of simple and rapid application during multiprofessional evaluations of the elderly patients in a PHC and has the potential to contribute to the design of strategies by the management of this local clinic for the identification, monitoring, and supervision of elderly individuals at risk of clinical-functional vulnerability.

Author Statement CREdiT

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All authors have read and agreed to the published version of the manuscript.

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