WHICH OLDER PEOPLE IN THE COMMUNITY HAVE THE HIGHEST CLINICAL-FUNCTIONAL VULNERABILITY?

Quais idosos residentes na comunidade apresentam a maior vulnerabilidade clínico-funcional?

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ABSTRACT

OBJECTIVE: To identify the factors related to clinical-functional vulnerability in older people. **METHODS:** This cross-sectional quantitative study was conducted in 2018/2019 with 492 older adults registered in Family Health Strategy units in the city of Três Lagoas, MS, Brazil. Sociodemographic data were collected and the Clinical-Functional Vulnerability Index (CFVI-20) was applied (possible score 0-40; higher scores indicate greater vulnerability). A multinomial logistic regression was performed to identify the risk factors for clinical-functional vulnerability. **RESULTS:** The sample's mean age was 70.80 years (SD, 7.82) and the mean CFVI-20 score was 9.25 (SD, 7.09), with 17.07% at high risk of clinical-functional vulnerability, 38.82% at moderate risk, and 44.11% at low risk. Low education, social isolation, difficulty sleeping, and being female were risk factors for moderate vulnerability. On the other hand, low education, social isolation, difficulty sleeping, physical inactivity, being female, not using alcohol, and not participating in social groups were risk factors for high vulnerability. **CONCLUSIONS:** The CFVI-20 is convenient for primary health care contexts, since it is fast and easy to apply. By recognizing factors related to vulnerability, specific preventive actions can be planned.

KEYWORDS: frail elderly; primary health care; family health strategy; health vulnerability.

RESUMO

OBJETIVO: Identificar os fatores relacionados à vulnerabilidade clínico-funcional em idosos. **METODOLOGIA:** Trata-se de um estudo transversal e quantitativo, realizado em 2018/2019 com 492 idosos cadastrados em unidades com estratégia Saúde da Família (eSF) no município de Três Lagoas-MS. Foram coletados dados de caracterização sociodemográfica e se aplicou o IVCF-20 (pontuação possível de 0-40; quanto maior a pontuação, maior o risco de vulnerabilidade). Realizou-se uma regressão logística multinomial para identificar os fatores de risco para vulnerabilidade clínico-funcional. **RESULTADOS:** A média de idade é 70,80 ± 7,82 anos e a média de pontuação no IVCF-20 é 9,25 ± 7,09, sendo que 17,07% apresentam alto risco de vulnerabilidade clínico-funcional, 38,82% risco moderado e 44,11%, baixo risco. Baixa escolaridade, isolamento social, dificuldade para dormir e sexo feminino foram fatores de risco para o risco moderado de vulnerabilidade. Já a baixa escolaridade, isolamento social, dificuldade para dormir, inatividade física, sexo feminino, não fazer uso de álcool e não participar de grupos sociais foram fatores de risco para o alto risco de vulnerabilidade. **CONCLUSÕES:** O IVCF-20 se mostra oportuno no contexto da atenção primária à saúde, visto que possui rápida e fácil aplicação. Com o reconhecimento dos fatores relacionados é possível planejar ações de prevenção específicas.

PALAVRAS-CHAVE: idoso fragilizado; atenção primária à saúde; estratégia saúde da família; vulnerabilidade em saúde.

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INTRODUCTION

With the increase in life expectancy and decrease in birth and mortality rates, there has been a rapid reorganization of the age pyramid, called the demographic transition. Although Brazil's population was mostly young in the not-so-distant past, there is currently an increasingly expressive population of individuals aged 60 years or over.¹

The aging process is characterized as a sequential, irreversible, cumulative and individual process of morphological, functional, biochemical and psychological changes. Thus, the population's epidemiological profile is changing, with a higher prevalence of morbidities and disabilities inherent to the aging process. In this context, a condition called frailty can emerge, which is characterized as a multi-dimensional clinical syndrome involving certain clinical manifestations that can indicate a higher degree of vulnerability to future complications, such as falls, disability and death.²

Nevertheless, the term frailty has a number of definitions; some authors³ conceptualize frailty as a decrease in homeostatic reserve or the ability to adjust to biopsychosocial aggression and, consequently, an increase in vulnerability to functional decline and its outcomes. Therefore, to better understand the aging process and its inherent care needs, a multidimensional evaluation of older adult health is necessary, considering not only chronological aspects and the presence of diseases but psychosocial aspects as well.³

Due to these circumstances, the Clinical-Functional Vulnerability Index-20 (CFVI-20) was developed and validated in Brazil. It is an interdisciplinary instrument that not only analyzes aspects of the older adult's physical health, such as age, mobility and presence of multiple comorbidities, but also evaluates activities of daily living, self-rated health, cognition, communication and mood.³ Total scores can reach 40 points, with 0–6 points indicating low risk of clinical-functional vulnerability, 7–14 points indicating a moderate risk of clinical-functional vulnerability, and ≥ 15 points indicating a high risk of clinical-functional vulnerability.³ The instrument was positively correlated with the Comprehensive Geriatric Assessment and has good indicators of sensitivity (90.50%), specificity (71%), and reliability (Cronbach's $\alpha = 0.740$ and 0.861 , depending on the health service used). It is considered a good instrument for identifying older adults at risk³ as well as an innovation, since it includes psychological and social well-being as fundamental factors in the aging process.

In primary health care (PHC), considering the many aspects of older adult health has led to effective prevention and care models, in contrast to rigid assistance standards based on fallacious stereotypes.⁴ The CFVI-20 is an efficient and reliable way to recognize and monitor vulnerable individuals, since

it was based on the Comprehensive Geriatric Assessment, a diagnostic procedure restricted to the geriatric/gerontological team that allows global observation of older adult health.³

In addition to guaranteeing the flow of health services and preventive interventions, the CFVI-20 is also compatible with PHC needs because it is designed for a multiprofessional team. Unlike the Comprehensive Geriatric Assessment, the CFVI-20 can be applied by professionals other than doctors, such as nurses, nurse technicians, health community agents, etc. Furthermore, the fact that it can be applied quickly and objectively makes it favorable to the public health context.³

Therefore, the CFVI-20 can be considered an innovative multidimensional instrument, which offers a quick, economical, and effective way to globally evaluate older adults. In Brazil, PHC teams tend to consider older people frail based on their general appearance or when they present multiple diseases or comorbidities.³

Thus, this study aimed to identify factors related to clinical-functional vulnerability in community-dwelling older people to determine health-related variables that are not directly evaluated by the CFVI-20, such as sociodemographic profile, social evaluation, and life habits. We also aimed to promote healthy aging in the PHC context through early monitoring of the well-being and autonomy of older adults, reiterating the importance of prevention and potentializing health care access and social participation, facilitating the active aging of the population.

METHODS

This cross-sectional study, based on the quantitative investigation method, was conducted in the city of Três Lagoas, Mato Grosso do Sul, Brazil, which has a population of 10 067 older adults (9.90%)⁵ according to the latest census.

The sample consisted of older adults (aged ≥ 60 years) treated at nine basic health units with a family health strategy, including a total of 14 health teams, which cover 41.10% of the total population. The data were collected by trained evaluators between November 2018 and November 2019 at the participants' homes or the health unit.

The sample size was based on the proportion estimate formula in a descriptive group, with categorical qualitative variables for the finite population. The significance level and sampling error were set at 5% ($d = 0.05$), with an estimate of 50% ($p = 0.50$). Thus, a minimal sample of 371 participants was required.

The inclusion criteria were: age ≥ 60 years, registration in one of the nine basic health units with a family health strategy, the ability to answer the questionnaire in the interviewer's

opinion. We excluded individuals with mental disorders or untreated systemic diseases, those with uncorrected visual or hearing impairment that would prevent applying the instruments, and those who could not be found at home after two attempts at different times. Participants were recommended by the basic health unit staff, who provided a list of individuals in the coverage area meeting the inclusion criteria.

A total of 570 older people were visited; two were excluded due to change of address, 14 could not be found at home after two tries, and 62 refused to participate. The final sample consisted of 492 older adults, with an answer rate of 86.31%. Participants from all nine basic health units were evaluated.

The dependent variable was clinical-functional vulnerability, which was assessed with the CFVI-20, a multidimensional assessment of older adult health. It includes 20 questions divided into eight sections: age, self-rated health, functional disabilities, cognition, mood, mobility, communication, and multiple comorbidities. Total scores vary from 0 to 40: the higher the score, the higher the risk of clinical-functional vulnerability.

The following cutoff scores were used: 0–6 points (low risk), 7–14 points (moderate risk) and ≥ 15 points (high risk).³

The following independent variables were chosen because they represent important health data that is not directly evaluated by the CFVI-20:

- sociodemographic profile: sex (male/female), education (in years), family income (in multiples of the federal minimum salary) and marital status (partner/no partner);
- social situation: number of people who reside with the participant, number of close people, participation in social groups (yes/no), and self-reported social isolation (yes/no).
- life habits: current smoker (yes/no), alcohol use (yes/no), number of meals per day, difficulty sleeping (yes/no), and physical activity (active = ≥ 150 minutes of moderate physical activity or 75 minutes of vigorous activity per week, according to the International Physical Activity Questionnaire – short version).⁶

For characterization purposes, the participants' age was also determined, since this data is collected in the CFVI-20.

The data were double entered and verified in Microsoft Excel™ and exported to SPSS version 25.0 for analysis. Clinical-functional vulnerability was the dependent variable. Independent variables were described as mean, standard deviation (SD), and percentage, according to low, moderate, and high risk groups. Low, moderate, and high risk of clinical-functional vulnerability were estimated with 95%

confidence intervals (CI). The Pearson and Kruskal-Wallis tests were applied to compare the groups. A multinomial logistic regression was also performed to identify risk factors for clinical-functional vulnerability, using low vulnerability risk as a reference for analysis. Associations with a p -value ≤ 0.20 in the univariate analysis were selected for multiple analysis and were inserted in order of significance (forward stepwise selection). Variables with $p \leq 0.05$ were considered significant and were included in the adjusted model.

All ethical precautions for research with human beings were taken. The project was approved by the Human Research Ethics Committee of the Universidade Federal de Mato Grosso do Sul and all participants provided written informed consent prior to inclusion.

RESULTS

The 492 participants were divided into three groups according to CFVI-20 classification, 17.07% (95%CI 14.01 – 20.65) were at high clinical-functional risk, 38.82% (95%CI 34.62 – 43.20) were at moderate risk, and 44.11% (95%CI 39.78 – 48.52) were at low risk. The mean participant age was 70.8 (SD, 7.8) years and the mean CFVI-20 score was 9.25 (SD, 7.09). Table 1 presents the independent variable data according to vulnerability risk.

Statistically significant differences were found between the three groups regarding sex, education, family income, marital status, participation in social groups, social isolation, alcohol use, number of meals per day, difficulty sleeping, and physical inactivity.

Table 2 presents the multinomial logistic regression data.

Moderate clinical-functional vulnerability was associated with the following risk factors: lower education (OR = 0.94), social isolation (OR = 1.72), difficulty sleeping (OR = 1.95) and being female (OR = 1.55). High vulnerability was associated with the following factors: lower education (OR = 0.88), social isolation (OR = 3.32), difficulty sleeping (OR = 3.12), physical inactivity (OR = 2.97), being female (OR = 1.99), no alcohol use (OR = 0.27), and no participation in social groups (OR = 2.24).

DISCUSSION

In our sample, 17.07% of the participants were at high clinical-functional risk, 38.82% were at moderate risk, and 44.11% were at low risk. These data corroborate other Brazilian cross-sectional studies. In one study of 1 750 older adults, 48.7% were considered at low risk, 31.2% at moderate risk, and 20.1% at high risk.⁷ Another study of 394 older adults

Table 1. Characterization of the participants (n = 492) according to clinical-functional vulnerability. Três Lagoas, MS, Brazil, 2018-2019.

Clinical-functional vulnerability	Total (n = 492)	Low risk (n = 217)	Moderate risk (n = 191)	High risk (n = 84)	p-value*
	% or average (standard deviation)				
Sex					0.001
Male	39.84	48.85	35.08	27.38	0.001
Female	60.16	51.15	64.92	72.62	
Education (years)	4.06 (3.99)	4.82 (4.34)	3.71 (3.88)	2.88 (2.78)	
Family income					
≤ 2 x the federal minimum salary	53.86	50.69	62.83	41.67	0.002
> 2 x the federal minimum salary	36.18	41.02	28.79	40.48	
Not disclosed	9.96	8.29	8.38	17.86	
Marital status					
Partner	50.00	56.22	49.21	35.71	0.006
No partner	50.00	43.78	50.78	64.29	
Number of people in the home	2.68 (1.52)	2.70 (1.44)	2.57 (1.57)	2.89 (1.57)	0.062
Number of close people	6.26 (12.04)	6.14 (9.36)	5.57 (7.13)	8.13 (22.52)	0.886
Participation in social groups (no)	30.69	27.19	29.84	41.67	0.048
Social isolation (yes)	25.61	16.13	27.75	45.24	< 0.001
Smoking (yes)	11.39	10.60	10.99	14.29	0.650
Alcohol use (yes)	17.48	21.69	17.80	5.95	0.006
Meals/day	3.44 (1.15)	3.52 (1.04)	3.50 (1.27)	3.12 (1.08)	0.006
Difficulty sleeping (yes)	38.82	26.73	43.98	58.33	< 0.001
Physical inactivity (yes)	65.04	60.18	63.35	82.14	0.001

*Pearson or Kruskal-Wallis tests.

Table 2. Multinomial logistic regression analysis of the risk factors for clinical-functional vulnerability in older adults (n = 492). Três Lagoas, MS, Brazil, 2018-2019.

Clinical-functional vulnerability	Univariate	Multivariate	Univariate	Multivariate
	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)
	Moderate risk		High risk	
Education	0.93 (0.89 – 0.98)	0.94 (0.89 – 0.98)*	0.86 (0.80 – 0.94)	0.88 (0.80 – 0.95)*
Social isolation (yes)	2.00 (1.24 – 3.23)	1.72 (1.04 – 2.83)*	4.30 (2.45 – 7.53)	3.32 (1.79 – 6.15)*
Difficulty sleeping (yes)	2.15 (1.42 – 3.26)	1.95 (1.27 – 3.01)*	3.84 (2.26 – 6.51)	3.12 (1.74 – 5.59)*
Physical inactivity (yes)	1.14 (0.77 – 1.71)	1.17 (0.77 – 1.77)	3.04 (1.64 – 5.66)	2.97 (1.52 – 5.79)*
Sex (female)	1.77 (1.19 – 2.63)	1.55 (1.02 – 2.38)*	2.53 (1.46 – 4.38)	1.99 (1.07 – 3.68)*
Alcohol use (yes)	0.78 (0.48 – 1.28)	0.89 (0.52 – 1.51)	0.23 (0.09 – 0.60)	0.27 (0.10 – 0.75)*
Participation in social groups (no)	1.14 (0.74 – 1.75)	1.28 (0.81 – 2.03)	1.91 (1.13 – 3.24)	2.24 (1.23 – 4.08)*

OR: odds ratio; 95%CI: 95% confidence interval; *p ≤ 0.05.

found that 19.5% were at high risk, 28% at moderate risk, and 52.5% at low risk.⁸ Silva et al.⁹ found that 71.8% of their sample of older adults were at low risk, 22% at moderate risk and 6.2% at high risk.

Low education is a risk factor for moderate risk. This correlation might be justified by the protective effect of education on older adult cognition, as was found in a cross-sectional study conducted in Curitiba, PR, Brazil.¹⁰ Furthermore, older adults with lower education have low access to information, which results in more unhealthy life habits and low preventive use of health services, considering that literacy can facilitate the inclusion of older adults in health promotion actions, as concluded by the FIBRA Study, which was carried out in 17 Brazilian cities.¹¹ Similarly, an Italian study found a relationship between frailty and low education.¹² Furthermore, a relationship between education and physical function in older adults has also been found in high-income countries, such as England.¹³ This social determinant increases vulnerability, impacting the frailty process in older adults.¹⁴

Corroborating the literature,^{11,15-17} there was a relationship between higher risk and difficulty sleeping. It is known that effective sleep is directly related to quality of life.¹⁸ However, difficulty sleeping is an avoidable part of aging. Sleep complaints are usually related to other morbidities, such as joint disease and urinary incontinence, as well as to being female.¹⁹ Poor sleep quality impedes activities of daily living and damages cognition and mental health, affecting the well-being of older adults.^{11,16}

Social isolation is an increasingly common phenomenon in contemporary society. Loneliness can be related to life satisfaction, including thoughts about lack of support.²⁰ Studies have shown that loneliness is related to depression, lower quality of life,²¹⁻²⁴ and greater vulnerability to physical and mental health problems in older individuals.²⁴⁻²⁶ A Finnish study found strong evidence that social isolation has an adverse effect on mortality.²⁷ The present study also found that self-reported social isolation is linked to higher risk of vulnerability.

One factor that can explain the relationship between being female and having a moderate or high risk of vulnerability is the higher prevalence of sarcopenia in women, which was demonstrated in the SarcoPhAge study in Belgium²⁸, as well as in the Hertfordshire Cohort Study in the United Kingdom.²⁹ Sarcopenia has a direct tie with frailty, since both conditions share common biological pathways and inflammatory markers.³⁰ The development of frailty in women is also influenced by various hormonal deficiencies and increased inflammatory states.³¹ Furthermore, social aspects play a relevant role in the higher vulnerability of women. In the city of São Paulo, it was observed that men under 75 years of age had greater

access to health care than women, as well as that dependent older women are more frequently widows and, consequently, do not have a spousal caregiver.³² An Ethiopian study found that women perform significantly more tasks and have greater responsibilities than men, resulting in a greater burden and less rest.³³ Although women live longer than men, they tend to have worse health. For them the environment is more harmful, even in developed countries, and lifestyle factors increase vulnerability to subcellular mechanisms that prolong recovery time.³⁴ Thus, the results of the present study corroborate studies that have found a higher prevalence of frailty in women.^{35,36}

An association between vulnerability and physical inactivity was found in a longitudinal study conducted in Bahia, Brazil.³⁷ According to this study, frailty is related to < 150 minutes of physical activity per week and ≥ 540 minutes of sedentary behavior per day. A cross-sectional study of Chinese adults ≥ 50 years of age found a linear dosage-response curve between daily sedentary time and frailty.³⁸ Furthermore, a Korean cohort study concluded that physical activity is negatively associated with mortality from cardiovascular, mental, and respiratory diseases and cancer.³⁹ It has also been found that exchanging 30 minutes of physical inactivity with an equal period of light physical activity reduces the risk of frailty in older adults.⁴⁰

Our results indicate that individuals who do not consume alcohol have a higher risk of vulnerability, which agrees with other research, such as a Danish study⁴¹ that found an association between light to moderate alcohol consumption and a lower risk of coronary heart disease in both men and women. According to a U.S. study,⁴² consuming small amounts of alcoholic beverages is a protective factor against ischemia. However, one limitation of the present study was that we collected no information regarding the amount or frequency of alcohol consumption. Thus, the relationship between vulnerability and alcohol consumption should be investigated in future studies.

Regarding participation in social groups, older adults who do not do so have higher vulnerability. A study on older adults in Paraíba, Brazil found that participating in social groups signifies a return to social living.⁴³ The benefits these authors cited include reduced loneliness, leisure activity, physical activity, social living, a feeling of freedom, the will to live, and improved quality of life.⁴³ Furthermore, a positive correlation was found between feelings of loneliness and depression and anxiety symptoms in an Egyptian study.⁴⁴

CONCLUSION

The risk factors for clinical-functional vulnerability in the community's older adults include low education,

social isolation, difficulty sleeping, physical inactivity, being female, not consuming alcohol, and not participating in social groups. More than half of the older adults in our study had high or moderate risk of clinical-functional vulnerability.

In developing countries such as Brazil, especially in the state of Mato Grosso do Sul, clinical-functional vulnerability in older adults is not well studied. It has been observed that the aging process appears in unfavorable health, economic, and social conditions, which might explain the high prevalence of clinical-functional vulnerability in the population. These results can help direct older adult care in PHCs, including procedural guidelines and improvements in practice and decision-making by professional teams, which should consider the whole biopsychosocial individual. One feasible idea is periodic multidimensional evaluations by a multi-professional team, which could prevent clinical-functional vulnerability and reduce adverse outcomes, such as institutionalization, hospitalization, and morbidity and mortality rates. In the Unified Health System, which uses PHC as a reference, these actions could contribute to integrated care and active aging of the population.

CONFLICT OF INTERESTS

The authors declare no conflicts of interest.

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AUTHOR CONTRIBUTIONS

AMA: data curation, writing – original draft. NOA: data curation, writing – original draft. MELF: data curation, writing – original draft. BRSM: data curation, project administration, writing – review & editing. ACMG: Project administration, writing – review & editing. TCRM: conceptualization, supervision, writing – review & editing. BML: conceptualization, formal analysis, supervision, writing – review & editing.

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