

## Functional Clinical Vulnerability Index (IVFC-20): the recognition of the fragile elderly person by Primary Health Care

### *Índice de Vulnerabilidade Clínico - Funcional (IVFC-20): reconhecimento da pessoa idosa frágil pela Atenção Primária à Saúde*

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Metadata

#### ABSTRACT

Aging, inherent to every human being, is a phenomenon of global magnitude. Age itself is an inappropriate predictor, as aging is a heterogeneous pattern. This process is associated with biopsychosocial changes. This study sought to evaluate the clinical-functional vulnerability index (IVCF-20) of elderly people registered in a Basic Family Health Unit in the city of Teresópolis - RJ. The study was a cross-sectional, descriptive, and quantitative one, consisting of community-dwelling elderly subjects. They were evaluated using an identification form and analysis of sociodemographic conditions and the IVCF-20. When analyzing 100 respondents, 74% were female and 26% male, with an average age of 72.18 years, 81% were white, 61% had incomplete primary education, and 71% were retired. No association was identified between frailty in the elderly and sociodemographic factors. The presence of frailty was equivalent to 63% high risk, 29% medium risk, 8% low risk. A high prevalence of pre-frail and frail elderly people was observed, and no factors associated with frailty syndrome were identified. Understanding and considering frailty and its multifactorial aspects gives visibility to this reality and can help promote strategies and actions for the prevention and tracking of vulnerable elderly people.

**KEYWORDS:** Geriatric Assessment. Frail elderly. Primary Care. Physiotherapy.

#### RESUMO

O envelhecimento, inerente a todo ser humano, é um fenômeno de magnitude mundial. A idade é um preditor inapropriado, já que o envelhecimento é um padrão heterogêneo. Esse processo está associado a modificações biopsicossociais. O estudo buscou avaliar o índice de vulnerabilidade clínico-funcional (IVCF-20) de pessoas idosas cadastradas em uma Unidade Básica de Saúde da Família do município de Teresópolis - RJ. O estudo foi transversal, descritivo e quantitativo, constituído por sujeitos idosos comunitários. Foram avaliados por meio de ficha de identificação e análise das condições sociodemográficas e o IVCF-20. Ao analisarmos 100 respondentes, observou-se 74% do sexo feminino e 26% masculino, com idade média de 72,18 anos, 81% da cor branca, 61% com ensino fundamental incompleto, 71% aposentados. Não foi identificada associação entre fragilidade em idosos e fatores sociodemográficos. A presença de fragilidade foi equivalente a 63% de alto risco, 29% de médio risco, 8% de baixo risco. Observou-se uma alta prevalência de idosos pré-frágeis e frágeis e não se identificou fatores associados a síndrome de fragilidade. Compreender e considerar a fragilidade e seus aspectos multifatoriais é dar visibilidade a esta realidade, podendo auxiliar na promoção de estratégias e ações para a prevenção e o rastreamento da pessoa idosa vulnerável.

**PALAVRAS-CHAVE:** Avaliação Geriátrica. Idoso Fragilizado. Atenção Básica. Fisioterapia.

## INTRODUCTION

Population aging is evident in most societies today<sup>1</sup>. The study of the elderly allows us to understand the physical and functional effects of the aging process, as well as what may stem from differences in lifelong manifestations and the steady rate of biological decline<sup>2</sup>. Therefore, knowing only a person's age and the number of chronic illnesses does not contribute to a deeper understanding of an elderly individual's health condition and fitness. Thus, the well-being of older adults can be understood as the unique ability to meet biological, psychological, and social demands, regardless of age or the presence of pathologies<sup>3</sup>. The aging observed in developing countries, such as Brazil, has not yet been sufficiently analyzed to provide the necessary elements for developing appropriate policies for the elderly population<sup>4</sup>. According to the Brazilian Institute of Geography and Statistics (IBGE – *Instituto Brasileiro de Geografia e Estatística*), in 2021, an estimated 31.23 million people in Brazil were 60 years old or older. The increase of life expectancy has been remarkable among 80 year old adults and older. Between 1997 and 2007, the population of 60–69 year old people increased by 21.6%, while those aged 80 and above increased by 47.8%<sup>5</sup>.

In this context, Primary Health Care (APS – *Atenção Primária à Saúde*) plays a key role in the health care of older adults. Within the Health Care Network (RAS – *Rede de Atenção à Saúde*), APS acts as the coordinator of care flow, aiming to ensure continuity of health actions, expanded access, and improved quality of care. APS serves as the entry point for users into the Brazilian Unified Health System (SUS – *Sistema Único de Saúde*)<sup>6</sup>. It is guided by the principles of universality, accessibility, care coordination, longitudinally, comprehensiveness, accountability, humanization, equity, and social participation<sup>7</sup>. From this perspective, the concept of an "entry point" functions as a guide for the user's care pathway.

The care provided to older adults with chronic health conditions, disabilities, or complex needs is often fragmented, inefficient, ineffective, and discontinuous, potentially worsening their health<sup>8</sup>. Furthermore, the assessment of frail older adults should prioritize a comprehensive evaluation of all the patient's illnesses, limitations, cognitive abilities, medications, health-related devices, other treatments, self-care practices, well-being habits, and psychological conditions<sup>9</sup>. Given this, there is a clear need for Primary Care Teams (eAB) and/or Family Health Teams (eSF) within the primary health care system to equip themselves for screening older adults at risk of frailty and illness<sup>10,11,12,13</sup>. To this end, the vitality of older adults has been assessed using the Clinical-Functional Vulnerability Index (IVCF-20), a rapid screening tool for vulnerability among Brazilian older adults, designed for use in Primary Health Care (APS). This instrument was developed and validated to assess eight dimensions: Age, self-rated health, activities of daily living (ADLs), cognition, mood, mobility, communication, and multiple comorbidities. Based on

these factors, the IVCF-20 can predict functional decline and/or mortality of this population<sup>11</sup>.

Recently, amid transformations in health policies and practices—with the gradual advancement, organization, and consolidation of Brazil's Unified Health System (SUS) —physical therapy has gradually been integrated into primary care, expanding its scope beyond physical rehabilitation to include disease prevention and health promotion. Although this inclusion in primary care is not yet a nationwide reality, the growing number of municipal-level initiatives reflects an expansion of physical therapists' role within the SUS, which is supported by local health managers.

In this study, the adopted concept of frailty refers to the vulnerability of older adults to adverse outcomes—such as functional dependence, risk of institutionalization, hospitalization, or death—which are influenced by biological, physical, cognitive, and psychological determinants. Consequently, early intervention with preventive and rehabilitative measures to recover or delay functional decline may help maintain and improve the health of frail older adults. This approach enables healthcare professionals, particularly physical therapists, to plan and implement higher-quality care for this population. Given this context, the study aims to assess the Clinical-Functional Vulnerability Index (IVCF-20) of older adults registered at a Family Health Unit in Teresópolis, Rio de Janeiro. Specifically, it seeks to: (I) Contextualize older adults' health through the lens of national public policies; (II) Examine the association between frailty markers and the clinical/sociodemographic characteristics of older adults; and (III) Provide support for implementing strategic health actions that positively impact the lives of older adults, their families, and their communities.

## METODOLOGY

### Study Design

This is a cross-sectional population study, descriptive and quantitative in design.

### Study Population

This study comprised elderly volunteers recruited from primary health care (APS) services in the municipality of Teresópolis, Rio de Janeiro state. Participants were assessed and enrolled in the research protocol during the first semester of 2023. As the study setting, the research protocol was implemented at a Family Health Basic Unit (UBSF – *Unidade Básica de Saúde da Família*) located in the urban area of Teresópolis, RJ.

## **Inclusion Criteria**

(I) Older adults, 60 years old or older; (II) Registered at the Family Health Basic Unit (UBSF) for at least 3 months; (III) A maximum of two older adults per household were included; (IV) In cases of cognitive impairment, caregivers provided the requested information while adhering to ethical principles; (V) Participants were selected by convenience sampling until reaching the minimum required sample size, while maintaining proportionality among registered older adults.

## **Data Collection Strategy**

Participants were randomly recruited either during home visits or at the Family Health Basic Unit (UBSF), using face-to-face interview techniques. Data collection employed two instruments: the Clinical-Functional Vulnerability Index 20 (IVCF-20) questionnaire and a sociodemographic identification and analysis form. The assessments were conducted from March to June 2023, beginning with the sociodemographic identification form developed by the research team to collect personal data about older adults. Subsequently, frailty phenotype was assessed using the Clinical-Functional Vulnerability Index 20 (IVCF-20), which evaluates eight dimensions: age; self-rated health; activities of daily living (ADLs); cognition; mood; mobility; communication; and multiple comorbidities.

## **Ethical Considerations**

In compliance with the Brazilian National Health Council Resolution 466, all participants in this study voluntarily signed the Informed Consent Form (ICF) for data collection and recording.

**Risk Assessment:** The questionnaire administration posed minimal risk, with consideration for potential subjective risks: Some questions might cause discomfort, evoke unpleasant memories or feelings, possible mild fatigue after questionnaire completion, risk of unintentional breach of confidentiality (despite safeguards).

The project was submitted and obtained a favorable opinion from the Human Research Ethics Committee of the Serra dos Órgãos University Center – UNIFESO (opinion no. 5,807,448; CAAE no. 74844223.6.0000.5247). The study adhered to Principles of voluntary and informed participation, Ethical guidelines of the current Resolution 196 (applicable during this project's approval).

## Statistical Analysis

The dependent variable was frailty, measured by the Clinical-Functional Vulnerability Index 20 (IVCF-20), used to classify the clinical-functional vulnerability of older adults based on the following cutoff points ( $\geq 7$  and  $\geq 15$  points). Participants were classified into: Low vulnerability risk (0-6 points), Moderate risk (7-14 points), High risk ( $\geq 15$  points). The IVCF-20 is a screening tool that classifies older adults as: Robust, At risk of frailty or Frail, through evaluation of eight predictive dimensions: age, self-rated health, activities of daily living (ADLs), cognition, mood, mobility, communication and presence of multiple comorbidities.

The independent variables consisted of sociodemographic data: age (categorized as  $< 70$  years old and  $\geq 70$  years old); educational level, classified as low education (illiterate and incomplete elementary education), medium/high education (complete elementary education, high school, and above); gender (female or male); race/skin color, categorized as white and POC (People of Color), and housing and access to basic needs.

The collected data was tabulated and statistically processed using SPSS (Statistical Package for the Social Sciences) version 21.0, with a significance level set at  $p < 0.05$ . Descriptive analysis was performed using measures of central tendency and dispersion for continuous variables, and frequency distribution determination for categorical variables. Subsequently, Pearson's chi-square test was applied to assess independence between variables (evaluating the likelihood that observed differences occurred by chance). When chi-square test assumptions were not met, the Fisher's Exact Test was employed (Table 1).

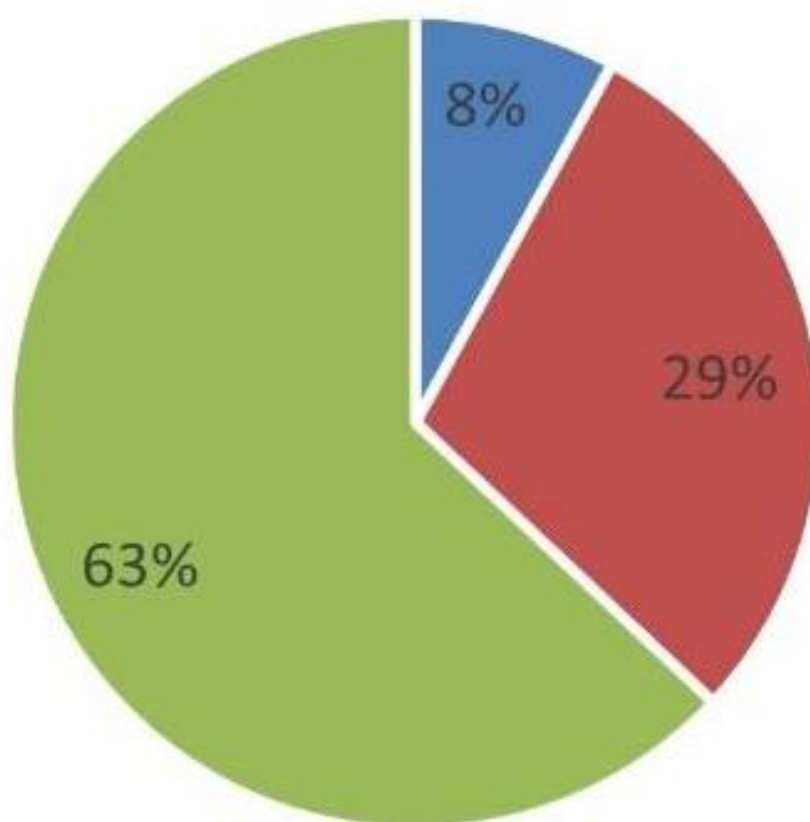
## RESULTS

The present study included 100 older adults residing in the municipality of Teresópolis, registered at a Family Health Basic Unit in Teresópolis (Rio de Janeiro state), with the age range between 60 and 95 years old at the time of interview. There was a predominance of individuals aged 70 years or older (61%). Regarding educational level, 61% of older adults had an incomplete elementary education, 31% were illiterate, and only 1% had a complete elementary and high school education. The sample showed a female predominance (74% women vs 26% men). Most participants self-identified as white (61%), while 20% identified as black and 19% as pardo (mixed-race). Concerning living arrangements, 82% did not live alone (vs 18% who did), with 61 out of 100 older adults living with family members and 39 not living with relatives. Regarding income, 81% relied solely on retirement pensions, while 95% did not receive continuous cash benefits (*Benefício de Prestação Continuada*) or *Bolsa Família* benefits. Among all interviewed elderly adults, 63% lived with two or three other people.

The study found that, according to the IVCF-20 questionnaire results, 8% of older adults were classified as low frailty risk, 29% as moderate risk, and 63% as high risk (Graph 1). Table 1 describes the sociodemographic and housing-related characteristics distributed among older adults with low/moderate versus high frailty risk. However, no statistically significant differences were found between groups using Pearson's chi-square test ( $p > 0.05$ ), indicating no significant association between frailty levels and the dependent variables in this population.

This study is highly relevant as it describes the sociodemographic and social profile of this population. However, further research—or an expansion of this study to include older adults from other subregions—is needed to better understand this population's characteristics and these associations among frail older adults. This would help identify higher-risk groups and guide targeted prevention efforts.

**Figure 1** - Prevalence of frailty among older adults in a microregion of Teresópolis, Rio de Janeiro, 2023



Legend: Blue (low risk); red (moderate risk); green (high risk)

Source: Prepared by the authors

**Table 1** – Sociodemographic characteristics of older adults

(Continues)

Sociodemographic characteristics	Low   moderate risk	High risk	p-value
<b>Age Group</b>			
< 70 Years old	18 (46,2%)	21 (53,8%)	0,130
≥ 70 Years old	19 (31,1%)	42 (68,9%)	
<b>Education Level</b>			
Low Education	34 (37%)	58 (63%)	0,626*
Medium   High Education	3 (37,5%)	5 (62,5%)	
<b>Gender</b>			
Female	29 (39,2%)	45 (60,8%)	0,489
Male	8 (30,8%)	18 (69,2%)	
<b>Race   Skin Color</b>			
White	26 (42,6%)	35 (57,4%)	0,145
POC	11 (28,2%)	28 (71,8%)	
<b>Lives Alone</b>			
Yes	8 (44,4%)	10 (55,6%)	0,470
No	29 (35,4%)	53 (64,6%)	
<b>Lives with family members</b>			
Yes	21 (34,4%)	40 (65,6%)	0,505
No	16 (41%)	23 (59%)	
<b>Lives with spouse</b>			
Yes	16 (36,6)	29 (64,4%)	0,787
No	21 (38,3%)	34 (61,8)	
<b>Has friends for social activities</b>			
Yes	16 (29,6%)	38 (70,4%)	0,098
No	21 (45,7%)	25 (54,3%)	
<b>Has a companion for medical visits</b>			
Yes	29 (34,9%)	54 (65,1%)	0,346
No	8 (47,1%)	9 (52,9%)	
<b>Easy access to Pharmacy   Grocery</b>			
Yes	23 (40,4%)	34 (59,6%)	0,424
No	14 (32,6)	29 (67,4%)	
<b>Easy access to transportation</b>			
Yes	30 (38%)	49 (62%)	0,695
No	7 (33,3%)	14 (66,7%)	
<b>Currently employed</b>			
Yes	8 (53,3%)	7 (46,7%)	0,155
No	29 (34,1%)	56 (65,9%)	
<b>Receives retirement   pension</b>			
Yes	27 (33,3%)	54 (66,7%)	0,117
No	10 (52,6%)	9 (47,4%)	
<b>Benefício de prestação continuada</b>			
Yes	1 (25%)	3 (75%)	0,527*
No	36 (37,5%)	60 (62,5%)	



			(Conclusion)
Sociodemographic characteristics	Low   moderate risk	High risk	p-value
<b>Occupational Status</b>			
Retired   Pensioner	26 (34,7%)	49 (65,3%)	0,403
Other	11 (44%)	14 (56%)	
<b>Bolsa Família</b>			
Yes	2 (66,7%)	1 (33,3%)	0,308*
No	35 (36,1%)	62 (63,9%)	
<b>Has other types of income</b>			
Yes	26 (33,8%)	51 (66,2%)	0,220
No	11 (47,8%)	12 (52,2%)	
<b>Household members</b>			
1 – 3 people	32 (39,5%)	49 (60,5%)	0,211*
≥ 4 people	5 (26,3%)	14 (73,7%)	

Source: Prepared by the authors

## DISCUSSION

The results demonstrate that most older adults were female (74%), with a predominance of individuals aged  $\geq 70$  years. The educational level was notably low in this study - a striking 92 older adults (92%) were either illiterate or had incomplete elementary education. This contrasts sharply with Ribeiro et al.'s<sup>14</sup> findings, who reported only 5.1% illiteracy among their study participants. Existing literature confirms that low educational attainment reflects lifelong opportunity deprivation and health inequalities<sup>14-16</sup>. Socioeconomic disadvantages, limited formal education, and low income are established risk factors for poorer health outcomes, including frailty<sup>14-16</sup>. Regarding social support, most participants reported: companionship for leisure activities; assistance attending medical appointments; cohabitation (primarily with family members). These housing arrangements align with Maia et al.'s<sup>17</sup> sociodemographic profile of older adults. Their APS-based study similarly found most older adults cohabiting with relatives. Financial data revealed over half were retirees, consistent with Lins et al.<sup>18</sup> (95 retirees in their sample).

The sample characterization showed that frailty risk is more frequent among female older adults. Lenard et al.<sup>19</sup> states that regarding sex, higher rates of frailty and pre-frailty are observed in women. Research conducted in other Brazilian cities also found similar data, such as studies by Lins et al.<sup>18</sup>, Maia et al.<sup>17</sup> and Oliveira et al.<sup>10</sup>. One point discussed in the literature explains that this may result from sex-specific frailty, due to lower lean mass concentration and reduced muscle strength compared to men. This condition can be verified by lower testosterone levels compared



to men, and an abrupt decline in hormone levels due to menopause<sup>18,19,20</sup>. Lins et al<sup>17</sup>, in their research, also reported a prevalence of older women, arguing as factors associated with frailty, that older women experience higher prevalence of chronic diseases, poorer nutritional conditions, financial dependence, and lower education levels compared to men. International studies also indicate frailty in older adults, with higher concentration among females. In the study by Metzelthin et al<sup>21</sup>, conducted in the Netherlands, 58% of older adults were female. Bleijenberg et al<sup>22</sup> report that 55.3% of the study participants were female.

Frailty in older adults is considered a syndrome with predisposing factors for future complications that can be prevented. Among its signs and symptoms are unintentional weight loss (5kg in the last five years), self-reported exhaustion, decreased grip strength, reduced physical activity, slower gait speed, and diminished social engagement<sup>20</sup>. Additionally, frailty encompasses multiple domains, including physical, psychological, and social. Lana and Schneider<sup>23</sup> describe frailty as a multisystem syndrome marked by significant decline in functional reserve. However, early identification through its indicators may prevent or delay its progression, as this syndrome leads to degraded quality of life, increased caregiver burden, and high healthcare costs. Accurate frailty diagnosis and community-level profiling are crucial, as early detection enables optimized interdisciplinary care<sup>23</sup>. Yet, recognizing predictive signs and their onset timing remains clinically challenging. Thus, multidimensional assessment – termed Wide Geriatric Assessment – is considered the gold standard for frailty management<sup>24</sup>.

Primary Health Care is the entry point of the Brazilian Healthcare Support Network (RAS – *Rede de Atenção à Saúde*), therefore, it is through this network that older adults can start their therapy process. Professionals working in these units can establish parameters to identify older adults in a subclinical condition of frailty syndrome, who are therefore candidates for preventive interventions aimed at preventing or maximally delaying adverse outcomes. For those that already have this syndrome established, applying specific assessment criteria will help delay or mitigate these outcomes, preserving functional autonomy and independence longer<sup>24</sup>. In the UBSF, the role of the Community Health Agent (ACS – *Agente Comunitário de Saúde*) is of great importance, as they can recognize possible signs related to frailty through their constant presence in the community and frequent contact with the population. One of the preventive measures for frailty by APS is the use of the Brazilian Older Adult Health Booklet (*Caderneta de Saúde da Pessoa Idosa*). This document enables the periodic collection of information about personal, social, and family data, health conditions, and lifestyle habits, identifying vulnerabilities while providing self-care guidance. Thus, the Booklet contributes to improving SUS professionals' skills in elderly care<sup>25</sup>. Gross et al<sup>26</sup> argues that among preventive actions are the adoption of healthier lifestyles, associated with regular physical activity, which minimizes the effects of aging by maintaining and improving muscle strength levels and indirectly preventing physical frailty

complications. Our results indicate that the support of family members, caregivers, and primary care teams (eAB) need to be incorporated in the health care routines for older adults.

## CONCLUSION

The IVCF-20 is an easy-to-use and quickly applicable instrument. As such, it proved to be a good tool for identifying at-risk older adults, it is capable of recognizing individuals who require assessment by a specialized geriatric-gerontological team. In this study, a high prevalence of pre-frail and frail older adults was observed, but no factors associated with frailty syndrome were identified. No associations were found between frailty profiles and sociodemographic variables. Our study has some limitations, including - use of proxy respondents (due to significant physical and cognitive limitations in some older adults, close relatives were consulted to obtain certain information, ensuring the study's internal validity), sample size (limited the analysis and significant data correlations), data collection methods (may not have facilitated a more comprehensive analysis of result), and convenience sampling (this approach may introduce bias and generate imprecise parameters, potentially underestimating outcomes - in our case, the prevalence of disability in the population).

Understanding and considering frailty and its multifactorial aspects brings visibility to this reality, helping promote strategies and actions for prevention and screening of vulnerable older adults. Frailty conditions - particularly pre-frailty - should be prioritized when implementing preventive and interventional measures to delay and mitigate functional decline, aiming to promote active aging and frailty management. This study contributes to strengthening and guiding comprehensive health policies and actions for older adults in APS by highlighting: the need for frailty screening at this healthcare level, and the importance of targeted approaches in primary care.

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