

Social Determinants of Health and Clinical-Functional Vulnerability in the elderly in a community in Vitória-ES



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ABSTRACT

Objective: To verify the association between Social Determinants of Health (SDH) and Clinical-Functional Vulnerability Index (CFVI) in the elderly at a Family Health Unit (FHU) in Vitória-ES. It is a cross-sectional observational study with 241 elderly people. **Materials and Method:** The SDH were evaluated in three layers, in the first, individual characteristics (age, sex, ethnicity), in the second, behavioral characteristics (smoking and drinking habits, physical and leisure activity, health self-assessment and marital status); in the third, social characteristics (living alone, number of residents, multigenerational residence, education and activity at the FHU). The CFVI -20 assessed vulnerability, according to a score: 0-6, low risk; 7-14, moderate; and ≥ 15 , high. **Descriptive analysis** with tables of absolute and relative frequencies and **inferential analysis** using chi-square test. **Results:** Of the 241 elderly, 37% had a low degree of vulnerability, 36% moderate and 27% high. Most of them were female, between 60-69 years old, self-declared black and brown, married and with low education. In addition, there was an association between vulnerability and age group, drinking habits, physical activity and self-rated health. **Conclusions:** There was an association of SDH with the vulnerability. Therefore, it is necessary to implement public policies for the elderly of different age groups that act directly in the SDH.

Keywords: Aged, Aging, Social Determinants of Health, Health Vulnerability, Family Health Strategy.

1 INTRODUCTION

The exponential growth of the elderly population and the strong evidence already put in the literature inherent to the link between the socioeconomic structure and the health status of people has contributed to the consolidation of the sociopolitical and cultural context as generators of poor health and its inequalities (Cavalcanti *et al.*, 2018; Sanglard *et al.*, 2023). These inequalities imply a number of social, cultural and epidemiological factors since, in this age group, the prevalence of disabilities



and diseases are higher (Boff, 2019). Therefore, it is important to become aware of the Social Determinants of Health (SDH), which is important for the creation of models that demonstrate the relationship between social inequalities and the impact on health, in addition to studying whether a population is healthy or not (Cavalcanti *et al.*, 2018; Lopez-Hidalgo, 2021).

The most accepted model for understanding SDH is proposed by Dahlgren and Whitehead, as it considers a sequence of concentric hierarchical layers that demonstrate the relationship between social inequalities and inequities and health impacts as resulting from the interaction of various determinants and conditioning factors (Lopez-Hidalgo, 2021; Passion *et al.*, 2022). The individual characteristics are present in the first layer, the lifestyle is located in the second layer, and in the third are the social and community networks that are the living and working conditions. In the most distal layer are the factors related to socioeconomic, cultural, political and environmental conditions (Lopez-Hidalgo, 2021).

The SDH in the elderly population gained magnitude from the moment there was an increase in life expectancy. In Brazil, in the 40's the demographic transition process began, whose expectation was 45.5 years and over time, in 2019, it went to 76.6 years, and the longevity of women is higher when compared to men (IBGE, 2020). The demographic change is marked by the gradual decrease in the fertility rate, birth, mortality and increase in life expectancy (Oliveira, 2019) and population aging is directly linked to the demographic and epidemiological transition, because, with a reduction in the population of children and expansion of the group of elderly, there will be a change in the way this population falls ill (Oliveira, 2019).

With Brazil's new demographic behavior, older adults who have had better living and working conditions are more likely to maintain their autonomy, well-being and financial independence, as well as access to new health technologies, medications and better hygiene habits (Oliveira, 2019). However, this is not the reality of most of the elderly, especially the poorest, where such conditions of life, work and health are unfavorable and need improvement (Oliveira, 2019). In addition, the natural aging process is accompanied by morphological, functional and biological changes in the body, leading to a higher prevalence of chronic non-communicable diseases, functional dependencies and disabilities and, consequently, provide an increase in the degrees of vulnerability of this population (Alexandrino *et al.*, 2019; Sanglard *et al.*, 2023).

The literature presents several instruments that assess the issues of functional capacity and functional changes in the elderly such as the Berg balance scale, Timed up & go test (TUG), Anterior Functional Range Test (TAF) (Farias *et al.*, 2017), *TINETTI* (Queiroz *et al.*, 2020) and Katz Index (Passion *et al.*, 2022), however, lack the accuracy to identify the frail elderly, following the conception of greater vulnerability to functional decline. In this sense, the Clinical-Functional Vulnerability Index-20 (IVCF-20) was created to improve this situation (Moraes *et al.*, 2021; Sanglard *et al.*, 2023).



Some studies conducted with the elderly have assessed the risk of falls (Queiroz *et al.*, 2020), *functional independence* (Paixão *et al.*, 2022) and functionality (Ferrer *et al.*, 2019) through the *TINETTI, Katz Index and WHODAS instruments, respectively*.

As for the study that used the Katz Index to verify the dependence or functional independence of the elderly associated with the social determinants of health, the association between the proximal and intermediate level variables of the social determination model proposed by Dahlgren and Whitehead was found as a result (Paixão *et al.*, 2022).

The bivariate analysis between the groups of dependent and independent elderly showed that, in the proximal layer of the SDH, represented by individual characteristics, in the group of independent elderly, those aged 60 to 69 years, male, and with schooling from 0 to 4 years of schooling were more prevalent. In relation to the dependent elderly, higher prevalences of elderly aged 80 years or more, females, widows and with schooling from 0 to 4 years of education were identified (Paixão *et al.*, 2022). In the intermediate layer of the SDH, constituted by behavioral characteristics, in the group of independent and dependent elderly, there was a lower prevalence of elderly alcoholics, who practice physical activity, who participated in the activities of the Family Health Unit (FHU).

Despite the relevant results, the Katz index evaluates only the basic Activities of Daily Living (ADL) and a suggested instrument that allows the multidimensional assessment of the elderly is the Functional Clinical Vulnerability Index-20 (IVCF-20), which evaluates not only the basic ADL, but also evaluates the instrumental ADL, age, self-perception of health, cognition, mood, mobility, communication and multiple comorbidities (Sanglard *et al.*, 2023).

The IVCF-20 is a rapid screening instrument, not requiring the use of a specific instrument, which can be applied by any health professional, and helps in the identification of functional impairment and the needs of the elderly, capable of assessing and identifying the frailty of the elderly, with a high index of sensitivity, specificity and reliability, being useful both to identify elderly people who require specialized monitoring, and those who should continue to be assisted by primary care (Moraes *et al.*, 2021). It consists of a twenty-question questionnaire that multidimensionally addresses aspects of the health of the elderly, thus allowing the diagnosis of frailty of the elderly according to the degree of vulnerability (Moraes *et al.*, 2021).

Given this context, the present study aimed to verify the association between the Social Determinants of Health and the different degrees of Clinical-Functional Vulnerability in elderly people assisted by a Family Health Unit in the city of Vitória-ES and thus to know the SDH responsible for the inequities in the health of the elderly.



2 METHODOLOGY

This is a cross-sectional observational study with a quantitative approach, originated from a primary study entitled: "Health conditions and functionality of elderly people assisted by the family health strategy in Vitória-ES". The present study was conducted at the Family Health Unit (FHU) Luiz Castellar da Silva, located in Vitória-ES. And for its accomplishment, a sample size calculation was made for different prevalence, based on the number of elderly registered in the FHU in April/2018 with a margin of error of 0.05 and an estimated proportion of 0.5 with an increase of 30% for possible losses, and the n reached was 241 elderly, included in the primary research. The selection was made in a simple random way where the elderly were organized in alphabetical order and according to the micro-area in which they reside, and then 2 elderly people out of 3 were randomly drawn.

The study included elderly people aged 60 years or older, enrolled in the territory of the FHU studied, registered in the Welfare Network and assisted by the Family Health Strategy. And those who were unable to answer the questionnaire and did not have a caregiver able to do so were excluded; those in which access was impossible due to refusal or restriction of the family; cases of death and/or migration to another region, prior to the interviews/evaluations. Only the elderly who agreed to sign the Free and Informed Consent Form (ICF) and submitted to the application of the IVCF-20 were considered for this study.

In the present study, 100% of the elderly evaluated in the primary research were used, that is, the n of the secondary research remained with 241 elderly. The data was collected between April and June 2018, by previously trained researchers. The interviews and evaluations were carried out in the homes of the elderly, with prior scheduling and at a time convenient for them.

The data obtained by the semi-structured questionnaire will allow to trace the SDH of these elderly, while the IVCF-20 will allow to evaluate the degrees of Clinical-Functional Vulnerability (Lopez-Hidalgo, 2021; Moraes *et al.*, 2021).

Following the model of social determination proposed by Dahlgren and Whitehead (Lopez-Hidalgo, 2021), in this study, the SDH were organized into three layers: the proximal (or primary) containing the individual characteristics, the intermediate (or secondary) encompassing the behavioral characteristics, and the distal (or tertiary) with the social characteristics. And the variables selected for the study were distributed in layers, described as follows: The proximal one comprises the individual characteristics with the age group of 60 to 69 years, 70 to 79 years and 80 years or more, sex (female; male) and ethnicity (white; black and brown). Within the intermediate level, behavioral characteristics are contained, such as smoking habit, drinking habit, physical activity, marital status (married; single), leisure activity and self-rated health (positive; negative) and with regard to the distal level, or tertiary layer, encompass the social characteristics, living alone, schooling (0-4 years, 5-11 years; 12 years or more of study) USF activity, number of residents (1-3; 4 or more) and multigenerational residence.



The IVCF-20 was used to assess the vulnerability of the elderly, and this is a questionnaire, developed and validated in Brazil in 2014 from a series of other diagnostic questionnaires of frailty in the elderly (Moraes *et al.*, 2021). It has the advantage of being simple, easy to use, fast to apply, and is able to assess the main determinants of the health of the elderly¹⁰. It has a multidimensional character and has high levels of sensitivity, specificity and reliability (Moraes *et al.*, 2021).

This instrument is composed of eight dimensions considered predictors of functional decline, namely: age, self-perception of health, ADL (basic and instrumental), cognition, mood, mobility (reach, grip, tweezers, aerobic and/or muscular capacity, gait and sphincter continence), communication (vision and hearing) and multiple comorbidities (polypathology, polypharmacy and recent hospitalization). Its score ranges from 0 to 40, and high scores indicate a higher risk of functional clinical vulnerability (Moraes *et al.*, 2021). Scores between 0 and 6 points indicate low risk; 7 to 14 points, moderate risk; and ≤ 15 points, high risk of vulnerability (Moraes *et al.*, 2021) and in the present study were considered in this way.

Initially, a descriptive analysis was performed using data on the sociodemographic and health profile and the degree of vulnerability of the elderly, reported through tables of absolute and relative frequencies. In the inferential analysis, the association between the outcome variable (risk of vulnerability) and the exposure variables (SDH) were tested using the Chi-square or Fisher's exact test, when one or more expected frequencies were less than five, and in the case of significant association, residue analysis was performed to verify the categories that contributed to the association, where residue values above $|1.96|$ were considered. In all analyses, a significance level of $p < 0.05$ was adopted, with a 95% confidence interval (95%CI). The study was presented and approved by CEP/EMESCAM, under No. 2,142,377 and in all stages of the research the criteria established in the Guidelines and Regulatory Standards for Research Involving Human Beings of resolution 466/12 were respected.

3 FINDINGS

The general profile of the elderly consisted of predominantly female individuals (61.4%), between 60 and 69 years old (57.7%), self-declared black and brown (74.3%). Regarding behavioral characteristics, most of the elderly are married (60.6%) and reported not having a smoking habit (85.9%), nor an alcoholic habit (77.6%) and do not practice physical activity (67.2%). The majority also stated that they practiced some leisure activity (62.2%) and self-assessed their health positively (90%). Finally, with regard to social characteristics, most of the elderly have low schooling (58.1%), do not practice activities in the FHU (78.4%), do not live alone (76.8%), live with up to 3 individuals (78.4%) in the same place and in a multigenerational residence (53.5%). Regarding the functional



clinical vulnerability of the elderly, 37% presented low risk, 36%, moderate risk and 27% high risk of vulnerability (data not presented in table).

According to Table 1, representing the proximal layer, only the variable age group showed a significant association with the degrees of vulnerability, $p < 0.05$. Observing the chi-square residue, it is observed that for the age group, the age of 60 to 69 years is associated with a low risk of vulnerability (residue = 3.4) and the age of 80 years or more is associated with the high risk of vulnerability (residue = 4.4).

Table 1 | Individual characteristics associated with Clinical-Functional Vulnerability in elderly assisted by a FHU.

Variables	Vulnerability						<i>p-value</i>
	Low Risk n = 89		Moderate Risk n = 87		High Risk n = 65		
	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)	
Age group							
60 to 69 years	64	(46,0) ²	51	(36,7)	24	(17,3)	0,0001
70 to 79 years	22	(30,6)	27	(37,5)	23	(31,9)	
80 years or older	3	(10,0)	9	(30,0)	18	(60,0) ²	
Gender							
Male	42	(45,2)	30	(32,3)	21	(22,6)	0,106
Female	47	(31,8)	57	(38,5)	44	(29,7)	
Ethnic group							
White (a)	20	(32,3)	22	(35,5)	20	(32,3)	0,505
Black (a) and Brown (a)	69	(38,5)	65	(36,3)	45	(25,1)	

¹p-value: < 0.05

² Adjusted Chi-square residue with values greater than 1.96

USF: Family Health Unit

Source: own authorship

In the secondary layer, presented through Table 2, the variables that were significantly associated with vulnerability are: drinking habit, physical activity and self-rated health ($p < 0.05$). The residue indicated a significant association of not having an alcoholic habit with a high risk of vulnerability (residue = 2.6). Doing physical activity is associated with a low risk of vulnerability (residue = 2.4) and not doing physical activity is associated with a high risk of vulnerability (residue = 4.1). In self-rated health, there was an association with low and moderate risk of vulnerability for the elderly who self-rated their health positively. On the other hand, those who self-rated their health negatively showed an association with high risk of vulnerability (residue = 6.1).



Table 2 | Behavioral characteristics associated with Clinical-Functional Vulnerability in elderly assisted by a FHU.

Variables	Vulnerability						<i>p-value</i>
	Low Risk n = 89		Moderate Risk n = 87		High Risk n = 65		
	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)	
Smoking Habit							
Yes	11	(35,5)	11	(35,5)	9	(29,0)	0,973
No	76	(36,7)	75	(36,2)	56	(27,1)	
NOR	2	(66,7)	1	(33,3)	0	(0,0)	
Drinking Habit							
Yes	25	(47,2)	21	(39,6)	7	(13,2)	0,0291
No	66	(35,3)	58	(31,0)	58	(31,0)²	
NOR	1	(100,0)	0	(0,0)	0	(0,0)	
Physical Activity							
Yes	37	(47,4)²	33	(42,3)	8	(10,3)	0,0001
No	51	(31,5)	54	(33,3)	57	(35,2)²	
NOR	1	(100,0)	0	(0,0)	0	(0,0)	
Leisure Activity							
Yes	59	(39,3)	58	(38,7)	33	(22,0)	0,083
No	30	(33,0)	29	(31,9)	32	(35,2)	
Self rated health							
Positive evaluation	88	(40,6)²	83	(38,2)²	46	(21,2)	0,0001
Negative evaluation	1	(4,2)	4	(16,7)	19	(79,2)²	
Marital Status							
Married	52	(35,6)	57	(39,0)	37	(25,3)	0,490
Single (a)	37	(38,9)	30	(31,6)	28	(29,5)	

¹p-value: < 0.05

² Adjusted Chi-square residue with values greater than 1.96

USF: Family Health Unit

Source: Own authorship

In relation to the tertiary layer of the SDH, described in Table 3, there was no statistically significant variable associated with the degrees of clinical-functional vulnerability of the elderly ($p > 0.05$).



Table 3 | Social characteristics associated with Clinical-Functional Vulnerability in elderly assisted by a FHU.

Variables	Vulnerability						p-value
	Low Risk n = 89		Moderate Risk n = 87		Low Risk n = 89		
	n	(%)	n	(%)	n	(%)	
Lives Alone							
Yes	20	(35,7)	22	(39,3)	14	(25,0)	0,844
No	69	(37,3)	65	(35,1)	51	(27,6)	
Schooling							
0 to 4 years of study	48	(34,3)	52	(37,1)	40	(28,6)	0,773
5 to 11 years of study	22	(37,3)	21	(35,6)	16	(27,1)	
12 years or older study	19	(45,2)	14	(33,3)	9	(21,4)	
USF Activity							
Yes	20	(38,5)	19	(36,5)	13	(25,0)	0,912
No	69	(36,5)	68	(36,0)	52	(27,5)	
Number of Residents							
1 a 3	73	(38,6)	66	(34,9)	50	(26,5)	0,576
4 or but	16	(30,8)	21	(40,4)	15	(28,8)	
Multigenerational Residence							
Yes	47	(36,4)	45	(34,9)	37	(28,7)	0,800
No	38	(35,2)	42	(38,9)	28	(25,9)	
NOR	4	(100,0)	0	(0,0)	0	(0,0)	

USF: Family Health Unit
Source: Own authorship

4 DISCUSSION

What determines people's health or disease is a complex issue that cannot be analyzed based only on established diseases, because it transcends this frontier and influences the entire health process in a broad way, encompassing the context of each individual, population and territories in which they are inserted, allowing us to understand the definition of health not only as the absence of disease, but a state of complete physical, mental and social well-being (Silva; Schraiber; Mota, 2019).

In this case, it becomes important to know the SDH, as it allows the creation of models that demonstrate the relationship between social inequalities and the impact on health, in addition to studying whether a population is healthy or not (Cavalcanti *et al.*, 2018; Lopez-Hidalgo, 2021).

The main results that showed an association between vulnerability and the SDH layers occurred at the proximal and intermediate levels. In the first layer, in table 1, the variable age group



was highlighted. In the second layer, in table 2, the variables drinking habit, physical activity and self-rated health were statistically significant.

The results of Table 1, contained in the first layer of the SDH showed a significant association when related to the age group with the low risk of vulnerability for the age of 60 to 69 years, and a high risk of vulnerability for the elderly aged 80 years or more, corroborating with other studies (Cavalcanti *et al.*, 2018; Alexandrino *et al.*, 2019). This data can be perceived since the younger elderly, from 60 to 69 years old, demonstrated a lower risk of vulnerability, considering that the natural degenerative process of aging is not yet so advanced, and therefore tend to be more active and with greater social participation, therefore, less vulnerable (Cavalcanti *et al.*, 2018; Alexandrino *et al.*, 2019). When compared to older adults, vulnerability tends to increase considerably with advancing age and as there is a greater decline in functionality, the degree of dependence increases, making the elderly more fragile and vulnerable (Ribeiro *et al.*, 2018; Sanglard *et al.*, 2023).

In addition to the individual characteristics that include sex, ethnicity and age, which in this study proved to be statistically significant compared to functional vulnerability, it is known that the socioeconomic, cultural and environmental conditions of a given society generate an economic-social stratification of individuals and groups of the population, giving them distinct social positions, causing health differentials (Cavalcanti *et al.*, 2018; Lopez-Hidalgo, 2021). That said, it is evident that health and disease are not random, but are distributed in society influenced by social position, which consequently determines their living and working conditions of groups and individuals (Cavalcanti *et al.*, 2018; Lopez-Hidalgo, 2021).

The result of Table 2, representing the second layer of the SDH, which covers the behavioral characteristics of the population studied, showed that the drinking habit, practice of physical activity and self-rated health had a significant association when associated with functional clinical vulnerability. These results agree with research (Oliveira *et al.*, 2020; Abreu *et al.*, 2019) which stated that elderly people at high risk of vulnerability deny the use of alcohol due to the frequent use of medications, which can aggravate clinical manifestations to the detriment of their rehabilitation and reintegration into society.

Regarding the practice of physical activity, one study (Oliveira; Vineyards; Rabello, 2020) demonstrated that the practice of regular physical exercise improves the independence and autonomy of the elderly, since there is an improvement in calcium absorption, increases muscle strength and consequently reduces the risk of falls, and the elderly are able to perform their basic activities of daily living. These benefits reach biopsychosocial magnitudes when practiced in a playful way, such as dance, because it favors the individual in a global and systemic way, in addition to providing social interaction, opportunity for new friendships, communication, sharing of stories and moments, becoming a great ally in the prevention of depression and the control of chronic diseases (Lima; Cape



Verde; Corrêa, 2020).

In view of the above, the need for health promotion actions is reinforced, acting directly on the SDH contained in the second layer concerning behavioral characteristics. One suggestion would be the creation of public spaces for the practice of sports and physical exercises, which seek to strengthen relationships of trust and solidarity, creating support networks and strengthening the participation of people in the community, given that social participation is one of the pillars of support to minimize inequities.

According to the authors Santos, Couto and Bastone (2018), self-rated health is the perception that the individual has in relation to his own general state of health, therefore, of complex discussion, but able to contemplate the domains of physical, cognitive and emotional health from the perspective of the population studied. Therefore, some findings (Alexandrino *et al.*, 2019; Ferrer *et al.*, 2019; Saints; Christian; Bastone, 2018) in which the elderly with the most affected functional capacity, history of falls, depression and chronic diseases self-reported their health negatively when compared to the other group with less compromised functionality. The elderly tend to manifest more health problems with increasing age, such as the prevalence of chronic diseases and disabilities, which contributes to the negative self-perception of health (Ribeiro *et al.*, 2018).

Authors such as Barbosa and Fernandes (2020), affirm that it is necessary to recognize the characteristics of vulnerability in the elderly, because the decrease in the ability to cope with the injuries threatens the autonomy and the reduction of the potentialities of the elderly intensify the decline of functionality with advancing age.

One way to act on social determination is the creation of public policies that aim to ensure greater benefits for this population and thus reduce health inequities. They are: policies that ensure access to clean water, sewage, healthy work environments, adequate housing, quality education; integration of health systems, insertion of qualified professionals in primary care for early detection of functional declines of the elderly, health promotion actions, which seek to strengthen relationships of trust and solidarity, creating support networks and strengthening the participation of people in the community, in addition to improving their health and well-being conditions, especially of the most vulnerable; creation of public spaces for the practice of sports and physical exercises, as well as awareness of the harms of drinking and smoking habits; educational programs and facilitated access to healthy foods; home visits to users with difficulty in locomotion or unable to attend the unit; individualized patient care, among others (Lopez-Hidalgo, 2021; Alexandrino *et al.*, 2019; Carmona-Torres *et al.*, 2019).

One limitation found is that the study is cross-sectional and does not allow determining the causal relationship of the variables studied. However, this research may support the survey of



consistent indicators capable of guiding the most appropriate decision-making for the generation of public policies that act directly in the SDH.

5 CONCLUSIONS

Through the above, it was concluded that there was an association of variables of the proximal and intermediate layers of the SDH with the different degrees of vulnerability. The high risk of vulnerability was observed in the long-lived with 80 years or more, while in the middle layer the elderly who did not have an alcoholic habit, did not practice physical activity and self-assessed their health negatively. On the other hand, the elderly aged 60 to 69 years had a low risk of vulnerability. Therefore, it is necessary to implement public policies for the elderly of various age groups that act directly in the SDH of the first layer and the second layer that comprises individual and behavioral characteristics such as the practice of regular physical activity and encouragement of healthy lifestyle habits. Given this, public policies should be focused on actions to promote and prevent diseases, aiming to reduce inequalities and minimize the risks of vulnerability. Moreover, for all interventions at the levels of the model proposed by Dahlgren and Whitehead to be executable and effective, through a reality of historical inequities, they need to be based on three basic pillars: social participation, intersectoriality and scientific evidence, contemplating, in addition to the biological, social, mental, environmental and spiritual aspects.



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