

ORIGINAL ARTICLE

Nutritional screening: self-perception of health in elderly riverside people in the interior of Amazonas

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Abstract

Introduction: Aging in the Amazon rural context, in remote and hard-to-reach areas, is a reality that requires special attention from health services regarding the demographic, social, and nutritional aspects related to health self-perception. **Objective:** The nutritional status and health self-perception of elderly individuals residing in the rural area of the State of Amazonas were evaluated and described. **Methods:** A cross-sectional study was conducted with elderly individuals aged ≥ 60 years residing in the rural area of the State of Amazonas. To assess nutritional health self-perception and sociodemographic variables, a validated semi-structured questionnaire was used. Nutritional status was evaluated using the Mini Nutritional Assessment (MNA). Sarcopenia screening was conducted using the Sarcopenia Risk Screening Tool (SARC-F). **Results:** A total of 215 elderly individuals were evaluated, the majority being female, who engage in domestic activities and, when retired, take on additional work. Most of the evaluated rural elderly individuals presented nutritional profiles within normal ranges; when assessing nutritional status and the risk of sarcopenia, elderly men showed a higher negative risk and prevalence of sarcopenia. A considerable portion of the rural elderly population exhibited risks of malnutrition, fractures, and falls. Regarding negative health self-perception, many reported loss of appetite and difficulty in food intake. Most elderly individuals consume, on average, 2 to 3 meals per day. **Conclusion:** The nutritional profile among the elderly was within normal ranges, although

health self-perception indicated risks of fractures, loss of appetite, and difficulty eating independently. Early nutritional and health interventions may reduce the risk of frailty among rural Amazonian elderly individuals and improve their health perception.

Keywords: Rural Health; Self Concept; Food and Nutritional Surveillance.

Resumo

Rastreo nutricional e autopercepção de saúde dos idosos rurais do Amazonas: um estudo descritivo

Introdução: Envelhecer no contexto rural amazônico, em regiões remotas e de difícil acesso, é uma realidade que exige atenção especial dos serviços de saúde em relação aos aspectos demográficos, sociais e nutricionais relacionados à autopercepção de saúde. **Objetivo:** Avaliou-se e descreveu-se o estado nutricional e a autopercepção de saúde dos idosos residentes na zona rural do Estado do Amazonas. **Métodos:** Estudo transversal conduzido com idosos com idade ≥ 60 anos residentes na zona rural do Estado do Amazonas. Para avaliar a autopercepção de saúde nutricional e as variáveis sociodemográficas, utilizou-se um questionário validado e semiestruturado. O estado nutricional foi avaliado por meio da Mini Avaliação Nutricional (MNA). O rastreo de sarcopenia foi realizado utilizando a Ferramenta de Rastreo do Risco de Sarcopenia (SARC-F). **Resultados:** Foram avaliados 215 idosos, a maioria do sexo feminino, que realizam atividades domésticas e, quando aposentadas, desenvolvem outro trabalho adicional. A maioria dos idosos rurais avaliados apresenta perfil nutricional dentro dos padrões normais; ao avaliar o perfil nutricional e o risco de sarcopenia, os homens idosos mostraram maior risco negativo e de sarcopenia. Uma parte considerável dos idosos rurais apresentou risco de desnutrição, fraturas e quedas. Em relação à autopercepção negativa da saúde, muitos relataram perda de apetite e dificuldade na ingestão alimentar. A maioria dos idosos realiza, em média, de 2 a 3 refeições por dia. **Conclusão:** O perfil nutricional entre os idosos mostrou-se dentro dos padrões de normalidade, embora a autopercepção de saúde tenha evidenciado risco de fraturas, perda de apetite e dificuldade em se alimentar sozinho. Intervenções nutricionais e de saúde precoces podem reduzir o risco de fragilização dos idosos rurais amazônicos, bem como melhorar sua percepção de saúde. **Palavras-chave:** Saúde da população rural; Autopercepção; Vigilância Alimentar e Nutricional.

Resumen

Tamizaje nutricional y autopercepción de salud en ancianos rurales de la Amazonas: un estudio descriptivo

Introducción: Envejecer en el contexto rural amazónico, en regiones remotas y de difícil acceso, es una realidad que exige atención especial de los servicios de salud en relación con los aspectos demográficos, sociales y nutricionales relacionados con la autopercepción de la salud. **Objetivo:** Se evaluó y describió el estado nutricional y la autopercepción de salud de los ancianos residentes en la zona rural del Estado de Amazonas. **Métodos:** Estudio transversal realizado con ancianos de edad ≥ 60 años residentes en la zona rural del Estado de Amazonas. Para evaluar la autopercepción de la salud nutricional y las variables

sociodemográficas, se utilizó un cuestionario validado y semiestructurado. El estado nutricional se evaluó mediante la Mini Evaluación Nutricional (MNA). El rastreo de sarcopenia se llevó a cabo utilizando la Herramienta de Rastreo del Riesgo de Sarcopenia (SARC-F). *Resultados:* Se evaluaron 215 ancianos, la mayoría de sexo femenino, que realizan actividades domésticas y, al estar jubilados, desarrollan otro trabajo adicional. La mayoría de los ancianos rurales evaluados presentan un perfil nutricional dentro de los patrones normales; al evaluar el perfil nutricional y el riesgo de sarcopenia, los hombres ancianos mostraron un mayor riesgo negativo y de sarcopenia. Una parte considerable de los ancianos rurales presentó riesgo de desnutrición, fracturas y caídas. En relación con la autopercepción negativa de la salud, muchos informaron pérdida de apetito y dificultad en la ingesta de alimentos. La mayoría de los ancianos realiza, en promedio, de 2 a 3 comidas al día. *Conclusión:* El perfil nutricional entre los ancianos se mostró dentro de los patrones de normalidad, aunque la autopercepción de la salud evidenció riesgo de fracturas, pérdida de apetito y dificultad para alimentarse de manera independiente. Intervenciones nutricionales y de salud tempranas pueden reducir el riesgo de fragilidad entre los ancianos rurales amazónicos, así como mejorar su percepción de salud.

Palabras-clave: Salud de la población rural; Autopercepción; Vigilancia Alimentaria y Nutricional.

Introduction

Aging in rural areas is challenging and requires special attention from health services, especially in remote and hard-to-reach regions, such as the riverside communities of the Amazon, which exhibit specific characteristics in how the elderly experience aging. It is known that individuals aging in rural contexts present different characteristics compared to those aging in urban environments [1].

In the riverside and rural communities of the state of Amazonas, demographic and social aspects have been linked to self-perception of health, highlighting the differences and health needs among population groups [2].

Among the elderly, the concept of self-assessment demonstrates how they describe and evaluate

their own health, through social and temporal comparison influenced by cultural, social, economic, and geographical factors, which directly affect their quality of life and health [2,3].

Self-perception represents one of the key indicators for measuring and monitoring health status, allowing the identification of the influence of these aspects on individuals' perceptions of their own health, and has been shown to be a good predictor of mortality [4,5,6].

The nutritional status and self-perception of health were evaluated and described in a representative sample of rural elderly individuals in the state of Amazonas/Brazil.

Methods

This is a cross-sectional study approved by the Research Ethics Committee with Human Beings

of the Federal University of Amazonas (CEP/UFAM), under opinion number 3.243.429 (Ethical

Appreciation Presentation Certificate - CAEE 08021319.0.0000.5020). The study was conducted in the rural area of the state of Amazonas. Data collection/evaluations were carried out in all regions (North, South, Lower Solimões, Middle Solimões, and Upper Solimões) to ensure representation from the entire state.

According to data from the 2010 IBGE census [7], the rural elderly population in Amazonas was 41,647 individuals, with the male rural population comprising 14,505 aged 60 to 69 years and 9,579 aged 70 years or older; the female rural population included 10,672 aged 60 to 69 years and 6,873 aged 70 years or older. Thus, rural aging in Amazonas is predominantly male. Based on the above data, a sample size calculation was performed using EPI Info for this study, considering the total population, with a sampling error of 5% and a confidence level of 95%, resulting in a required sample of 245 elderly individuals. However, in 2020, the COVID-19 pandemic emerged globally, and data collection had to be halted, resulting in the inclusion of only 215 elderly individuals for this study.

A semi-structured questionnaire was used to characterize these elderly individuals. The elderly were recruited through announcements on the local radio and were selected randomly. Data collection was conducted in their homes, where they received guidance and, upon agreeing to participate in the research, signed the Informed Consent Form (ICF).

Results

Table 1 presents the sociodemographic characteristics of the baseline sample selected for the study. A total of 215 elderly individuals were

For data collection, a sociodemographic questionnaire was utilized, which included the following questions: age, sex, occupation, race, marital status, religion, number of children, length of residence in the community, living alone or with family members, type of housing, income, use of health services, smoking, and alcohol consumption.

Nutritional status was determined using the Mini Nutritional Assessment (MNA). The Body Mass Index (BMI) classification proposed by [8] was chosen, as it pertains to an elderly population. For abdominal circumference, the parameters recommended by the World Health Organization [9] were adopted, classifying the circumference as having increased or very increased risk for developing cardiovascular diseases (CVDs). To reinforce the findings, the Sarcopenia Risk Screening Tool (SARC-F) was applied.

To estimate muscle depletion in the elderly, the Calf Circumference (CC) was measured using a non-elastic measuring tape, with the most prominent measurement of the leg considered adequate if equal to or greater than 31 cm, for both men and women.

The obtained data were organized and analyzed using Microsoft Excel® version 10, and statistical evaluation was conducted using the Statistical Package for the Social Sciences Inc., Chicago, United States (SPSS), version 18.0, through descriptive analysis of the results.

assessed, with 54.88% (118) being female and 45.12% (97) being male.

Table 1 - Sociodemographic Profile of Rural Older Adults – Amazonas, 2025

Variable		Male % (n=97)	Female % (n=118)
Age group			
	60-69 years old	52,58 (51)	83,78 (71)
	71-79 years old	32,99 (32)	22,03 (26)
	80-89 years old	10,31 (10)	15,25 (18)
	>90 years old	4,12 (04)	2,54 (03)
Education level			
	Illiterate	30,93 (30)	36,44 (43)
	Completed Early Childhood Education	11,34 (11)	7,63 (09)
	Incomplete Early Childhood Education	46,39 (45)	40,68 (48)
	Completed Elementary School	5,15 (05)	5,93 (07)
	Incomplete Elementary School	7,22 (07)	4,24 (05)
	Completed High School	1,03(01)	2,54 (03)
	Incomplete High School	---	---
	Completed Higher Education	---	2,54 (3)
	Incomplete Higher Education	---	
Place of birth			
	Amazonas (countryside)	98,97 (96)	99,15 (117)
	Amazonas (capital)	1,03 (1)	0,85 (01)
Occupation			
	Retired, with domestic activities	80,41 (78)	88,98 (105)
	Business owner or self-employed	17,53 (17)	10,17 (12)
	Unemployed	2,06 (02)	0,85 (01)
Personal income			
	No income	2,06 (02)	0,85 (01)
	Less than 1 minimum wage	11,34 (11)	7,63 (09)
	1 minimum wage	46,39 (45)	40,68 (48)
	Did not inform	40,21 (39)	5,08 (60)
Housing			
	With spouse	48,45 (47)	52,54 (62)
	With child	30,93 (30)	37,29 (44)
	With sibling	2,06 (02)	---
	With grandchild	3,09 (03)	4,24 (05)
	With mother or father	---	5,08 (06)
	Alone	15,46 (15)	0,85 (01)

Source: Authors, 2025.

The nutritional profile of the elderly participants in this study was characterized within normal ranges for sex and age, based on anthropometric measurements. Among the participants, 60.17% (71) of the women and 37.11% (36) of the men were classified as eutrophic, indicating Body Mass Index (BMI) values between ≥ 22 and ≤ 27 kg/m². However, 39.53% (85) of the assessed individuals exhibited obesity and/or overweight, which increases the risk of developing Non-Communicable Chronic Diseases (NCCDs). It is noteworthy that 10.70% (23) of the elderly were diagnosed with malnutrition, a finding that is corroborated by calf circumference and self-perception of nutritional status.

Abdominal circumference (AC) measurements indicated that 52.5% (51) of the male participants

were at elevated risk for cardiovascular diseases (CVDs) (with AC ≥ 102 cm), while 34.75% (41) of the women had an AC ≥ 88 cm, also indicating an increased risk for the development of CVDs.

Regarding calf circumference (CC), 81.86% (176) of the elderly did not present muscular depletion for this parameter, with values > 31 cm. However, 18.14% (39) had a CC < 31 cm and a BMI < 21 kg/m², which is considered an indicator of malnutrition. This result aligns with the self-perception of nutritional status, where 19.07% (41) of participants believed they were malnourished.

To analyze muscle mass loss, sarcopenia screening was conducted using the SARC-F scale, as shown in Table 2.

Table 2 - Components of Sarcopenia Screening by SARC-F, According to Sex of Rural Older Adults – Amazonas, 2025

Variable	Male (n=97)	Female (n=118)
No suggestive signs of sarcopenia	86,60 (84)	76,27 (90)
Indicative of sarcopenia	13,40 (13)	23,73 (28)
Strength – difficulty in lifting and carrying 5 kilograms		
None	83,51 (81)	76,27 (90)
Some	10,31 (10)	17,80 (21)
Unable to	6,19 (06)	5,93 (07)
Assistance for walking – difficulty in traversing a room		
None	87,63 (85)	75,42 (89)
Some	11,34 (11)	20,34 (24)
Unable to	1,03(01)	4,24 (05)
Assistance for walking – difficulty in traversing a room		
None	84,54 (82)	75,42 (89)
Some	14,43 (14)	21,19 (25)
Unable to	1,03 (01)	3,39 (04)

Climbing stairs – difficulty in ascending a flight of ten steps			
	None	76,29 (74)	69,49 (82)
	Some	18,56 (18)	16,10 (19)
	Unable to	5,15 (05)	14,41 (17)
Falls – How many times have you experienced a fall in the past year?			
	None	56,70 (55)	62,71 (74)
	1 to 3 falls	29,90 (29)	31,36 (37)
	4 or more falls	13,40 (13)	5,93 (07)

Source: Authors, 2025.

In Table 3, the variables related to self-perception of nutritional status in the selected rural sample are presented.

Table 3 - Distribution of the Studied Sample According to Variables of Self-Perception of Nutritional Status in Rural Older Adults – Amazonas, 2025

Variable		Male (n=97)	Female (n=118)
Self-perception over the past 12 months			
Loss of appetite	Yes	34,02 (33)	31,36 (37)
	No	65,98 (64)	68,64 (81)
Difficulty in mastication	Yes	1,03 (01)	5,08 (06)
	No	98,97 (96)	94,92 (112)
Dysphagia	Yes	2,06 (02)	4,24 (05)
	No	97,94 (95)	95,76 (113)
Food choking	Yes	4,12 (04)	6,78 (08)
	No	95,88 (93)	93,22 (110)
Gastroesophageal reflux disease	Yes	0	4,24 (05)
	No	100,00 (97)	95,76 (113)

Self-perception over the past three months			
Reduction in food intake			
	No decrease	28,87 (28)	10,17 (12)
	Severe loss	1,03 (01)	0,85 (1)
	Moderate loss	70,10 (68)	88,98 (105)
Weight loss			
	Unknown	30,93 (30)	30,51(36)
	No loss	30,93 (30)	50,00 (59)
	1 to 3 kg	27,84 (27)	18,64 (22)
	> 3 kg	10,31 (10)	0,85 (01)
Self-report of habits			
Eating habits			
	Unable to feed oneself independently	1,03 (01)	0,85 (01)
	Feeds oneself independently, with difficulty	31,96 (31)	35,59 (42)
	Feeds oneself independently, without difficulty	67,01 (65)	63,56 (75)
Number of meals per day			
	One meal	8,25 (08)	---
	Two meals	47,42 (46)	10,17 (12)
	Three meals	42,26 (41)	89,83 (106)
Purchasing food items independently			
	Without difficulty	84,54 (82)	77,12 (91)
	With little difficulty	10,31 (10)	13,56 (16)
	With a lot of difficulty	5,15 (05)	9,32 (11)
Preparing your meals alone			
	Without difficulty	87,63 (85)	86,44 (102)
	With little difficulty	7,22 (07)	8,47 (10)
	With great difficulty	4,12 (04)	5,08 (06)
	Does not know	1,03 (01)	---

Source: Authors, 2025.

Discussion

The rural aging population in the Amazon, as described in this study, was characterized by a predominance of females. It is noteworthy that the majority of elderly individuals continue to engage in domestic and agricultural activities. There is a prevalence of low educational attainment and income derived from pensions; however, a well-established family support system is present to assist with daily living activities.

In terms of nutritional assessment, the prevalence of eutrophy was observed, with no signs suggestive of sarcopenia identified. However, an increase in the number of falls was reported, along with moderate appetite loss and a reduction in food intake (2 to 3 meals per day), leading to significant nutritional risk.

It is known that elderly residents in rural areas of the Amazon may experience more pronounced restrictions due to territorial dispersion, socioeconomic vulnerability, insufficient access to goods and services, and limited basic sanitation infrastructure [2].

Considering self-perception of health as a predictor of morbidity and mortality among the elderly in the state of Amazonas should include indicators related to personal factors, health conditions, environmental factors, and functionality. This represents an important indicator for the risk of frailty, translating into repercussions for various health issues [10].

A study [11] involving 199 elderly individuals from the city of Coari, AM, showed that the majority of participants were female (57.78%), with 56.28% falling within the age range of 60 to 69 years and 67.33% exhibiting low educational attainment. According to the Rural Census conducted by the Brazilian Institute of Geography and Statistics (IBGE), since 2017, the percentage of young people in rural areas has decreased, while the number of

rural elderly individuals has increased by 21.4%. This result has impacted the rise in the number of rural pensions and retirements [12], findings that corroborate those identified in the research.

The low monthly income of rural elderly individuals is a negative indicator that contributes to a higher prevalence of disabilities and diseases, as well as increased severity of health problems affecting this population [13].

Rural elderly individuals in the Amazon exhibit considerable family support, and the majority live with large families. Family care for the elderly is associated with strong familial support and a positive impact on activities of daily living [14].

Older adults living in rural areas who engaged in agricultural and physically demanding tasks remain physically active [15]. In another study [16] rural older adults experienced reduced signs suggestive of sarcopenia due to long-distance travel by river and/or on foot, as well as subsistence-related activities such as fishing, hunting, and forest extractivism. These findings are consistent with those of the present study, as the improvement in physical performance observed among the evaluated older adults supports the preservation of muscle mass [15].

However, with advancing age, physiological changes occur that affect the quality of skeletal muscle, contributing to alterations in gait and balance, which increase the risk of falls in older adults and deterioration of postural control. Consequently, falls in older adults are primarily due to the lack of clinical conditions or a safe dietary environment [17,18]. The increased incidence of adverse events, such as falls, among rural older adults warrants special attention.

A study [19] conducted with older adults in the interior of Amazonas showed that 58.3% had a BMI

in the overweight and obesity range, indicating an increase in the number of older adults with excess weight and a risk of nutritional imbalance, which contrasts with the findings in rural older adults in this study.

Nutritional monitoring and assessment are of great importance in raising awareness about health among older adults, thereby improving their nutritional status. Evaluating weight loss and addressing nutritional risks has been a challenge for nutrition professionals, particularly in remote areas. It is well known that such interventions can positively impact the health of the older adult population [20,21]

Weight loss and difficulty feeding independently are important markers of frailty in rural older adults in the interior of Amazonas and may lead to further deterioration of their health [22]. Moreover, nutritional risk plays a key role in the pathogenesis of frailty, functionally impairing older adults and increasing difficulty in performing activities such as shopping and meal preparation. This may lead to social isolation, challenges in food intake, and decreased appetite [23,25].

Factors related to the decline in food consumption and the lack of motivation to eat [26], can significantly compromise the autonomy, quality, and life expectancy of older adults [27]. Low dietary diversity is one of the factors that increases the likelihood of malnutrition by 5.44 times when

compared to older adults with high dietary diversity. The seasonal availability of foods in the Amazon region impairs the adequacy of food intake [28].

The elderly population in remote rural areas has lower incomes compared to urban elderly, which directly impacts the number of meals consumed. It is well established that household income is a strong determinant of nutritional status and places many older adults at risk of food insecurity, with inadequate intake of essential nutrients [29]. Diet and the variety of available food options, the frequency of meals with inadequate food intake, increased nutrient loss, poor nutrient absorption, and loss of appetite are factors that hinder the maintenance of health and nutritional status in older adults [30,31].

Self-care regarding nutrition in an environment of food insecurity impairs and alters the ability of older adults to access food and meet their nutritional needs [32,33]. It appears that living in rural and remote areas increases the difficulties in accessing a variety of foods. Sustainable and organizational measures within the local system should be adopted as a way to adapt to the needs of this population in the Legal Amazon.

The findings of this study, although descriptive, reveal the need and vulnerability related to the self-perception of health and eating habits among rural, remote, and riverine older adults in the Amazonas region.

Conclusion

Rural aging in the Amazonas region shows a predominance of females, with women actively engaged in rural activities. Low educational levels and low monthly income are concerning factors that directly negatively impact the food consumption of this population. The lack of access to adequate

nutrition and information about health and nutrition can negatively affect the functionality of rural older adults aging in the Amazonian context. Further studies and more robust analyses are necessary to accurately define the nutritional and health profile of rural older adults aging in this context.

Conflicts of Interest

The authors declare that there are no conflicts of interest of any kind.

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Author Contributions

Research conception and design: Campos HLM. Data analysis and interpretation: Fernandes LPC, Damasceno MB; Manuscript writing: Justino SG, Silva VCF, Torcato SS. Critical review of the manuscript regarding significant intellectual content: Hércules Lázaro Morais Campos HLM, Fernandes LPC.

References

1. Campos H, De Leon E, De Souza I, Quialheiro A, De Oliveira E. Cognição, função física e propósito de vida na população idosa rural: uma revisão sistemática. *Rural Remote Heal.* 2025;(25):8827.
2. Garnelo L, Parente R, Puchiarelli M, et al. Barreiras ao acesso e à organização dos serviços de atenção primária à saúde para populações ribeirinhas rurais na Amazônia. *Int J Equity Heal.* 2020;(19):54.
3. Najas M, Andreazza R, Souza A, Sachs A, Guedes A, Sampaio LR, et al. Padrão alimentar de idosos de diferentes estratos socioeconômicos residentes em localidade urbana da região sudeste, Brasil. *Rev Saúde Pública* . 1994;(28(3)):187–91.
4. Institute of Medicine. State of the USA Health Indicators: Letter Report. Washington (DC): The National Academies Press. 2009;
5. Benyamini Y. Why does self-rated health predict mortality? An update on current knowledge and a research agenda for psychologists. *Psychol Heal.* 2011;(26(11)):1407–13.
6. Jylhä M. What is self-rated health and why does it predict mortality? Towards a unified conceptual model. *Soc Sci Med* . 2009;(69(3)):307–16.
7. Ministério da Saúde G br. B. Tab Net Datasus. 2020.
8. Lipschitz D. Screening for nutritional status in the elderly. *Primary Care.* 1994;(21(1)):55–67.
9. OMS, Organização Pan-Americana da Saúde (OPAS). <<https://www.paho.org/pt/envelhecimento-saudavel>>. Acesso em: 15 nov. 2023. 1995. Envelhecimento saudável.
10. Pagotto V, Bachion M, Silveira EA. Autoavaliação da saúde por idosos brasileiros: revisão sistemática da literatura. *Rev Panam Salud Pública* . 2013;(33, n. 4):302–10.
11. Ribeiro RDJM, de Lira EM, Júnior RCF, de Carvalho Bastone A. Fatores associados à autopercepção negatividade saúde em idosos residentes no interior do Amazonas: análise baseada no modelo da cif. *Estud Interdiscip sobre o Envelhec.* 2025;1–13.
12. Campos HLMC, Preste Y., Soares BF. Envelhecimento Rural no Brasil e nas Barrancas do Amazonas. Portal do Envelhec Comun 1a edição, São Paulo. 2024;
13. Krug R de R, Xavier AJ, D’Orsi E. Fatores associados à manutenção do uso da internet, estudo longitudinal EpiFloripa Idoso. *Rev Saude Publica.* 2018 Apr 3;52:37.
14. Shrestha A, Ghimire S, Kinney J, et al. O papel do apoio familiar na autoavaliação da saúde de idosos no leste do Nepal: resultados de um estudo transversal. *BMC Geriatr* . 2024;(24):20.

15. Mazocco L, Gonzalez MC, Barbosa-Silva TG, Chagas P. Sarcopenia in Brazilian rural and urban elderly women: Is there any difference? *Nutrition*. 2019;(58):120–4.
16. Nascimento R, Cardoso R, Santos Z, Pinto D, Magalhães C. The perception of elderly riverside residents of the Amazon region: the empirical knowledge that comes from rivers. *Rev Bras Geriatr e Gerontol*. 2016;(19(3)):429–40.
17. Ferretti F, Diany L, Larissa B. Causas e consequências de quedas de idosos em domicílio. *Fisioter em Mov*. 2013;(26):753–62.
18. Almeida ST et al. Análise de fatores extrínsecos e intrínsecos que predisõem a quedas em idosos. *Rev da Assoc Médica Bras*. 2012;58(n.º4). Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0104-42302012000400012.
19. Duarte TCF, Lopes HS, Campos HLM. Atividade física, propósito de vida de idosos ativos da comunidade: um estudo transversal. *Rev Pesqui Fisioterápicas*. 2020;(10(4)):591–8.
20. Attanasio A, Bedin M, Stocco S, et al. Resultados clínicos e complicações da nutrição enteral entre adultos mais velhos. *Minerva Med*. 2009;100(n.º2):159–66.
21. Wong A, Goh G, Banks MD, Bauer JD. Uma revisão sistemática do custo e dos resultados econômicos da nutrição enteral domiciliar. *Clin Nutr*. 2018;37(n.º 2):429–42.
22. Verlaan S, Ligthart-Melis G, Wijers S, et al. Alta prevalência de fragilidade física entre idosos desnutridos residentes na comunidade – uma revisão sistemática e meta-análise. *J Am Med Dir Assoc*. 2017;(18(5)):374–82.
23. Fried LP, Cohen AA, Xue QL, et al. A síndrome da fragilidade física como uma transição da sinfonia homeostática para a cacofonia. *Nat Aging*. 2021;(1(1)):36–46.
24. Evans C. Desnutrição em idosos: uma falha multifatorial no desenvolvimento. *Perm J*. 2005;(9(3)):38–41.
25. Liang H, Li X, Lin X, et al. A correlação entre nutrição e fragilidade e a curva ROC (Receiver Operating Characteristic) de diferentes índices nutricionais para fragilidade. *BMC Geriatr*. 2021;(21(1)):619.
26. Lima A, Portes L, Oliveira N, Alfieri. Limiar de tolerância de dor à pressão, estilo de vida, força muscular e capacidade funcional em idosas com sarcopenia. *Acta fisiatra*. 2017;(23, 2):73–7.
27. Souza TJN et al. Percepção de idosos sobre o envelhecimento em um projeto extensionista. *Rev Remecs-Revista Multidiscip Estud Científicos em Saúde*. 2020;5(n.º8):29–39.
28. Tessfamichael D, Gete A, Wassie M. Alta prevalência de desnutrição entre idosos no noroeste da Etiópia: um estudo transversal. *Read Write*. 2014;(244):32.
29. Bernstein M, Munoz N. Posição da Academia de Nutrição e Dietética: alimentação e nutrição para idosos: promovendo saúde e bem-estar. *Rev da Acad Nutr e Dietética*. 2012;(112 (8)):1255–77.
30. Smith ML, et al. Uma breve intervenção para desnutrição em idosos: intensificando sua nutrição. *Int J Env Res Public Heal*. 2020;(17(10)):3590.
31. Demling R, De Santi L. Perda de peso involuntária e desnutrição proteico-energética: Diagnóstico e tratamento. *Nov York Módulos Gestão Clínica Enferm do Medscape*. 2001;
32. Lee J, Frongillo EJ. Nutritional and health consequences are associated with food insecurity among U.S. elderly persons. *J Nutr*. 2001;1503–9.

33. Sharkey J. Risco e presença de insuficiência alimentar estão associados à baixa ingestão de nutrientes e à multimorbidade entre idosas confinadas em casa que recebem refeições entregues em casa. J Nutr. 2003;(133 (11):):3485–91.



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