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Review Article

Nursing Diagnosis Frail Elderly Syndrome: an integrative review

Diagnóstico de Enfermagem Síndrome do Idoso Frágil: revisão integrativa

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ABSTRACT

Objective: to identify the defining characteristics and factors related to the Nursing diagnosis is Frail Elderly Syndrome. **Methods:** integrative review developed in seven databases, besides the use of Grey literature in Google Scholar and Open Grey. The Problem, Concept, and Context strategies were used to develop the guiding question and select the descriptors. Eight articles and one thesis were included in the final sampling. **Results:** three new characteristics were identified: Urinary Incontinence; Dysfunctional Family Processes and Sleep Pattern Disorder. The most frequent defining characteristics of the Frail Elderly Syndrome Nursing Diagnosis were: impaired physical mobility; decreased activity tolerance; unbalanced nutrition: less than the body needs and impaired ambulation. Among the related factors, the most present was: impaired muscle strength; cognitive dysfunction, and impaired postural balance. **Conclusion:** it was found that the three defining characteristics that are not present in NANDA-I need to be further investigated to be included in the Nursing Diagnosis Frail Elderly Syndrome. **Contributions to practice:** the study provides nurses with a deeper understanding of this diagnosis, supporting and strengthening the clinical reasoning necessary for decision-making to correctly assign the diagnosis to the patient.

Descriptors: Nursing Diagnosis; Frail Elderly; Signs and Symptoms; Risk Factors.

RESUMO

Objetivo: identificar as características definidoras e os fatores relacionados ao Diagnóstico de Enfermagem Síndrome do Idoso Frágil. **Métodos:** revisão integrativa desenvolvida em sete bases de dados, além da utilização de literatura cinzenta no *Google Scholar* e no *Open Grey*. A estratégia Problema, Conceito e Contexto foi utilizada para elaborar a questão norteadora e selecionar os descritores. Foram incluídos oito artigos e uma tese na amostragem final. **Resultados:** três novas características foram identificadas: Incontinência Urinária; Processos Familiares Disfuncionais e Distúrbio no Padrão de Sono. As características definidoras do Diagnóstico de Enfermagem Síndrome do Idoso Frágil mais frequentes foram: Mobilidade física prejudicada; Tolerância à atividade diminuída; Nutrição desequilibrada: menor do que as necessidades corporais e Deambulação prejudicada. Sobre os fatores relacionados, os mais presentes foram: Força muscular diminuída; Disfunção cognitiva e Equilíbrio postural prejudicado. **Conclusão:** verificou-se que as três características definidoras que não estão presentes na NANDA-I precisam ser mais bem investigadas, a fim de serem incluídas ao Diagnóstico de Enfermagem Síndrome do Idoso Frágil. **Contribuições para prática:** o estudo disponibiliza, ao enfermeiro, um aprofundamento no referido diagnóstico, subsidiando e fortalecendo o raciocínio clínico necessário à tomada de decisão para atribuir, corretamente, o diagnóstico ao paciente.

Descritores: Diagnóstico de Enfermagem; Idoso Fragilizado; Sinais e Sintomas; Fatores de Risco.

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Introduction

Population aging started at the end of the XIX century, in Europe, and has spread over the last decades to several countries, including Brazil. Since the 1970s, a demographic transition has been taking place in Brazil, where the population has gradually shifted from being predominantly young to having an increasing number of elderly people[1-2]. This transition is caused by the drop in birth rates, associated with the decrease in mortality and the increase in life expectancy, which today reaches 74 years[1,3].

The projections made by the World Health Organization estimate that in 2050 the elderly population may reach two billion people and, in Brazil, this population will correspond to 53 million, lower only than those of India, China, the United States, and Indonesia, constituting the fifth-largest population in the number of elderly individuals[3].

Population aging in developing countries, such as Brazil, occurs in an accelerated and disorderly manner, generating a sequence of changes in family relationships, the economic sector, and health services[3]. Thus, issues such as frailty in the aging process have come to occupy a prominent place among health professionals and among the senescent population itself[2,4].

Although there is no consensual definition, frailty can be understood as a multidimensional syndrome that involves a complex interaction of biological, psychological, and social factors. This interaction culminates in increased vulnerability and is associated with the risk of adverse clinical outcomes, such as functional decline, falls, hospitalization, institutionalization, and increased mortality[5-9].

Due to the magnitude and complexity of frailty, nurses play a role in identifying and caring for frail elderly. Therefore, nurses must be trained to offer specialized and continuous care at all levels of health care. To this end, nurses use the Nursing process as a scientific method and, based on clinical reasoning, make the Nursing Diagnosis[10], which is a private action of nurses, consisting of a clinical judgment of the human responses presented by the patient, the family, or the community. This diagnosis develops an individualized care plan with evidence-based nursing interventions and scientific knowledge[10].

The diagnosis of Frail Elderly Syndrome arose from the need to identify the frailty presented by some elderly people. It was instituted in NANDA-International (NANDA-I) in 2013 and included in the classification of diagnoses in the 2015-2017 version with the title "Frail Elderly Syndrome". It has a level of evidence 2.1, with content validation characteristic, being defined as a "dynamic state of unstable balance, affecting the elderly who experience deterioration in one or more health domains (physical, functional, psychological or social), and leads to increased susceptibility to adverse health effects, in particular, disability"[11:177].

This is a syndromic diagnosis whose defining features are formed by other diagnoses from the same taxonomy, which is: Impaired ambulation (00088); Hopelessness (00124); Decreased cardiac output (00029); The deficit in self-care for feeding (00102); Deficit in self-care for bathing (00108); Deficit in self-care for intimate hygiene (00110); Deficit in self-care for dressing (00109); Fatigue (00093); Social isolation (00053); Impaired memory (00131); Impaired physical mobility (00085); Unbalanced nutrition: Less than body needs (00002) and Diminished activity tolerance (00298)[11].

The related factors of this diagnosis are anxiety; inadequate social support; inadequate knowledge about modifiable factors; malnutrition; cognitive dysfunction; decreased energy; impaired postural balance; sedentary lifestyle; exhaustion; decreased muscle strength; neurobehavioral manifestations; fear of falls; obesity and sadness[11]. The concept of frailty, even today, is not consensual in the literature, and its inclusion in NANDA-I dates back to 2015. After seven years, and given the propulsion of research on the subject and its consequent refinement and evolution, it became necessary to review the defining characte-

ristics and related factors that make up the diagnosis, since new characteristics and new factors may have been identified from the research developed in this period. This study aimed to identify the defining characteristics and factors related to the Nursing diagnosis is Frail Elderly Syndrome.

Methods

Integrative Review developed in six distinct steps: identification of the theme and elaboration of the research question; establishment of inclusion and exclusion criteria; identification of pre-selected and selected studies; categorization of the selected studies; analysis and interpretation of results and presentation of the review/knowledge synthesis[12].

To elaborate on the research question, the acronym Population, Concept, Context (PCC) was used. The P was assigned to the elderly; the C: defining characteristics and factors related to the Nursing Diagnosis of Frail Elderly Syndrome; and the C: primary health care, hospital, and long-stay institution for the elderly. In developing this strategy, the following question was considered: What defining characteristics and related factors are found in studies addressing the Nursing Diagnosis of Frail Elderly Syndrome?.

Publications in any language were included, with a full electronic version available. The time frame was from 2013 when this Nursing Diagnosis was established by NANDA-I. Exclusion criteria were: editorials, letters to the editor, duplicates, congress reports, and congress abstracts.

The literature search occurred between the months of January and April 2022, from the journals portal of the Coordination for the Improvement of High-Level Personnel (*Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* - CAPES), via remote access entitled Federal Academic Community (CAFe), in the databases: Scientific Electronic Library Online (SciELO); Latin American and Caribbean Literature on Health Sciences (LILACS); Database in Nursing (BDN); PubMed Central; Cumulative Index to Nursing and Allied Health Literature (CINAHL); Scopus Elsevier and Web of Science. In addition, a grey literature review was conducted on Google Scholar and Open Grey.

The Health Sciences Descriptors (HSD) and Medical Subject Headings (MeSH) were selected: Nursing Diagnosis, frail elderly, primary health care, hospital, and long-stay institution, and the correlated terms in English. The combinations were made in English and Portuguese, as follows: "Nursing Diagnosis AND Frailty AND (Primary Health Care OR Hospital OR Long-stay Facility)", "Nursing Diagnosis AND Frailty Syndrome", "Nursing Diagnosis AND (Frail Elders OR Functionally-Impaired Elderly OR Frail Older Adults) AND (Hospitals OR Nurses, Public Health OR Homes for the Aged)". Each database has its particularities, and the search strategies were adapted according to the database, keeping the proposed combinations.

To reduce the probable errors or biases in the studies, the selection was developed in two stages by two researchers, independently, ensuring the double-blind review and the required methodological rigor. In the first, the title and abstract were read, and in the second, the articles were read in their entirety. In cases of disagreement between the two reviewers, there was a discussion to reach a consensus. The selection was structured using the recommendations of the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA)[13].

For data extraction, a careful evaluation was carried out, with an exploratory reading of the studies and the completion of the semi-structured instrument prepared by the authors. It contained: the article title; authors; year of publication; journal of publication; objective; methodology; population; study setting; frailty assessment criteria; and results and conclusions. Subsequently, a synthesis of the theme was prepared with the data descriptively analyzed.

The selected studies were classified according to the level of evidence of which seven levels were considered: 1) evidence presented in a systematic review or meta-analysis of randomized controlled trials or clinical guidelines based on systematic reviews of

randomized controlled trials; 2) evidence from a randomized controlled trial; 3) evidence from non-randomized clinical trials; 4) evidence from cohort and case-control studies; 5) evidence from a systematic review of descriptive and qualitative studies; 6) evidence from a single descriptive or qualitative study; 7) evidence from the opinion of authorities and/or expert committee report[14].

This study did not involve participants; however, concerning the intellectual property of the authors of the articles that made up the sample, the papers were fully and rigorously cited.

Results

The search resulted in 2.994 productions of which 675 were excluded for duplicity. First, 2.319 were selected for the title and abstract reading. Using the inclusion criteria, 2.268 were excluded at this stage. A total of 51 studies were eligible for reading in full, of which 42 did not answer the review's guiding question, resulting in a total of eight articles and one thesis (Figure 1).

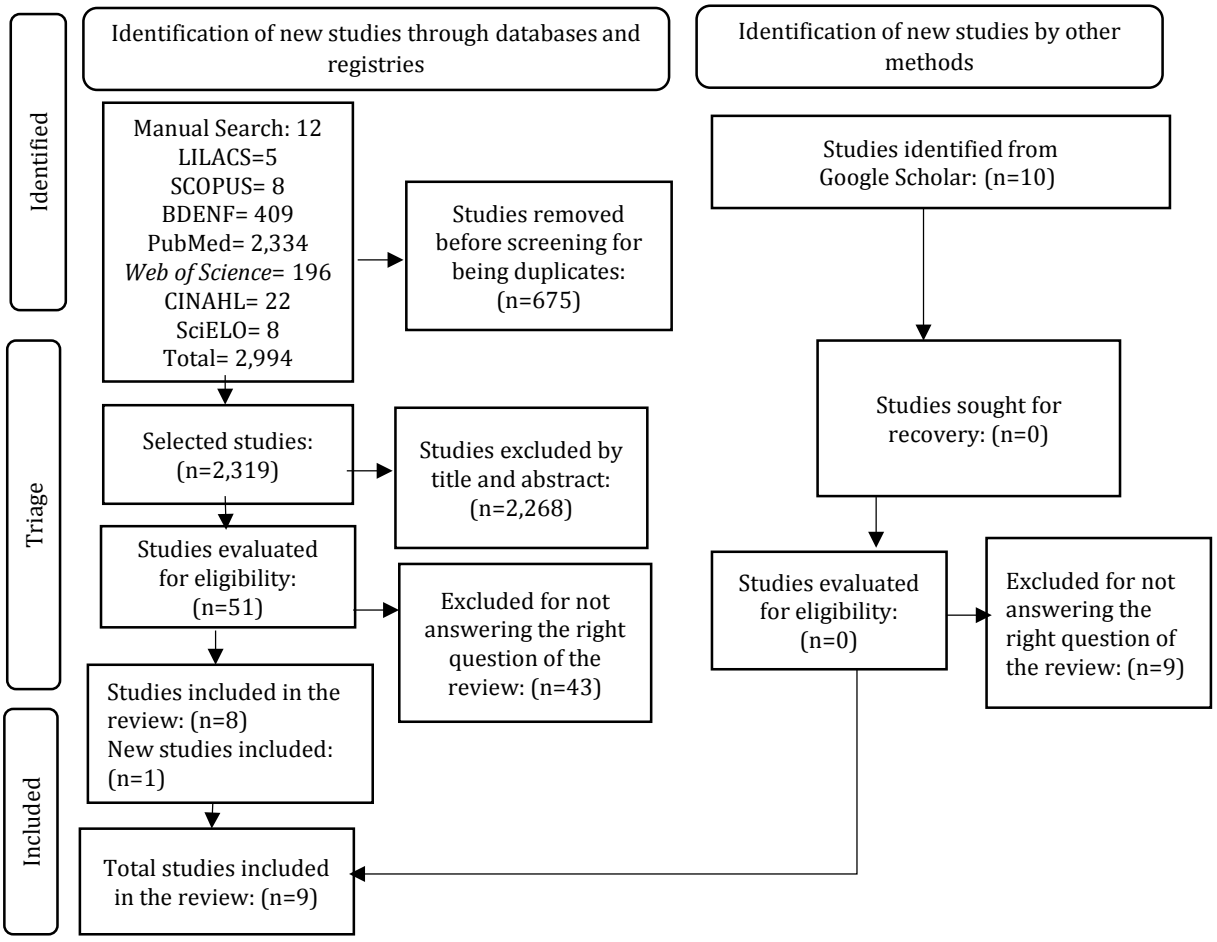

Figure 1 – Flowchart of identification, selection, and inclusion of studies according to Preferred Reporting Items for Systematic reviews and Meta-Analyses. Rio Branco, AC, Brazil, 2022

The predominant type of study was the level of evidence 6, located in six productions. All studies were Brazilian. Regarding the publication period of the studies, there was no emphasis on recent years. Regarding the approach/type of studies, six were cross-sectional, two were on concept analysis, and one was methodological (Figure 2).

In the final sample, regarding the databases consulted and the studies included in the review, there was a predominance of CINAHL, with four findings, followed by SciELO, with two; BDENF, LILACS and a manual search in Google Scholar had one study each. No articles addressing the Nursing Diagnosis of Frail Elderly Syndrome was identified in its entirety in the Web of Science and PubMed databases. It is important to point out that three studies were developed in Long Staying Institutions for the Elderly, two in hospitals, and one each in community and Primary Health Care. The Edmonton Frailty Scale was the most used, being present in five articles (Figure 2).

Author/Year/ Journal	Delineation and Level of evidence	Sample	Frailty Assessment Instrume
Oliveira et al. 2021 Rev Bras Enferm[15]	Methodological study (5)	40 hospitalized elderly	Edmonton Frailty Scale
Oliveira et al. 2020 Rev Bras Enferm[16]	Conceptual Analysis (5)	66 studies	-
Silva et al. 2020 Saude Coletiva[17]	Cross-sectional study (6)	25 elderly people from a Long-Term Care Institution for the Elderly	Edmonton Frailty Scale
Fernandes et al. 2019 Rev Enferm UFPE on line[18]	Cross-sectional study (6)	53 elderly people from a Long-Term Care Institution for the Elderly	Edmonton Frailty Scale
Ribeiro et al. 2019 Rev Esc Enferm USP[19]	Cross-sectional study (6)	78 elderly from Primary Health Care	Protocolo de Fried
Martins et al. 2018 Rev Eletr Trab Acad - Universo/ Goiânia[20]	Cross-sectional study (6)	162 community elders	Protocolo de Fried
Crossetti et al. 2018 Rev Gaúcha Enferm[21]	Cross-sectional study (6)	395 hospitalized elderly	Edmonton Frailty Scale
Link, 2015 Digit Repository[22]	Concept Analysis (5)	100 studies	-
Maciel et al. 2014 Rev Enferm UFSM[23]	Cross-sectional study (6)	24 elderly women from a Long-Term Care Institution for the Elderly	Edmonton Frailty Scale

Figure 2 – Characteristics of the studies regarding the author, year of publication, journal, design, level of evidence, sample, and evaluation instrument. Rio Branco, AC, Brazil, 2022

In this review, it was observed that all the defining characteristics that are inserted in the Nursing Diagnosis of Frail Elderly Syndrome were found, being the most frequent: impaired physical mobility; decreased activity tolerance; impaired ambulation, and imbalanced nutrition: lower than body needs. Moreover, clinical situations that can be grouped with the new defining characteristics were identified in the articles, namely: Urinary incontinence; Dysfunctional family processes, and Sleep pattern disturbance. In the syndrome diagnosis, the defining characteristics are composed of other diagnoses present in NANDA-I, therefore, these three defining characteristics found are present in NANDA-I, but are not inserted in the Nursing Diagnosis Frail Elderly Syndrome (Figure 3).

The Nursing Diagnosis of Frail Elderly Syndrome has 14 related factors. Of these, 10 were identified in the review, namely: decreased muscle strength; cognitive dysfunction; impaired postural balance; malnutrition; obesity; sadness; inadequate social support; exhaustion; fear of falls; sedentary lifestyle, the most frequent being decreased muscle strength; cognitive dysfunction and impaired postural balance (Figure 3).

Components of Nursing Diagnosis Frail Elderly Syndrome	References
Defining characteristics	
Impaired ambulation	15, 16, 17, 18, 19
Decreased cardiac output	15, 19
Hopelessness	19
The deficit in self-care for bathing	15, 19
The deficit in self-care for intimate hygiene	15, 19
The deficit in self-care to dress	15, 19
Fatigue	15, 19, 22
Social isolation	19, 22
Activity intolerance	15, 16, 19, 20, 22, 23
Self-care deficit for food	19
Impaired memory	17, 19, 23
Impaired Physical Mobility	15, 16, 19, 20, 22, 23
Unbalanced nutrition: less than the body needs	15, 16, 17, 18, 22
Urinary Incontinence	17, 21, 22, 23
Dysfunctional Family Processes	16, 18
Insomnia	18
Related factors	
Inadequate social support	17
Malnutrition	22
Cognitive dysfunction	16, 19, 22
Impaired balance	16, 17, 20
Sedentary lifestyle	16, 19
Exhaustion	20
Decreased muscle strength	16, 17, 18, 20, 22
Muscle weakness	16
Fear of falls	16
Obesity	20, 22
Sadness	17, 18

Figure 3 – Components of the Nursing Diagnosis Frail Elderly Syndrome: defining characteristics and related factors of the studies regarding the author/reference. Rio Branco, AC, Brazil, 2022

Discussion

Although not included in the Nursing Diagnosis of Frail Elderly Syndrome, the three defining characteristics found in this review may negatively impact the quality of life of the frail elderly. It is therefore suggested that they should be further investigated for possible inclusion in the classification.

The defining characteristic of urinary incontinence was identified in three studies. It is linked to the physiological systems of the human being and can be triggered due to the weakening of the pelvic muscles and the urethra among women and by the increase of the prostate gland among men, besides being one of the biggest problems faced by the elderly population, with vast repercussions on the quality of life, independence, and autonomy. In addition, many who have this characteristic, out of shame, stop performing their daily and social activities and even isolate themselves from friends and relatives for fear that they will notice their problems[24-26].

Evidence points out that urinary incontinence is present in frailty syndrome in the elderly, besides being associated with an increased risk of functional decline[27]. Of the 54 frail patients seen in a Geriatrics and Gerontology outpatient clinic, 22 (40.7%) presented with urinary incontinence[24], as well as of the 300 patients seen in a Geriatrics and Gerontology outpatient clinic in Cairo, Egypt, 130 were frail, and of these, 104 (80%) had the diagnosis of urinary incontinence[26].

Another relevant defining characteristic that is not included in this Nursing Diagnosis, but that has repercussions on the frailty process is the Dysfunctional Family Process. The family plays an important role in elderly care and is often the main source of care. It also acts in the care during the frailty process and needs to be closer to the elderly to help them with their difficulties and anxieties. Being cared for by the family brings well-being to the elderly and, in a broad sense, brings more quality of life[28].

Frailty is a syndrome that demands a lot of care from elderly family members. When the family, the main provider of this assistance, is not able to adapt to this new reality, coexistence conflicts arise among members, causing tensions in the care process. This affects the family bond and the elderly may receive less comfort and company from their relatives, leading to a feeling of uselessness and abandonment[29].

Such feeling usually motivates social isolation, sedentarism, and increased dependence level, which

predisposes to frailty[29]. Within this context, Nursing needs to know the family bond of the elderly and encourage links with the family, making them understand their role as caregivers of the frail elderly, making them responsible for and assisting them in caring for the elderly[19].

The defining characteristic of Sleep Pattern Disorder is characterized by awakenings with limited time due to external factors[11]. It is configured as a recurring complaint that can generate an increase in daytime sleepiness, and behavioral alterations, besides potentiating the complications that arise from frailty. Sleep pattern disturbance generates weakness and fatigue, which are criteria that define physiological frailty in the elderly, as well as the risk of falling, lack of enthusiasm, and mood swings[30].

Sleep pattern disturbance causes attention deficit, impaired memory, diminished concentration, and reduced ability to perform daily activities[18]. The proportions of elderly participants with sleep pattern disturbance increased with the severity of frailty (non-frailty; pre-frailty/frailty: 48.31%; 65.25%, $p<0.001$), suggesting that the pre-frailty/frailty group had a higher prevalence of poor sleep quality than the non-frailty group[31]. It is important to identify the reason that leads the elderly to present the sleep pattern disorder if it is due to nighttime getting up to go to the bathroom if it is some drug interaction so that the nurse can intervene appropriately.

Among the 13 defining characteristics that are embedded in NANDA-I, four were prominent and were cited in all the studies identified in the review. The defining characteristic of Unbalanced Nutrition: is less than body requirements is associated with inadequate protein intake, which can lead to a failure to maintain muscle mass and function. Observational studies have suggested that protein supplementation may help to slow frailty[32].

This nutritional imbalance can be caused by numerous variables that interfere with food intakes such as physiological anorexia of aging; sensory changes; loss of teeth; social isolation; depression, and low socioeconomic status. These conditions affect the autonomy of individuals to select and prepare food, limiting the food repertoire and interest in food, as well as the lack of appetite associated with food monotony[33]. There is a strong association between frailty syndrome and altered nutritional status, and 36.3% of participants who had altered nutritional status were frail, compared to 0.9% of non-frail participants[34].

The defining characteristic of Impaired Physical Mobility is characterized as a common manifestation of frailty, being a sensitive marker of acute disease and a major component of the genesis of frailty[16]. It is defined as the limitation of independent, voluntary movement of the body or one or more extremities[11] and is associated with the loss of strength and/or function that characterizes sarcopenia. Approximately one-third to one-half of individuals aged 65 years or older report difficulties related to walking or climbing stairs[35].

A study of 1.085 hospitalized elderly individuals demonstrated that 73.3% were at risk for mobility-related impairment[36]. Gait speed is a good predictor of disability in activities of daily living and mobility impairment. Furthermore, age-related decline in walking speed has been associated with an increased risk of falls, lower quality of life, cognitive decline, dementia, and early mortality[35].

Decreased Activity Tolerance, also found in all studies, represents a key indicator of frailty, being understood as a decrease in the level of physical activity that entails a decline in the regulation of organ systems, and a decline in cardiovascular and musculoskeletal reserves[9]. It is also related to obesity since obese elderly people are prone to sluggishness and have difficulty performing physical activities[37].

Another important defining characteristic is Impaired Deambulation, which is influenced by the aging process due to physiological changes that may decrease the elderly's ability to walk[38]. These three characteristics - impaired physical mobility, impaired activity tolerance, and impaired ambulation- to some extent feedback on each other since they usually pre-

sent the related factor of impaired muscle strength as the main cause. Decreased muscle strength is one of the frailty phenotypes, appearing since pre-frailty, which may serve as an indication of increased vulnerability in the early stages of frailty[9].

In this sense, physical activity is configured as an important protective factor for the elderly, since it has the potential to improve the health condition of the elderly, besides improving physical performance, helping in the maintenance of muscle mass and bone replacement during the aging process and, thus, it can prevent, delay or reverse the frailty process[39-40]. Physical activity and the reduction of sedentary behavior may play an important role in preventing and reducing sarcopenia and frailty, delaying functional dependence and improving physical functioning in the elderly[41].

Another related factor often mentioned in the review was cognitive dysfunction. With aging, the ability to process information becomes slower, affecting autonomy, the ability to make decisions, and independence[18]. It was observed in a group of 1.399 elderly people that 8.5% of these elderly were frail, and of these, 38.9% had cognitive decline[24]. To keep the elderly in good cognitive status, it is important to maintain their overall health and well-being. The stimulation of the elderly. The stimulus and practice of activities such as board games, dominoes, manual activities, and the practice of physical activities is an excellent care strategy to prevent cognitive decline.

The factor related to impaired postural balance is caused by the aging process itself, being one of the main factors that limit the functional independence of the elderly[1,15]. In 80% of the cases, the cause is nonspecific, but, generally, it is associated with a decrease in the level of physical activity, causing the decline of the musculoskeletal system, muscle weakness, and, consequently, interfering in the balance of the elderly, which may cause falls followed by fractures or not, leaving the elderly bedridden for days or months, and is responsible for 70% of accidental deaths in people over 75 years of age[42].

To avoid this condition, balance exercises are recommended, such as progressively difficult postures that gradually reduce the support base; movements that disturb the center of gravity, as well as exercises to gain muscle strength, leading to greater safety and independence when walking, improving body balance[42].

In this review, the Edmonton Frailty Scale was the most used among the frailty assessment tools. The such fact can be understood because this scale is considered a robust instrument due to its ability to assess the elderly in a multidimensional way, addressing nine domains (cognition, health status, functional independence, social support, medication use, nutrition, mood, urinary continence, and functional performance). Moreover, it is easy to handle, being used by health professionals to determine the risk factors and the level of frailty of the elderly, as well as the main domains that require intervention[6-7].

In Brazil, currently, the Vulnerable Elders Survey-13 is used to assess and track the vulnerability of the elderly in Primary Health Care and is available in the Elderly Health Booklet, which is a strategic a management tool, allowing the identification of elderly people with greater vulnerability or in the process of frailty to be directed to recovery, promotion, and healthcare actions. The Vulnerable Elders Survey-13 should be applied to all elderly in the areas covered by the basic health units to support the actions of the Nursing team and to improve the planning of care for the elderly with a diagnosis of frailty[43].

It can be observed in this study that, given the magnitude of the Frailty Syndrome in the Elderly, the nurse becomes an important professional in this context because they has the autonomy to track/identify the frail elderly in their community and, together with the multi-professional team, use the tools and strategies such as entering consultation and unique therapeutic projects to draw care plans for each elderly individual, depending on the reality in which they is real.

Study limitations

The limitations of this review are related to the low level of evidence of the selected studies and the small number of studies that deal exclusively with the defining characteristics and factors related to the Nursing Diagnosis of Frail Elderly Syndrome. Although many articles covered the theme of frailty syndrome in the elderly, they did not refer to the Nursing Diagnosis as a whole.

Contributions to practice

This study provides nurses with a deeper understanding of the Nursing Diagnosis of Frail Elderly Syndrome, supporting and strengthening the clinical reasoning necessary for decision-making to correctly assign the diagnosis to patients who, in fact, present frailty.

Conclusion

We found that the three defining characteristics that are not present in NANDA-I need to be further investigated to be included in the Nursing Diagnosis Frail Elderly Syndrome. Issues related to walking, nutrition, physical activity, and muscle strength are closely linked to the frailty process and are considered an indication of the syndrome and, consequently, of the Nursing Diagnosis of Frail Elderly Syndrome. It is also suggested that more robust studies be carried out to evaluate the prevalence of frail elderly in different contexts.

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Authors' contribution

Conception and design or analysis and interpretation of data; writing of the manuscript or relevant critical review of the intellectual content; agreement to be responsible that all aspects of the manuscript related to the accuracy or completeness of any part of the manuscript is properly investigated and resolved: Souza VMAF.

Writing of the manuscript or relevant critical review of the intellectual content and final approval of the version to be published: Lins SMSB.

Writing of the manuscript or relevant critical review of the intellectual content: Bezerra PCL.

Conception and design or analysis and interpretation of data: Santana RF.

Conception and design or analysis and interpretation of data; writing of the manuscript or relevant critical review of the intellectual content: Prado PR, Cardoso RB.

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