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Mini Review: Screening, Prevention, and Interventions for Frailty in Older Adults

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Abstract

Frailty is a clinical syndrome characterized by decreased physiological reserve resulting from the cumulative decline of multiple physiological systems. This condition has significant public health implications, particularly with increased longevity and its growing prevalence among older adults. Identifying, screening, preventing, and implementing interventions for frailty are essential for improving the quality of life of older adults and reducing the burden on healthcare systems. This mini review aims to evaluate the current approaches to screening, prevention, and interventions for frailty in older adults, as well as their public health implications. The analyzed articles were published between 2013 and 2023 and were retrieved from the PubMed and Google Scholar databases. The findings underscore the importance of integrating frailty assessments into routine clinical practice and developing targeted public health policies to address the needs of an aging population.

Keywords: Frailty; Older Adults; Screening; Prevention; Interventions; Public Health

Introduction

The aging population is a global phenomenon, resulting in an increased prevalence of various health conditions, including frailty. As of 2023, the global population of individuals aged 65 and older has surpassed 700 million, with projections estimating this number will reach nearly 1.5 billion by 2050. This demographic shift has led to a rise in the prevalence of frailty, a condition affecting an increasing number of older adults and posing a significant challenge for healthcare systems worldwide [1]. Frailty is widely recognized as a marker of vulnerability among the elderly, leading to significant adverse health outcomes and decreased quality of life [2,3]. This clinical syndrome is characterized by reduced physiological reserve and decreased resistance to external stressors due to the cumulative decline of multiple physiological systems [2-4]. This progressive decline compromises the body's ability to respond to stressors such as acute illnesses or trauma, increasing susceptibility to adverse outcomes [5]. Early identification of frailty is crucial for implementing interventions that can mitigate its effects and improve the health and well-being of older adults.

It is estimated that 15% of non-institutionalized adults in the United States are frail, with global estimates ranging from 3.5% to 27.3% depending on the region and population studied [6]. This wide variation reflects differences in diagnostic criteria, study populations, and socioeconomic contexts. Frailty is associated with an increase in adverse health outcomes, including mortality, disability, worsening

mobility, polypharmacy, falls, and hospitalizations [5,7]. These adverse outcomes underscore the urgent need for effective strategies for screening, prevention, and management of this condition. Therefore, frailty has significant public health implications, particularly due to increased longevity and its high prevalence among the elderly. Proper management can significantly reduce the burden on healthcare systems by decreasing the need for frequent hospitalizations and long-term care.

The aim of this mini-review is to evaluate current approaches to the screening, prevention, and interventions related to frailty in older adults, as well as their implications for public health.

Methods

A literature search was conducted using the databases PubMed and Google Scholar to capture relevant studies published between 2013 and 2023. The keywords used to ensure comprehensive coverage of the search included: "frailty," "older adults," "screening," "prevention," "interventions," and "public health implications". The inclusion criteria for the selected studies were: studies addressing screening, prevention, and interventions for frailty in older adults; articles published in English between 2013 and 2023. The exclusion criteria included: non-peer-reviewed articles, duplicate publications, and studies with non-representative samples of the elderly population. The three frailty scales chosen for this review—Fried Frailty Scale, Rockwood Frailty Index, and FRAIL Questionnaire—were selected due to their widespread use and validation in the scientific literature. The Fried Scale was chosen for its effectiveness in predicting disability and mortality, and is widely recognized as the gold standard for assessing physical frailty. The Rockwood Index was included for its holistic approach, which considers multiple health domains, while the FRAIL Questionnaire was selected for its simplicity and applicability in resource-limited settings, making it ideal for initial screening in large populations.

Results

The following results describe the findings in the current literature on the complex processes of frailty screening and assessment, the implementation of preventive and therapeutic interventions, and the broader public health implications, all aimed at preserving the autonomy and functionality of older adults while addressing the rising healthcare costs associated with frailty.

Screening and Assessment

The screening and assessment of frailty are complex processes that require specific tools to identify individuals at risk of adverse outcomes, such as falls, hospitalizations, and mortality. These processes are essential for detecting of vulnerable individuals, enabling the implementation of appropriate preventive and therapeutic interventions. Early identification of conditions that may compromise the health and quality of life of older adults is essential for administering care that preserves the autonomy and functionality of this population [4-6].

Among the validated tools developed for detecting frailty, the Fried Frailty Phenotype [4], the Rockwood Frailty Index [2], and the FRAIL Questionnaire [8] stand out. The Fried Scale uses five main criteria (unintentional weight loss, exhaustion, weakness, slowness, and low physical activity) and is effective in predicting disability and mortality (Table 1). In contrast, the Rockwood Index adopts a holistic approach, considering multiple health domains, including physical, cognitive, and emotional states, making it suitable for assessing the global vulnerability of the elderly (Table 2). The FRAIL Questionnaire, assesses, in a simple manner, fatigue, resistance, ambulation, existing illnesses, and weight loss with its simplicity and practicality, is ideal for use in resource-limited settings (Table 3) [5,9,10].

Criteria	Description
Unintentional Weight Loss	Loss of 10 pounds or more in the past year without intentional dieting.
Exhaustion	Self-reported feelings of fatigue or low energy.
Weakness	Reduced grip strength, adjusted for gender and BMI.
Slowness	Slow walking speed, adjusted for height and gender.
Low Physical Activity	Low level of physical activity, with specific thresholds for males and females.

Table 1: Fried Frailty Scale.
Legend: Frailty Classification: Robust: 0 Criteria Met; Pre-Frail: 1-2 Criteria Met; Frail: 3 or More Criteria Met.

Domain	Examples of Variables	Description
Physical Health	Chronic conditions, mobility issues, sensory impairments	Assesses the presence of chronic diseases, physical limitations, and sensory deficits.
Cognitive Function	Memory problems, cognitive impairment	Evaluates cognitive decline and issues related to memory and processing speed.
Functional Abilities	Activities of Daily Living (ADLs), Instrumental ADLs	Measures the ability to perform daily tasks such as bathing, dressing, shopping, and cooking.
Mental Health	Depression, anxiety	Assesses the presence of mental health conditions that may affect overall well-being.
Nutritional Status	Unintentional weight loss, nutritional deficiencies	Evaluates the individual's nutritional health and risk of malnutrition.
Social Support	Living situation, social interactions	Considers the availability of social support and engagement in social activities.
Medications	Polypharmacy, inappropriate medications	Reviews the number and appropriateness of medications being taken, which can affect frailty.

Table 2: Rockwood Frailty Index.
Legend: Classification: 0.0 – 0.1: No or Minimal Frailty; 0.11 – 0.2: Mild Frailty; 0.21 – 0.3: Moderate Frailty; 0.31 – 0.4: High Frailty; 0.41 – 0.5: Severe Frailty; > 0.5: Extreme Frailty Calculation: The Number of Deficits Present is Divided by the Total Number of Variables Assessed, Resulting in a Value between 0 and 1.

Criteria	Description
Fatigue	Do you feel tired most or all of the time?
Resistance	Can you climb a flight of stairs?
Ambulation	Can you walk one block?
Illnesses	Do you have five or more illnesses?
Loss of Weight	Have you lost more than 5% of your weight in the past year?

Table 3: FRAIL Questionnaire.
Legend: Frailty Classification: Robust: 0; Pre-Frail: 1-2 Criteria; Frail: 3 or More Criteria.

Feature	Fried Frailty Phenotype	Rockwood Frailty Index	FRAIL Questionnaire
Assessment Base	Physical phenotype	Accumulation of deficits	Self-reported symptoms
Criteria	Unintentional weight loss, exhaustion, grip strength, slowness, and low physical activity	Various health indicators including chronic conditions, symptoms, signs, and laboratory tests	Fatigue, resistance, ambulation, illnesses, and weight loss
Strengths	Good prediction of disability and mortality	Comprehensive assessment including multiple health aspects	Simple and quick to apply; suitable for initial screening
Limitations	Focus only on physical aspects; less comprehensive	Complex to apply in resource-limited settings	Less detailed and comprehensive than other methods

Table 4: Comparison of Frailty Assessment Tools.

The choice of instrument should consider the context, available resources, and specific characteristics of the elderly population being assessed. Table 4 illustrates the comparison of these instruments.

Adequate screening facilitates the implementation of preventive interventions aimed at preserving the autonomy and functionality of older adult's independence and quality of life of older adults. Scientific literature demonstrates that

the application of screening tools, such as the Rockwood Frailty Index and the Fried Frailty Scale, can effectively stratify older adults into different risk levels [5]. For instance, studies indicate that the Fried Scale is particularly effective in predicting disability and mortality, while the Rockwood Index is useful for assessing overall vulnerability, integrating physical, psychological, and social aspects. Additionally, the use of the FRAIL Questionnaire has shown good results in resource-limited settings, allowing for the rapid identification of at-risk older adults [11,12].

Stratifying older adults into different risk levels enables a personalized approach to managing frailty, where specific interventions can be tailored according to the identified degree of vulnerability. This not only improves clinical outcomes but also optimizes the use of healthcare resources, providing more efficient and patient-centered care.

Prevention and Interventions

Preventing frailty involves a series of multidimensional strategies, including promoting a healthy lifestyle that combines nutritional interventions, physical activity programs, cognitive health care, management of multimorbidities, and psychosocial support [13]. These strategies are essential for mitigating the effects of aging and improving the quality of life of older adults. Early recognition and intervention are crucial to slow or reverse the progression of frailty, promoting healthy longevity.

Recent studies highlight the effectiveness of physical exercise programs, especially those combining strength, balance, and resistance training, in reducing the incidence of frailty and improving the functionality of older adults [7,14,15]. Activities such as weight lifting, resistance exercises, and balance practices like tai chi have shown significant results in preventing sarcopenia, the loss of muscle mass and strength associated with aging [16]. Regular physical activity helps maintain and even increase muscle mass, improve bone density, and enhance cardiovascular capacity, all essential elements for reducing the risk of falls and other complications associated with frailty [17-19]. Additionally, physical activity has psychological benefits such as reducing stress and improving mood, which are vital for the overall health of older adults [20].

In terms of nutrition, sarcopenia is a condition closely related to the construct of frailty. Its definition includes the loss of lean mass, strength, and/or muscle function, typically associated with the aging process [21]. Thus, adequate nutritional intake, prioritizing the consumption of proteins and essential micronutrients, is fundamental and is associated with maintaining muscle mass and improving the functional capacity of older adults [22]. Adequate protein intake is crucial for muscle synthesis, and studies have shown that evenly distributing protein intake throughout the day can maximize muscle protein synthesis. Additionally, nutrients such as vitamin D, calcium, and omega-3 fatty acids play essential roles in muscle and bone health. Diets rich in fruits, vegetables, whole grains, and lean protein sources, such as fish and legumes, provide the necessary nutrients to sustain overall health and combat inflammation that can accelerate the frailty process [22-26]. Nutritional supplementation may be required in cases of specific deficiencies identified by healthcare professionals.

A successful example of frailty prevention intervention in the Japanese community is demonstrated by Shinkai S, et al. [27]. The approaches used in primary prevention included promoting physical activity, ensuring adequate nutrition, and encouraging social participation through a health education program aimed at motivating older residents. For secondary prevention, a comprehensive geriatric assessment and routine annual health check-ups were implemented, enabling older adults to self-manage their health and functionality. After 10 years of follow-up, these approaches were found to be promising in promoting healthy aging among community-dwelling older adults [27].

In this context, rehabilitation programs that integrate physical, nutritional, cognitive, and social components are the most promising in reversing frailty [17,26]. These programs aim not only at physical and nutritional improvement but also at the mental and social well-being of older adults, treating frailty comprehensively and holistically. Proper clinical management of comorbidities such as diabetes, hypertension, and heart disease is also essential for the effectiveness of these programs [28]. Access to the healthcare system and coordination of care among different medical specialties ensure an integrated and effective approach in these cases. Therefore, multidimensional and personalized strategies are fundamental for preventing and treating frailty in the elderly population.

Public Health Implications

The public health implications are immense, as frailty in older adults is associated with a significant increase in healthcare costs due to frequent and prolonged hospitalizations, as well as intensive use of primary and specialized care. It is well known that frail individuals are more prone to repeated and prolonged hospitalizations, resulting in substantially higher expenses for healthcare systems [29,30]. A study by Robinson TN, et al. [31] showed that frail individuals spend three times more resources than non-frail older adults on hospitalization, surgical, and total postoperative costs within six months of follow-up [31]. Additionally, the need for rehabilitation services,

home care, and institutionalization in long-term care facilities contributes to the high costs associated with this condition. Allocating financial resources for managing frailty is, therefore, a critical challenge requiring efficient and sustainable strategies.

In a longitudinal observational population-based study conducted in Spain, Lavado A, et al. [32] found that the average healthcare cost during the study period was €142,019 for robust individuals, €284,551 for pre-frail individuals, €420,005 for frail individuals, and €561,073 for very frail individuals. Regardless of age and sex, frailty implies an additional healthcare cost of €1,171 per person per year, i.e., 2.25 times higher for frail individuals compared to non-frail individuals [32]. These findings demonstrate the significant financial burden that frailty in older adults imposes on the healthcare system.

Health policies should focus on promoting healthy aging, educating and training healthcare professionals, and developing supportive environments for the elderly population. Moreover, implementing early screening and intervention programs can reduce costs associated with hospitalizations and long-term care. For example, programs that encourage regular physical activity and adequate nutrition have demonstrated efficacy in reducing the prevalence of frailty, thereby decreasing the need for costly medical interventions [7-9,31,32].

In this scenario, implementing public policies that promote the early identification, screening, prevention, and interventions for frailty can improve the health and quality of life of older adults and reduce the economic burden on healthcare systems. Creating community programs focused on social support, health education, and access to preventive medical services is essential to mitigate the negative effects of this financial burden. Coordination among different levels of care, from primary care to specialized services, is crucial to ensure a comprehensive and continuous approach. Additionally, the use of health technologies such as telemedicine and remote monitoring can optimize the management of frailty, facilitating regular follow-up and timely intervention.

Discussion

Advances in screening, prevention, and interventions for frailty in older adults demonstrate the potential to significantly improve quality of life and reduce morbidity and mortality in this population [6,10,13]. However, the heterogeneity of interventions and variability in study outcomes indicate the need for further research to identify the most effective and cost-effective approaches.

The variability in frailty assessment tools can influence study outcomes, making direct comparisons between different populations and interventions challenging. Therefore, standardizing screening and assessment tools is essential to improve data consistency and facilitate the practical application of research findings. Moreover, the continuous validation and cultural adaptation of the tools are necessary to ensure their relevance and accuracy in different population contexts [33-35].

Multidimensional interventions that combine physical exercise, nutrition, and psychosocial support have shown promising results in reversing frailty [4,6,7,22,23,35]. However, adherence to these interventions can be challenging, especially in older populations with multiple comorbidities or physical limitations. Strategies to increase adherence, such as personalizing programs and using assistive technologies, can improve outcomes and the sustainability of interventions.

The implementation of public health policies that promote healthy aging is crucial for addressing the challenges associated with frailty in older adults. These policies should include the establishment of effective screening programs, the development of preventive interventions, the creation of environments that facilitate mobility and social interaction, the establishment of community support programs, and ongoing education for healthcare professionals [3,35]. Integrating these policies is essential to tackle this growing challenge, thereby significantly reducing healthcare costs and improving the quality of life for these older adults.

Conclusion

Frailty in older adults is a complex and multifactorial condition that requires comprehensive approaches for its screening, assessment, prevention, and management. Integrating strategies based on promoting healthy lifestyle habits and implementing effective public health policies is essential to address the challenges posed by an aging population and the consequent increase in frailty. Further studies on this condition should be encouraged, particularly focusing on the individualization of interventions and the evaluation of their long-term impacts.

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