

Opinion Article

Implementing frailty assessment into a healthcare system: a clinical opinion paper

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Abstract

Frailty is a multifactorial medical syndrome characterized by reduced endurance and decreased physiological ability. The aim of this narrative literature review is to present the frailty diagnostic instruments that are already used in most Western countries and provide recommendations for use in clinical practice. Among the numerous available frailty instruments identified in current literature, the Frailty Index and the Physical Frailty Phenotype are most commonly used. There are large differences in each instrument design, ease of use by healthcare teams and also significant heterogeneity in the design of the studies based on these instruments. Therefore, future studies should be designed to properly address the discrepancy in the comparison of the existent instruments and consider their validity and feasibility of implementation in different healthcare settings with different healthcare providers.

Keywords: Screening, Frailty assessment, Frailty diagnosis, Frailty syndrome, Geriatric assessment instruments

Introduction

Frailty is a multifactorial medical syndrome characterized by reduced endurance and decreased physiological ability that increases the vulnerability of an individual to develop increased dependence and/or death¹. Many parameters are included in the definition of frailty syndrome including exhaustion, unintentional weight loss, weakness, poor physical activity and slow walking speed, as reported by Fried et al. in 2001 in an endeavor to optimally define and standardize frailty as a clinical entity².

The prevalence of frailty is increasing, both as a result of more older people living longer in society and also due to the early detection and increased awareness of healthcare personnel³. However, calculation of prevalence of frailty syndrome remains challenging due to the heterogeneity of frailty definitions and diagnostic criteria that exist in current literature⁴. The association of frailty with decreased survival is also an issue of great significance for the geriatric population. A systematic review by Shamliyan et al. estimated that about 3-5% of deaths could have been delayed if frailty syndrome would have been recognized and prevented⁴. Therefore, recognizing older people who can be classified as frail is pivotal in improving the health care system in Western societies^{5,6}.

Several risk factors for frailty have been recognized so far, including aging (individuals older than 65 years of age),

female gender and low socio-economic status^{3,7}. Pre-frailty syndrome, as defined by the Physical Frailty Phenotype (PFP) is also of great concern and should always be identified and properly addressed^{2,7,8}.

The aim of the present paper is to present the frailty diagnostic instruments that are already used in most Western countries, and also to recognize the appropriate tools and methods that can be implemented and are therefore recommended in order to identify frailty within a healthcare system. The authors focused on tools that are more commonly used.

Materials and methods

The MEDLINE/Pubmed and Scopus database were searched using "frailty screening instruments", "frailty

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assessment”, “frailty diagnosis” and “geriatric assessment instruments” as keywords. Two independent reviewers (E.K. and D.T.) performed the literature search. Papers not written in English were excluded from the study. The end date for the literature search was set to July 2019.

Results

Overall frailty scores/tools

Many tools have been developed so far in order to accurately assess the functional state of individuals in the context of frailty syndrome. The most commonly used as reviewed by Buta et al. are the Physical Frailty Phenotype (PFP), the Frailty Index (FI), the Vulnerable Elders Survey (VES-13), the PRISMA-7 questionnaire and the Clinical Frailty Scale⁹.

According to the PFP, for the definition of frailty 3 out of 5 of the following criteria should be met: slowed walking speed, unintentional weight loss, low physical activity level, low grip strength and low energy. When 1 or 2 criteria are present, individuals are considered to be in a pre-frail (intermediate) stage, whereas when 3 or more criteria are met they are considered frail².

On the other hand, the frailty index (FI) is a complex index which is based on the accumulation of various deficits that appear over time and include a broad spectrum of features that increase the risk for adverse events, including disability, cognitive and physical impairment and geriatric syndromes¹⁰⁻¹². The original index includes 70 items, while shorter versions are available due to the complexity of the calculation, which makes FI time-consuming and possibly more useful for research than in clinical practice. Frailty Index is also strongly associated with increased mortality risk¹³.

The Clinical Frailty Scale (CFS) developed by Rockwood et al in 2005¹⁴. While it was originally introduced to assess frailty in the context of the Canadian Study of Health and Aging, a five-year prospective study designed to assess the overall fitness and frailty of older individuals, it rapidly became a widely used instrument in clinical settings¹⁵. Its initial seven point scale, which later progressed to a nine-point scale, categorizes individuals according to their level of robustness, activity levels and dependence to others. It is also associated with hospital outcomes, as it can be used to predict the increased length of hospital stay and inpatient mortality¹⁶. However, it should be used with caution since the assessment is subjective and highly dependent on physician’s clinical judgment.

There are also questionnaires that are used as screening tools for frailty. The Vulnerable Elders Survey (VES-13) is a simple, easy to perform 13-item self-reported questionnaire that assesses functional status and disability¹⁷. It does not require specialized personnel and can even be performed over the phone. A score equal or more than 3 corresponds to increased risk of functional decline and death over the next two years¹⁸. The PRISMA 7 questionnaire is simple to perform and can identify frailty among community-dwelling

individuals and within primary care units. The questionnaire is comprised of seven questions which include: age (cut-off 85 years of age), gender, health issues that limit the individual’s activities or force them to stay home, help in everyday tasks, the use of walking-aids and the need to rely on someone else in a daily-basis. Three or more affirmative answers indicate a positive result for frailty¹⁹.

Assessment of frailty risk factors

Apart from the use of overall tools assessing frailty syndrome it is equally important to individually address underlying risk factors with a series of questions and simple diagnostic tests. Assessment of older individuals’ functional status has been extensively studied over the years and can accurately be estimated by standardized questionnaires, like the ADL (Activities of Daily Living) Index introduced by Katz et al. and IADL Scale (Instrumental Activities of Daily Living), introduced by Lawton et al. in the 1960s^{20,21}. Questions for assessing key activities necessary for everyday living (ADLs) include questions about whether the individual can perform the following activities alone: bathing, dressing, going to the toilet, moving, and feeding. On the other hand, phone use, meal preparation, homework, washing, using public transport or driving, taking medication and managing finances represent questions for the assessment of more complex activities, as expressed by IADLs. Grading depends on whether the individual is able to complete the above tasks without additional help, with difficulty or cannot finish the task without help.

Due to the multifactorial nature of frailty syndrome and the variety of risk factors that have been so far identified by current literature, other tests may also be needed in order to assess eyesight, hearing, bladder control, malnutrition, risk of falls, depression, cognitive perception and interaction with the environment⁶. Specific questionnaires and clinical tools are employed in clinical practice to properly address each of the above mentioned parameters, which is beyond the scope of this paper.

Discussion

There are three ways that patients get in touch with the healthcare system, the primary care units, hospital’s emergency departments and elective admission to a hospital ward. These three “gates” of a healthcare system should be the areas where health care professionals can implement frailty assessment instruments. Primary care could hold a major role in the assessment of frailty and potentially give health care and advice that could improve the trajectory of frailty. However, many patients are introduced to the healthcare system at the emergency departments of the hospitals. Due to the large amount of patients the emergency departments serve, it is understood that they also can play a significant role for frailty screening. As for the patients who are electively admitted in a hospital ward for any elective procedure, it is easier to implement

frailty assessment instruments at some point during the patient's stay at the hospital. Doctors, nurses and other health professionals in all the above mentioned areas of healthcare system should always pay attention for frailty in every encounter with older people.

Validated instruments can be used to diagnose and identify frailty syndrome within clinical practice. These should be easy to perform during the patient's visit. Specifically, the presence of immobility, incontinence, multiple falls, cognitive decline or medication side effects should "ring a bell" of possible frailty which warrants deeper assessment. These indicators must alert every healthcare provider for the presence of frailty despite the presenting problem of patients²². At the time of patient's detailed assessment and clinical examination detection of indicators like decreased mobility, physical activity deficit, weight loss, muscle weakness or lack of strength (sarcopenia), lack of endurance or decreased stamina, poor balance, deficits in motor processing and poor cognitive condition should raise concern regarding the presence of underlying frailty syndrome and instigate interventions.

The tools that are discussed in this paper have also been identified in a systematic review performed by Buta et al and more recently by Dolenc et al.^{9,23}. So far, the preferred instrument for accurate and early detection of frail individuals remains uncertain. Every instrument has both strengths and weaknesses. The choice of a particular instrument can be guided by many factors including the setting in which it is performed, the background of the medical personnel who administers the test and the available time for screening. Recent studies emphasize the use of these instruments in specific patient subgroups, like patients suffering from cardiovascular disease as described by Zao et al.²⁴. The instruments identified and discussed within this paper are mostly clinical tools. However, radiological modalities could also be of great significance in frailty assessment in other settings like the perioperative care, as noted by Bentov et al.²⁵. Most instruments also have differences regarding their scoring method and the way they evaluate frailty factors. Due to the structural differences in the various frailty tools comparison among them becomes a highly demanding task.

The two most frequently cited tools in the literature, as mentioned above, are the PFP 2 and the FI¹⁰⁻¹². It has been shown by many authors that the validation and clinical applications of the above instruments differ significantly^{26,27}. More specifically, the PFP divides individuals into three categories, the robust, the prefrail and the frail individuals. This phenotype is characterized by multisystem dysregulation which therefore disrupts the homeostatic mechanisms required to resist to various stressors, which subsequently reinforces the idea that the PFP can be used both as a way to identify one's functional status and as a means of risk prediction²⁸. The biological background embedded in the PFP might be of benefit in elucidating the underlying mechanisms and etiology of frailty syndrome²⁷.

The authors of the present study focused on the PFP as it seems to dominate current literature and also because it can be of assistance in defining frailty as a medical entity¹.

Many authors in numerous studies have attempted to make adaptations of the PFP, driven by the lack of accurate measurements in certain studies²⁹ and the need for simplifications on test application in order to make patient assessment in clinical settings faster and easier^{11,30-32}. The majority of the existent adaptations mainly address the issue of their ability to yield comparable results and their efficiency regarding risk prediction of several detrimental frailty consequences including disability and death^{29,33-36}. Nevertheless, in the aforementioned studies researchers have not been able to compare the subgroups of the five PFP criteria for their preciseness in distinguishing between the risks of unfavorable effects of aging in frail and non-frail individuals. What is more, the PFP simplifications have not yet been assessed for their ability to accurately define frailty syndrome relative to the initial PFP³⁴⁻³⁶.

Alternatively, the Frailty Index (FI) covers a wider variety of frailty factors³⁷. Alongside items regarding present physical and psychological functioning, the FI also includes other deficits and co-morbidities which remain relatively steady and are amenable to change. Further research is warranted to elucidate to what extent co-morbidities are an integral part of FI or could be treated as a discrete entity that guides the therapeutic interventions in the setting of frailty. It is important to note that the FI seems to outperform the PFP in the prediction of adverse health outcomes, as it includes a greater variety of risk factors and has a continuous and more precisely graded scoring method¹¹. The FI possesses the distinct advantage of not being a fixed index. Item choice is free as long as the minimum of 40 items is achieved. As a result, the number of items that are not subjected to change can be altered and minimized relatively to the number of changeable items according to the purpose that the tool serves every time. This is why the FI needs to be translated in clinical terms in order to be used in either research context or clinical setting¹¹.

Furthermore, it is of utmost importance to consider whether it is possible to employ a single outcome measure in order to quantify frailty. This measure would have to depict both the fluctuation and gradual deterioration of frailty with time and the interplay of the many associated factors. The attempt to describe and standardize a certain set of factors and weight them according to their effect on frailty remains a challenging pursuit and a highly debatable issue. The authors of the present study recommend the use of a fixed-scoring index with variables that are representative of the intervention aim. Recent studies showed that significant results were noted with the implementation of physical activity, when FI was used as a frailty measurement tool^{38,39}. However, further research of the potentials of the FI is needed, especially those that are clinically relevant, in order to be employed as a primary outcome measure. Most

instruments identified in this study classify an individual as either frail or not frail, like the PFP. But, as frailty is a dynamic entity, a continuous scoring scale on multiple levels would be preferred, like that used in FI. Despite not having a specific cut-off point for frailty diagnosis this is not mandatory in order to be used in clinical trials.

This narrative review has inherent limitations. The literature search was meticulous but not systematic. We were interested in scales and tools that could be used in clinical practice. However, the assessment tools for frailty syndrome are numerous and vary substantially in their design and uses, it is pivotal to understand that different instruments measure frailty in different settings and comparison should not always be the ultimate goal. Apart from the great variety in each instrument design, there is also significant heterogeneity in the design of the studies based on these instruments. Therefore, future studies should be designed to properly address the discrepancy in the comparison of the existent instruments.

Overall, both PFP and FI are commonly used to assess frailty. Due to the multifactorial nature of frailty other parameters, like the functional status, eyesight, hearing, bladder control, malnutrition, risk of falls, depression, cognitive perception and interaction with the environment should also be addressed in clinical practice using specific tests and questionnaires. Frailty assessment instruments can help design health care interventions, measure outcomes, and stratify hazards. It is understood that frailty grading is important and the assessment should not be limited in predicting mortality but also to guide the implementation of new strategies in order to improve quality of life. Continuous efforts are required to further study the validity and utility of these tools. Their adaptation to a specific healthcare system is a strenuous and long lasting endeavor that demands extensive study and research to ultimately reflect the population the healthcare system serves.

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