

AMERICAN UNIVERSITY OF BEIRUT

FRAILITY IN OLDER ADULTS: A PROPOSAL FOR THE  
ADOPTION, IMPLEMENTATION AND EVALUATION OF A  
FRAILITY ASSESSMENT TOOL IN THE INPATIENT SETTING

by  
NOUR ALI ABDALLAH

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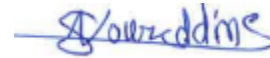
Approved by:



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Dr. Marina Gharibian, Clinical Associate Professor  
Rafic Hariri School of Nursing

First Reader



---

Dr. Samar Nouredine, Professor  
Rafic Hariri School of Nursing

Second Reader

Date of project defense: December 19, 2022

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# ABSTRACT OF THE PROJECT OF

Nour Ali Abdallah

for

Master of Science

Major: Nursing

Title: Frailty in Older Adults: A Proposal for the Adoption, Implementation and Evaluation of a Frailty Assessment Tool in the Inpatient Setting

Frailty is defined as a syndrome in the older adult population characterized by age-related disturbances in homeostasis and diminished physiological reserves and function in various systems. Frail people are at higher risk of developing health problems such as falls, depression, morbidity, mortality, and reduced quality of life. Frailty has been found to be prevalent in many countries around the world. In Lebanon, only one study was conducted regarding the prevalence of frailty, and frailty was found in 48.2% of the participants. The significance of frailty assessment is not only patient and practice directed but it also has an impact on the healthcare system. The objectives of this project are: 1) To identify a suitable frailty assessment tool that can be used in the inpatient setting and 2) to propose a plan for its implementation and evaluation in the medical-surgical units of a university medical center. The proposed plan consists of several stages using Lewin's theory of change as a framework. The literature review revealed the Edmonton Frail Scale (EFS) to be the most appropriate for use for hospitalized older adults considering its psychometric properties, appropriateness for use in acute care settings, and the context of Lebanon. This project provides the structure needed to integrate frailty assessment using the Edmonton Frailty Scale into practice. It involves an assessment of healthcare providers' knowledge about frailty, the education and training of healthcare providers about frailty and the use of the EFS, and the integration of the EFS in clinical practice. The implementation and evaluation plan for this intervention is described. The execution of this project helps identify frailty in older adults admitted to medical/surgical floors at the American University of Beirut and paves the way for the implementation of frailty management protocols to reduce adverse health outcomes and improve quality of life in older adults.

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# CHAPTER I

## INTRODUCTION

Global aging is a phenomenon that is becoming more prevalent in countries across the world (Ghusn et al., 2021). According to the United Nations, the number of people aged 65 and above was 7.3 million in 2019 and is expected to reach 1.5 billion by 2050 (Abyad & Hammami, 2021). The demographic shift towards aging is mainly due to decreased fertility rates, increased life expectancy and decreased mortality rates (Abdulrahim et al., 2015; Hussein & Ismail, 2017). In Lebanon, the percentage of older adults is already relatively high reaching 10% and is expected to double by 2050 (Hajjar et al., 2013). Consequently, the growth of the older adult population has made chronic diseases and geriatric syndromes more prevalent. An important and prevalent geriatric syndrome is frailty.

### **A. Definition of frailty**

Frailty is defined as a syndrome of the older adult population characterized by age-associated impairment in homeostasis and declines in physiologic reserves and function across the various systems (Abyad & Hammami, 2021). The decline in physiologic reserves and function renders the older adult more vulnerable to stressors (such as illness or injury), adverse health outcomes and disability (Chen et al., 2014). Frail individuals have a reduced capacity to return to their baseline health state after being exposed to a stressful event as a result of their limited functional reserves (Khan et al., 2019). It is also noteworthy that frailty is multidimensional as it



may affect many health domains such as the physical, social, spiritual and psychological among others. On another note, the frailty syndrome is manageable and may be reversible in its early stages (Abyad & Hammami, 2021). Although the theoretical definitions of frailty are similar across the literature, there is no consensus on a clinical operational definition for frailty due to the presence of multiple models and indices that are used to describe it (Tocchi, 2015). The different models for frailty will be discussed in the next chapter.

## **B. Prevalence of frailty**

The prevalence of frailty varies significantly according to the assessment model or tool used for its definition and measurement. A systematic review conducted by O’Caoimh et al. (2020) shed light on the population-based prevalence of frailty in a total of 62 countries around the globe. By geographical location and based on the Frailty index (FI) assessment tool, Africa was found to have the highest prevalence of frailty (22%), followed by the United States (17%) and lastly Europe (8%) (O’Caoimh et al., 2021). Another systematic review focusing on frailty in developing countries revealed the following prevalence: 31.4% in Brazil based on the Edmonton Frail Scale, 15% in Mexico using the Fried’s criteria, 28.9-30.8% in China, and 21.1% in Russia using the FI (Nguyen et al., 2015). In the Middle East, the pooled prevalence of frailty has been shown to be 35% (Alqahtani et al., 2022). In Lebanon, one study was conducted by Ghusn et al. (2021) that investigated the prevalence of frailty in older adults in Lebanese rural areas. The study showed a frailty prevalence of 48.2% and a pre-frailty prevalence of 13.3% among the participants based on the Fried’s frailty criteria.

### **C. Significance of frailty in Practice**

Investigators agree that frailty is a multidimensional, highly prevalent syndrome among the older adult population, but why is it important and how does it translate to clinical practice? As previously mentioned, frail individuals are at a higher risk to develop adverse health outcomes. These outcomes include falls, delirium, dementia, depression, polypharmacy, hospitalization and increased length of stay, poor quality of life, and mortality among others (Abyad & Hammami, 2021; Satake & Arai, 2020). Consequently, frailty has been shown to predict negative health outcomes (Drubbel et al., 2013). A review by Ritt et al. in 2016 highlighted the significance of frailty in predicting negative health outcomes in patients with different medical conditions including cardiac, pulmonary, kidney and liver diseases.

It is important to note that frailty assessments' ability to foresee adverse health outcomes varies not only with the medical conditions but also with the clinical settings. Frailty assessment can be used in most healthcare settings ranging from primary care to inpatient units and long-term care facilities. Several investigators discussed the utilization of frailty in the various clinical settings. Examples of the latter include: Sanchez -Garcia et al. in 2017 illustrated the use of frailty assessment in the community, Dent et al. in 2017 discussed the predictive value of frailty assessment in hospitalized patients and De Silva et al. highlighted the utilization of frailty assessment in nursing homes . The value of frailty assessment lies in its prognostic and risk stratification ability. Given that assessing frailty provides insight into the risk for and the development of adverse health outcomes of patients, it plays a major role in the clinical decision making and planning of care of frail individuals.

On another note, frailty assessment and management are highly significant at the individual level as it is associated with several negative outcomes affecting the older patient directly. Some of these outcomes and their relationships to frailty are discussed next. Starting with falls, frailty has been strongly associated with falls in both hospitalized and community-dwelling older adults (Cheng & Chang, 2017; Lan et al., 2020). The literature reveals an overlap between the risk factors of frailty and those of falls; these risk factors include muscle weakness, polypharmacy, and alteration in gait. Therefore, frailty puts the patients at a significant risk for fall which is an emerging topic when caring for older adults as it may result in serious complications such as bruises, fractures, bleeding, prolonged length of stay in the hospital and an increase in medical expenses (Lan et al., 2020).

Another adverse outcome of frailty among the older adult population is the occurrence of chronic wounds such as diabetic ulcers and pressure injuries (Jaul et al., 2018). The pathogenesis of a chronic wound or pressure injury starts with a causative factor and progresses due to the initial wound's failure to achieve the stages of healing properly. Failure to heal is associated with several factors including immobility, co-morbidity, poor perfusion, malnutrition and inflammatory and hormonal imbalances among others, which are all related to the pathophysiology and manifestations of frailty (Barry & Nugent, 2015; Ferris & Harding, 2020; Jaul et al., 2018). Therefore, frailty puts the older adult at a significant risk for developing a chronic wound and consequently suffering from its adverse outcomes including infection, pain and poor quality of life (Barry & Nugent, 2015; Ferris & Harding, 2020).

Frailty is also strongly associated with poor quality of life (QOL) in the geriatric population. Compared to sturdy individuals, frail older adults have a significantly poorer quality of life (Kojima et al., 2016). The world health organization defined quality of life as: "An

individual's perceptions of their position in life, in the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards and concerns"("The World Health Organization Quality of Life assessment (WHOQOL): position paper from the World Health Organization," 1995, p. 1405). Consequently, the term quality of life is broad in nature and integrates several domains other than the physical domain (e.g., social, psychological...). The association between frailty and QOL depends on the adopted definition of frailty. However, Kojima et al. found that even though the definition of frailty often focuses on the physical aspect, frailty was found to have an impact on the mental and psychological aspects of QOL (Kojima et al., 2016). Crocker et al. (2019) in their systematic review corroborated with the association between frailty and quality of life mentioned earlier and further established the inverse correlation between frailty and quality of life in several domains including physical, psychological and social. Further research is needed to delineate the specific causative factors of poor QOL in the context of frailty; only one study showed strong relationships between lack of energy and slowness in movement caused by frailty and poor mental state and exhaustion reflected in quality of life respectively (Mulasso et al., 2014).

In addition, frailty was found to be correlated with depressive symptoms. And frailty status has been correlated with loneliness, social isolation reduced cognitive ability, being more dependent and less able to carry out activities of daily living (ADLs) (Mulasso et al., 2016; Van der Vorst et al., 2018). Moreover, the relationship between frailty and depression is strongly documented in the literature (Mayerl et al., 2020).

#### **D. Impact of Frailty on the healthcare system**

The significance of frailty extends beyond clinical practice and patients as it also exerts significant impact on the healthcare system. Frailty has been shown to be a burden on the healthcare system in terms of human and financial resources allocation, as it greatly increases healthcare expenditures (Hoogendijk et al., 2019). The reason behind this is multifaceted and may be explained by the following. As previously discussed, frailty increases an individual's risk to develop chronic conditions that require attention ranging from clinic visits to diagnostic tests and medications among others. In addition, frailty is associated with risk of falls, disability and depression thereby increasing the need for emergency care and hospital admissions (Hoogendijk et al., 2019). Also, in case of hospitalization, frailty has been associated with an increased risk of developing complications and consequently an increased length of stay and increased readmission rates (Chi et al., 2021). According to the meta-analysis of cohort studies conducted by Chi et al. in 2021, the healthcare cost of frail individuals in the community differed by up to 32,549\$ in comparison to the healthcare costs of robust individuals over time where frail individuals had the higher cost. Moreover, apart from the acute care settings, older adults who develop weakness and exhaustion require support from others and ultimately an increased need for human resources as well (Chi et al., 2021). There are many possible trajectories for frail individuals, one of which is institutionalization in long term care facilities and palliative care centers which in turn contribute to the burden exerted on the healthcare system (Doody et al., 2022). All of these factors greatly increase the cost of health care whether it is in the acute care, community or long-term care settings.

Given the importance and impact of frailty on the healthcare system, several guidelines were developed regarding its assessment. The best practice guidelines by the British Geriatrics society,

Age UK and the Royal College of General Practitioners recommended that frailty assessment must be included in every visit between healthcare personnel and older adults in the outpatient settings. They suggested the use of the PRISMA 7 questionnaire in addition to the physical performance tests (e.g. gait speed) to identify frailty (Turner et al., 2014). In addition, the Asia-Pacific Clinical Practice Guidelines for the Management of Frailty recommended the incorporation of frailty assessment in the comprehensive geriatric assessment whenever possible, in addition to the use of a validated tool to identify frailty (Dent et al., 2017). Also, the International Conference of Frailty and Sarcopenia Research (ICFSR) group assembled a task force to establish clinical practice guidelines for the identification and management of frailty. The task force recommended that healthcare professionals assess/screen older adults for the presence of frailty using a validated instrument that preferably excludes disability in the assessment process. Older adults who are found to have frailty should undergo a more comprehensive and thorough assessment to further identify risk factors, signs and symptoms as well as the underlying mechanisms of frailty (Dent et al., 2019). All of the above-mentioned guidelines stress upon the need of frailty assessment in the different contexts therefore highlighting the importance of this project.

In summary, it is now well established that frailty is a highly common geriatric syndrome characterized by increased vulnerability to stressors and impaired homeostasis and has a remarkable significant impact in several domains being the patients, the healthcare system and clinical practice. Given the importance of frailty in the care of the geriatric population, the aim of this project is to propose a plan for the identification, adoption, implementation, and evaluation of a frailty assessment tool in the inpatient setting at the American University of Beirut Medical Center.

## CHAPTER II

### LITERATURE REVIEW

In this chapter, the pathophysiology, manifestations, and the various tools used to assess frailty are reviewed. of frailty.

#### **A. Pathophysiology of Frailty**

Several systems are involved in the pathogenesis of frailty. Evidence suggests that the neurologic, endocrine, immune and musculoskeletal systems play major roles in the development of frailty as a result of dysregulation depicted through maladaptive response to stressors (Clegg et al., 2013).

With respect to the neurologic system, although changes in the structure and physiology of the brain are normal consequences of aging, neurons that require high metabolic needs may be more affected by the dysregulated synaptic and mitochondrial function that occur with aging. Aging is also associated with changes in the microglial cells, which are the immune cells of the central nervous system. As microglial cells get activated by injury or inflammation, they become hypersensitive to minimal stimulation. As a result, the high risk for developing cognitive decline was shown to be directly proportional to the degree of frailty (Clegg et al., 2013).

Aging and frailty largely impact the endocrine system as the changes and dysregulation become apparent. The hypothalamic-pituitary axis of the brain has been proven to largely affect the pathogenesis of frailty and aging. Evidence suggests that the deficiency in glucocorticoids, insulin like growth factors (IGF-1), and androgen production along with the dysregulation in the adaptive responses of the hypothalamic pituitary axis are associated with the adverse outcomes of

frailty (Clegg & Hassan-Smith, 2018). The literature also highlights the role of Vitamin D deficiency and insulin resistance in the pathophysiology of frailty (Clegg et al., 2013). It is important to note that high levels of evening cortisol were observed in frail individuals (Chen et al., 2014). The effect of the dysregulation in the endocrine system becomes apparent through its impact on other systems. For example, muscle strength is highly dependent on IGF-1 because IGF-1 stimulates the production of myocytes, halts protein breakdown in the muscle and stimulates muscle cell hypertrophy. So, when IGF-1 is deficient, muscle mass and consequently muscle strength decline (Clegg & Hassan-Smith, 2018).

The aging process affects the immune system in several ways. With aging there is a decline in the number of stem cells, diminished phagocytic activity of macrophages, CD8 killer cells and neutrophils, in addition to an attenuated response of antibodies produced by B-cells, as well as low grade chronic inflammation and high levels of IL-6. Also, other inflammatory molecules such as C-reactive protein (CRP) and Tumor necrosis factor alpha (TNF-  $\alpha$ ) have been noted in higher than average levels in frail individuals (Chen et al., 2014). The chronic low grade inflammation contributes to the development of frailty through its impact on the different organs of the body, specifically the musculoskeletal and endocrine system, and may also affect the hematopoietic function of the bone marrow, resulting in anemia (Clegg et al., 2013).

Finally, with regards to the musculoskeletal system, there is a dysregulation between the processes of muscle formation, protein loss and hypertrophy that normally govern the muscle hemostasis (Chen et al., 2014). This dysregulation results in sarcopenia. Sarcopenia is defined as low musculoskeletal performance in the context of low muscle mass. Causes of sarcopenia in older adults are mainly insufficient use of the skeletal muscle as well as a decrease in the number of motor cells (Morley, 2016). The loss of muscle mass may be directly associated with high levels



of inflammatory markers observed in frail individuals which may be exacerbated by malnutrition and the “anorexia of aging”. Also, in addition to the role of IGF-1 in the pathogenesis of sarcopenia, low levels of testosterone were highly correlated with the onset of sarcopenia (Morley, 2016). It is noteworthy to mention that osteopenia and osteoporosis have also been shown to be associated with frailty (Chen et al., 2014; Clegg et al., 2013).

After detailing the changes that occur at the level of the neurologic, endocrine, immune, and musculoskeletal systems, it is noteworthy to mention that the etiology of the frailty syndrome is more complicated. It has been shown that diseases may have a role in the onset and development of frailty in the sense that some diseases may exacerbate the clinical picture of frailty such as in patients with chronic obstructive pulmonary disease. Also, acute exacerbation of chronic illnesses may in turn lead to the acceleration of frailty syndrome (Chen et al., 2014). Therefore, although the pathogenesis of frailty was partially explained by the changes discussed earlier, more research is needed to clearly delineate the pathway and the different factors involved in the pathogenesis of the frailty syndrome (Chen et al., 2014).

## **B. Frailty Assessment**

So far, we have attested that frailty is a geriatric clinical syndrome that is highly prevalent and impactful on the health outcomes of older adults. We have also noted the significance of frailty in different domains and its role in predicting negative health outcomes such as morbidity, mortality, poor quality of life, falls delirium, depression, increased admission rates and others. Therefore, frailty assessment is of paramount importance to be able to delay its progression and manage its consequences. Several assessment tools were proposed in the literature such as the frailty index (FI) also known as the deficit accumulation index, the physical frailty phenotype also

known as the Fried frailty phenotype (FFP) , the Edmonton frail scale (EFS), the clinical frailty scale among others (Buta et al., 2015). In the next section, the most commonly used frailty assessment scales and instruments will be described.

### ***1. Fried Frailty Phenotype***

Starting with the Frailty phenotype, this model was proposed by Fried et al. in 2001 and it represents the physiologic manifestations that frailty precipitates in an older adult. The phenotype of frailty has five major criteria and they are: unintentional weight loss, fatigue, slower gait speed, weaker handgrip strength and lower level of physical activity in comparison to other non-frail individuals (Hogan, 2018). An individual is classified as frail if he/she meets three of the five criteria and as pre-frail if he/she meets two of the five criteria. Pre-frailty is a subset that includes individuals who are at high risk of quickly developing frailty. This model differentiates between frailty and disability. Although features of disability and some of the features of frailty (such as low levels of activity, weak handgrip strength and slow gait speed) overlap, other characteristics of frailty (such as reduced resilience to stressors and the dysregulation in several organ systems) make the distinction simple. Therefore, it is safe to state that not all disabled individuals are classified as frail but many frail individuals are considered disabled (Chen et al., 2014).

The Frailty Phenotype has been widely used in the assessment of frailty in both clinical and community settings. However, it was heavily criticized for not including clinically relevant factors in the assessment (e.g. cognitive impairment) which in turn makes its scope rather narrow (Kojima et al., 2018). Another drawback of the frailty phenotype is that different scales using the Fried criteria use different classification for example weight loss is defined in one scale as a loss of 5% body weight while in another scale it is defined as loss of more than 10% (Bouillon et al., 2013).

The predictive validity of the Frailty Phenotype was heavily tested in the literature and included several outcomes such as mortality, falls and deterioration in activities of daily living (ADLs). Woods et al. in 2005 concluded that the frailty phenotype has good predictive validity with regards to mortality with a HR of 1.71 (1.48- 1.97). Fried et al. in 2001 found that the FFP has significant predictive validity of worsening ADLs with a HR of 1.79 (1.47-2.17) and a  $p < 0.0001$  as well as a significant predictive validity of falls with a HR of 2.06 (1.61-2.59) and a  $p < 0.0001$ .

## ***2. Frailty Index***

The Deficit Accumulation Model (also known as the Frailty Index) was proposed by Rockwood and Mitnitski in 2005, and as its name suggests, unlike the frailty phenotype, it conceptualizes frailty as the manifested state precipitated by the accumulation of biological deficits over the course of life. The Frailty index (FI) is the ratio of the number of deficits manifested in an older adult to the total number of deficits considered in the index. The deficits considered include comorbidities, signs, symptoms, social determinants, and others. The exact calculation of the index along with its criteria and standards differ among studies (Kojima et al., 2018). However, for a factor to be classified as a deficit, it needs to meet several criteria. The criteria state that the factor needs to be acquired not innate, associated with advancing age, associated with undesirable outcome and should not be too prevalent, for if a symptom is present in almost all older adults, it would not provide useful information regarding frailty and therefore cannot be placed in the index (e.g. nocturia) (Chen et al., 2014). The frailty index has been used extensively primarily in hospital and research settings (Theou et al., 2018).

In comparison to the frailty phenotype, the FI seems to provide more accurate data in the prediction of adverse health events resulting from the diseases and conditions included in the index. However, unlike the frailty phenotype, the distinction between frailty and disability is not apparent in the FI. Contrary to the frailty phenotype, in the FI, disability is placed under the umbrella of the considered deficits. Criticism of the FI includes the notion that the accumulation of deficits is not enough to constitute a syndrome defined as a series of signs and symptoms but instead may be classified as a “state variable” (Rockwood & Mitnitski, 2007). Therefore, the FI does not allow for further exploration of the etiology underlying frailty (Chen et al., 2014). Both the FI and the FFP were heavily tested for their validity but not for their reliability; both FI and FFP were found to have good predictive validity (Bouillon et al., 2013). The concurrent validity with respect to the association between the frailty index and dependence in ADLs and IADLs was documented in a study done in 2009 by Cigolle et al. where p value was consistently significant (p value < 0.001) using the chi square test.

### ***3. The Edmonton Frail Scale***

Another tool for the assessment of Frailty is the Edmonton Frail scale (appendix 1). The Edmonton frail scale (EFS) was first presented by Rolfson in 2000 in the Canadian city of Edmonton. The EFS is a multidimensional tool that adopts the bio-psychosocial model of health and assesses nine different domains in both the hospital setting and the community settings. These domains are: nutrition, polypharmacy, functional independence, continence, cognition, general health status, social support, mood and functional performance (Perna et al., 2017). The assessments of the domains are self-reported except for cognition and functional performance where the clock drawing test and the “get up and go” test are used respectively. Each component

is given a score and then a cumulative score is calculated; the higher the cumulative score the more frail is the individual. According to the EFS individuals are classified into categories ranging from severely frail, to non-frail. The advantages of the EFS include: it does not require special training for its administration and takes less than five minutes to complete (Perna et al., 2017).

The validity and reliability of the Edmonton Frail scale were published by Rolfson et al. in 2006. The internal consistency of the EFS was found to be equal to 0.62 using Cronbach's alpha coefficient and the inter-rater reliability illustrated by the kappa coefficient was found to be 0.77 ( $p = 0.0001$ ) (Rolfson et al., 2006). The EFS's predictive validity of mortality was documented by Armstrong et al. in 2010 (HR = 2.49 with a CI of (2.32-2.68)). The concurrent validity of the EFS with respect to depression was tested by Chang et al. in 2011 where the association was found to be statistically significant with a  $p$  value of  $< 0.0001$ . Also, the EFS's construct validity in relation to the Barthel index of ADL was found to be significant ( $P = 0.006$ ) (Rolfson et al., 2006). It is noteworthy to mention that unlike the FFP and the FI, the EFS takes into account the social domain thus extending the definition of frailty beyond its physical manifestations (Rolfson et al., 2006).

Several modifications have been proposed for the EFS. Hilmer in 2009 criticized the performance-based measures of the EFS claiming that in the acute care setting, the performance-based measures may assess the impact of the acute illness on the patient rather than the underlying frailty. Consequently, he proposed and tested the "Reported Edmonton frail scale (REFS)" (appendix 2) (Hilmer et al., 2009). In the Reported Edmonton Frail scale, the performance-based measure (the get up and go test) was replaced with subjective questions that reflect the participant's physical performance. In that study the REFS was found to be reliable in the Australian population only therefore its reliability in other populations may not be asserted. In addition, it is important

to note that the REFS may be affected by recall bias, respondent bias and interview bias (Hilmer et al., 2009).

Another modification to the EFS was proposed by Rose et al. in 2018 where the cognition component of the scale was tackled. In that study, it was argued that many patients in the acute setting are unable to undergo the clock draw test for many reasons such as physical impairment, psychiatric disorders, visual/auditory problems, impaired dexterity, low education and literacy levels, among others (Rose et al., 2018). Therefore, they suggested an alternative method to assess cognition. They created a new scale called the Modified Reported Edmonton Frail Scale (mod-REFS) in which they replaced the clock drawing test with subjective questions to assess cognition (Appendix 3). They concluded that the REFS and the mod-REFS are equivalent and thus the mod-REFS may be used in situations where the clock drawing test cannot be administered (Rose et al., 2018).

#### ***4. Clinical Frailty Scale***

The clinical frailty scale (CFS) uses a different approach for the assessment of frailty (appendix 4). Unlike the FI, FFP and EFS, the CFS is a judgment-based frailty assessment tool. It is described as judgement based because it combines objective findings with clinical judgement when classifying frailty. It focuses on several domains that include cognitive ability, function, and comorbidity. A score is generated ranging from one to nine; one being very fit and nine being terminally ill. The CFS has been extensively used in hospital settings, especially in emergency departments but has been applied in the community setting as well. While examining the predictive validity of the CFS, its score was found to be significantly associated with several adverse outcomes including mortality, multi-morbidity, cognitive deterioration and functional

dependence (Church et al., 2020). Kaeppeli et al. conducted a study in 2020 to test the validity of the CFS in the prediction of mortality, ICU admission and hospitalization in the emergency department. The CFS was found to be predictive of all three outcomes: mortality with a HR of 12.3 (CI 7.46-20.27), ICU admission with an OR of 3.73 (CI 2.57-5.37) and hospitalization with an OR of 3.75 (CI 2.73-5). The CFS also had good interrater reliability with Cohen's Kappa of 0.74 (CI 0.64-0.85) (Kaeppeli et al., 2020).

Several other frailty assessment tools are found in the literature. Tools focusing on community dwelling older adults include the self-reported tools (which are the Tilburg frailty indicator (TFI) and the PRISMA-7 questionnaire), the G erontop ole Frailty Screening Tool (GFST) and Groningen Frailty Indicator (GFI) among others. Other frailty assessment tools used for hospitalized patients include the Multidimensional Prognostic Instrument (MPI) and the frailty index derived from comprehensive geriatric assessment (FI-CGA) among others (Dent et al., 2016). These tools have not been tested enough and are very similar to the ones described above.

The choice of frailty assessment tool for this project is based on the available literature as well on the professional opinions of the geriatric experts at the American University of Beirut Medical Center. Based on the available literature and the expert opinion of Dr. Nazem Bassil, the original Edmonton frail scale (EFS) will be adopted as the frailty assessment tool for this project (refer to appendix 1). The EFS was chosen because it is a valid and reliable tool that has been extensively used in the inpatient setting; it is also simple and brief.

## CHAPTER III

### PROPOSED IMPLEMENTATION PLAN

In this chapter, the proposed plan for the integration and implementation of frailty assessment for older adults aged 65 and above in the medical surgical units of the American University of Beirut Medical Center in Lebanon is discussed. The implementation of this plan will be based on Kurt Lewin's theory of change.

#### **A. Theoretical Framework**

The aim of this project is to propose a plan for the integration and implementation of frailty assessment in the inpatient unit of a hospital. Therefore, in this case the change would be the introduction of frailty assessment into practice. This frailty assessment plan will be based on Kurt Lewin's organization theory of change. This framework provides the necessary scaffold to establish an implementation plan for the intended target. Kurt Lewin created his model of change in 1951 after World War II when he studied how individuals change their diets. Lewin views change as a dynamic balance between positive forces for change also called as 'driving forces' and obstacles to change called 'restraining forces' that typically contradict each other within an organization (figure 1) (White, 2021).



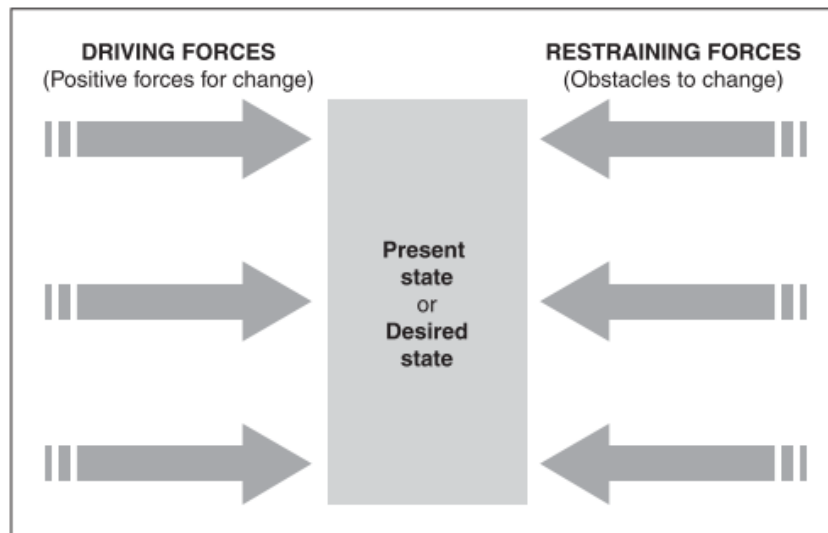


Figure 1: Lewin's force field analysis

Source: White, K. M. D.-B., S. Terhaar, M. F. (2021). *Translation of Evidence Into Nursing and Healthcare* (Third Edition ed.). Springer Publishing Company. <https://doi.org/10.1891/9780826147370>

Lewin's model of change consists of three stages: unfreezing, moving, and refreezing respectively. The first stage (unfreezing) involves a change agent identifying the problem, the need for change and directing others to appreciate the value of change. This stage may involve conducting an assessment of existing gaps between the current and desired conditions, selecting an action plan and preparing for its implementation (Shirey, 2013). The first stage is achieved by increasing the driving forces and decreasing the obstacles to change (White, 2021).

The second stage (moving) involves the move to the new state of equilibrium; it is the stage during which the change is implemented. During moving, a thorough and detailed action plan and

engagement of individuals are needed to successfully transition to the new state. The word “transition” is used to refer to change as a process not an event. It’s noteworthy to mention that during this stage continuous support and communication are needed to keep the focus on the intended target (Shirey, 2013). The third stage (refreezing) is the stage during which the change or the new improved reality is sustained, the change is embedded into the existing system and translated into practice (Shirey, 2013; White, 2021). Lewin’s theory has been criticized for being linear as change is often complex and unpredictable; however it is still widely used as a model for organizational change because it simple, clear and suitable for the integration of change in organizations (Wagner, 2018). Figure 2 illustrates Lewin’s model of change.

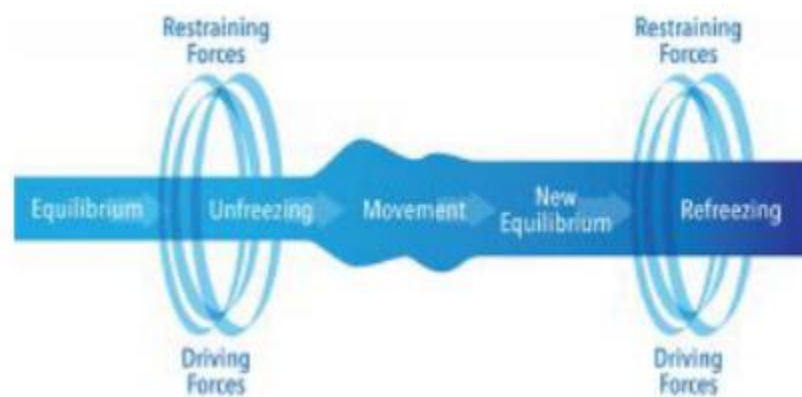


Figure 2: Lewin’s model of change

Source: Wagner, J. (2018). *Leadership and Influencing Change in Nursing*. University of Regina Press.

## B. Description of the Plan

### 1. Target Population

The target population of this frailty assessment intervention will be older adults aged 65 and above admitted to the medical surgical units of the American University of Beirut Medical Center (AUBMC). Although older adults are found in various units in the hospital such as critical

care and the emergency department, this intervention in this project will be limited to medical surgical units only to pilot test the intervention on a relatively small scale.

AUBMC was chosen for the following reasons: (1) AUBMC is one of the largest medical centers in the country with a bed capacity exceeding 350 beds allowing for a large patient pool; (2) AUBMC is a part of the American University of Beirut (AUB), so we are granted access to statistical data and patient information after obtaining the necessary approvals.

## ***2. Goals and objectives***

This frailty assessment intervention has two main goals that are sought through the achievement of many corresponding objectives, and they are follows.

- Goal 1: The recruited healthcare personnel will exhibit increased knowledge about the frailty syndrome and its impact on older adults.
  - Objectives of goal 1:
    - 1.1 By the end of the second month of the plan's initiation, all recruited personnel will have attended the program's educational sessions followed by simulation labs, which will be facilitated by the clinical educators and provided on two different days per week over a period of 2 months.
    - 1.2 By the end of the educational sessions, all recruited personnel will be knowledgeable about the chosen frailty assessment tool and proficient in its administration.
- Goal 2: Frailty assessment using the chosen tool will be administered upon the admission of all older adult patients to the medical surgical units of AUBMC.
  - Objectives of goal 2:

2.1 Within the first four months of the project's initiation, the necessary support and guidance regarding frailty assessment will be provided to at least 85% of the recruited personnel through regular rounds to the units, brief interviews, and the availability of guidance on-demand.

2.2 By the end of the first year of the project's initiation, at least 80% of older adults admitted to the medical surgical units of AUBMC will have been assessed for frailty using the chosen assessment tool by trained personnel.

Based on the goals and objectives stated above, this frailty assessment plan will be composed of several steps and stages. The description of the strategies used is detailed below.

### ***3. Description of Intervention strategies***

As a first step, a proposal will be sent to AUBMC's administration and the clinical and professional development center (CPDC) for approval. Once approval is obtained, the following steps will be followed:

- Establishing a taskforce to organize the implementation process.
- Training a group of staff from the Clinical and Professional development Center (CPDC) who will take the lead in moderating the educational sessions to the rest of the involved personnel.
- Pilot testing the proposed frailty assessment plan in one of the medical surgical units of AUBMC.
- Evaluating the pilot program by soliciting feedback from the nurses and making the necessary modifications according to compiled data.

After the education of the CPDC staff, the next step would be to identify the registered nurses who will be involved in this intervention and to assess their knowledge about frailty. For this purpose, a list of the registered nurses employed on the medical surgical units of AUBMC will be obtained from the human resources department and a brief questionnaire will be sent to them via their institutional emails to assess their knowledge (appendix 5). The pretest is based on a series of questions used to assess nurse's opinions and knowledge of frailty in a study done by Gobbens et al. in 2022. The units' nurse managers will be asked to encourage their staff to fill the pretest online. The questionnaire will include questions related to general knowledge about frailty to identify the existing gaps.

Once the registered nurses fill the pre-tests, analysis of data will follow, gaps will be identified, and educational sessions will be designed accordingly. The staff's training in frailty assessment will be composed of two main stages: theoretical stage and practical stage. The theoretical component of the training will include didactic sessions providing general knowledge about frailty syndrome, its different components, its impact on older adults and a brief overview of possible measures for its management. In addition, the chosen frailty assessment tool will be explained in detail.

After the theoretical component of the training is successfully completed, the practical component will be initiated. Staff who successfully completed their theoretical sessions will be invited to a simulation lab to practice the administration of the Edmonton frail scale. Upon the completion of the training, both theoretical and practical, frailty assessment using the EFS will be initiated at the units' level for all older adults aged 65 and above whenever is possible based on the patient's condition. The recruited nurses will be followed up and supported throughout all stages of the project.

The pathway that this project will follow has been set (*refer to appendix 6*) and the details of each step are explained as follows:

- Educational sessions (theory): Participants will be presented with interactive sessions to increase their knowledge and awareness regarding frailty syndrome. The content of theoretical sessions will cover the definition of frailty syndrome, its various components, its significance for clinical practice, patients and system, a brief overview of management measures, and a detailed explanation of the EFS. The information included in the educational sessions will be a compilation adopted from the most recent literature about frailty and compiled in collaboration of the CPDC. The educators of the CPDC will conduct the sessions at AUBMC auditorium after obtaining permission from the administration. The schedule of the sessions will consider the nurses' changes in shifts whereby one session will be provided in the early morning and the other in the afternoon allowing staff rotating in both shifts to attend. The sessions will be provided twice per week to allow for flexibility in scheduling. Each participant will be provided access to a Moodle course that contains all the information discussed in the sessions. Each educational session lasts around 40 minutes, takes place at AUBMC's auditorium, and moderated by one or two CPDC educators. Each session may accommodate up to 20 participants. Upon the completion of the theoretical sessions, participants will be required to complete the same knowledge test again.
- Educational sessions (practice): After the successful completion of the theoretical component of the training, participants will be invited to a simulation lab at the Hariri School of Nursing to practice the administration of the EFS. Each session will include a scenario during which the registered nurse will be asked to administer the EFS on a

volunteer. The simulation lab will be moderated by CPDC staff after which debriefing will be done and feedback will be provided. Each simulation lab may accommodate two groups, each group consisting of four participants. Simulation labs are expected to last between 60 to 80 minutes. Like the theoretical sessions, sim labs will take place during two different timeslots several days per week to allow for flexible scheduling.

- Integration of EFS in AUB health: During the training of the staff, the information technology department will be contacted and requested to integrate the EFS in the health information system for easy access and documentation of findings. Moreover, once the patient assessment interface is modified, a video tutorial may be sent to the nurses involved to introduce them to the changes in EPIC and facilitate its use.
- Follow up: After the initiation of the intervention continuous guidance and follow-up will be provided to the registered nurses involved. Regular scheduled rounds on the units will take place on different shifts to support the nurses. Clinical educators may shadow nurses during frailty assessment to make sure that it is being completed adequately. Regular medical records check will take place to make sure that frailty assessments is being documented properly. Guidance and support will be available on-demand any time during working hours where nurses may page educators for any inquiries or questions. Follow up may last up to one year after the initiation of the intervention.

The proposed plan targets several components including the recruited personnel's knowledge as well as their assessments of older adults. The relationship between the proposed plan and the adopted theoretical model is discussed next.

#### ***4. The interventions and the underlying theory of change***

As previously mentioned, the theory underpinning this project is Kurt Lewin's theory of change and the steps followed in this plan are compatible with Kurt Lewin's three step model of change. In the unfreezing stage, gaps are identified and preparations for change are initiated. In this stage, the preliminary questionnaire to assess knowledge and the subsequent educational sessions are taking place. At the same time, preparations at the level of the information system are occurring as the EFS is being integrated into AUB Health. In the second stage, frailty assessment is initiated by the registered nurses in the medical surgical units, supported by the clinical educators. In the last stage, supporting mechanisms are withdrawn gradually as the established change will become part of the hospital's policy and standard practice. This stage typically occurs after one year of project initiation when nurses are proficient in the administration of the EFS, and frailty assessment is being done on most older adults admitted to the medical surgical units of AUBMC.

#### ***5. Challenges***

We expect to face certain challenges in the implementation of this project. The first one may be nurses' unwillingness to carry out the program as they may be burned out and overworked and this program requires a fair amount of commitment time. This limitation may be overcome by providing some sort of incentive e.g., financial bonuses. Another difficulty that may arise is the patients' unwillingness to undergo frailty assessment as it requires the older adult to carry out tasks such as the get up and go test and the clock



drawing test. Also, some older adults may be incapable of doing the EFS due to several reasons such as mental incapacitation (e.g., dementia) which may result in reduced number of participants in the project.

## CHAPTER IV

### EVALUATION PLAN

The evaluation of this program will be focused on both the process and the outcomes based on the objectives set earlier and they are as follows.

In reference to objectives of goal 1:

- ✓ Process indicators: number of registered nurses attending both the theoretical and practical educational sessions out of those recruited to the program and the number of sessions delivered.
- ✓ Outcome indicators: The proportion of nurses who exhibit increased knowledge about frailty during the sessions and through the completion of the Moodle based quiz at baseline and after receiving the training.

In reference to objectives of goal 2:

- ✓ Process indicators: number of rounds done by the clinical educators with the registered nurses on medical surgical units.
- ✓ Outcome indicators: number of eligible older adult patients on whom frailty assessment was done and documented on the electronic health record out of all eligible patients.

As for the team running the pilot program, the process and outcome indicators for their performance are as follows:

- ✓ Process indicator: number of sessions delivered, number of meetings held and number of follow-ups per participant.

- ✓ Outcome indicator: result analysis of post-test participants' understanding of educational sessions delivered and participants' satisfaction with them.

Based on the process and outcomes detailed above the evaluation of the pilot program will focus on two main components: the nurses' knowledge about frailty and their proficiency in frailty assessment and the implementation of frailty assessment on the older adults admitted to the medical surgical units of AUBMC. For nurses' knowledge, the pre-test post-test evaluation design will be used where the nurses will be requested to complete a post-test to assess their newfound knowledge and thus assess the effectiveness of the educational sessions. As for the second component, rounds will be done to assess the efficiency of the frailty assessments using the EFS and medical record reviews will be done to assess proper documentation of findings. The data gathered regarding frailty in older adults may pave the way for further interventions such as integrating frailty management and prevention plans, integrating frailty in the decision-making process, and using it as a risk stratification tool for older adults during the course of hospitalization.

After the pilot program is implemented and evaluated, the same process will be followed whereby the program will be extended to other medical surgical units after it is revised based on the feedback obtained from the pilot unit.

Long term evaluation of this program shall include retrospective and prospective studies regarding the outcomes of older adults (mortality, falls, etc...) before and after implementation of frailty assessment and related interventions to document changes in the prognosis of this patient population.

## CHAPTER V

### CONCLUSION

In conclusion, frailty is a geriatric syndrome that is highly prevalent and of paramount clinical importance. The pathogenesis of frailty is complex and multifactorial in nature. Frailty assessment can be used as a risk stratification tool, and a predictor for adverse health outcomes for older adults. Several frailty assessment tools are featured in the literature; the most prominent ones include Fried's frailty phenotype, Frailty index, the clinical frailty scale, and the Edmonton frail scale. In this project a plan for the identification, adoption, implementation and evaluation of a frailty assessment tool (the Edmonton Frail Scale) in the inpatient setting of a medical center was presented. The integration of frailty assessment in the inpatient setting is highly recommended for its identification and management as they may contribute to health promotion, decreased morbidity and mortality and improved quality of life of geriatric patients. Also, these effects will translate to lower health care costs for the institution.

## APPENDIX I

### **Edmonton Frail Scale (EFS)**

**Scoring:** The EFS score ranges from zero to 17 points. Severe Frailty is defined as a score of 12-17 possible points; apparent vulnerability is a score of 6-11 points; and non-frail is a score of 5 or less points.

<b>Frailty Criterion</b>	<b>Definition</b>
<b>Cognition</b>	<p>Clock Drawing Test: place numbers the correct positions on a pre-drawn circle, and place hands to indicate the time of 'ten after eleven'</p> <ul style="list-style-type: none"> <li>• 0 points if no errors</li> <li>• 1 point if minor spacing errors</li> <li>• 2 points if other errors</li> </ul>
<b>General Health Status</b>	<p>"In the past year, how many times have you been admitted to a hospital?"</p> <ul style="list-style-type: none"> <li>• 0 points if 0</li> <li>• 1 point is 1-2</li> <li>• 2 points if &gt;2</li> </ul>
	<p>"In general, how would you describe your health?"</p> <ul style="list-style-type: none"> <li>• 0 points if 'Excellent', 'Very Good', or 'Good'</li> <li>• 1 point if 'Fair'</li> <li>• 2 points if 'Poor'</li> </ul>
<b>Functional Independence</b>	<p>"With how many of the following activities do you require help? (meal preparation, shopping, transportation, telephone, housekeeping, laundry, managing money, taking medications)"</p> <ul style="list-style-type: none"> <li>• 0 points if 0-1</li> <li>• 1 point is 2-4</li> <li>• 2 points if 5-8</li> </ul>
<b>Social Support</b>	<p>"When you need help, can you count on someone who is willing and able to meet your needs?"</p> <ul style="list-style-type: none"> <li>• 0 points if 'Always'</li> <li>• 1 point if 'Sometimes'</li> <li>• 2 points if 'Never'</li> </ul>
<b>Medication Use</b>	<p>"Do you use five or more different prescription medications on a regular basis?"</p> <ul style="list-style-type: none"> <li>• 0 points if 'No'</li> <li>• 1 point if 'Yes'</li> </ul>
	<p>"At times, do you forget to take your prescription medications?"</p> <ul style="list-style-type: none"> <li>• 0 points if 'No'</li> <li>• 1 point if 'Yes'</li> </ul>
<b>Nutrition</b>	<p>"Have you recently lost weight such that your clothing has become looser?"</p> <ul style="list-style-type: none"> <li>• 0 points if 'No'</li> <li>• 1 point if 'Yes'</li> </ul>
<b>Mood</b>	<p>"Do you often feel sad or depressed?"</p> <ul style="list-style-type: none"> <li>• 0 points if 'No'</li> <li>• 1 point if 'Yes'</li> </ul>
<b>Continence</b>	<p>"Do you have a problem with losing control of urine when you don't want to?"</p> <ul style="list-style-type: none"> <li>• 0 points if 'No'</li> <li>• 1 point if 'Yes'</li> </ul>
<b>Function Performance (balance and mobility)</b>	<p>Timed Up and Go test: "sit in this chair with your back and arms resting. Then, when I say 'GO', please stand up and walk at a safe and comfortable pace to the mark on the floor (approximately 3m away), return to the chair and sit down"</p> <ul style="list-style-type: none"> <li>• 0 points if completed in 0-10 seconds</li> <li>• 1 point if completed in 11-20 seconds</li> <li>• 2 points if completed in &gt;20 seconds, or if the person is not willing or if they require assistance.</li> </ul>

## APPENDIX II

### The Reported Edmonton Frail Scale (REFS)

Frailty Domain	Item	0 Point	1 Point	2 Points
Cognition	Please imagine this pre-drawn circle is a clock. I would like you to place the numbers in the correct positions then place the hands to indicate a time of 'ten after eleven'.	No errors	Minor spacing errors	Other errors
General Health Status	In the past year, how many times have you been admitted to a hospital?	0	1-2	≥ 2
	In general, how would you describe your health?	Excellent/ very good/good	fair	poor
Functional Independence	With how many of the following activities do you require help? Meal preparation, shopping, transportation, telephone, housekeeping, taking medication, managing money, laundry.	0-1	2-4	5-8
Social Support	When you need help, can you count on someone who is willing and able to meet your needs?	Always	Sometimes	never
Medication Use	Do you use five or more prescription medications on a regular basis?	No	Yes	
	At times, do you forget to take your prescription medications?	No	Yes	
Nutrition	Have you recently lost weight such that your clothes have become looser?	No	Yes	
Mood	Do you often feel sad or depressed?	No	Yes	
Continence	Do you have a problem with losing control of urine when you do not want to	No	Yes	
Self-Reported Performance	Two weeks ago, were you able to (1) Do heavy work around the house such as washing windows, walls, or floors without help?	Yes	No	
	(2) Walk up- and downstairs to the second floor without help?	Yes	No	
	(3) Walk 1 km without help?	Yes	No	
Scoring the Reported Edmonton Frail Scale (-/18): Not frail (0-5) Apparently vulnerable (6-7) Mild frailty (8-9) Moderate frailty (10-11) Severe frailty (12-18)				

## APPENDIX III

### The modified Reported Edmonton Frail Scale (mod-REFS)

Frailty Domain	Item	0 Point	1 Point	2 Points
Cognition	(1) No history of cognitive impairment	Yes	No	No
	(2) Is a cognitive impairment suspected?	No	Yes	No
	(3) is there a known history of cognitive impairment	No	No	Yes
General Health Status	In the past year, how many times have you been admitted to a hospital?	0	1-2	$\geq 2$
	In general, how would you describe your health?	Excellent/ very good/good	fair	poor
Functional Independence	With how many of the following activities do you require help? Meal preparation, shopping, transportation, telephone, housekeeping, taking medication, managing money, laundry.	0-1	2-4	5-8
Social Support	When you need help, can you count on someone who is willing and able to meet your needs?	Always	Sometimes	never
Medication Use	Do you use five or more prescription medications on a regular basis?	No	Yes	
	At times, do you forget to take your prescription medications?	No	Yes	
Nutrition	Have you recently lost weight such that your clothes have become looser?	No	Yes	
Mood	Do you often feel sad or depressed?	No	Yes	
Continence	Do you have a problem with losing control of urine when you do not want to	No	Yes	
Self-Reported Performance	Two weeks ago, were you able to (1) Do heavy work around the house such as washing windows, walls, or floors without help?	Yes	No	
	(2) Walk up- and downstairs to the second floor without help?	Yes	No	
	(3) Walk 1 km without help?	Yes	No	
Scoring the Reported Edmonton Frail Scale (-/18): Not frail (0-5) Apparently vulnerable (6-7) Mild frailty (8-9) Moderate frailty (10-11) Severe frailty (12-18)				

## APPENDIX IV

### Clinical Frailty Scale\*



**1 Very Fit** – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.



**2 Well** – People who have **no active disease symptoms** but are less fit than category 1. Often, they exercise or are very **active occasionally**, e.g. seasonally.



**3 Managing Well** – People whose **medical problems are well controlled**, but are **not regularly active** beyond routine walking.



**4 Vulnerable** – While **not dependent** on others for daily help, often **symptoms limit activities**. A common complaint is being “slowed up”, and/or being tired during the day.



**5 Mildly Frail** – These people often have **more evident slowing**, and need help in **high order IADLs** (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.



**6 Moderately Frail** – People need help with **all outside activities** and with **keeping house**. Inside, they often have problems with stairs and need **help with bathing** and might need minimal assistance (cuing, standby) with dressing.



**7 Severely Frail** – **Completely dependent for personal care**, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~ 6 months).



**8 Very Severely Frail** – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.



**9. Terminally Ill** - Approaching the end of life. This category applies to people with **a life expectancy <6 months**, who are **not otherwise evidently frail**.

#### Scoring frailty in people with dementia

The degree of frailty corresponds to the degree of dementia. Common **symptoms in mild dementia** include forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.

In **moderate dementia**, recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting.

In **severe dementia**, they cannot do personal care without help.

\* 1. Canadian Study on Health & Aging, Revised 2008.  
2. K. Rockwood et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005;173:489-495.

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## APPENDIX V

### Frailty Questionnaire

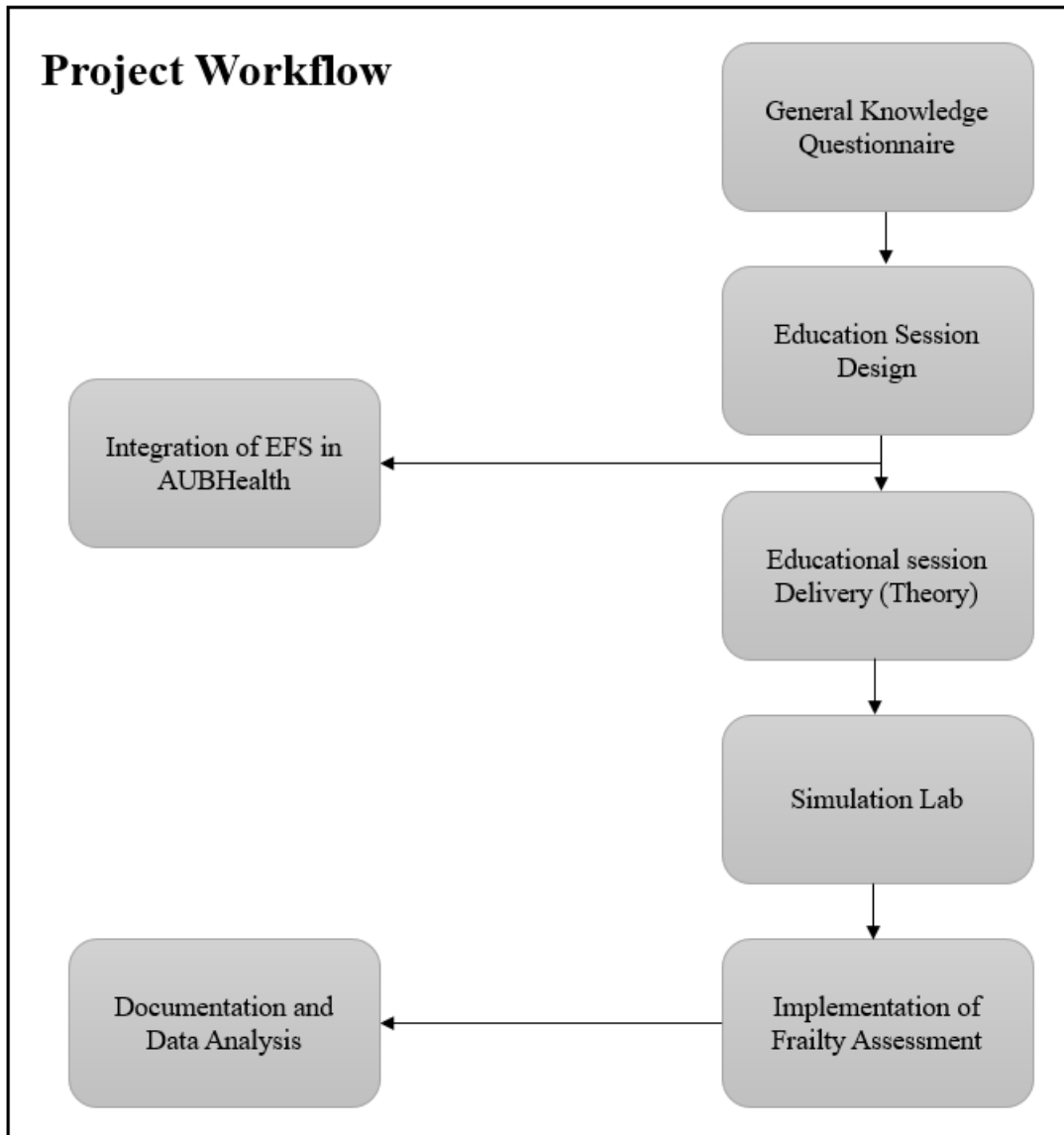
#### A. Demographics

1. Gender:  Male  Female
2. Age category in years:  
 20 – 30       30 – 40       40 – 50       50 – 60       > 60
3. Years of experience:  
 < 5       5 – 10       10 – 15       15 – 20       > 20
4. Please specify your highest level of education: \_\_\_\_\_
5. Please specify your position in your place of employment: \_\_\_\_\_
6. Area of Employment  
 Medical – Surgical Unit     Critical Care unit     Ambulatory unit     Other: \_\_\_\_\_

#### B. Frailty

1. Please choose the keywords that you most relate to the term “frailty”: *(Select all that applies)*  
 Physical decline     Advanced Age     Cognitive impairment     Depression  
 Disability     Dependence in performing ADLs     Chronic disease     Other: \_\_\_\_\_
2. Which of the following domains do you think frailty belongs to? *(Select all that applies)*  
 Physical                       Social                       Environmental  
 Cognitive                       Psychological               Spiritual                       Other: \_\_\_\_\_
3. What do you think may cause frailty? *(Select all that applies)*  
 Memory impairment                       Co-morbidity                       Lack of mobility  
 Polypharmacy                       Poor nutrition                       Other: \_\_\_\_\_
4. What are possible effects of frailty? *(Select all that applies)*  
 Poor quality of life                       Falls                       Depression  
 Mortality                       Social isolation                       Memory problems  
 Weakness                       Hospitalization                       Hospital admission     Other: \_\_\_\_\_
5. Do you think frailty is preventable?  Yes     No  
    5.1 If the answer to question 5 is yes, what do you think may prevent frailty?  
    \_\_\_\_\_
6. Do you think frailty is reversible?  Yes     No  
    6.1 If the answer to question 6 is yes, what do you think may improve frailty?  
    \_\_\_\_\_

## APPENDIX VI



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