

Prevalence of Functional Impairment among Frail Elderly
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Abstract

Background

Frailty is a state of vulnerability describes a syndrome characterized by progressive multi system decline, loss of physiologic reserve, and increase vulnerability to disease and death. Frailty has emerged as a condition associated with an increased risk of functional decline among the elderly population, which may be differentiated from aging, disability, and comorbidity.

Objectives: The aim of this study is to assess the prevalence of functional impairment and cognitive functions among frail elderly.

Methods:We examined104 frail elderly. Frailty criteria included unintentional weight loss, exhaustion, weakness, low physical activity, and slow walking speed. physical function was assessed using Activities of daily living (ADL) and Instrumental activities of daily living (IADL). The cognitive function was assessed using the Mini-Mental State Examination (MMSE).

Results:The mean age of the studied population was 69 years, 53.85% were males, 46.15% were females, the majority of our participants were illiterates (89.4%), and were living with family (84.62%), only 6.73% were smokers. 36.5% of frail participants were assisted in activity of daily living (ADL) and 7.7% were dependents, while 63.5% were assisted in instrumental activity of daily living (IADL) and 8.7% were dependents; the sample participants in general had borderline scores for MMSE, indicating a cognitive performance in the lower normal range.

Conclusions

Frail elderly had low normal score on MMSE, and high prevalence of functional impairment.

KEYWORDS: Frailty– prevalence– Functional impairment –ADL – IADL – MMSE.

Introduction

The frailty defined as a syndrome of decreased resiliency and physiologic reserves, in which a mutually exacerbating cycle of declines across multiple systems results in negative energy balance, sarcopenia, and diminished strength and tolerance for exertion. The physical phenotype of frailty composed of5 measurable domains (exhaustion, weight loss, weak grip strength, slow walking speed, and low energy expenditure) ⁽¹⁾.

Some studies view frailty in a broader sense as they included cognitive impairment and psychosocial dimensions in their assessment for frailty ^(2,3).

Frailty has emerged as a condition associated with an increased risk of functional decline among the elderly

population, which may be differentiated from aging, disability, and comorbidity⁽⁴⁾.

Functional decline can be defined as a new loss of independence in self-care activities, measured on an activities of daily living (ADL) scale (e.g. bathing, dressing, transferring from bed to chair, using the toilet) and/or on an instrumental activities of daily living (IADL) scale (e.g. shopping, housekeeping, preparing meals ⁽⁵⁾.

Assessment of functional impairment among the elderly is very important as early screening for functional impairment may help in reducing secondary morbidity such as reactive depression, and effective counseling and advice can be given to carers of the elderly

targeted specific area of impairment, which may vary from person to person⁽⁶⁾.

The prevalence of functional impairment among Brazilian frail elderly was 9.5% in the 60–69 years old group; 18.9% in 70–79 years old group; 36.8% in 80–89 years old group 61.3% in 90–99 years old group⁽⁷⁾. Another study conducted in Malaysia, on a sample of 260 elderly aged above 60 found that the prevalence of functional impairment was 33.5%⁽⁶⁾.

The aim of this study was to assess the prevalence of functional impairment and cognitive functions among frail elderly attending inpatients wards of Ain Shams University Hospital.

Methodology:

Across section observational study was conducted to assess the prevalence of functional decline and cognitive functions among frail elderly.

Subjects:

Inclusion criteria:

The study sample comprised 104 participants aged 60 years and above. They were recruited from the inpatients wards of Ain Shams University Hospital from march 2012 to December 2012. All diagnosed as frail by modified Fried criteria⁽⁶⁾.

Exclusion criteria:

1. Those with a history of stroke, Parkinson's disease, or severe cognitive impairment (Mini-Mental State exam score <18), and those taking medication which impair the ability to perform the measures used to define frailty status.

2. Participants with history of heart diseases (symptom of heart failure or history of myocardial function).

3. Any patient who refused to participate in the study.

B) Methods:-

After taking informed consent all participants were subjected to:-

1-Comprehensive geriatric assessment:

- Detailed history and physical examination.

- Functional assessment on admission Using:

1-Activities of daily living (ADL)⁽⁹⁾.

Basic activities of Daily Living" (ADL) scale is a practical and useful scale to

assess the ability of the patient to complete basic self-care tasks (e.g. bathing- dressing-toileting- transfer -continence and feeding).

Participants were scored yes/no for independence in each of the six functions. A score of 6 indicates full function, 4 indicates moderate impairment (i.e. assisted), and 2 or less indicates that the patient is dependent. An Arabic version of the test was applied⁽¹⁰⁾.

2-Instrumental activities of daily living (IADL)⁽¹¹⁾

IADL scale is used to assess the deficits in the performance of the patients' everyday activities and it is composed of 8 items: telephone usage, shopping, food preparation, housekeeping, laundry, mode of transportation, responsibility for own medications and managing finances. The score rang from 0 (low functioning=dependent) to 8 (high functioning=independent). Assisted in IADL was defined as needing help with ≥ 1 activities. An Arabic version of the test was applied⁽¹²⁾.

▪ Cognitive assessment:

This was done by Mini-mental status examination (MMSE)⁽¹³⁾

2-Frality assessment:

In the current study, frailty was diagnosed using modified Fried criteria⁽⁸⁾. All five components from the original phenotype were retained for this study; however, the metrics used to characterize the frailty criteria were slightly different as follows:

- Shrinking: Participants who had recent unintentional weight loss of ≥ 3 kg in the prior year and/or had a body mass index < 21 kg/m² were considered to be frail for this component.
- Poor endurance and energy: As indicated by self-report of exhaustion, identified by two questions from the Center for Epidemiological Studies-Depression scale [CES-D (22)]⁽¹⁴⁾: Participants were asked: "How often, in the last week, did you feel that everything you did was an effort? And "How often, in the last week, did you feel that could not get going? 0=rarely or none of the time; 1=some or a little of the time; 2=a moderate amount of the time; or 3=most of the time. Participants answering

“2” or “3” to either of these questions were considered as frail by exhaustion.

- **Slowness:** Meets criteria for frailty if time to walk 6m was > 8 seconds for height <173 cm or > 7 seconds for height >173 cm in males, and > 8 seconds for height < 159cm or > 7 seconds for height > 159cm in females.
- **Weakness:** “Do you have difficulty rising from a chair?” if Participants answered “yes” to this question were categorized as frail for this component:
- **Low physical activity.**—Participants categorized as physically inactive if they denied doing daily leisure activities such as walking or gardening and/or denied doing some sport activity per week.

The participants were considered to be “frail” if they had three or more frailty components among the five criteria; they were considered “prefrail” or “intermediate” if they fulfilled one or two frailty criteria, and “nonfrail” if none⁽¹⁾.

Statistical analysis:

Analysis of data was performed by using the 16th version of Statistical Package of Social Science (SPSS). Description of all data in the form of mean (M) and standard deviation (SD) for all quantitative variables. Frequency and percentage for all qualitative variables.

Results

As regards the demographic characteristics of our sample; the mean age of the studied population was 69 years, 53.85% were males, 46.15% were females, the majority of our participants were illiterates (89.4%), and were living with family (84.62%). As regards special habits 65.4% were non smokers, 27.88% were ex-smokers, and 6.73% were smokers (Table 1).

As regards function level of the studied participants, we found 36.5% of frail participants were assisted in activity of daily living (ADL) and 7.7% were dependents, while 63.5% were assisted in instrumental activity of daily living (IADL) and 8.7% were dependents (Table 2).

As regards the cognitive assessment; the sample participants in general had borderline scores for MMSE,

indicating a cognitive performance in the lower normal range (Table 3).

Discussion

Functional independence in daily activities is a key aspect on frailty elderly quality of life. This independence is related with elderly social and leisure activities, which improves their physical and mental health and brings sense to their life⁽⁷⁾.

In this study we found 44.23% of frail elderly had difficulty in ADL, and 72.1% had difficulty in IADL. This didn't differ much from a prospective multicenter cohort study conducted in two tertiary university teaching hospitals and one regional teaching hospital in the Netherlands; done on 639 patients with a mean age of 78 years; **Buurman et al.**⁽¹⁵⁾ found the prevalence of ADL impairment was 50.9%, and IADL impairment was 83%.

However, the prevalence of functional impairment in our study was relatively higher than the prevalence of functional impairment in the community based studies; as **Fried et al.**⁽¹⁾ found that 27% of frail elderly reported difficulty in ADL and 60% of frail elderly reported difficulty in IADL. Another study conducted on a sample of 8769 Brazilian frail elderly found that the prevalence of functional impairment among Brazilian frail elderly was 9.5% in the 60–69 years old group; 18.9% in 70–79 years old group; 36.8% in 80–89 years old group and 61.3% in 90–99 years old group⁽⁷⁾.

Although geriatric failure-to-thrive, primarily characterized by nutritive and functional decline, also reflects an integration of physical, functional, social, and psychological aspects of health⁽¹⁶⁾.

Cognitive impairment, mood disorders, sensory impairment, poor social conditions and support, chronic diseases, and disability were considered by many investigators as part of the frailty syndrome⁽¹⁷⁾.

For example, chronic inflammation is believed to play a central role in the pathogenesis of frailty⁽¹⁸⁾. And increased levels of inflammatory cytokines are also associated with both a lower Mini-Mental State Examination score⁽¹⁹⁾,

Prevalence of Functional Impairment among Frail Elderly

and an increased risk of developing dementia⁽²⁰⁾.

As regards the cognitive assessment; the sample participants in general had borderline scores for MMSE (25.0±2.5) indicating a cognitive performance in the lower normal range. This agrees with **Ávila-Funes et al.**⁽⁸⁾, who found that frail participants had worse performance on the MMSE (26.9± 2.0), in comparison to prefrail(27.4±.9) and nonfrail subgroups (27.5±1.9).

Our results confirm and support that the prevalence of functional impairment among hospitalized frail elderly is high. It is well-known that preadmission health and functional status of the elderly result in physical and psychosocial problems, such as

dehydration, malnutrition, falls, depression, and delirium⁽²¹⁾, and increase risk of further functional decline associated with hospitalization⁽²²⁾.

So it is necessary to increase the awareness of the physicians towards the importance of functional assessment of frail hospitalized elderly; to identify those with functional impairment, and to initiate preventive and therapeutic interventions at the time of hospital admission.

Study limitation :

We excluded participants with certain diseases e.g. stroke; that known to be risk for functional impairment, so the results did not represent all categories of hospitalized frail elderly.

Demographic characteristics	
Age (year)	69.1±6.84
Gender	
• Female	48 (46.15%)
• Male	56 (53.85%)
Education	
• Illiterate	93 (89.4%)
• Literate	11 (10.58%)
Social Status	
• Living alone	16 (15.38%)
• Living with family	88 (84.62%)
Smoking	
• Non smoker	68 (65.38%)
• Ex-smoker	29 (27.88%)
• Smoker	7 (6.73%)

Demographic characteristics of the studied participants (**Table 1**).

		N	%
ADL	Independent	58	55.77
	Assess	38	36.54
	Dependent	8	7.69
IADL	Independent	29	27.88
	Assess	66	63.46
	Dependent	9	8.65

Function level of the studied participants (**Table 2**).

	Range	Mean ± SD
MMSE	20.0 - 29.0	25.02 ± 2.5

MMSE scores of the studied participants (Table 3)

Reference:

- 1-Fried L, Tangen C, Walston J et al. (2001):** Frailty in older adults: evidence for a phenotype. *Journals of Gerontology: Series A: Biological Sciences and Medical Sciences*; 56(3):146–156.
- 2-Espinoza S and Walston JD (2005):** Frailty in older adults: insights and interventions. *Cleve Clin J Med*; 72(12): 1105–12.
- 3-Ferrucci L, Guralnik J M, Studenski S et al. (2004):** Designing randomized, controlled trials aimed at preventing or delaying functional decline and disability in frail, older persons: a consensus report. *J Am Geriatr Soc*; 52(4): 625–34.
- 4-Walston J, Hadley EC, Ferrucci L et al. (2006):** Research agenda for frailty in older adults: toward a better understanding of physiology and etiology: summary from the American Geriatrics Society/National Institute on Aging Research Conference on Frailty in Older Adults. *J Am Geriatr Soc*;54(6):991–1001.
- 5-Hoogerduijn JG, Schuurmans MJ, Korevaar JC et al. (2010):** Identification of older hospitalised patients at risk for functional decline, a study to compare the predictive values of three screening instruments. *J Clin Nurs*; 19(9-10):1219-25.
- 6-Loh K Y, Khairani O, and Norlaili T (2005):** The Prevalence of Functional Impairment Among Elderly Aged 60 Years and Above Attending Klinik Kesihatan Batu 9 Ulu Langat, Selangor. *Med. J Malaysia* ;60: 2.
- 7- Ferreira AS, Barbosa E M S, Raposo N R B, and Gattaz W F (2011):** P01-565 Functional impairment prevalence in Brazilian frailty elderly. *European Psychiatry*; 26 (1).
- 8-Avila-Funes J, Helmer C, Amieva H et al. (2008):** Frailty among community dwelling elderly people in France: The three city study: *Journals of Geriatrics Series A Biol. Sc. And Med. Sc*;63(10):1089-1096.
- 9-Katz S, Ford A, Moswowitz R et al. (1963):** Studies of illness in the aged. The index of ADL: Standardized measure of biological and psychological function, *JA. A*; 185-914.
- 10-El-Sherpiny M, Mortagy A and Fahy H (2000):** Prevalence of hypercholesterolemia among elderly people living in nursing houses in Cairo. *Ain Shams University: geriatric department library*; pp6.
- 11-Lawton M and Brody E (1969):** Assessment of older people: self-maintaining and instrumental activities of daily living. *Gerontologist* ; 9:176-186.
- 12-Fillenbaum G (1986):** The wellbeing of the Elderly: Approaches to Multi-Dimensional Assessment. World Health Organization, WHO Offset Publication No 84. Arabic translation Distributed by the Eastern Mediterranean Regional Office. ISBN-139789246700844.
- 13-El-Okli M, El Banouby M and El Etrebi (2002):** A Prevalence of Alzheimer dementia and other causes of dementia in Egyptian elderly. MD Thesis, Faculty of Medicine, Ain Shams University.
- 14-Orme J, Reis J, Herz E (1986):** Factorial and discriminate validity of the Center for Epidemiological Studies depression (CES-D) scale. *J Clin Psychol.*;42(1):28–33.
- 15-Buurman BM, Hoogerduijn JG, de Haan RJ et al. (2011):** Geriatric Conditions in Acutely Hospitalized Older Patients: Prevalence and One-Year Survival and Functional Decline. *PLoS ONE* 6(11): e26951. doi:10.1371/journal.pone.0026951
- 16-Rocchiccioli J T and Sanford J T (2009):** Revisiting geriatric failure to thrive: a complex and compelling clinical condition. *J Gerontol Nurs*;34:18–24.
- 17-Abellan van Kan G, Roll Y, Houles M et al. (2010):** The Assessment of Frailty in Older Adults. *Clin Geriatr Med*; 26:275–286.
- 18-Walston J, McBurnie MA, Newman A et al. (2002):** Frailty and activation of the inflammation and coagulation systems with and without clinical comorbidities: results from the cardiovascular health study. *Arch Intern Med*;162(20):2333–41.
- 19-Ravaglia G, Forti P, Maioli F et al. (2005):** Serum C-reactive protein and cognitive function in healthy elderly Italian community dwellers. *J Gerontol A Biol Sci Med Sci*;60: 1017-1021.
- 20-Engelhart M J, Geerlings M I, Meijer J et al. (2004):** Inflammatory proteins in plasma and the risk of dementia: the rotterdam study. *Arch Neurol.*;61:668-672.
- 21-de Vos A JBM, Asmus-Szepesi K JE, Bakke T JEM et al. (2012):** Integrated approach to prevent functional decline in hospitalized elderly: the Prevention and Reactivation Care Program (PRECaP). *BMC Geriatrics*; 12:7.
- 22-Shelton P, Sager MA, Schraeder C (2000):** The community assessment risk screen (CARS): identifying elderly persons at risk for hospitalization or emergency department visit. *Am J Manag Care*;6:925-33.