The Egyptian Journal of Hospital Medicine (July 2013) Vol. 52, Page 566–572

Relation Between Frailty and Common Geriatric Problems in Elderly

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Abstract

Background: There is a high prevalence of common geriatric problems (falls, urinary incontinence, visual and hearing impairment) among frail elderly leading to more disability and functional impairment.

Objectives: The aim of this study is to compare the prevalence of common geriatric problems between frail and non-frail elderly.

Design: A Case control study. ***Participants***: 90 participants aged 60 years and above. They were selected from Ain Shams University Hospital from inpatient wards and outpatient clinics. The studied sample was divided into 2 groups: Group A (30 frail elderly females and 30 frail elderly males) and Group B (30 healthy elderly subjects; 15 males and 15 females).***Measurements***: Comprehensive geriatric assessment, including detailed history of common geriatric problems as mentioned above, physical examination, and also assessment of frailty using modified Fried criteria].

***Results*:** Hearing impairment, incontinence and falls were more prevalent in frail elderly with a highly difference between the two groups, with p values< (0.001,0.009,0.006) consequently, visual impairment was statistically significant in cases more than controls with p value (0.012).

***Conclusion*:** There is a significant positive relationship and high prevalence of common geriatric problems especially falls, urinary incontinence, visual and hearing impairment among frail elderly.

KEYWORDS: Frailty– Falls – Urinary incontinence – Visual impairment– Hearing impairment- Elderly

Introduction

The cornerstone of geriatric medicine is the identification, evaluation, and treatment of frail older adults and prevention of loss of independence and other outcomes for which they are at risk. The proportion of frail within the older population is high and will increase with the aging of society [1].

A focus on frailty has been a consistent theme in geriatric theory and practice. According to Espinoza and Walston frailty is a state of vulnerability that carries an increased risk of poor outcomes in older adults. There is no single best definition of frailty, as this construct is a constellation of clinical attributes[2]. Frailty does not fit easily with the typical organ-specific model of disease. The frailty phenotype represents the complex relationship between sarcopenia, physical activity, nutritional intake, and energy expenditure. Sarcopenia leads to poor muscle strength, which limits mobility and physical activity, thereby reducing energy expenditure and nutritional intake. This leads in turn to weight loss and worsening sarcopenia [3]

Frailty as a clinical entity belongs to the family of geriatric syndromes and should be distinguished from the aging process. As a syndrome, frailty is defined by symptoms and signs clusters which form its clinically complex profile known as 'frailty clinical phenotype'. The most researched cluster is the physical frailty phenotype, but currently a much broader definition of frailty is accepted involving cognitive, functional, and social domains [4].The widely used domains are

 DOI:10.12816/0000593

'shrinking' with weight loss and sarcopenia, weakness with low grip strength, exhaustion or poor endurance, slow motor performance(e.g. slow walking speed, decreased balance) and low physical activity as a marker of low energy expenditure [4].

In other words, frailty is a state of increased vulnerability to stressors that results from decreased physiological reserves and multi-system dysregulation, limited capacity to maintain homeostasis, and to respond to internal and external stresses. Frailty is an aggregate expression of risk resulting from age or disease-associated physiologic accumulation of sub threshold decrements affecting multiple physiological systems resulting in adverse health outcomes [4].

Falls and frailty share many significant characteristics. Both are important health issues that affect older people, increase with increasing patient age and are multifactorial phenomena associated with adverse health outcomes. There are also important differences. Falls tend to be viewed by health professionals from a positivist perspective, as predictable events which they have a duty to try and prevent[5]. Frailty, on the other hand, still lacks a precise definition and is viewed by some as an inevitable consequence of age-related disease processes.[6] The prevention and treatment of frailty, while being fundamental aspirations of many researchers in the ageing field, currently remain enigmatic. In a large study of 6724 community-dwelling older women, frailty was an independent predictor of falls.11 Among 111 men and women aged over 75 years, those defined as frail were 3.6 times more likely to fall than non-frail adults.[7]

Urinary incontinence (UI) is very common in the elderly and has personal and social implications. Many authors have pointed out the necessity to analyze UI in correlation with the overall quality of aging; UI is a marker of frailty and that UI patients should be monitored and, in case, treated in a timely manner to avoid, or to limit, the effects of frailty such as malnutrition, falls, and the consequent accumulation of disabilities [8].

Visual and hearing impairment are common among older community-dwelling outpatients. Functional status is reduced among patients with these sensory impairments. Correcting hearing and visual impairments can improve the functional status and quality of life of frail, older persons, help maintain their independence in the community, and reduce their risk for physical disability [9]. In many cases, either eyeglasses and/or hearing aids are sufficient to correct the impairments. The financial costs of these actions are rather modest given the expected improvements in clinical, quality-of-life, and economic outcomes. Ensuring proper diagnosis of sensory impairments is the necessary first step [10].

Methodology:

Study design:

The study is a case control study conducted to compare the prevalence of common geriatric problems between frail and non-frail elderly.

Sample size: The study sample comprised 90 participants aged 60 years and above. They were recruited from the inpatients and those attending the outpatient clinics of Ain Shams university hospitals from June 2009 to November 2010 .The study sample was then divided into 2 groups:

Group A

Thirty frail elderly females and thirty frail elderly males diagnosed by modified Fried's criteria [11] as applied by Avila-Funes *et al* . [12].

Group B

Fifteen male and fifteen female non-frail participants.

Exclusion criteria of patients:

-Any patient who refused to participate in the study.

-Any patient diagnosed as prefrail.

-Patients who had acute infection

-Patients who were taking drugs that have anti-inflammatory effects.

Assessment:

After taking informed consent, both groups were subjected to:

1) Comprehensive geriatric assessment, including complete medical history (especially falls, urinary incontinence, visual and hearing impairment). Physical examination , Mini-mental

state examination □□□□□ Activities of daily living [14], Instrumental activities of daily living (IADL) assessment[15] □Screening for depression using Geriatric depression scale-15 items (GDS-15) [16].

Assessment for frailty:

Diagnosis of Frailty: using modified Fried criteria [11]. All five components from the original phenotype were retained for this study; however, the metrics used to characterize the frailty criteria were slightly different. For example the slowest quartile of the population was used to identify participants with slowed walking speed, based on a timed 6-meter walking test, adjusting for gender and height as recommended.

For assessment of grip strength Avila-Funes *et al* ([12] used the question ‘‘Do you have difficulty rising from a chair?’’. Participants answering ‘‘yes’’ to the following question were categorized as frail for this component. A multidisciplinary expert consensus (nutritionist, neurologist, psychologist, and geriatrician) determined that the question was an adequate ‘‘proxy’’ for weakness. In addition, it was shown that grip strength significantly correlates with muscular power in other muscle groups among elderly persons (elbow flexion, knee extension, trunk extension, and trunk flexion) [17]. These modifications were applied in the current study.

As proposed by Fried and colleagues, the participants were considered to be ‘‘frail’’ if they had three or more frailty components among the five criteria; they were considered ‘‘pre frail’’ or ‘‘intermediate’’ if they fulfilled one or two frailty criteria, and ‘‘non frail’’ if none**.**

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.

Comparison between quantitative variables was done using t-test to compare two groups and ANOVA to compare four groups. Comparison of qualitative variables was done using Chi square test. Correlation coefficient was also done to find linear relation between different variables using Spearman’s correlation co-efficient. Significant level measured according to P value (Probability), P> 0.05 insignificant, P < 0.05 significant and P<0.01 highly significant.

Results:

The descriptive data of the sample are shown in table (1-2). The study sample was age matched. There was no significant statistical difference found between cases and controls regarding smoking with p-value=0.06. Subjects in the case group had significantly lower educational level than the control group with p-value=0.024 as shown in Table (3).

Hearing impairment, incontinence and falls were highly significant among case participants than control participants, with p-value=0.001, p-value=0.009, p-value=0.006 respectively. Visual impairment was statistically more frequent in cases more than controls with p-value=0.012 as shown in Table (4).

The frail groups (groups A and B) were more functionally dependent than non-frail participants (group C), and this was statistically highly significant in both ADL (p =0.001) and IADL (p=0.001). table (5).

Depression was significantly more common in the case group than the control group with p value < 0.05 .While there was no significant statistical difference between case and control groups as regards MMSE as shown in table (6).

Discussion

The current study aimed to compare the prevalence of common geriatric syndromes in frail and non-frail elderly. A highly significant relationship was found between frailty and urinary incontinence.

In fact, in a study done by Landi *et al* urinary incontinence was found to be a highly prevalent condition among frail older people [18]. Another study also concluded that urinary incontinence may be considered as an early marker of frailty [19].

Also in concordance with the current results was a cross sectional study carried out by Bilotta *et al.,* which reported that

frailty independently correlated with incontinence [20]**.**

Concerning the association between falls and frailty, as frailty is associated with high incidence of falls due to sarcopenia, high association was found between falls and frailty status in comparison to healthy controls**.**

This coincided with the results of several studies. In one study performed in Mexico it was found that frailty increases the odds of falls in older Mexican Americans [21]. A Japanese study also claimed that frailty is associated with incident falls [7]. In a German pilot study, frailty was associated with high frequency of falls [22]**.**

In the current study there was an association between the presence of sensory impairment (visual & hearing) and frailty, as sensory impairment is a disability and each disability can lead to frailty**.** In a study done by *Lang et al.* sensory impairment was considered to be, not only related to frailty, but also one of its manifestations [23].

Regarding the relationship between functional status (ADL & IADL) and frailty; the results of this study showed a highly significant relationship between functional dependence and frailty due to loss of muscle mass and strength associated with frailty.

A study carried out by Galluci *et al*.

was in concordance with these results. They found that frailty was strongly correlated to disability, and moreover that the severity of frailty was related to increasing disability [24].

Dayhoff *et al* went so far as to include functional disability in ADLs as part of their operational definition of frailty [25]. While other studies considered dysfunction in ADLs to be a predictor of frailty .[26,27]

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Table (1): Demographic data of the sample as regards gender, education and special habits.

	No.	%
Gender		
Males	**45**	**50.00**
Females	**45**	**50.00**
Education		
Illiterate	**35**	**38.89**
Can read & write	**17**	**18.89**
≤ 6 yrs education	**22**	**24.44**
>6 yrs education	**7**	**7.78**
High education	**9**	**10.00**
Smoking		
Smokers	**33**	**36.67**
Non smokers	**57**	**63.33**

Table (2) Descriptive data of the sample as regards chronic diseases, common geriatric problems and functional status (ADL and IADL).

	No.	%
Chronic diseases		
Diabetes Mellitus	**35**	**38.89**
Hypertension	**44**	**48.89**
Ischemic heart disease	**21**	**23.33**
Congestive heart failure	**7**	**7.78**
Chronic obstructive pulmonary disease	**21**	**23.33**
Chronic liver disease	**9**	**10**
Chronic kidney disease	**11**	**12.22**
Osteoarthritis	**12**	**13.33**
Common geriatric problems		
Falls	**15**	**16.67**
Urinary Incontinence	**13**	**14.44**
Visual impairment	**31**	**34.44**
Hearing impairment	**25**	**27.78**
ADL		
Independent	**61**	**67.78**
Assisted	**29**	**32.22**
Dependent	**0**	**0**
=IADL		
Independent	**32**	**35.56**
Assisted	**52**	**57.78**
Dependent	**6**	**6.67**

ADL (activities of daily living), IADL (instrumental activities of daily living).

Table (3): Comparison between the case & control groups as regards education.

		Case		Control		Chi-square	
		No.	%	No.	%	X^2	P-value
Education	Illiterate	25	71.43	10	28.57	11.24	0.024*
	Can read & write	7	41.18	10	58.82		
	≤6 yrs education	19	86.63	3	13.64		
	>6 yrs education	5	71.43	2	28.57		
	University	4	44.44	5	55.56		

***(significant)**

Table (4): Comparison between the case & control groups as regards urinary incontinence, falls and sensory impairment.

	Case		Control		Chi-square	
	No.	%	No.	%	X^2	P-value
Urinary incontinence	15	100	0	0	9	0.009**
Falls	13	100	0	0	7.597	0.006**
Hearing impairment	25	100	0	0	17.31	0.001**
Visual impairment	26	83.87	5	16.13	6.299	0.012*

*(significant) **(highly significant)

Table (5):Comparison between the case & control groups as regards functional status.

		Case		Control		Chi-square	
		No.	%	No.	%	X^2	P-value
ADL	Independent	31	50.82	30	49.18	21.39	0.001**
	Assisted	29	100	0	0		
	Dependent	0	0	0	0		
IADL	Independent	10	31.25	22	68.75	28.6	0.001**
	Assisted	44	84.62	8	15.38		
	Dependent	6	100	0	0		

**(highly significant)

Table (6): Comparison between the case & control groups as regards mental and psychological status.

	Case	Control	T-test	
	Mean ± SD	Mean ± SD	T	P-value
GDS	5.63 ± 2.56	4.3 ± 2.42	-2.37	0.02*
MMSE	26.82 ± 2.55	27.77 ± 1.79	1.83	0.071

*(significant) GDS (geriatric depression scale) MMSE (mini mental status examination)