Original Research Article

Prevalence of frailty among diabetic and non-diabetic elderly in a tertiary care hospital

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Abstract

Background: The increase in life expectancy during the 20th century has been accompanied by an increase in the proportion and total number of people at the age above 90 and also a considerable number of centenarians. Clinician awareness of the Frailty syndrome, its biologic basis, and the increased risk for adverse outcomes can improve care for this most vulnerable subset of patients. If we are able to recognize and treat frailty in our clinical practice, it bring a newer perspective to geriatric medicine. This includes the study of the prevalence of frailty in elderly in the community and a specific care targeting this vulnerable population. This was a hospital based observational study and individuals more than 65 years were included. Physical frailty was defined in accordance with the frailty phenotype (Fried *et al.*2001) as a clinical syndrome in which the participant expressed three or more of the five criteria. Prevalence of frailty among elderly in the sample population was assessed. We also compared the prevalence of frailty between diabetic and non-diabetic groups. Frail subjects predominantly fell in the age group of 80 years and above. There was clustering of pre-frail subjects in the age group of 65 -69 years. The ratio of frail subjects - male: female ratio was 0.46:1 Proportion of study subjects with diabetes were more among frail than pre frail. But this association between diabetes and frailty was not statistically significant (p = 0.197). Frailty is prevalent in people aged more than 80 years and females.
Keywords: Frail, prefrail, Fried *et al.*, Elderly, gait speed, Sarcopenia.

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INTRODUCTION

Frailty is a clinical syndrome seen in older adults characterized by gradual and growing loss in the function or reserves of multiple physiologic systems and is associated with poor health outcomes like falls, hospitalization and mortality.[1,2] The clinical signs of frailty are: body weight loss, declined physical activity, reduced balance and gait speed, sarcopenia, osteoporosis, reduced cognitive function, and altered state of nutrition.[2] Frailty is theoretically defined as a clinically recognizable state of increased vulnerability resulting from aging-associated decline in reserve and function across multiple physiologic systems such that the ability to cope with every day or acute stressors is compromised. It has been operationally defined by Fried *et al.* as meeting three out of five phenotypic criteria indicating compromised energetics: low energy, low grip strength, low physical activity, slowed waking speed, and/or unintentional weight loss.[1] Though the interest in frailty is growing, the pathophysiological changes leading to frailty are not clearly known. Inflammation is considered as one such potential pathophysiological change that may be closely linked with frailty. Inflammatory molecules may directly or indirectly through their detrimental effects on musculoskeletal metabolism and endocrine system contribute to frailty.[2] Diabetes and frailty are both two age-

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related conditions with some common underlying pathophysiology involving derangements in vascular, endocrine, neurohormonal, and muscular function among others and also share some risk factors including glucose dysregulation, impaired insulin resistance, physical inactivity and obesity.[3] Since early identification of frailty in elderly can improve the practice in geriatric medicine we wanted to study the prevalence of frailty among diabetic and non-diabetic elderly.

MATERIALS AND METHODS

After obtaining the institutional human ethics committee approval we conducted the observational study in the outpatient department of Internal Medicine at JSS Hospital, Mysuru. The study was conducted between October 2012 and December 2014. Patients aged more than 65 years attending were included in the study. The patients who were aged less than 65 years were excluded and those with Parkinson's disease, stroke with residual hemiparesis, symptomatic congestive heart failure, uncompensated endocrine disorders, active infections or malignancy, rheumatoid arthritis or any other inflammatory conditions, or using immunomodulating drugs including oral corticosteroids were also excluded from the study. After obtaining written informed consent the subjects were enrolled. Basic demographic details were collected and subjects were divided into two groups based on the diabetes status – Diabetics in group 1 and non-diabetics in group 2. Fried *et al.* criteria were used to assess frailty. Fried *et al.* was developed by Fried and colleagues and has five criteria for assessing frailty - weight loss, exhaustion, low physical activity, slowness and weakness. The proportion of individuals with frailty among different age groups, sexes and diabetic status were assessed.

RESULTS

A total of 45 subjects who fulfilled the inclusion criteria were included in the study. Table 1 shows the age, sex distribution and diabetes status of the study population. 71% of study subjects belonged to age group 65-75 years, 53% were females and 51% were non-diabetic. Out of the 45 subjects enrolled, 22(49%) were frail and 23 (51%) were prefrail. Among the frail individuals 36% were above 80 years of age, 62% were females and 55% were diabetics. Frailty was significantly higher in females than males (p = 0.05). Table 2 shows the Fried index of the study population. The proportion of study subjects with weight loss and Severe exhaustion were significantly higher among frail [13 (86.7%) and 11(78.5%) respectively (p=0.001)]. Hand grip was significantly weaker among frail 21(56.7%) (p = 0.023*). Walking speed and physical activity were significantly low among the frail group [14(70%) (p = 0.011*) and 20(76.9%) respectively (p = <0.001*)]. Table 3 shows the proportion of diabetic and non-diabetic patients having frailty. There was no significant association between diabetes and frailty.

Table 1: Age, sex distribution and diabetes status

Age group (years)	Percentage
65 – 69	38
70 – 74	33
75 – 79	9
80 and above	20
Sex	
Male	46
Female	53
Diabetes status	
Diabetic	48
Non-diabetic	51

Table 2: Fried index

Parameters	Frail	Pre frail	total	Chi square	df	P value
Weight loss present	13(86.7)	2(13.33)	15(100)	10.683	1	0.001*
Weight loss absent	9(30)	21(70)	30(100)			
Exhaustion scale 0	4 (20)	16 (80)	20 (100)	16.329	3	0.001*
Exhaustion scale 1	1 (25)	3 (75)	4 (100)			
Exhausion scale 2	6 (85.7)	1 (14.28)	7 (100)			
Exhausion scale 3	11 (78.5)	3 (21.4)	14 (100)			
Hand grip normal	1 (12.5)	7 (87.5)	8 (100)	5.156	1	0.023*
Hand grip Weak	21 (56.7)	16 (43.2)	37 (100)			
Walking speed fast	8 (32)	17 (68)	25 (100)	6.421	1	0.011*
Walking speed Slow	14 (70)	6 (30)	20 (100)			
Physical activity Low	20 (76.9)	6 (23.07)	26 (100)	19.368	1	<0.001*
Physical activity Satisfactory	2 (10.5)	17 (89.5)	19 (100)			

Table 3: Frailty among diabetics and non-diabetics

	frail	Pre frail	total	Chi square	df	P value
Diabetic	12 (54.55%)	10 (45.45%)	22 (100%)	0.197	1	0.657
Non-diabetic	10 (43.48%)	13 (56.52%)	23 (100%)			

DISCUSSION

Frailty is recognized as a geriatric syndrome that is highly prevalent, distinct from disability and comorbidity, and potentially modifiable and that increases vulnerability to an array of clinically important outcomes, including functional decline, institutionalization, and falls.[4] In community-dwelling older adults, an accurate assessment of care needs is essential to establish the allocation of adequate services.[5] The aim of screening for frailty in elderly people may be considered to identify people in a relatively early phase, with no or limited frailty-related complaints, at a point in time at which interventions are still effective. Screening is only useful if the frailty risk can be reversed or negative health outcomes can be avoided. Equally important is the ability to prevent unnecessary suffering as a consequence of futile medical interventions.[6] Our study enrolled subjects aged 65 years and above since frailty is prevalent in this age group. A total of 45 patients were included as per the statistical significance and Fried criteria was used to group them into frail and pre-frail. It was found that among them 22 were frail and 23 were pre-frail. Frail subjects predominantly fell in the age group of 80 years and above. There was clustering of pre-frail subjects n= 12 (52.17%) in the age group of 65 -69 years. Demographic pattern in our study resembled that of O. Theou *et al.* 2010 which stated that age distribution of frail group was above 81±6 years and pre-frail was 75±4 years.[7] Llibre J D J, López A M, Valhuerdi A*et al.* reported from Havana and Matanzas provinces between June 2003 and July 2011 that Frailty was seen more among age group ≥ 80 (32.9%) and the female population had higher frail subjects (25.8%)[8] which was similar to our study. J. Collerton *et al.* 2012 used Fried criteria and noted that frailty among men was 12.7% and was 27.7% in females suggesting that frailty was more common among women.[9] In our study also the proportion of subjects with frailty was significantly higher among females than male (p = 0.05) with a ratio of1 :0.4. These studies highlight that frailty is a common occurrence amongst women and requires active screening to prevent it's undesirable consequences. All the five parameters of the Fried criteria which were evaluated in this study viz. weight loss n=13 (p= 0.001), exhaustion scale n=11 (p =0.001), hand grip n= 21(p =0.023), slow walking speed 14 (p = 0.010), low physical activity 20 (p<0.001) independently exhibited statistically significant association with frailty. Other studies show three of the five original Fried frailty criteria - slow gait speed, low-physical activity, and weight loss were independently associated with chronic disability, long-term nursing home stay, and mortality.[10] As compared to Rothman *et al.* in our study it was noted that weight loss in 86.7% as to 23%; exhaustion scale in 78.5% as to 13%; weak hand grip in 56.7% as to 54%; slow walking speed 70% as to 43% and low physical activity in 76.9% as to 31 % .Review of literature depicts slow walking speed and weak handgrip as the most affected parameters in the frailty syndrome.[10] Patients with slow gait speed were more likely to be female (43% vs. 25%, p=0.03), have shorter height (1.65 m vs.1.69 m, p =0.01). Slow gait speed demonstrated the strongest and most consistent associations with the adverse outcomes and was the only criterion that was independently associated with injurious falls. Gait speed is inexpensive to assess and highly reliable and because it has been shown to predict incident disability, and mortality almost as well as summary measures of lower extremity performance, it may represent the best single indicator of frailty in the clinical and research setting.[10] The CHS study by Hirsch *et al.* noted a higher prevalence among diabetes with Odds ratio (95% CI) 1.61 (1.14–2.26) as compared to pre-frailty among diabetics was 1.25 (1.04–1.50).[11]A similar observation made in our study with proportion of frail subjects being higher amongst diabetics than non-diabetics which was not statistically significant, probably, because of a smaller size of the study group.

SUMMARY AND CONCLUSIONS

Frailty has emerged as an important clinical entity following American Medical Association report in 1990: emphasizing the growing population of vulnerable older adults. Frail individuals are identified to be at a greater risk for decline and adverse health related characteristics. Frailty is increasingly viewed as a potentially modifiable geriatric syndrome. Confirmation and identification of the existence of a "pre-frail" condition would open a window of opportunity for crucial preventive strategies. Frailty scores used in this study were sensitive and specific enough to identify frail subjects. This study found out a higher proportion of frail patients in the elderly population. The proportion of frail was more in elderly female population. In our study all the five components were found to be statistically significant in identifying frailty. The study demonstrated the validity of individual components of Fried criteria in categorizing frail and pre-frail amongst elderly population. Multi-domain assessment combined with multimodal interventions viz. promoting physical activity, cognitive therapy and nutritional supplementation in frail would provide a cost effective approach in the practice of geriatric medicine.

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