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# PREVALENCE AND PREDISPOSING FACTORS OF FRAILTY SYNDROME IN ELDERLY (> 75 YEARS) INDIAN POPULATION IN SUBACUTE CARE SETUP

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**Abstract:** *Background:* Purpose of the study was to find out prevalence and predisposing factors of "Frailty Syndrome" in 75 + Indian population. *Methodology:* Frailty was measured by using Fried criteria, data were then analyzed to look for the association between Frailty with various determinants. *Result:* Among 100 elderly patient, randomly chosen from Geriatric department of Madras Medical College, India, 21% were frail, 20% were Intermediate frail. Study shows significant association between frailty with ageing (p=0.012), slow gait speed (p=0), hand grip strength (p=0),Under nutrition (p =0.03), ADL impairment (p=0), recurrent hospitalization in last year for minor ailment (p=0.00003) and depression(p=0). *Conclusion:* Prevalence of frailty is high in 75 + population in hospital setup (sub acute care) which needs immediate attention. Age is the most important risk factor of frailty. Under-nutrition is one of the preventable but significant risk factor. Impaired ADL, Slow gait speed and low hand grip, are independent predictors of Frailty.

**Key words:** Frailty syndrome, aging, gait speed, grip strength, under nutrition, ADL impairment.

## Background

The term 'frailty' has gained much popularity during last two decades due to many reasons. Foremost cause is rapid growth of elderly (especially 80 +) population all over the world. Secondly, frailty is a major cause of familial, social and financial burden. Furthermore, lots of frail elderly are undiagnosed due to lack of simple diagnostic tool.

Frailty is a state of vulnerability towards external or internal challenges, decreased age related inability to maintain homeostasis (1), and is characterized by decrease in functional reserve across multiple physiologic system (2).This vulnerability is age related and partially genetically predetermined (3, 4).

Frail patients tend to have more complications medical instability, disability, dependence, recurrent hospitalization, injuries, fall, acute illness, delayed recovery from illness ,high risk of iatrogenesis and side effects from medical interventions and mortality (5, 7).

Until recently diagnosis of frailty was purely subjective, as there was no operational definition. In 2001, Dr Linda Fried gave an operational tool to diagnose frailty (6, 7). This tool has predictive (2, 5). Prevalence of frail elderly in American Community dwellers in 65-80 yrs population is 10-15 % and in 85+ population is 30-45% (2).

So considering Indian geriatric population in absolute number, we can expect more number of frail elders here. Researchers all over the world are working on various aspects of frailty but data is lacking from India. Our motto was to get an idea about the prevalence and predisposing factors of frailty syndrome in individual aged 75 yrs or more in a sub acute care setup using Fried's criteria.

## Material and methodology

We conducted a Cross-sectional study among 100 subjects (50 men and 50 women) aged 75 years and above, chosen randomly from Geriatric outpatient clinic and inpatient ward of Madras Medical College, India between April 2008 to march 2009 .

Patient with acute illness, painful lower limb condition, severe dementia (MINICOG score 0) and severe depression (GDS >11) were excluded from study to reduce false positive cases.

After taking written consent, demographic information like name, age, sex, address, education, income and

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relevant information pertaining to this study like co morbid conditions (pallor, hypertension, coronary artery disease, cerebrovascular accident, chronic airways disease, chronic heart failure ,pulmonary tuberculosis, arthritis parkinsonism, cancer, vision and hearing problems) , polypharmacy (more than 5 drugs ), h/o fall and h/o hospitalization were obtained. A brief General and neurological examination, including MINICOG test for dementia and Geriatric Depression Score for depression were carried out.

Diagnosis of Frailty was done by Fried's operational criteria, one point is scored for each criterion met to specification, and the components are: a) slow walking speed -walking four meters with or without a walking aid. Six seconds or more was classified as having slow walking speed .b) Weakness (grip strength) -Measured using hand dynamometer in kg, best of three attempts were taken. In our study Grip strength of less than 7 kg in female and less than 12 kg in male were counted as positive (20th percentile of age matched control were taken as cut off value) c) Weight loss- loss of weight greater than 5% of body weight or 10 lb unintentionally in the last one year was taken as positive response. d) Self Reported Exhaustion regarding last week- Patient were asked "how often they felt, that everything they did was an effort" and "whether they could get going?" – if the answer is 3–4 days in a week, taken as positive responsive). Low Physical Activity (measured for past three months)- Positive response was defined as, "if they did not perform minimum weight-bearing physical activity, spent more than 6 hours per day sitting or lying other than sleep time." Individuals with 3 or more of these characteristics were considered frail, individuals with 1 or 2 characteristics as intermediate frail.

Result were then analyzed statistically, based on chi-square tests, which suits best for heterogeneity corresponding p value has been mentioned under the table.

**Table 1**
The study of prevalence of frailty and intermediate the presumed causal factors

| | | Frail ( n=21) | Intermediate frail(n=20) | Non frail (n=59) |
|---|---|---|---|---|
| Age | Above 80 Yrs | 14 | 11 | 19 |
| | Below 80 Yrs | 7 | 9 | 40 |
| Nutrition | BMI less than 19 | 10 | 6 | 13 |
| | BMI more than 19 | 11 | 14 | 46 |
| Income | Less than 1000 / pm | 15 | 12 | 26 |
| | More than 1000 /pm | 6 | 8 | 33 |
| ADL | Impaired | 15 | 7 | 3 |
| | Normal | 6 | 13 | 56 |
| Depression | YES | 11 | 4 | 6 |
| | NO | 10 | 16 | 53 |
| Dementia | YES | 18 | 18 | 53 |
| | NO | 3 | 2 | 6 |
| Recurrent Hospitalization | YES | 13 | 5 | 8 |
| | NO | 8 | 15 | 56 |
| Gait Speed | Less Than 4 m/sec | 20 | 10 | 0 |
| | Normal | 1 | 10 | 59 |
| Hand Grip (Male) | Less than 12 Kg | 8 | 2 | 0 |
| | Normal | 2 | 5 | 53 |
| Hand Grip (Female) | Less Than 7 Kg | 6 | 3 | 1 |
| | Normal | 5 | 10 | 25 |

**Table 2**
Frailty and the presumed causal factors Summary Table of the study of association between

| Characteristic under study | Calculated value of $\chi 2$ | The p-value | Significance |
|---|---|---|---|
| Age | 8.693 | 0.013 | Significant |
| Income | 5.146 | 0.076 | Not Significant |
| Hospitalization | 20.720 | .0.000 | Highly Significant |
| ADL Impairment | 37.690 | 0.000 | Highly Significant |
| Depression | 16.650 | 0.000 | Highly Significant |
| Dementia | 0.294 | 0.863 | Not Significant |
| Nutrition | 6.79 | 0.0335 | Significant |
| Gait Speed | 79.59 | 0.000 | Very Significant |
| Hand Grip Female | 12.52 | 0019 | Significant |
| Hand Grip Male | 31.070 | 0.000 | Very Highly significant |

## Observations

Among, 100 elderly patient aged 75 years and above, 21 patients were frail, 20 patients were Intermediate frail and 59 patients were non frail. It was observed frailty and intermediate frailty both are more prevalent in female, constituting 52.38 % and 65% respectively. Study shows significant association between frailty with ageing (p=0.012), slow gait speed (p=0), hand grip strength (p=0), under nutrition (p =0.03), ADL impairment (p=0), recurrent hospitalization in last year for minor ailment (p=0.00003) and depression (p=0). No significant association were demonstrated between frailty with cognitive impairment (p=0.8) and socioeconomic status (p=0.07). [Details in table]

## Discussion

Study showed prevalence of frailty and intermediate frailty were 21% and 20% respectively, which seems to be very high. We observed Frailty increases with ageing and females are more prone, also supported by other studies (8, 16, 10, 12-14 ). Probable explanation could be female survive more and they have lower average lean mass and strength compared men (1, 15). We observed under-nutrition as an important preventable risk factor of frailty.

We couldn't find low socioeconomic status as risk factor for frailty, contradicting the findings of previous study (9). Reason could be small sample size. In our observation impaired ADL and frailty were closely associated, supported by other study (8). Recurrent hospitalization from minimal insult was more common in frail group implies economic burden, data supported by CHS (9). Depression was shown to have strong relationship with frailty, also documented in WHI study (8). Compared to previous studies (8, 16-18), we couldn't find significant association between frailty with Cognitive impairment, recurrent fall , may be due to small sample size. Slow gait speed and weak hand grip have shown to have independent association with frailty.

Our study was a cross sectional study,with a small sample size. Hence susceptible to several sources of bias and confounding factors. Fried's operational criteria, though validated in various trials, but it is not beyond criticisms. Its limitations are: a) questionnaires and observation are lengthy, difficult for mass screening, b) Presence of subjective criteria reduces specificity. c) Lastly, weight loss, a feature of severe frailty, may not be present in early cases, thereby reducing sensitivity.

## Conclusion

Prevalence of Frailty in 75 + Indian population is high in hospital setup, which calls for immediate attention. Age is the most important irreversible risk factor but not all oldest old are frail. Under-nutrition is an important preventable risk factor.Impaired ADL, slow gait speed and weak hand grip are independentclinical predictors for frailty. Large scale longitudinal study in community set up and more validated scale for frailty is required.

*Conflict of interest:* None of the authors had a conflict of interest in relation to this manuscript.

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