Study of morbidity profile and functional assessment of elderly population of age ≥ 60 years in Ghaziabad, Uttar Pradesh, India

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ABSTRACT
Background
Conditions commonly associated with aging include diabetes, hypertension, Alzheimer's and Parkinson's disease. Frailty, alongside multiple comorbidities, occurs amongst the elderly population due to declining physiological function. Declining psychological well-being also impacts health in later years. The aim of this study was to find the morbidity profile and functional status of elderly patients ≥60 years of age in Ghaziabad, India, and to classify the incidence of frailty occurring within age groups 60-69, 70-79 and 80+ years of age.

Methods
A cross-sectional study was conducted in Santosh Hospital, Ghaziabad, India. The sample size was 300. Patients aged ≥ 60 years who attended the Out-patient Department (OPD) of General Medicine and who were admitted to the In-patient Department (Medicine) of the hospital were included in the study. Data was collected from historical details, interviews with patients, reviews of hospital records and by conducting examinations. Elderly patients were classified into one of the three age groups and given a functional assessment for frailty, depression, cognition and functional ability.

Results
Significant associations were found between age and frail status. In the oldest age group (those aged 80+ years), 62.5% were assessed as frail, compared with 33.3% of those aged 70-79 years and 26.8% of those aged 60-69 years. Out of all patients over 60 years of age, 66% were assessed to have some degree of functional disability; 68% had a vision impairment, 49% had a hearing impairment, musculoskeletal disease was present in 44.3% and anaemia in 42.7%. Psychiatric issues were recorded in 37.7% of patients.

Conclusion
A systematic and logical approach is necessary to make a correct diagnosis for elderly patients as these are likely to require a broad range of diagnostic assessments for neurological issues, metabolic conditions, diverse physiological dysfunction and functional impairment. It is recommended that future studies should focus on frailty and incidence of morbidity within a larger sample size to record more refined data on the state of health within the elderly Indian population.

Keywords: Frail status, Morbidity profile, Elderly population

INTRODUCTION

Aging is an inevitable part of the complex process of life but the aging process is not uniform across the population, due to differences in genetics and lifestyle. At what age one is considered 'elderly' has varied between countries and over time but is most commonly classified into young elderly (60–69 years), middle elderly (70– 79 years) and extreme elderly (80+ years). People today live longer than ever thanks to medicine, advanced investigation and diagnostic techniques, early interventions, an increase in health facilities, better understanding of diseases and improved health education and awareness. India, being a developing country, is currently experiencing a demographic transition and thus an increasingly elderly population. Morbidities associated with aging include diabetes, hypertension, Alzheimer's disease, Parkinson's disease, coronary artery diseases and heart failure. Functional independence often reduces due to physiological changes caused by the aging process, such as reduced muscle strength and loss of bone density, loss of bladder capacity and reduced pulmonary ventilation. These can lead to a lower quality of life for the elderly.[1] Frailty and multiple morbidities are common in the older population.

Frailty is defined as the proportion of deficits present in an individual out of a total number of age-related health variables considered. The progressive decline in physiological reserve, increased vulnerability to stress and poor clinical outcomes can be assessed by phenotypic frailty scales.[2,3] As multiple morbidity conditions commonly occur alongside frailty, a functional assessment of the elderly population, using a multidisciplinary, multi-dimensional test for evaluation of frailty, functional disability, physical and mental health is necessary.

As the morbidity and functional pattern of the geriatric population of India is unclear, the present study was carried out with the dual objective of studying the morbidity profile and functional assessment in elderly patients of age ≥60 years; and classifying accordingly to groups of increasing age (60–69 years; 70–79 years and 80+ years). This study will be helpful in the diagnosis of morbid conditions, enabling developing better treatment, follow-up plans and long-term care needs. Identification of poor outcomes and a better understanding of disease among the elderly will help to improve health status and quality of life amongst this demographic.

METHODS AND MATERIALS

A cross-sectional study was conducted in Santosh Hospital, Ghaziabad, Uttar Pradesh, India. The sample size was 300. Inclusion criteria was patients who attended the Out-patient Department (OPD) of General Medicine and were admitted to the in-patient department (Medicine) of the hospital. Patients who were less than 60 years old were excluded, as were patients who were ≥60 years but were acutely ill, mentally challenged or who could not speak.

Data was collected from historical details, interviews, reviews of hospital records and by conducting examinations. Participants were classified into three age groups: young elderly (60 to 69 years), middle elderly (70 to 79 years) and oldest (80+).

The elderly patients were given a functional assessment using the Frail Scale[4] which measures fatigue, resistance (difficulty completing physical activity such as climbing stairs without aids), ambulation, illnesses and loss of weight, and classifies respondents as frail, pre-frail or robust based on their answers. Participants were also screened for depression using a two-question screener test[5] and their cognition was assessed by Mini-Mental Status Examination.[6] Functional ability was assessed by Lawton's Index,[7] and risk of fall was assessed by the Timed Up and Go Test.[8] Ethical committee review of the study gave clearance to conduct the study with informed consent from the patient.

Continuous data in three groups were compared by one-way ANOVA or Kruskal-Wallis (for non-parametric distribution) tests depending on data distribution. Associations between categorical data were assessed by Pearson chi-square test/Fisher's exact test. Correlation between two continuous variables was performed using Pearson's correlation or Spearman's rank. A p-value <0.05 was considered statistically significant at the 95% confidence level.

RESULTS

Of the 300 participants, 164 participants (55%) were male and 136 (45%) were female. 179 (60%) were classified as young elderly aged 60-69, including 78 females and 101 males. 81 (27%) were in the middle elderly group aged 70-79 (43 males and 38 females) and 40 participants (13%) were above 80 years of age, including 8 males and 8 females (Table 1).

Of the participants, 100 (33.3%) were assessed as frail of whom 40 (40% of all those assessed as frail) were female and 60 (60% of all those assessed as frail) were male. 184 participants (62%) were assessed as pre-frail, of which 96 were male (52% of all those assessed as pre-frail) and 88 were female (48% of those assessed as pre-frail). 16 participants were assessed as robust, 8 male and 8 female (an equal 50% split of all those assessed as robust).

A significant association was recorded between age group and frail status, with frailty increasingly with age. In the oldest age group, the majority (62.5%) were assessed as frail, with 27.5% assessed as pre-frail and 10% as having robust health status. The majority of both the young elderly and middle elderly age groups were assessed as pre-frail (68.7% and 61.7% respectively) with frailty recorded in 33.3% of middle elderly and 26.8% of young elderly. Robust health status was seen in 4.4% of young elderly and 4.9% of middle elderly. The percentage difference of robust health between the oldest age group and the young elderly could be skewed due to the larger numbers of young elderly participants than extreme elderly in our study. The highest prevalence of frailty was among the oldest age group (62.5%) compared to 33% in the middle elderly and 26.8% in the young elderly as shown in Table 2. Chi-square was 23.45, degree of freedom 4, and p<0.001. Musculoskeletal disease was present in 44.3% of participants, 42.7% were anaemic, 37.7% recorded psychiatric Illnesses. Hypertension was present in 35%, diabetes mellitus in 28%, cardiovascular disease in 16.7%, chronic obstructive pulmonary disease in 14.7%, gastrointestinal disease in 23.3%, chronic kidney disease in 10.3%, cerebrovascular disease in 5.7% and Benign Prostatic Hyperplasia (males only) in 14% (Table 3).

A statistically significant association was found between age group and morbidity count (Chi-square 55.98, degree of freedom 14, and p<0.001). Overall, the prevalence of morbidity in our study was 89.6%. Multi-morbidity was common amongst the elderly population with an average of three morbidities per person but a non-significant association was found between morbidity count and frail status. Patients with frail status had up to 7 morbidities and pre-frail patients were those most likely to have zero morbidities (Chi-square 14.44, degree of freedom 14 and p=0.42). The majority of the study participants had mild to moderate cognitive impairment according to Mini-Mental State Exam (MMSE). Severe cognitive impairment was more likely to be present in the oldest age group. Depression was common among the population on screening but needs further evaluation as in our study, it was not associated with age.

Table 1 Gender distribution of age groups and frailty status

Gender	Male n	Male %	Female n	Female %	Total n
Total	164	55%	136	45%	300
Age					
60-69 years	101	34%	78	26%	179 (60%)
70-79 years	43	14%	38	13%	81 (27%)
80+ years	20	6.5%	20	6.5%	40 (13%)
Frailty					
Frail	60	60% of frail	40	40% of frail	100 (33% of total)
Pre-frail	96	52% of pre-frail	88	48% of pre-frail	184 (62% of total)
Robust	8	50% of robust	8	50% of robust	16 (5% of total)

Table 2 Association of age with frailty

	60-69	70-79	80+	Total		
				M	F	T
Frail	26.8%	33.3%	62.5%	60	40	100
Pre-frail	68.7%	61.7%	27.5%	96	88	184
Robust	4.4%	4.9%	10%	8	8	16

Table 3 Health issues recorded in study participants

Health issue	Percentage
Vision impairment	68%
Functional disability	66%
Hearing impairment	49%
Muscular-skeletal disease	44.3%
Anaemia	42.7%
Psychiatric illness(es)	37.7%
Hypertension	35%
Diabetes mellitus	28%
Gastro-intestinal disease	23.3%
Chronic obstructive pulmonary disease	14.7%
Chronic kidney disease	10.3%
Cerebrovascular disease	5.7%
Benign Prostatic Hyperplasia (BPH) (males only)	14%

DISCUSSION

According to Government of India statistics, cardiovascular disorders account for one-third of elderly mortality. Respiratory disorders account for 10% mortality while infections including tuberculosis account for another 10%. Neoplasm accounts for 6% of mortality. Accidents, poisoning and violence constitute less than 4% of elderly mortality; similar incidence is recorded for nutritional, metabolic, gastrointestinal and genitourinary infections.[9] In India, elderly people suffer from both communicable and non–communicable diseases, sometimes simultaneously. This is further compounded by impairment of sensory functions including vision and hearing. Declining immunity as well as age-related physiologic changes leads to an increased burden of communicable diseases in the elderly.[10] In our study, functional assessment for frailty was by validated Morley's Frail Scale.[14] We found that out of 300 elderly participants with age ≥60 years, 16 (5.3%) were robust, 184 (61.3%) were pre-Frail and 100 (33.3%) were frail. A similar study by Abrahamian et al[15] found that of 811 subjects of age ≥60 years 13.6% were robust, 48.7% were pre-frail and 37.7% were frail. However, in a meta-analysis by Siriwardhana et al,[16] prevalence of frailty in this age group varied from 3.9% (China) to 51.4% (Cuba) and prevalence of pre-frailty ranged from 13.4% (Tanzania) to 71.6% (Brazil). The pooled prevalence of frailty was 17.4% and pre-frailty was 49.3%. The variation in prevalence rates across studies was largely explained by differences in frailty assessment method and the geographic region.

We found in our study that vision impairment was present in 68% of elderly population with highest prevalence among the oldest age group (92.5%). Polisetty et al[12] recorded eye problems in more than

70% of elderly individuals. Hearing impairment was present in 49% of the elderly population in our study and is again significantly associated with age, with highest prevalence (80%) among the oldest age group. This is more than that reported by Polisetty et al[12] who found 25.64% and Bardhan et al[17] who found 24.8%.

Prevalence of 66% functional disability was found in terms of restriction in activities of daily living (ADLs) based on the Lawton index, including activities such as using the telephone, shopping, preparing food, housekeeping, handling medications and handling finances. A community- based cross-sectional study by Keshari et al[18] conducted in Varanasi, India, with 616 elderly subjects over 60 years old, showed prevalence of functional disability in elderly subjects of 53.6%.

In our study, musculoskeletal system disease was recorded in 44.3% of participants. This is in concordance with George et al,[19] who recorded that that most common morbidities suffered by the elderly were musculoskeletal (50.5%), and Selvaraj et al[20] who found that musculoskeletal disorders including arthritis were present in 43.7% of participants. In our study we found a strong association between musculoskeletal disease and age group, with increasing higher incidence in older age groups.

Anaemia (based on clinical interpretation) was present in 42.7% subjects, similar to results found by Garg et al[21] which reported anaemia in 39.6% of participants. Anaemia can be due to poor nutrition, constipation leading to bleeding haemorrhoids, chronic diseases or malabsorption of iron, often compounded by lack of healthcare provided to the elderly, lack of attention by caregivers, and poor income.

Hypertension was seen in 35% of our subjects, similar to that in a study conducted of 285 participants ≥60 years of age by Kishore et al,[22] where 41.4% prevalence was recorded. We found 28% diabetes mellitus, which is similar to Polisetty et al[12] (24.4% prevalence).

Overall prevalence of morbidity across our study was 89.6%, whereas Polisetty et al [12] found that almost their entire study population (99.6%) suffered from some form of acute or chronic morbidity. However, our study was conducted with 300 subjects only, and may not be generalizable to the entire population of India. We recognize this as a limitation of the study.

CONCLUSION

Common morbidities among the elderly in our study included musculoskeletal diseases (44.3%), anaemia (42.7%), psychiatric illness (37.7%), hypertension (35%), diabetes (28%), gastrointestinal diseases (23.3%), COPD (14.7%) and chronic kidney (10.3%) diseases. Vision (68%) and hearing impairment (49%) were also common. A systematic approach is necessary to make correct diagnoses across broad diagnostic categories including neurological conditions, metabolic disease and physiological function. It is recommended that future studies should focus on frailty and morbidity status of a larger sample to determine the precise health status of elderly people within the Indian population.

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