Study of the Association of Geriatric syndromes with Functional Dependence in the Elderly

Neeta Bhardwaj[1], Manshi Kashyap[2*]

[1]Director Professor, [2]Junior Resident (3rd year), Department of Medicine, Lady Hardinge Medical College, New Delhi

Department of Medicine, Lady Hardinge Medical College, New Delhi

ABSTRACT

Background: Most commonly encountered conditions in the elderly are falls, frailty, functional limitation, cognitive disturbances and depressed mood. Thus, the objective of this study was to study the association of the aforementioned geriatric syndromes with functional dependence in the elderly patients ($\geq$ 60 years) presenting to the geriatric-medical OPD in a tertiary care hospital. **Materials and Methods**: It was a cross-sectional descriptive study. 100 patients at or above 60 years of age who presented to the Geriatric-medical OPD in Srimati Sucheta Kriplani Hospital were selected randomly for the study. Patients presenting with Acute confusional State or patients requiring emergency-management were excluded. Geriatric Assessment was performed. Katz Index of ADL was used to assess the functional status. Its association with Geriatric syndromes, such as Frailty, Impaired Cognition, Impaired Gait/Balance, Falls, Depression, Cataract and Hearing impairment were studied with the help of internationally validated tools. **Results**: 88% of the study population had fully preserved functional status, while 12% of the study population had functional dependence in Activities of Daily Living. The factors which were found to be significantly associated with functional dependence are advanced age (>75 years) (p=0.016), cataract (p=0.008), hearing impairment (p=0.005), falls (p <0.001), depression (p=0.003), and frailty (p=0.001). **Conclusion**: Geriatric Assessment on outpatient basis can help us to identify the geriatric problems and the population at risk of functional dependence which would enable us to make early interventions.

KEYWORDS: cognitive decline, depression, falls, frailty, functional dependence.

INTRODUCTION

The term Geriatric Syndrome encompasses clinical conditions that are frequently encountered in older adults; have a deleterious effect on function and quality of life; have a multi-factorial pathophysiology, often unrelated to the apparent chief symptom; and are manifested by stereotypical clinical presentations. It includes Frailty, Impaired Cognition, Gait and Balance impairment, Falls, Depression, Cataract and Hearing impairment [1]. Older adults have special health care needs as they are more prone to diseases due to decrease in immunity as well as age related physiological changes. Furthermore, they suffer from impaired physical mobility which is a cause as well as effect of the interaction between a various physical mental ad socio-economic factors.

Functional status refers to a person's ability to perform tasks that are required for living. Activities of daily living (ADL) and instrumental activities of daily living (IADL) are two key divisions to assess functional ability. ADL encompasses six basic human functions: bathing, dressing, toileting, transfer, continence, and feeding [2]. It provides an objective method of classifying heterogeneous groups of people with chronic illnesses, disabilities and impairments, and of describing their health needs and outcomes.

Independence in each of the function is given one point while zero point each is assigned if a person is dependent to carry out the basic human functions. A score of six denotes full function while that of four denotes moderate impairment in function. Scores of two or less indicate very severe functional impairment. IADLs are activities that are required to be performed for a person to live independently- cooking,

cleaning, managing money etc. They are not essential for basic functioning of the individual.

Deepak Sharma, on assessing the Functional Ability in the elderly population in Shimla, observed that prevalence of ADL (Activities of Daily Living) activity limitation was 5.5%. Advancing age (70 years and above), poor self-rated health and ailments namely musculoskeletal problems and cataract were found to be the predictors of functional limitation [3]. Another study in an urban community of North India [4] concluded that dependency increased with increasing age. ADL can, therefore be utilized to assess the services offered to the older adults and work out measures for improvement in the content of these services.

Frailty is a common geriatric problem, manifesting as weakness, slowness, reduced activity, low energy levels and unintended weight loss. It involves dysregulation of many physiological systems, ultimately resulting in decline in energy production, energy utilization and repair mechanisms of the body [5]. Frailty Index that was earlier used to assess frailty was cumbersome in the clinical setting. In 2005, the 7 point Clinical Frailty Scale was developed and applied to the participants in the second stage of the Canadian Study of Health and Aging (CSHA).

This cohort was followed prospectively; after 5 years, it was found to highly correlate ($r = 0.80$) with the Frailty Index. Each 1-category increment of our scale significantly increased the medium-term risks of death (21.2% within about 70 mo, 95% confidence interval [CI] 12.5%–30.6%) and entry into an institution (23.9%, 95% CI 8.8%–41.2%) in multivariable models that adjusted for age, sex and education [6]. In 2008, CSHA revised it to a 9 point Scale.

Cognitive change as a normal process of aging has been well documented in the scientific literature. Conceptual reasoning, memory, and processing speed decline with age. The Mini–Mental State Examination (MMSE) [7] is a 30-point questionnaire that is used extensively in clinical and research settings to measure cognitive impairment. It is an 11-question measure that tests five areas of cognitive function: orientation, registration, attention and calculation, recall, and language. Any score greater than or equal to 24 points (out of 30) indicates a normal cognition. Below this, scores can indicate severe (≤9 points), moderate (10–18 points) or mild (19–23 points) cognitive impairment. Ganguly's Hindi version of the MMSE (HMSE), while retaining the original MMSE scoring and cutoff also took care of the rural illiterate Indian population by carefully substituting some words with relevant local words [8]. A cut off of 24 was used in our study.

Falls and concomitant instability in the older adults can be markers of poor health and declining function [9]. Community based studies have reported prevalence of fall among 60 years and older adults to be 14% to 50% in India [10, 11]. Assessment of postural hypotension, gait and balance, cognition and review of prescription drugs are, therefore, very important in this age group.

The 'timed up and go' test (TUG) [12] is a simple, quick and widely used clinical performance-based measure of lower extremity function, mobility and fall risk. In this test, subjects are asked to stand up from a standard chair (seat height between 44 and 47 cm), walk a distance of 3 m (marked on the floor) at a comfortable pace, turn, walk back

and sit down. Subjects are permitted to use routine walking aids and are instructed not to use their arms to stand up. No physical assistance is given.

The time to complete the task is measured with a stopwatch. Timing commences on the command 'go' and stops when the subject's back is positioned against the back of the chair after sitting down. The TUG has been studied in elderly populations in various situations [13, 14]. In a cohort of 110 consecutive fall clinic patients, it was also indicated that 15 seconds in the TUG was the optimal cutoff point for identifying those with a high risk of falling [15]. Same cutoff was used in our study.

With change in the family structure, breakdown of the framework for support and economic insecurity feeling of loneliness and depression have increased among the elderly population. A meta-analysis of 74 studies, including 487,275 elderly individuals found the worldwide prevalence rate of depressive disorders to be between 4.7 to 16%. This study indicates a comparatively higher prevalence of geriatric depression in India (21.9%).[16] The 15 point Geriatric Depression Scale [17] is suitable as a screening test for depression symptoms in the elderly.

Cataract and hearing loss are other common problems associated with ageing. Their impact may be profound, with consequences for the social, functional, and psychological well-being of the person. The whispered voice test is a simple and accurate test for detecting hearing impairment [18]. It is performed by standing 3 feet behind the patient and whispering a series of letters and numbers after exhaling. Failure to repeat most of the letters and numbers is suggestive of hearing impairment. Several studies have already demonstrated that presbycusis may have a negative effect on Quality of life (QoL) and psychological well-being – social isolation, depression, anxiety, and even cognitive decline have been reported in affected persons [19, 20].

Objective: To study the association of geriatric syndromes with functional dependence in the elderly patients (≥ 60 years) presenting to the geriatric-medical OPD in a tertiary care hospital.

MATERIALS AND METHODS

It was a cross-sectional descriptive study. The study population included older adults (≥ 60 years) presenting to the geriatric-medical OPD of Srimati Sucheta Kriplani Hospital (SSKH), New Delhi. Annually about 1000 patients present to the geriatric-medical OPD in SSKH, which is conducted on every Sunday from 10 am to 1 pm. Taking 95% Confidence level and a Confidence Interval of 10 (by convenient sampling), the estimated sample size was 88 based on feasibility and time frame of enrollment. However, a sample size of 100 patients was included. Two patients were selected randomly in every Geriatric OPD during the period from November 2015 to March 2017. Informed consent was sought from all selected patients. Patients presenting with Acute Confusion or requiring emergency management and those who didn't give consent were excluded.

Structured validated questionnaires and simple tests were used to interview and evaluate the patient. Geriatric Assessment was performed with the help of the following tools, details of which have already been mentioned above:-

- Functional Ability: Katz Index of Independence in ADL scale [2]
- Frailty: Clinical Frailty Index [6]
- Cognitive Evaluation: Hindi version of Mini Mental State Examination (HMSE) [8]
- Gait and Balance: "Timed up and Go" Test [12]
- Depression: 15 point Geriatric Depression Scale [17]
- Hearing: Whispered voice Test [18]

All the above mentioned tools are validated and open to access for research and clinical practice. They have been mentioned in the appendices for reference. The study didn't include any investigation or treatment advised to the patient. Statistical analysis was doe using Percentages Chi-Square test /Fisher's exact test and Logistic regression with the help of Statistical Package for Social Sciences (SPSS) version 21.0. A p value of <0.05 was considered statistically significant.

RESULTS

In the study, the majority, 88 (88%) patients had fully preserved functional status. 6 (6%) patients had moderate and another 6 (6%) had severe functional dependence.

89% of the patients were between 60-75 years of age while remaining 11% were aged above 75 years. Mean age was 65.59 ± 6.9 years while the median age was 64.5 years. Male (56%) and female (44%) patients were almost equally represented in the study. 4 (8.99%) patients between 60 to 75 years of age had functional dependence while 8 (36.36%) patients who were above 75 years were functionally dependent. Factors affecting functional status in the elderly have been described in detail in Table 1.

The factors which were found to be significantly associated with functional dependence are advanced age (>75 years) (p=0.016), cataract (p=0.008), hearing impairment (p=0.005), falls (p <0.001), depression (p=0.003), and frailty (p<0.001).

Table 1: Factors affecting functional status in the elderly

Factors	Total (%)	Functional Status Preserved (%)	Dependence In Functional Status (%)	P Value
Age group (years) 60-75 >75	89 (89.0%) 11 (11.0%)	81 (91.0%) 7 (63.6%)	8 (9.0%) 4 (36.4%)	0.016
Cataract Absent Present	75 (75.0%) 25 (25.0%)	70 (93.3%) 18 (72.0%)	5 (6.7%) 7 (28.0%)	0.008
Hearing Impairment Absent Present	87 (87.0%) 13 (13.0%)	80 (91.9%) 8 (61.5%)	7 (8.1%) 5 (38.5%)	0.005
Gait and balance Normal Abnormal	91 (91.0%) 9 (9.0%)	82 (90.1%) 6 (66.7%)	9 (9.9%) 3 (33.3%)	0.55
Falls in past 6 months Absent Present	83 (83.0%) 17 (17.0%)	80 (96.4%) 8 (47.1%)	3 (3.6%) 9 (52.9%)	p< 0.001
Cognitive Decline Absent Present	91 (91.0%) 9 (9.0%)	85 (93.4%) 4 (44.0%)	6 (6.6%) 5 (56.0%)	OR= 0.898; (CI= 0.84 - 0.96)
Frailty Not frail Frail	81 (81.0%) 19 (19.0%)	81 (81.0%) 7 (36.8%)	0 (0.0%) 12 (63.2%)	p<0.001
Depression Absent Present	61 (61.0%) 39 (39.0%)	60 (98.4%) 28 (71.8%)	1 (1.6%) 11 (28.2%)	p= 0.003

DISCUSSION

In our study, only 12% study participants were categorized as dependent in carrying out Activities of Daily Living (ADL). A lower prevalence (5.5%) was reported by Sharma et al. in a hilly state in North India [4]. Studies conducted by Chen in Chinese elderly and by Hairi in Malaysian elderly have recorded nearly similar prevalence [21, 22].

Advanced age (>75 years) was a significant risk factor for functional dependence (p value= 0.016). A possible reason may be that with advancing age the rate of physiological decline increases, which might limit the ability to perform ADL. A similar observation was made by Deepak Sharma [4] in India. Another study reported that individuals belonging to the age group of 75 years & above had significantly higher proportion of functional dependence (82.6%) than other elderly age groups [23].

Both cataract as well as hearing impairment were statistically significant correlates affecting the functional dependence in our study (p=0.008, 0.005 respectively). Similar observations were made by Sharma et al [4]. Cataract in very elderly can cause progressive painless vision loss. Sogebi reported that elderly patients with hearing impairment have vital functional limitation in daily living activities in Nigeria [24].

Abnormality in gait and balance, however, was not a statistically significant factor affecting functional status in our study (p=0.55). There are numerous studies worldwide which have reported an association of imbalance in gait and stance with functional dependence. Since this was an OPD based study, there was a poor representation of the elderly who suffered from balance disorders like Parkinsonism, as their movement is usually restricted and tend to remain at home. Moreover, severely ill patients were excluded from our study and the sample size was limited.

Falls are a major cause of unintentional injuries associated with old age and are a leading cause of death in older adults. Russell reported an ongoing decline in function in 35% of elderly fallers as compared to pre-fall levels [25]. In our study too, fall was a significant risk factor for decline in functional status (p<0.001). Cognitive decline, however didn't seem to be significantly associated with functional dependence in our study [OR= 0.898; (CI= 0.84 - 0.96)].

There could be several reasons for the same. The sample size was limited. Furthermore, the level of education in the study population was considerably low as majority of the people had attended only primary level of formal education. This may have interfered in the assessment of cognition. Another reason could be that only ADL was assessed in the study whereas cognitive decline is expected to affect IADL activities first. A study conducted by Johnson et al, in 2007, had observed that only executive function impairment, as measured by the Trails B test was significantly associated with worse ADL and IADL function. No significant association was observed between global cognitive impairment, as assessed by MMSE, and functional dependence [26].

Frailty was a significant risk factor for functional dependence in our study. Similar findings were reported by Jotheeswaran in Latin America, India, and China. Frailty predicted the onset of dependence and mortality, even after adjusting for chronic diseases and disability, with little heterogeneity of effect among sites [27]. Gonzalez too observed that frailty is associated with an increase in the rate of mortality, hospitalizations and dependence in basic activities of daily life [28].

In our study, depression was also found to be significant predictors of functional dependence. Similar findings were observed by Rentala had reported a positive correlation (r=.417), between depressive scores and functional impairment scores [29]. Recording ADL is a well-established practice now for the measurement of functional status of older adults [30]. These can serve as a baseline to help review the quality as well as the distribution of services offered to the elderly. Community based fall surveillance should be undertaken to determine the prevalence of falls and screening of factors found to be associated with falls, e.g. poly-pharmacy, alcohol intake, chronic illnesses, decline in function and cognition. Proper building design,

stairway protection, slip resistant bathroom tiles, sufficient lighting should be provided to prevent fall related injuries.

Cataract is easily treatable. Identifying individuals with hearing loss, supplying appropriate hearing aids or other listening devices, and teaching coping strategies may have a positive impact on the quality of life of older people. Early recognition of signs of depression, fostering healthy relationships among families as well as providing and maintaining the quality of services in old age homes can significantly improve functional status. The Government and NGOs can partner together in the construction of more such homes with satisfactory infrastructure, amenities and facilities.

CONCLUSION

Strengthening of the geriatric care services, with performance of a comprehensive geriatric assessment, prioritizing care for the vulnerable elderly and increasing utilization of the care services through raising awareness is required in order to improve the quality of life of our elders.

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*Corresponding author: Dr. Manshi Kashyap
E-Mail:kashyapmansi58@gmail.com