A cross-sectional study on the etiological spectrum and morbidity profile among geriatric patients: A hospital-based study

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ABSTRACT

Background: Elderly people are now the most rapidly growing population group worldwide, and the challenge ahead for the health-care system is to ensure the quality of life and provide adequate health care for a large group the of geriatric population. **Aims and Objectives:** The objective of the study was to determine the most common causes of emergency hospital admission of geriatric patients and to evaluate their morbidity profile. **Materials and Methods:** This present study was carried out on 208 geriatric patients (age >60 years) in a medical college and teaching hospital, in eastern India between May 2019 and October 2020 after taking institutional ethical clearance and informed consent of the participants. **Results:** Nearly 38.9% of the participants belonged to the age group of 60–70 years. 73.7% of the participants presented with respiratory diseases (chronic obstructive pulmonary disease and respiratory failure), 21.0% had pulmonary tuberculosis, and 5.3% had cancer lung. Nearly 88.46% had endocrinal morbidity, followed by cardiovascular morbidity (74.03%) and respiratory morbidity (62.50%). 81.25% of the participants had diabetes, and 60.58% suffered from musculoskeletal disorder. 36.53% had osteoarthritis and 22.59% had rheumatoid arthritis. **Conclusion:** The present study result showed the most common presentation in hospital admissions during the emergency in the elderly were cardiovascular, respiratory diseases, neurological causes, and gastrointestinal disorders. The majority of cases had three or more complications necessitating admission contributing to a higher disease burden in the elderly.

Key words: Geriatric population; Chronic obstructive pulmonary disease; Hypertension; Diabetes; Morbidity profile

INTRODUCTION

Geriatric population includes persons who are 60 years and above. They are categorized into young old (60–75 years), old-old (76–85 years), and very old (>85 years).[1] The World Health Organization (WHO) estimates[2] by 2050, the world's population aged 60 years and older is expected to total 2 billion, and among them, 434 million people will be aged 80 years and above.

Aging refers to the inevitable, irreversible decline in organ function that occurs over time even in the absence of injury, illness, environmental risks, or poor lifestyle choices.[3] According to the population census 2011, there are nearly 104 million elderly persons (aged 60 years or above) in India; 53 million females and 51 million males.[4] Longevity contributes to the increased prevalence of chronic disease, the burden of disease, and increased health service use.[5-12]

Aging is a universal process and is regarded as a normal biological phenomenon.[3,4] Geriatric health problem is a growing concern due to the increase in the absolute number of geriatric people and sociodemographic

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changes in the community. Non-communicable diseases are already a major cause of morbidity as well as mortality throughout the world, and India is not untouched by that. As the elderly population is accumulating due to increased life expectancy so is the burden of these non-communicable diseases. In this modern era, after the successful development of various antibiotics and different vaccines, many life-threatening infectious diseases are controlled or eradicated. However, due to change of food habit, lifestyle, and various other factors, prevalence of non-communicable diseases becomes more than the infectious diseases. These diseases are more prone to develop among the persons who already have various comorbid conditions, such as diabetes, hypertension, hypothyroidism, dyslipidemia, chronic kidney disease (CKD), and chronic obstructive pulmonary disease (COPD), which leads to various life-threatening conditions such as acute coronary syndrome or cerebrovascular accident (CVA) or atypical pneumonia.[5-7] There is a rapid expansion of the geriatric age group due to increased longevity and so morbidities among them. Older age is usually characterized by the initiation of several complex health states that mainly occur only later in life and that do not fall into discrete disease categories and these are called as geriatric syndromes.[2] There is a close association between morbidities and disabilities. Census 2011 reports India to be home to 27 million people with severe disabilities.[7] Around 5% of the elderly population in the country is affected by some kinds of disability, and the burden is predicted to increase due to increase in life expectancy and associated population aging.[7] A major component of the burden of illness for the elderly derives from the prevalent chronic diseases. People age 65 and older are much more likely to suffer a heart attack, to have a stroke, or to develop coronary heart disease and heart failure. Heart disease is a major cause of disability, limiting activity, and diminishing the quality of life of millions of older people.[8] Cataracts are a condition that commonly occurs in seniors.[8-19] Diabetes mellitus prevalence is growing worldwide and is becoming an epidemic and endemic problem.[15] However, its prevalence, comorbidities, and mortality are higher in the elderly than in young people.[9] Musculoskeletal disorders are common problems affecting the elderly, loss of muscular strength, and fat redistribution decreasing the ability of the tissues to carry out their normal functions.[10-12]

Worldwide, the 60-plus population constitutes about 11.5% of the total population of 7 billion.[13,14] The percentage of the elderly in India has been increasing at an increasing rate in recent years, and the trend is likely to continue in the coming decades.[15-17] The share of the population over the age of 60 is projected to increase from 8% in 2015 to 19% in 2050.[11] By the end of the century, the elderly will constitute nearly 34% of the total population in the country.[16] Severe morbidities require hospitalization; the estimates of NSSO 71st Round, 2014 indicate that the rate of hospitalization among the elderly is much higher than the general population.[11] Chronic ailments are more prevalent among elderly women (674/1,000) than elderly men (619/1,000) and also higher in rural areas (658 out of 1,000) than urban (621 out of 1,000).[14] Common chronic ailments such as arthritis, hypertension, cataracts, and diabetes are more prevalent among women, whereas ailments such ase asthma and heart disease are more prevalent in men.[11]

This cross-sectional study was conducted to determine the most common causes of emergency hospital admission of geriatric patients and to describe their morbidity profile so that early screening can be done to decrease ailments among these elderly populations and improve their quality of life.

Aims and objectives

To determine the most common causes of emergency hospital admission of geriatric patients and to describe their morbidity profile.

MATERIALS AND METHODS

This was a hospital-based observational descriptive epidemiological study; the design was cross-sectional design; the study setting was the inpatient Department of Medicine of Burdwan Medical College and Hospital in Purba Bardhaman District (West Bengal). The cross-sectional study was conducted after obtaining institutional ethical clearance (BMC/605: dated December 15, 2019) and informed consent of the participants.

Inclusion criteria

- Age above 60 years.
- Admitted for the first time to the department of general medicine
- Participants were recruited within 24 h of admission.

Exclusion criteria

- Patients who died within 24 h of admission
- Patients who did not give consent for participation.

Sample size

Considering the prevalence (P) of systemic etiology and morbidity (genitourinary system) among inpatients admitted through the emergency department 42.5%, as per a study by Vasanth et al.[18] (2018), the sample size was calculated.

The standard deviate at 95% confidence interval (Z) was 1.96 and taking 80% power of the study the absolute error

(l) was (0.425×0.2). Considering a design effect of 1.5 for this study, the minimum required sample size (n) was $\{1.96^2 \times 0.425 \times (1-0.425)\}/(0.425 \times 0.2)^2 \approx 208$.

In the 9-month data collection period, a total of 36 weekly admission days + 6 rotational Sundays were available for data collection, i.e., 42 days. The required sample to be collected each day was set as 208/42=4.95≈5. From the hospital census, it was noted that every day on average 15 elderly patients were admitted to the emergency. Hence, a sampling interval of 15/5=3 was considered. On each day of data collection, the first patient was chosen randomly from the first three eligible patients. When a patient selected through sampling was found ineligible for the study, the immediate next patient was considered based on inclusion and exclusion criteria.

Study tools
Schedule development
Pre-designed and pre-tested schedule designed as a booklet was developed for data collection. It contained structured and open-ended questions on sociodemographic profile and the clinical including laboratory parameters of the participants.

Pretesting
Before the study, the questionnaire was pre-tested on 15 eligible elderly individuals through interview and subsequent recording of the relevant laboratory and clinical parameter by the researcher. Pretesting questions/components that were found to be irrelevant, ambiguous, and incomprehensive were deleted and questions required to be added for revealing necessary information according to stated objectives were noted. Then, the schedule was finalized.

The schedule contained two domains:
1. Sociodemographic information: Age, gender, education, occupation, religion, residence, and socioeconomic status
2. Etiology and morbidity profile of the participants: Etiology behind emergency admission, morbidities identified.

Instruments used
Bathroom-type weighing machine, cardiophonic stethoscope, digital sphygmomanometer, capillary blood glucose machine, blood collection sample with requisition format, ultrasonography format for imaging study, echocardiograph; electrocardiograph (electrocardiography machine).

Data analysis
Data (from the questionnaire and schedule) were entered into a spreadsheet class/section, serial no wise and exported to Statistical Package for the Social Sciences® (SPSS) version 21.0 software for analysis.

Descriptive statistics were used to describe the sociodemographic characteristics and etiologic and morbidity profile of the participants. Chi-squared tests were done to determine difference between the observed proportions of etiology and morbidities among different age groups, genders, and addiction habits.

The risk factors were again separately examined based on the sociodemographic variables which showed statistically significant difference among urban and rural populations. The proportions of the risk factors in these different groups were statistically tested for any difference by the Chi-squared test.

All tests were two-tailed, and $P<0.05$ was considered statistically significant.

RESULTS

In the present study, 38.9% of the participants belonged to the age group 60–70 years (Table 1), followed by 71–80 years and more than 80 years. 49.5% of the participants were male and 50.5% were female. 29.3% had smoking habit and 17.8% had chronic alcoholism history. The clinical profile of the participants in the present study revealed that 48.6% of the participants were conscious, 28.8% were drowsy, and 22.6% unconscious. 30.3% had pallor, 7.2% had cyanosis, 4.3% had jaundice, 9.1% had clubbing, and 15.4% had edema. Overall, 59.6% of the participants were normal, 35.6% were overweight, and 4.8% were obese.

Etiological profile showed that 10.6% of the participants had cardiovascular diseases (CVDs) (Table 2). 90.9% of the participants with CVD had acute coronary syndrome and 9.1% had cardiomyopathy and heart failure. 17.8% of the participants had neurological diseases, of which 59.5% had ischemic CVA, 29.7% had hemorrhagic CVA, and 10.8% had meningitis. 73.7% of the participants with respiratory diseases had COPD and respiratory failure, 21.0% had pulmonary tuberculosis (TB), and 5.3% had cancer (CA) lung. 10.1% of the participants had genitourinary diseases, of which 81.0% of the participants had CKD and 19.0% had urinary tract infection (UTI) and pyelonephritis. 9.1% of the participants had gastrointestinal (GI) diseases. 63.2% of the participants with GI diseases had chronic liver disease (CLD), and 21.0% had intestinal TB and 15.8% had GI malignancy. 52.9% of the participants with endocrinal diseases had hyperglycemia and 47.1% had

Table 1: Sociodemographic profile of the participants (n=208)

Variables	Number	Percentage
Age groups (years)		
60–70 years	81	38.9
71–80 years	78	37.5
>80 years	49	23.6
Total	208	100.0
Gender		
Male	103	49.5
Female	105	50.5
Total	208	100.0
Religion		
Hinduism	170	81.7
Islam	38	18.3
Total	208	100.0
Place of residence		
Urban	135	64.9
Rural	73	35.1
Total	208	100.0
Type of family		
Nuclear	31	14.9
Joint	177	85.1
Total	208	100.0
Educational level		
Illiterate	87	41.8
Below primary	6	2.9
Primary	76	36.5
Middle	19	9.1
Secondary	19	9.1
Higher secondary	1	0.5
Total	208	100.0
Marital status		
Unmarried	2	1.0
Married	146	70.2
Widowed	60	28.8
Total	208	100.0
Socioeconomic class		
Upper high	1	0.5
High	23	11.1
Upper middle	54	26.0
Lower middle	78	37.5
Poor	52	25.0
Total	208	100.0
Smoking		
No	147	70.7
Yes	61	29.3
Total	208	100.0
Chronic alcoholism		
No	171	82.2
Yes	37	17.8
Total	208	100.0

hypoglycemia. 4.3% of the participants had psychiatric diseases. 88.9% of the participants with psychiatric diseases had attempted suicide and 11.1% had other complications (Tables 2-6).

Majority of the participants (88.46%) had endocrinal morbidity, followed by cardiovascular morbidity (74.03%) and respiratory morbidity (62.50%). Psychological morbidity was least common (24.03%). Various morbidities which were found among the study participants were: 63.46% of the participants had ischemic heart disease, 40.38% with dilated cardiomyopathy, 27.40% with heart failure, and 9.13% with pericardial effusion. 58.65% of the participants had COPD, 19.71% with pulmonary TB, and 7.21% with lung CA. 43.75% of the participants had ischemic CVA, 31.25% with hemorrhagic CVA, and 18.75% with transient ischemic attack. 81.25% of the participants had diabetes, 75.96% with dyslipidemia, and 48.55% with hypothyroidism. 31.25% of the participants had CKD, 14.90% with UTI and pyelonephritis, and 13.46% with BHP. 54.80% of the participants had fibromyalgia, 36.53% with osteoarthritis, and 22.59% with rheumatoid arthritis. 83.71% of the participants had peptic ulcer, 35.09% with CLD, 15.38% with intestinal TB. 14.42% of the participants had depression, 19.71% with insomnia, and 7.21% with attempted suicide.

System-wise morbidities did not vary statistically among the participants of different age groups (Table 2). Among the elderly population (>80 years), endocrinal morbidities (93.9%) followed by gastrointestinal morbidities were the most common (91.8%). On the other hand, among the younger age group, i.e., 60–70-year psychiatric morbidities were least common (18.3%). Among the morbidities noted, central nervous system morbidities had a female preponderance, which was statistically significant. All the participants who were smokers, were diagnosed with endocrinal morbidities. While among non-smokers 83.7% had endocrinal morbidities. The difference was statistically significant ($P<0.001$) (Tables 4 and 5). All the participants, who were chronic alcoholics, were diagnosed with GI

Table 2: Distributions of morbidities according to age group

Morbidities	Age groups			P-value
	60–70 years (%)	71–80 years	>80 years	
CVS	54 (76.1)	59 (75.6)	34 (69.4)	0.668
Respiratory	45 (63.4)	49 (62.8)	28 (57.1)	0.757
CNS	41 (57.7)	40 (51.3)	26 (53.1)	0.722
Endocrinal	59 (83.1)	69 (88.5)	46 (93.9)	0.202
GU	31 (43.7)	36 (46.2)	19 (38.8)	0.716
GI	58 (81.7)	65 (83.3)	45 (91.8)	0.279
Musculoskeletal	45 (63.4)	48 (61.5)	28 (57.1)	0.785
Psychiatric	13 (18.3)	21 (26.9)	14 (28.6)	0.339

CVS: Cardiovascular, CNS: Central nervous system, GU: Genito urinary, GI: Gastro intestinal

Table 3: Distributions of morbidities according to gender

Morbidities	Gender		P-value
	Male (%)	Female (%)	
CVS	74 (71.8)	80 (76.2)	0.475
Respiratory	61 (59.2)	69 (65.7)	0.334
CNS	48 (46.6)	66 (62.9)	0.019
Endocrinal	94 (91.3)	90 (85.7)	0.211
GU	43 (41.7)	49 (46.7)	0.475
GI	85 (82.5)	92 (87.6)	0.302
Musculoskeletal	63 (61.2)	63 (60.0)	0.864
Psychiatric	28 (27.2)	22 (21.0)	0.293

CVS: Cardiovascular, CNS: Central nervous system, GU: Genito urinary, GI: Gastro intestinal

Table 4: Distributions of morbidities according to smoking status

Morbidities	Smoking		P-value
	No (%)	Yes (%)	
CVS	106 (72.1)	48 (78.7)	0.324
Respiratory	94 (63.9)	36 (59.0)	0.504
CNS	83 (56.5)	31 (50.8)	0.457
Endocrinal	123 (83.7)	61 (100.0)	<0.001**
GU	71 (48.3)	21 (34.4)	0.067
GI	128 (87.1)	49 (80.3)	0.214
Musculoskeletal	91 (61.9)	35 (57.4)	0.543
Psychiatric	31 (21.1)	19 (31.1)	0.122

CVS: Cardiovascular, CNS: Central nervous system, GU: Genitourinary, GI: Gastrointestinal. P value <0.01** is considered highly significant.

Table 5: Distributions of morbidities according to smoking status

Morbidities	Smoking		P-value
	No (%)	Yes (%)	
CVS	106 (72.1)	48 (78.7)	0.324
Respiratory	94 (63.9)	36 (59.0)	0.504
CNS	83 (56.5)	31 (50.8)	0.457
Endocrinal	123 (83.7)	61 (100.0)	<0.001**
Genitourinary (GU)	71 (48.3)	21 (34.4)	0.067
Gastrointestinal (GI)	128 (87.1)	49 (80.3)	0.214
Musculoskeletal	91 (61.9)	35 (57.4)	0.543
Psychiatric	31 (21.1)	19 (31.1)	0.122

CVS: Cardiovascular, CNS: Central nervous system, GU: Genitourinary, GI: Gastrointestinal. P value <0.01** is considered highly significant.

Table 6: Distributions of morbidities according to chronic alcoholism

Morbidities	Chronic alcoholism		P-value
	No (%)	Yes (%)	
CVS	129 (75.4)	25 (67.6)	0.322
Respiratory	110 (64.3)	20 (54.1)	0.242
CNS	93 (54.4)	21 (56.8)	0.793
Endocrinal	148 (86.5)	26 (97.3)	0.064
GU	80 (46.8)	12 (32.4)	0.111
GI	140 (81.9)	37 (100.0)	0.002**
Musculo-skeletal	103 (60.2)	23 (62.2)	0.828
Psychiatric	42 (24.6)	8 (21.6)	0.704

CVS: Cardiovascular, CNS: Central nervous system, GU: Genitourinary, GI: Gastrointestinal. P value <0.01** is considered highly significant

morbidities. While among non-alcoholics, 81.9% had endocrinal morbidities. The difference was statistically significant (P=0.002) (Table 6).

DISCUSSION

Geriatric populations include persons aged 60 years and above. WHO estimates the worlds' population aged above 60 years is expected to total 2 billion by 2050; up from 900 million in 2015. By 2050, 80% of all older people will be living in low- and middle-income countries. Different epidemiological studies have been shown that various comorbid conditions prevail among geriatric population, which causes fatal non-communicable as well as communicable diseases.

In the present study, majority (38.9%) of the participants belonged to the age group of 60–70 years, followed by 71–80 years and more than 80 years. Jamkhandi DM et al. (2015)[20] stated the 70.2% of participants belonged to young-old age group. Mean age of the participants in the current study was 74.44 years (±9.56). In the study by Sharma et al.,[17] the mean age of the sample studied was 69.01 years. Vasanth[18] stated that in their study that 14% of patients had a history of active alcohol consumption, and 27% of patients were active smokers. Grover[19] reported in their study that about one-third (31%) of the participants had tobacco dependence, and one-fifth (19.8%) of patients had alcohol dependence syndrome currently. The clinical profile of the participants in the present study revealed that 48.6% of the participants were conscious, 28.8% were drowsy, and 22.6% unconscious. 30.3% had pallor, 7.2% had cyanosis, 4.3% had jaundice, 9.1% had clubbing, and 15.4% had edema. Overall, 59.6% of the participants were normal, 35.6% were overweight, and 4.8% were obese. Comparison of the current study findings with existing literature is given in Table 7.

Limitations of the study

This study was conducted over a period of 1.5 years with various limitations such as lack of economic support, manpower, and the chance to follow up. These morbidity conditions can be easily prevented by taking proper measures. If social support, government and economic support, and proper medical care for the elderly people can be assured; the morbidity factors can be reduced or

Table 7: Comparison of current study findings with the existing literature

Study	Findings	Explanation
Current study	• 73.7% of the participants presented with respiratory diseases had COPD and respiratory failure, 21.0% had pulmonary TB and 5.3% had CA lung. • Etiological profile as presented in the emergency medical ward showed that 10.6% of the participants had CVDs, 9.1% of the participants had GI diseases, 18.3% of the participants had respiratory etiology.	-
Jamkhandi and Bhattacharji[20]	• Three participants presented with acute- on-chronic illness while 12 presented with acute symptoms in outpatient clinic. • In those who presented with acute or subacute symptoms, 15% were due to exacerbation of COPD or fever.	The difference in findings is because the current study findings were of the patients admitted through the medical emergency but the literature being compared was from the outpatient clinic.
Sehgal et al.[21]	• The maximum cases (64.45%) presented with involvement of eyes, followed by musculoskeletal disorders (30.23%), CVDs (26.58%), respiratory system diseases (24.58%), GIT diseases (19.93%), and ear diseases (11.30%) in that order.	Percentage of GI disease presentation was comparable with the current study. But CVDs and respiratory diseases were not comparable with the current study finding. The possible explanation can be due to the literature being compared was from the outreach clinic in the rural area.
Vasanth[18]	• The presenting symptoms in the inpatient ward at tertiary hospital were: cardiorespiratory symptoms (65.5%), neuropsychiatric symptoms (63%), genitourinary symptoms (42.5%), and GI symptoms (26%).	The difference in findings from the current study can be due to regional difference as the literature being compared was done in North-East region.
Current study	• Psychiatric etiology were present among 4.3%. • 88.9% of the participants with psychiatric diseases had attempted suicide and 11.1% had other complications.	-
Grover[19]	• Among participants attending medical emergency department, around half of the patients (47.4%) fulfilled at least one axis-I psychiatric diagnosis.	The discrepancy in findings in current study and the literature being compared can be explained by the regional differences.
Current study	• Majority of the participants (88.46%) had endocrinal morbidity, followed by cardiovascular morbidity (74.03%) and respiratory morbidity (62.50%). • 81.25% of the participants had diabetes, 60.58% with musculoskeletal disorder. • 36.53% with osteoarthritis and 22.59% with rheumatoid arthritis.	-
Sudarshan Pai and Harsha Kumar[22]	• The common morbidities found were diabetes mellitus (54.5), CVDs (50.3), locomotive disorder (45.5).	The findings were not completely comparable with the current study findings due to difference in settings of the study being conducted. The literature being compared was done in private setting, but the current study was conducted in government setting.
Jennifer et al.[23]	• Common morbidities found to be arthritis (75%), followed by hypertension (63.9%), low back pain and other pain (52.8%), diabetes (33.3%).	The findings were not comparable with the current study findings because of the difference in study setting.
Vanitha et al.[24]	• Musculoskeletal problems were the most common which was 71.5% followed by ocular problems 60.3%, cardiovascular problem 26.7% and endocrine problem 19.8%.	• Musculoskeletal problems were almost comparable with the current study finding showing musculoskeletal problems prevalence to be 60.58%. • Cardio vascular and endocrine problems prevalence were not comparable which can be due to different study setting.
Current study	• Among the morbidities noted, CNS morbidities had a female preponderance, which was statistically significant. • Among male respondents, endocrinal abnormalities were the most common (91.3%). Female respondents had GI morbidities most commonly (87.6%).	-
Sharma et al.[17]	• A significantly higher proportion of women suffered from musculoskeletal problems, hypertension, diabetes.	• The findings were not comparable with the current study findings because of the difference in study setting.
Sehgal et al.[21]	• Musculoskeletal diseases and GIT disorders were higher among the women, whereas CVS and respiratory group of diseases exhibited a higher prevalence among the men.	• In the current study all morbidities were higher among female except endocrinal, musculo-skeletal and psychiatric which were common among male. This difference in findings might be explained by the difference in study setting and area of the literature being compared.
Current study	• System-wise morbidities did not vary statistically among the participants of different age groups. Among the elderly population (>80 years) endocrinal morbidities (93.9%) followed by GI morbidities were the commonest (91.8%). On the other hand, among the younger age group, i.e., 60–70 years psychiatric morbidities were least common (18.3%).	-
Dabade et al.[25]	• In higher age, presence of any morbidities also increased and this difference was statistically significant.	• The discrepancy in findings could be explained as in the current study the setting was different as compared to the literature being compared.

COPD: Chronic obstructive pulmonary disease, CA: Cancer, TB: Tuberculosis, CVDs: Cardiovascular diseases, GI: Gastrointestinal, GIT: Gastrointestinal tract

eliminated and the fatal clinical outcome can be prevented. Thus, the overall disease burden of the society can be reduced.

CONCLUSION

The present study result showed the most common presentation in hospital admissions during the emergency in the elderly were cardiovascular, respiratory diseases, neurological causes, and gastrointestinal disorders. The majority of cases had three or more complications necessitating admission contributing to a higher disease burden in the elderly.

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