Prevalence and pattern of geriatric emergencies in a teaching hospital of North India

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ABSTRACT

Introduction: Changing demographic patterns worldwide and improvement in healthcare has contributed to increasing visits to the emergency department by elderly patients. Geriatric patients usually have multiple co-morbidities and declining physiological functional status. This complex interplay of various factors requires a specific and curated approach from the emergency physicians. Our aim was to study the pattern and prevalence of geriatric emergencies and the profile of infectious and non-infectious causes of fever in geriatric population in our tertiary care center. Materials and Methods: This retrospective descriptive study was carried out at a tertiary care hospital of north India and included all patients aged more than 18 years who visited the emergency department over a period of six months (July 2018 to December 2018). Detailed data regarding demographic, clinical and diagnosis was obtained retrospectively from the hospital records system. The patients were divided into two groups, age less than 60 years and elderly patients more than 60 years of age for comparison. Results: A total of 24768 patients above the age of 18 years visited the emergency department over a period of six months. Out of which 5399 (27.5%) patients belonged to the geriatric age group more than 60 years of age. 2474 (45.8%) geriatric age group patients were triaged to critical areas level one and level two as compared to 4668 (24.1%) patients aged less than 60 years. Ninety (1.8%) geriatric patients succumbed to death as compared to 77 (0.4%) patients aged less than 60 years. 651 (21.9%) geriatric patients were shifted to intensive care unit as opposed to 1038 (14.8%) patients of the younger age group. 226 (4.2%) geriatric patients presented with fever in the emergency department. Conclusion: The clinical presentation mortality and morbidity pattern of geriatric patients differs significantly from that of younger population and requires a customized approach and dedicated emergency setups.

Keywords: Geriatric emergencies, Emergency department, Triage, emergency severity index

Introduction

There has been an increase in the number of geriatric patients coming to hospitals, which has an obvious bearing on the functioning of health care systems across the globe. Around 12 to 24% increase in geriatric emergency patient visits are estimated in both developed and developing countries. India, as a result of a transitional demographic phase has witnessed a rise in the geriatric population from 1991 to 2001. It is projected to be almost 324 million by the year 2050. The improved health care system of India has contributed to a reduction in mortality rates and rising life expectancy, further enhancing the portion of geriatric patients being managed in the health care setup.
As per 2001 statistics, around 75% of the elderly Indian population was residing in rural areas, approximately 73% of them were illiterate and involved in physical labor for their livelihood.[14] The healthcare problems of the elderly are complicated as they suffer from both communicable as well as non-communicable diseases. They may have multiple co-morbidities such as hypertension, cardiovascular diseases, dental problems, diabetes, obstructive airway diseases and urinary complaints.[15] This makes them more vulnerable and requiring earlier medical intervention compared to younger patients. Poly-pharmacy also adds to this burden.[16,17] Older patients have higher admission rates, readmission rates, mortality rates and emergency department attendance rates as compared to younger patients.[18] The susceptibility to infections increases with ageing. In addition, they suffer from multiple co-morbidities. As a consequence, the morbidity and mortality of these infections increases multifold in the geriatric population.[19,20]

This study highlights the need of radically re-designing the emergency department appropriate to the needs of elderly population, with the aim is to provide quicker, better and multidisciplinary care to the frail and vulnerable patients. It also highlights the need for prompt diagnosis of various infections in the elderly age group so that timely and appropriate treatment can be initiated.

Materials and Methods

This retrospective descriptive study was carried out at a tertiary care hospital of the north India. Patients aged more than 18 years who visited the emergency department in the past 6 months were enrolled in the study. Detailed demographic data, patient characteristics, outcomes, final disposition, shift of the day at time of presentation, day of presentation and area of admission, were noted from the hospital records. Results were tabulated and analyzed using statistical package for social sciences (SPSS) software. The patients were divided into two groups, age less than 60 years and elderly patients more than 60 years of age for comparison. Data was presented as number and percentages and compared using Chi-square test. P value <0.05 was considered significant.

The ESI (Emergency severity index) was used for triaging these patients. It is a five-stage triage system. Level one system is assigned to patients who require immediate life-saving interventions. Level two is assigned to patients in high-risk situations or confused, lethargic or in severe pain or distress. The remaining levels are decided by number of resources needed and vital signs like blood pressure heart rate and respiratory rate.[19] The objective of this study was to compare the pattern of geriatric emergencies (age more than 60 years) with that of younger patients in a tertiary care setup. The secondary objective of the study was to study the profile of geriatric patients with acute fever presenting to the emergency department with and without underlying diseases.

Results

Table 1 enumerates demographic and clinical data of patients visiting emergency, comparison between patients aged less than 60 years and more than 60 years of age. The mean age of geriatric population was 68.2 ± 3.9 years. Significantly more number (2474, 45.8%) geriatric patients as compared to patients less than 60 years of age (4668, 24.1%) were shifted to critical areas (level one and level two). There was no significant difference between days and shift of presentation in both the groups. However, a significantly greater number of elderly patients were admitted (2965, 54.9%), brought dead (194, 3.6%) and expired in emergency department (97, 1.8%). On the contrary, fewer geriatric patients 2073 (38.4%) were discharged directly from the emergency as opposed to 11951 (61.7%) patients aged less than 60 years. Significantly more number (651, 21.9%) of patients in the geriatric age group were admitted to the intensive care unit.

Table 2 lists the spectrum of presenting complaints of geriatric patients visiting the emergency. It was observed that maximum (972, 18%) number of patients present with non-specific complaints followed by shortness of breath (739, 13.7%) and angina pain (637, 11.8%). As evident in Table 1, the median length of stay (in minutes) was more in the geriatric age group in each triage category. However, the statistical difference of median length of stay between patients survived and expired in both age groups was not statistically significant [Table 3]. 226 (4.2%) geriatric patients presented with fever in the emergency department [Table 4]. 158 (69.9%) geriatric patients had underlying co-morbidities whereas 68 (30.0%) did not have underlying diseases. Clearly, fever due to infectious as well as non-infectious causes were more common in the elderly group with underlying co-morbidities such as diabetes mellitus (43, 27.2%), chronic renal failure (26, 16.4%), hypertension (26, 16.4%), multiple myeloma (4, 2.5%), malignancies (7, 4.4%), chronic liver disease (23, 14.5%) and chronic obstructive pulmonary disease (29, 18.3%).

Discussion

The present study describes the pattern of geriatric emergencies in a tertiary care hospital of north India. 27.5% of the patients visiting the emergency were of the geriatric age group. Previous studies by Fayyaz et al. and Jalal S et al. had similar observations.[9,10] Similarly, a study from Taiwan observed that 23.8% of all patients visiting emergency department belonged to geriatric age group.[11] In the current study, 16.5% patients of the geriatric age group were triaged to level one system as per ESI triaging level, as compared to 9.2% in the younger patients. In a study conducted by Fayyaz et al.[9], 24.8% of elderly emergencies have life-threatening conditions. Similar results were observed by Wolinsky et al.[12]

In our current study around 3.6% of elderly patients were brought dead compared to 0.8% of younger patients. It is
well known that the successful outcome of cardiopulmonary resuscitation in elderly patients is around 3.8%. Previous studies have also highlighted similar observations. Elderly patients admitted in emergency often have multiple co-morbidities and thus require a longer time for investigative procedures. It is mentioned in literature that, longer emergency stays before final admission lead to a higher mortality. Elderly patients not only have higher rates of admission but also longer hospital stays as compared to younger patients. Similar observations were made by previous studies done in US and Taiwan. The median length of stay in geriatric population irrespective of the level of triage category was significantly more as compared to that of younger population. The elderly suffer from multiple co-morbidities and thus require more time for various investigative procedures. This may lead to a longer hospital stay. Additionally, previous studies have also demonstrated that hospitals without geriatric department witness higher adverse outcomes among geriatric patients as compared to the younger patients.

Table 1: Demographic and clinical profile of the two groups

|                           | 18-60 Years (n=19,369) (78.2%) | >60 Years (n=5399) (27.5%) | P   |
|---------------------------|-------------------------------|-----------------------------|-----|
| Mean age                  | 39.8±4.2                      | 68.2±3.9                    | NS  |
| Gender                    |                               |                             |     |
| Male                      | 10304 (53.2%)                 | 3153 (58.4%)                | NS  |
| Female                    | 9065 (46.8%)                  | 2246 (41.6%)                | NS  |
| ESI triaging level        |                               |                             |     |
| Level 1                   | 1782 (9.2%)                   | 891 (16.5%)                 | <0.05|
| Level 2                   | 2886 (14.9%)                  | 1583 (29.3%)                | NS  |
| Level 3                   | 9182 (47.4%)                  | 2148 (39.8%)                | NS  |
| Level 4                   | 2647 (14.7%)                  | 557 (10.3%)                 | NS  |
| Level 5                   | 2672 (13.8%)                  | 221 (4.1%)                  | NS  |
| Day of presentation       |                               |                             |     |
| Weekends                  | 5500 (28.4%)                  | 1063 (19.7%)                | NS  |
| Weekdays                  | 13869 (71.6%)                 | 4366 (80.3%)                | NS  |
| Shift of presentation     |                               |                             |     |
| Morning (8am - 3pm)       | 5772 (29.8%)                  | 1803 (33.4%)                | NS  |
| Afternoon (3pm - 10pm)    | 9549 (49.3%)                  | 2317 (42.9%)                | NS  |
| Night (10pm to 8am)       | 4048 (20.9%)                  | 1279 (23.7%)                | NS  |
| Disposition from ED       |                               |                             |     |
| Admission                 | 7012 (36.2%)                  | 2965 (54.9%)                | <0.05|
| Brought dead              | 155 (0.8%)                    | 194 (3.6%)                  | NS  |
| LAMA                      | 174 (0.9%)                    | 70 (1.3%)                   | NS  |
| Discharge                 | 11951 (61.7%)                 | 2073 (38.4%)                | NS  |
| Expired                   | 77 (0.4%)                     | 97 (1.8%)                   | NS  |
| Inpatient care area of admission |                      |                             |     |
| General ward              | 5974 (85.1%)                  | 2314 (78%)                  | NS  |
| Intensive care area        | 1038 (14.8%)                  | 651 (21.9%)                 | <0.05|
| Median length of stay in emergency (mins) |                  |                             |     |
| Level 1                   | 315                           | 596                         | <0.001|
| Level 2                   | 316                           | 428                         | <0.001|
| Level 3                   | 233                           | 338                         | <0.001|
| Level 4                   | 209                           | 319                         | <0.001|
| Level 5                   | 116                           | 219                         | <0.001|

Data presented as number (percentage), Time in minutes as median, P<0.05 significant

Table 2: Frequency of geriatric presenting complaints to emergency

| Presenting complaint                  | Frequency (%) |
|---------------------------------------|---------------|
| Fever                                 | 226 (4.2%)    |
| Non-specific Chest pain               | 492 (9.1%)    |
| Neurological                          | 415 (7.7%)    |
| Shortness of breath                   | 739 (13.7%)   |
| Pain abdomen                          | 314 (5.8%)    |
| Trauma                                | 167 (3.1%)    |
| Poisoning                             | 157 (2.9%)    |
| Bites and stings                      | 243 (4.5%)    |
| Urinary tract                         | 206 (3.8%)    |
| Angina                                | 637 (11.8%)   |
| Advanced malignancy                   | 254 (4.7%)    |
| Psychiatric                           | 151 (2.8%)    |
| Upper gastrointestinal bleed and Ascitis | 426 (7.9%)    |
| Other nonspecific complaints          | 972 (18%)     |

Fever is one of the common symptom of presentation among the geriatric population. 4.3% of elderly patients presented with fever in our study. Fever in geriatric population can have both infectious as well as non-infectious etiologies. Ageing
causes enhanced vulnerability to infections. Malfunction of cardiovascular, renal and respiratory systems, malnutrition and breach of natural mechanical barriers increase the susceptibility of geriatric population to infections. The lack of regulation of T cells on B cells also contributes to the same.5 In our study the most common infectious causes of fever were urinary tract and lower respiratory tract infections in the geriatric population. Pneumonia has been reported as an important cause of morbidity and mortality in geriatric population.2,4 Urinary tract infection in our study was seen in 18.9% and 25.9% geriatric patients with and without co-morbidities respectively. In the previous studies, urinary tract infection has been reported in 5% to 30% of healthy geriatric population. However, higher rates have been reported among institutionalized geriatric males and females.21 Greater number of geriatric patients with underlying diseases had fever either due to infectious or non-infectious causes. Thus, co-morbidities such as diabetes mellitus, chronic renal failure and chronic liver disease render them immunocompromised and vulnerable to infections.22 The common non-infectious causes of fever in our study among geriatric population were rheumatological diseases, vasculitis and malignancies. Langford et al.23 documented that rheumatological diseases were the most common non-infectious causes of acute fever in geriatric population.

Thus, the geriatric population with underlying diseases should not only be evaluated for infectious causes but also non-infectious etiologies of acute fever.

### Table 3: Comparison of median length of stay in emergency between geriatric and younger Patients in each triage category

| Triage category | 18-60 years | >60 Years | *P* | 18-60 years | >60 Years | *P* |
|-----------------|-------------|-----------|-----|-------------|-----------|-----|
| Level 1         | Expired     | Survived  |     | Expired     | Survived  |     |
| Level 2         | 618         | 587       | 0.113 | 629         | 607       | 0.789 |
| Level 3         | 683         | 597       | 0.060 | 545         | 609       | 0.301 |
| Level 4         | 646         | 373       | <0.001 | 702         | 679       | 0.087 |
| Level 5         | 421         | 417       | 0.885 | 746         | 623       | 0.278 |
| Level 1         | -           | 223       | -    | -           | 243       | -    |

*P*<0.01 significant, *Mann-Whitney test, time in minutes

Elderly patients are also sicker, have longer emergency department stays and consequently have a higher cost of treatment. This impacts the morbidity and mortality pattern of these patients significantly. Previous studies have highlighted the role of discrete beds in the emergency department for geriatric patients. This concept is called as a “specialist emergency department”. This multidisciplinary model along with a discharge facility can decrease the length of stay of such patients and influence their morbidity and mortality significantly.24 Some studies have also suggested the role of “geriatric emergency departments” and “senior emergency rooms”. The aim of such setups is to identify geriatric patients with acute medical conditions, rapidly evaluate them, and provide optimal treatment at the earliest.25 Few studies in the past have also highlighted the neuropsychiatric complaints of the geriatric population.24 Thus, a psychiatrist should also be a part of geriatric emergency care team. The hilly state poses a geographical and demographic challenge to implement to improve geriatric emergency care centres. Thus, quality indicator projects should be taken up to upgrade the existing system of health care.27

### Key Points

1. The present study highlights the pattern of geriatric emergencies in the hilly areas of Uttarakhand.
2. Approximately, one-fourth of the emergencies belonged to the geriatric age group, out of which majority were critically ill. The elderly had longer emergency stays as they had multiple co-morbidities. Therefore, they had higher mortality.
3. There is an urgent need to establish a separate geriatric emergency department where a dedicated team of geriatric emergency care physicians can take care of this sub-set of population.

### Conclusion

Geriatric patients have a different pattern of health care needs compared to younger patients. The elderly have significantly higher admission rates, mortality rates and ICU admission rates. Additionally, the geriatric population has multiple co-morbidities which render them susceptible to various infections and cripple their immune response. Thus, their evaluation requires a multi-disciplinary team to facilitate their prompt diagnosis
and timely treatment. There is an urgent need for establishing specialist emergency departments and dedicated setups for geriatric population, to cater for the ever-increasing changes in demographic patterns; especially in developing countries like India.

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Conflicts of interest
There are no conflicts of interest.

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