

**ORIGINAL RESEARCH**

# Clinical and Demographic Profile of Geriatric Patients Admitted in Intensive Medical Care Unit of a Tertiary Care Hospital, Jodhpur, Rajasthan

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**ABSTRACT**

**Background:** Elderly populations are now the most rapidly growing population worldwide. The ageing population is currently and is expected to continue to place increasing demands on intensive care services. To improve facilities at tertiary care, first we should have statistical data of burden of geriatric patient's disease. Our aim of this study was to assess the clinical and demographic profile of elderly patients admitted to the intensive medical care unit. **Materials & Methods:** A hospital based longitudinal observational study done on 220 geriatric patients; those were admitted in intensive medical care unit of SN Medical College & Hospital, Jodhpur during one year period. The relevant history, clinical examination findings, comorbidities and etiological history were entered in case record form. SOFA score of every patient was calculated on admission. The Acute Physiology and Chronic Health Evaluation (APACHE) II score incorporates 12 physiologic variables, age, and an assessment of chronic diseases in individual patients. We entered the data from the analyzers and questionnaire into Microsoft Excel and analyzed it using SPSS version 16.0. **Results:** Our study showed that most of the patients fall under the age group of 60-70 years (58.63%). Out of total 220 geriatric patients, 137 (62.27%) are survivors and 83 (37.72%) geriatric patients are not-survivors. Most patients (N=144) needed ventilators in ICU. Out of total 144 who required ventilators 73 patients survived & 71 patients did not survive. Out of total 72 who did not require ventilators 64 patients survived & 12 patients did not survive. Comparison of mean value of APACHE II score, SOFA score & Charlson comorbidity index in survivors and non survivors was statistically not significant (P=0.2455, P=0.0038\*\* & P=0.0006\*\*\*). The mean value of ICU stay in survivors was 6.978 days and non-survivors was 8.566 days, which was statistically significant (P<0.0001\*\*\*). **Conclusion:** We found that mortality in elderly patients was higher among those with prolonged ICU stay. Rapid expansion of geriatric population, need to develop geriatric health care services and create awareness about the control of underlying diseases to reduce the mortality and morbidity is need of the last hour of the geriatric population.

**Keywords:** Geriatric Population, ICU, APACHE II Score, SOFA Score, Survivors, Non-survivors.

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**INTRODUCTION**

Ageing is a normal phenomenon, and the proportion of the elderly population is increasing due to improvement in living standards. The elderly populations are now the most rapidly growing population worldwide. The increase in life expectancy created new public health problems in developing countries like India. World population grows at a rate of 1.7% annually, the elderly population grows at a rate of 2.5% annually.<sup>1</sup> There has been increasing elderly population from 1991 to 2001 and it has been

projected that by the year 2050, the number of elderly people will increase up to about 324 millions.<sup>2</sup>

Given the increased demand by the aging population in presence of resource limitations, it is important to know the outcomes of elderly patients admitted to the ICU and factors contributing to these outcomes. Outcomes of elderly populations have previously been studied<sup>3,4</sup>, but aside from a large dataset of Medicare beneficiaries in the United States<sup>5</sup>, most reports are restricted to small patient groups or preselected geriatric cohorts.

Lack of health care facilities to manage multiple diseases in the ageing population which is most important need of ageing population at least 50% of the ageing population in India have chronic diseases. Non communicable diseases like hypertension, diabetes, musculoskeletal disorders, refractive disorders and their complications are increasing among ageing population.<sup>6</sup> Health services need to be increased and strengthened according to the increasing ageing population. At the same time facilities should improve the availability and accessibility to the tertiary care hospitals.

Knowledge of long-term outcomes of elderly ICU patients is also limited as most studies have data for only 1-2 years following discharges from the hospital.<sup>7,8</sup> With increased life expectancy, such longer-term data become highly relevant. To improve facilities at tertiary care, first we should have statistical data of burden of geriatric patient's disease. Our aim of this study was to assess the clinical and demographic profile of elderly patients admitted to the intensive medical care unit.

## MATERIALS& METHODS

A hospital based longitudinal observational study was done on 220 geriatric patients; those were admitted in intensive medical care unit of SN Medical College & Hospital, Jodhpur during one year period.

### Inclusion Criteria

- All geriatric age patients admitted in intensive medical care unit.
- Age  $\geq$  60 years at the point of admission
- Any elective admission to critical care was excluded from analysis
- Informed consent was not obtained from or on behalf of the participants as all data used in the study was routinely collected during their stay on intensive care.

### Method

During this study period, all patients admitted in the ICU were recruited for the study. After admission, the patients were divided into survival group (those who were discharged from the ICU after improvement) and non-survival group (those who died in the ICU).

### Data Collection

Data collection was done for all participants including patients' demographics and medical history, length of stay in the ICU.

A hospital-wide computerized database (Computerized Patient Support System, CPSS Singapore) that collects all the electronic records, including discharge summaries and biochemical, haematological, microbiological, and radiological investigations, was used to record the following data: demographics, comorbidities, preadmission

conditions, admission source, length of stay, diagnosis, investigations (haematology and biochemistry), and outcomes (ICU and hospital).

All the investigations, ventilator related parameters and treatment given were entered in the case record form. The length of MNICU stay and outcome were determined.

The relevant history, clinical examination findings, comorbidities and etiological history were entered in case record form. SOFA score of every patient was calculated on admission.

The Acute Physiology and Chronic Health Evaluation (APACHE) II score incorporates 12 physiologic variables, age, and an assessment of chronic diseases in individual patients.

### Statistical Analysis

We entered the data from the analyzers and questionnaire into Microsoft Excel and analyzed it using SPSS version 16.0. In order to compare quantitative and qualitative variables between the groups, Mann-Whitney and Chi-square tests were applied, respectively.

## RESULTS

Ours study showed that most of the patients fall under the age group of 60-70 years (58.63%), followed by 71-80 years age group (22.72%). 18.63% were more than 80 years of age. Out of total 220 geriatric patients, 137 (62.27%) are survivors and 83 (37.72%) geriatric patients are not-survivors.

Out of total 143 male patient 82 (57.34%) survived while 61 (42.65%) died. Out of total 77 female patient 55 (71%) survived while 22 (28%) died hence survival of female patient was more as compared to male patients.

According to modified Kuppaswami scale, mostly patients were lower class 102 (46.36%) followed by upper lower class 75 (34%), lower middle class 27 (12%), upper middle class 11 (5%) & only 5 (2.2%) patients had upper class in our study. Mostly patients reside in rural areas 127 (57.72%) as compared to urban area 93 (42.27%). Most patients (N=144) needed ventilators in ICU. Out of total 144 who required ventilators 73 patients survived & 71 patients did not survive. Out of total 72 who did not require ventilators 64 patients survived & 12 patients did not survive (table 1).

Mean score of APACHE II, SOFA score & charlson comorbidity index was  $28.89 \pm 6.552$ ,  $9.182 \pm 5.383$  &  $6.350 \pm 2.942$  in overall geriatric patients in ICU. Comparison of mean value of APACHE II score, SOFA score & charlson comorbidity index in survivors and non survivors was statistically not significant ( $P=0.2455$ ,  $P=0.0038^{**}$  &  $P=0.0006^{***}$ ). The mean value of ICU stay in survivors was 6.978 days and non-survivors was 8.566 days, which was statistically significant ( $P < 0.0001^{***}$ ) (table 2).

**Table 1: Demographic profile of geriatric patients in ICU**

Age profile	Overall (N=220)	Outcome	
		Survivors (N=137)	Death (N=83)
<b>Age (yrs)</b>			
60-70 yrs	129	76	53
71-80 yrs	50	39	11
>80 yrs	41	22	19
<b>Gender</b>			
Male	143	82(57%)	61(42%)
Female	77	55(71%)	22(28%)
<b>Socioeconomic status</b>			
Upper class	5	4	1
Upper middle class	11	7	4
Lower middle class	27	20	7
Upper lower class	75	52	23
Lower class	102	54	48
<b>Residential profile</b>			
Rural	127	80	47
Urban	93	57	36
<b>Use of Ventilator in ICU</b>			
Yes	144	73	71
No	76	64	12

**Table 2: Clinic profile of geriatric patients in ICU**

Clinical score	Overall (N=220)	Outcome		P-value
		Survivors (N=137)	Death (N=83)	
APACHE II	28.89±6.552	28.61±6.267	29.35±7.013	0.2455
SOFA Score	9.182±5.383	8.752±4.737	9.892±6.272	0.0038**
Charlson comorbid score	6.350±2.942	5.708±2.432	7.410±3.389	0.0006***
Hospital stay (in days)	7.772±2.097	6.978±2.113	8.566±2.148	<0.0001***

## DISCUSSION

Health problems associated with geriatric population were multiple and outcomes from the acute medical illnesses are variable. There is a tremendous increase in the geriatric population in developing countries like INDIA. At the same time disease burden is also increased in India, consisting of non-communicable diseases which are major burden in geriatric people. In INDIA Geriatric health care services are lagging behind when compared to the developed countries. There is no clear clinical data available on disease profile in the geriatric population regarding hospital admissions.

In our study 220 Patients were admitted in acute medical care unit during the above period. Most of the patients fall under the age group of 60-70 years (58.63%), followed by 71-80 (22.72%). 18.63% were more than 80 years of age. ICU mortality rate was 39 % had occurred in 60-80 years of age group in our study. Although age has frequently been examined as a prognostic factor related to mortality of patients admitted to the ICU, few prior studies have provided quantitative estimates of increased risk associated with specific age intervals. Most of these studies adopted different selection criteria when defining an elderly population, mainly ranging from 60 to 85 years of age and not differentiating between various age intervals.<sup>9,10</sup> In a study done by Castillo et

al.<sup>11</sup> they showed that ICU mortality rates for patients aged  $\geq 75$  years, varying from 22% to 31%, reflect differences in underlying diseases and severity of illness on admission and are mostly related to underlying disease, severity of illness, nosocomial infection, evolving organ dysfunction and quality of care after discharge from the ICU.<sup>11-13</sup>

Risk prediction in elderly patients will become increasingly important over the next decade as the population ages. More accurate prognosis predictions in critically ill elderly patients may help to decrease morbidity, improve therapeutic strategies and increase patients' quality of life.<sup>14</sup>

In our study Male to female patients' ratio was 2:1. Similar profile of male to female ratio 1.6:1 is observed by Venkatesh et al.<sup>15</sup> A study by Salma M.S. et al.<sup>16</sup> male to female ratio of 1:2 with mortality 43.6%.

According to modified Kuppaswami scale, mostly patients were lower class 102 (46.36%) followed by upper lower class 75 (34%), lower middle class 27(12%), upper middle class 11(5%) & only 5(2.2%) patients had upper class in our study.

In India, mostly people reside in rural areas, they depend on limited sources for earning money & living standard. So, there is limited access to health care service especially in elderly patients due to poor income source. Mostly patients belong to rural areas

(57.72%) as compared to urban areas (42.27%). There is very less data available on this scenario in INDIA especially in northern rural areas.

The mean score of APACHE II was  $28.89 \pm 6.552$  in overall geriatric patients in ICU. The comparison of mean value of APACHE II score was statistically not significant ( $P=0.2455$ ) in survivors and non-survivors. The APACHE II score measures severity of illness using a numerical score based on physiological variables selected because of their known impact on mortality: a more ill patient has more deranged values and a higher APACHE II score.<sup>17</sup> As in other studies<sup>18-21</sup> the APACHE II score was sufficiently accurate in the present study to be able to predict mortality in individual patients. The APACHE II score alone can, therefore, be used to predict the outcome of critically ill elderly patients on admission. The mean score of SOFA was  $9.182 \pm 5.383$  in overall geriatric patients in ICU. The comparison of mean value of SOFA score was statistically significant ( $P=0.0038^{**}$ ) in survivors and non-survivors. Our study substantiates similar result of higher SOFA score in non-survivor patients similar to other studies by Sodhi et al,<sup>22</sup> Qiao Q et al.<sup>23</sup>

The mean score of Charlson comorbid index was  $6.350 \pm 2.942$  in overall geriatric patients in ICU. The comparison of mean value of Charlson comorbid index score was statistically significant ( $P=0.0006^{***}$ ) in survivors and non-survivors. A study done by Poses et al.<sup>24</sup>, demonstrated that the Charlson index, as a univariate predictor, had a linear relationship with hospital mortality for ICU patients. Another study done by Susan Quach et al<sup>18</sup> concluded that the Charlson index might be considered as an alternative method of risk adjustment and therefore facilitate comparisons between intensive care units.

The mean value of ICU stay in survivors was 6.978 days and non-survivors was 8.566 days, which was statistically significant ( $P<0.0001^{***}$ ). Similar findings done by Salma M. S. El Said<sup>16</sup>, who found that the mean length of ICU stay was 7.03 days among the survival group and 10.15 days among the non-survival group with high statistically significant difference ( $p = 0.004$ )

Most patients ( $N=144$ ) needed ventilators in ICU. Out of total 144 who required ventilators 73 patients survived & 71 patients did not survive. Out of total 72 who did not require ventilators 64 patients survived & 12 patients did not survive.

Greater healthcare utilization by the growing elderly population is likely to put a strain on the hospital services including the intensive care units (ICUs). Mechanical ventilation use in ICUs in geriatric patients was indicative of disease severity. Most common cause of admission in ICUs was cerebrovascular disease secondary to uncontrolled hypertension (34.09%), followed by COPD and cardiac causes, least common causes are DVT with PTE, peptic ulcer, acute pancreatitis etc. According to S.Vosylius et al<sup>25</sup> 49% ICU admission are due to

neurological diseases, 41.5% are due to cardiac diseases. According to K.Sodhi et al<sup>22</sup> found 22.24.6% are due to medical causes, 15.8% are due to renal causes, 6.3% are due to neurological causes, 5.14% are due to cardiac causes, 7.64% are due to pulmonary causes. Another study done by Venkatesan et al<sup>15</sup> found 50% HTN, 38.8% DM, 16.04% IHD, 14.5% COPD, 12.4% metabolic encephalopathy.

## CONCLUSION

The ageing population is currently and is expected to continue to place increasing demands on intensive care services. As a result, the last decade has seen a drive for prognostic models with the aim to improve medical service allocation by better selecting patients who are more likely to benefit from treatment escalation. Critically ill elderly patients have multiple system disorders and complications. We found that mortality in elderly patients was higher among those with prolonged ICU stay.

The APACHE II score has excellent capability to predict mortality on the basis of values measured within the first 24 h after admission. Sequential scoring like SOFA after 48 hours can be helpful in monitoring and predicting the clinical outcome rather than one time scoring. A rising SOFA score will indicate deteriorating clinical condition and guide further therapy.

Clinical presentation and outcome of disease may be different due to various factors. Rapid expansion of geriatric population, need to develop geriatric health care services and create awareness about the control of underlying diseases to reduce the mortality and morbidity is need of the last hour of the geriatric population.

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