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Morbidity Pattern And Outcome of Patients Admitted At Intensive Care Centre of A Tertiary Care Hospital

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Abstract:
Introduction: *Intensive care medicine has developed into a highly specialised discipline covering several fields. Evaluation of the morbidity and outcome of admitted patients can assess the efficacy of treatment, making it possible to take better decisions, to further improve quality of care, to standardize conduct, and to ensure effective management of the high-level resources.*
Objectives:
1) *To study the morbidity and outcome profile of patients admitted to ICU of the tertiary care centre.*
2) *To study causes of death of patients admitted at ICU.*
Study design: *Cross sectional descriptive record based study.*
Study period: *1st January 2014 to 1st December 2015.*
Study Setting: *Dr. Shankarrao Chavan Government Medical College, Maharashtra.*
Data collection: *Data collected from the ICU register and the IPD case record sheet.*
Data entry & Statistical analysis: *It was done by using Microsoft Excel – 2007 software.Statistical analysis was carried out with help of statistical measures, such as percentages, proportion, and chi square test using software Statistical Package for Scientific Solutions (SPSS) version 16.0.*
Results: *During the period of the study, a total of 1,624 patients were admitted into ICU of the 1624 admitted patients, 951(58.55%) were male and 673 (41.44%) were female. Among the study patients, 73.09% belonged to a rural background as compared to only 26.90% from urban areas. The major cause of morbidity among the patient admitted was due to cardiovascular diseases (19.88%), followed by respiratory (18.04%) and organophosphate (OP) poisoning (12.50%). Four hundred fifty one (27.77%) patients died during the period, consisting of 265 (58.75%) males and 186 (41.24%) females.Most of the deaths occurred due to respiratory illness (19.06%), cardiovascular diseases (17.29%) and OP poisoning (11.52%).*
Conclusion: *The primary reasons for admission into the ICU among the patients were cardiovascular problems and respiratory illness while cardiovascular problems, respiratory illness and OP poisoning were the major contributor to the mortality.*
Keywords: *ICU, morbidity of patients, Los*

I. Introduction

Intensive care may be broadly defined as a service for patients who have potentially recoverable conditions, who can benefit from more detailed observation and invasive treatment that can be provided safely in a high dependency area. Intensive care represents the highest level of continuing patient care and treatment.[1]A patient whose condition is extremely serious, possibly life-threatening, is often taken to an Intensive Care Unit (ICU) which provides constant observation and treatment from specially trained staff qualified to use specialised equipment.

In recent decades, intensive care medicine has developed into a highly specialised discipline covering several fields of medicine. It is usually only offered to patients whose condition is potentially reversible and who have a good chance of surviving with intensive care support. Since these patients are critically ill, the outcome of intervention is sometimes difficult to predict. In critical care medicine, intensive care unit results can be assessed on the basis of outcomes such as "death" or "survival" by means of indicators such as mortality rates. Evaluation of the outcomes of medical interventions can assess the efficacy of treatment, making it possible to take better decisions, to further improve quality of care, to standardize conduct, and to ensure

effective management of the high-level resources needed to deliver intensive care services thereby optimizing resource utilization.[2]

Mortality rates in the ICU strongly depend on the severity of illness and the patient population analysed. Across different ICUs, 6.4% to 40% of critically ill patients were reported to die every year despite intensive care medicine. Mortality in patients depends on factors such as demographic and clinical characteristic of population, infrastructure, non-medical factors (management and organization), admission practice and also by ICU performance.[3] ICU beds are limited in any hospital. Rationalized use for needy patients therefore is necessary. Length of stay (LOS) is, therefore, used to assess quality of care and resource utilization.[4] Although pathophysiological processes and new treatment approaches are extensively analysed in laboratory and clinical research, comparably less data are available on the causes of death, short- and long-term outcomes of critically ill patients.[5] This study is, therefore, conducted to study the pattern of cases being admitted into our ICU and their outcome.

II. Objectives

1) To study the morbidity and outcome profile of patients admitted to ICU of the tertiary care centre.
2) To study causes of death of patients admitted at ICU.

III. Materials And Methods

Study design: Cross sectional descriptive record based study.
Study period: 1stJanuary 2014 to 1st December 2015.
Sample Participant: 1,624 patients admitted into ICU during 1stJanuary 2014 to 1stDecember 2015.
Study Setting: Dr. Shankarrao Chavan Government Medical College, Vishnupuri, Nanded, is a 550 bed tertiary care government hospital. The hospital operates a well-equipped 13 bed modern MICU, which admits critically ill patients 14 years of age and above, from medical subspecialties.
Data collection: As it is a record based study data was collected from the ICU register and the IPD papers. ICU records of all admissions, transfers out, discharges, and deaths were utilized for the purpose of this study. Data extracted from the records included age, sex, diagnosis, duration of stay in the unit, and outcome profile. Outcome was classified as transfers to medicine ward, cure and discharged, discharges against medical advice (DAMA), absconded and death.
Data entry & Statistical analysis: It was done by using Microsoft Excel – 2007 software. Statistical analysis was carried out with help of statistical measures, such as percentages, proportion, and chi square test using software Statistical Package for Scientific Solutions (SPSS) version 16.0. Ethical approval was waived by the Ethics Committee of the hospital as this is a retrospective observational study, confidentially and anonymity was maintained.

IV. Results

During the period of the study, a total of 1,624 patients were admitted into ICU. Of them, 549 were MLC (Medico-legal cases) patients while 1075 were Non MLC patients.There were total 951 (58.55%)male and 673 (41.44%) female patients included in the study. Male MLC predominated over female MLC which were 406 (25.00%) and 143 (8.80%) respectively.

The maximum number of cases of MLC as well as non MLC were in the age group of 20 -39 years, 626 (38.54%). The least affected age group was >80 years with 35 (2.15%) cases. ICU admission rates rose rapidly with age, but then declined among the oldest people (Fig.1). Out of the 1,624 patients admitted in the study period 1187 (73.09%) belong to rural area and 437 (26.90%) belong to urban area. According to availability of the BPL cards on the recorded indoor paper 1299 (79.98%) were BPL and 325 (20.01%) were APL(Fig.2).People with lower incomes had higher rates of ICU admission. Education and professional status of the patient was not mentioned in any case paper.

The two most common disease categories admitted were cardiovascular disease (19.88%) and respiratory disease (18.04%).A higher proportion of both females 164 (24.36%) and males 159 (16.71%) presented with cardiovascular diseases. This relationship was statistically significant (P = 0.001) (Table 1).

Out of 549 MLC patients admitted in ICU, OP poisoning (12.50%) followed by Unknown poisoning (7.94%) was the most common reason for morbidity among MLC patients. Out of 203 cases of OP poisoning, 162 (17.03%) were male and 41 (6.09%) were female. The least common reason for morbidity among these patients was due to kerosene poisoning with 5 cases (Table 2).

Overall mortality of critically ill patients in the ICU was 27.77% (451/1624). In-hospital mortality of patients admitted to the ICU because of respiratory diseases, cardiovascular diseases and OP poisoning was 19.06%, 17.51%, and 11.52%, respectively (Table 3).

In our study, 1010 (62.19%) patients improved and were transferred to the medicine wards for further management, 69 (4.24%) were discharged, 56 (3.44%) left against medical advice, and 38 (2.33%) absconded (Fig.3). Four hundred fifty one (27.77%) patients died during the period, consisting of 265 (58.75%) males and 186(41.24%) females. 86 (19.06%) patients died of respiratory disease, 79 (17.51%) of cardiovascular diseases, 52 (11.52%) of OP poisoning, 41(9.09%) due to gastrointestinal illness.

A higher proportion of males, 265 (27.86%), died following admission compared to females, 186 (27.63%). This relationship wasnot statistically significant ($P = 0.919$). Majority of deaths were in the age group 40-69 (29.04%) and 20-39 (28.27%) followed by>69 (26.25%) and <20 (21.85%). This relationship was not statistically significant ($P = 0.326$). The mean length of stay (LOS) in the ICU was 3.89 ± 4.06 days (range, 0–28 days). Mortality among patients who stayed for two day or less was 31.40%, while it was 34.69% for those who stayed for more than ten days. A higher proportion of the patients who stayed more than ten days in the ICU died. This relationship was statistically significant ($P = 0.004$) (Table 4).

V. Discussion

Criteria for admission into the ICU include patients needing technological support such as mechanical ventilation and/or invasive monitoring.It also includes patients who are critically ill but recoverable who need care other than that available in the general wards. In the present study, cardiovascular, respiratory diseases and OP poisoning were the major causes of admission into the ICU of the tertiary care centre studied.

Male outnumbered female in the present study,it was also documented by **Ala. S et al (2012).**[6] Percentage of males getting admitted to the hospital is more than female patients may be because it is a male dominating community which gives importance to males in the families with least priority to females in this region. Patients aged 20 -39 year old (38.54%) were the most common age group admitted to the ICU, **Ala. S et al (2012)**[6] also reported the similar result, where patient aged 20 -29 years old (19.4%) were more common.

Cardiovascular disease entity was the commonest (19.88%) cause of admission. Similarly, cardiovascular diseases (16.40%) was the most common cause of admission in the ICU in the study of intensive care unit occupancy and patient outcome by **Iwashyna. Tet al (2009)**.[7]

Respiratory (19.06%) and cardiovascular (17.51%) diseases were the major causes of mortality in the ICU among the Non MLC patients. In a previous study by **Paudel. R et al (2011**)[13] cardiovascular diseases (22.86%) and respiratory diseases (22.86%) were the major cause of mortality.As most of the patients belong to BPL and rural areas. This may be due to suboptimal long-term medical care in the dispensaries located in the periphery or Primary health centre (PHC) and delay in obtaining specialised help during the final attack.

It was observed that most of the MLC were of male (75.04%). This is consistence with the study by **Trangadia. M et al (2014)**[8] where (72.77%) were male. The male predominance may be explained by the fact that males by nature indulge in more violent activities as compared to females.

In the present study, OP poisoning (12.5%) followed by Unknown poisoning (7.94%) and Snake bite (7.56%) were the most common type of poisoning. Other studies in India by **Ahuja. H et al (2015)**[9] reported organophosphorus compounds (32.8%) to be the commonest poison consumed followed by aluminium phosphide (20.9%) and **Ramesha. Ket al (2015)**[10] reported organophosphorus (36%) to be most common poisoning followed by Snake bite (16.2%). The rampant use of organophosphorus pesticides in our country, the ease of their availability, their low cost are probably some of the reasons why these are commonly employed for self- poisoning. Majority of the patients 88% consumed the poison with suicidal intent as compared with 12% of the patients exposed accidentally. Similar findings were reported by **Maharani B et al (2013)**[11] where (98.66%) cases were of intentional poisoning and (1.44%) were due to accidental poisoning.

The study recorded lower mortality (31.40%) in short-stay patients (patients who stayed for less than two days) than in long-stay patients (34.69%). Although study by **Frick S et al (2003)**[12] reveal that there is correlation between length of stay and outcome of patients,**Ala. S et al (2012)**[6] show no relationship. Our observed mortality rate was low. Important factors that may have contributed to survival in these patients include adequate manpower and equipment and provision of continuous medical education on critical care from time to time for staff by the institution.

Establishing databases and studying outcome trendsadds to key knowledge about performance and resourceallocation. Important information about the mortalityof ICU patients among different ICUs can also guidein decisions regarding the burden of treatment and success rates.

VI. Conclusion

The primary reasons for admission into the ICU among the patients were cardiovascular problems and respiratory illness while cardiovascular problems, respiratory illness and OP poisoning were the major contributor to the mortality. Organophosphorous poisoning is the most common poisoning admissions that require intensive care admission and management. Majority of the patients recovered which indicates good

emergency and intensive care management.The incidence of poisoning and its morbidity and mortality can be reduced by developing and implementation of effective prevention strategies. An effective ICU goes a long way in reducing morbidity and mortality. With low mortality rate in patients who stayed for long duration, we would say that total quality management of our ICU patients was optimal. We conclude that a well-equipped ICU with modern and innovative intensive care greatly facilitates the care of critically ill patients giving desirable outcome. Those responsible for health system planning need such data to understand current ICU needs, and to ensure that they are able to meet projected future needs. Also, identifying subgroupswith disproportionately high utilization is the starting point for further research to illuminate the reasons for such phenomena, and to devise strategies for reducing critical illness in high-risk groups.

VII. FIGURES AND TABLES

Fig 1. Distribution of patients according to age.

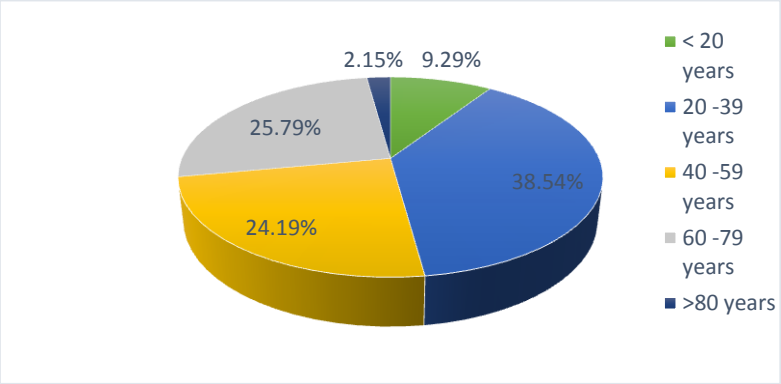

Fig 2. Distribution of patients according to Socio-demographic Characteristic.

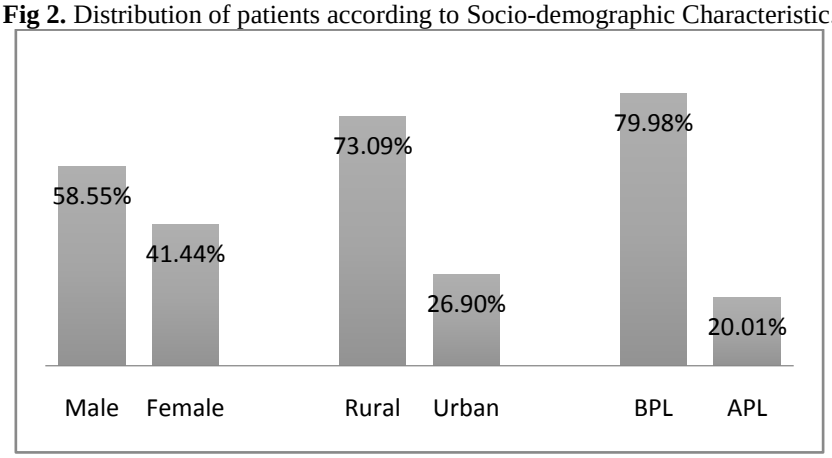

Table 1: Sex wisedistribution of reasons for morbidity in Non MLC patients.

Reasons (ICD-10-CM Diagnosis Code)	**Male**		**Female**		**Total**	
	(f)	**(%)**	**(f)**	**(%)**	**(f)**	**(%)**
Cardiovascular (I00 –I99)	159	16.71	164	24.36	323	19.88
Respiratory (J00 –J99)	170	17.87	123	18.27	293	18.04
Neurological (G00 –G99)	51	5.36	53	7.87	104	6.40
Gastrointestinal (K00 –K95)	35	3.68	47	6.98	82	5.04
Diabetic Ketoacidosis (E13.11)	37	3.89	29	4.30	66	4.06
Febrile illness (R50)	35	3.68	25	3.71	60	3.69
Severe anaemia (D63.8)	14	1.47	44	6.53	58	3.57
Tuberculosis (A15 –A19)	24	2.52	27	4.01	51	3.14
Nephropathy (N00 –N99)	18	1.89	15	2.22	33	2.03
Others	2	0.21	3	0.44	5	0.30

□² = 28.01, df (9), P= 0.001.

Table 2: Sex wise distribution of reasons for morbidity in MLC patients.

Reasons (ICD-10-CM Diagnosis Code)	**Male**		**Female**		**Total**	
	(frequency)	**(%)**	**(frequency)**	**(%)**	**(frequency)**	**(%)**
OP poisoning (T60.0X1A)	162	17.03	41	6.09	203	12.50
Unknown poisoning (T60.8X3A)	91	9.56	38	5.64	129	7.94
Vasculotoxic Snake bite (T63.001A)	67	7.04	31	4.60	98	6.03
Rodenticide poisoning (T60.4X1)	25	2.62	11	1.63	36	2.21
Neurotoxic Snake bite (T63.001A)	17	1.78	8	1.18	25	1.53
Hanging (T71.161)	12	1.26	1	0.14	13	0.80
Insecticide inhalation (T60.2X1)	11	1.15	2	0.29	13	0.80
Unknown bite (E906.5)	5	0.52	5	0.74	10	0.61
Drowning(W74.XXXA)	6	0.63	3	0.44	9	0.55
Alcohol withdrawal (F10.230)	8	0.84	0	0	8	0.49
Kerosenepoisoning (T52.0X2)	2	0.21	3	0.44	5	0.30

□² = 18.89, df (10), P= 0.0417.

Table 3: Mortality in the patient groups according to primary reason of ICU admission.

Primary reason for admission	**(f)**	**(%)**
Respiratory	86	19.06
Cardiovascular	79	17.51
OP poisoning	52	11.52
Gastrointestinal	41	9.09
Neurological	39	8.64
Unknown poisoning	30	6.65
Vasculotoxic snake bite	19	4.21
Tuberculosis	17	3.76
Rodenticide poisoning	17	3.76
Febrile illness	15	3.32
Nephropathy	14	3.10
Severe anaemia	9	1.99
Diabetic Ketoacidosis	8	1.77
Neurotoxic snake bite	8	1.77
Alcohol withdrawal	5	1.10
Drowning	4	0.88
Insecticide inhalation	3	0.66
Unknown Bite	2	0.44
Hanging	1	0.22
Kerosene poisoning	1	0.22
Others	1	0.22

Fig 3: Outcome of admitted patients.

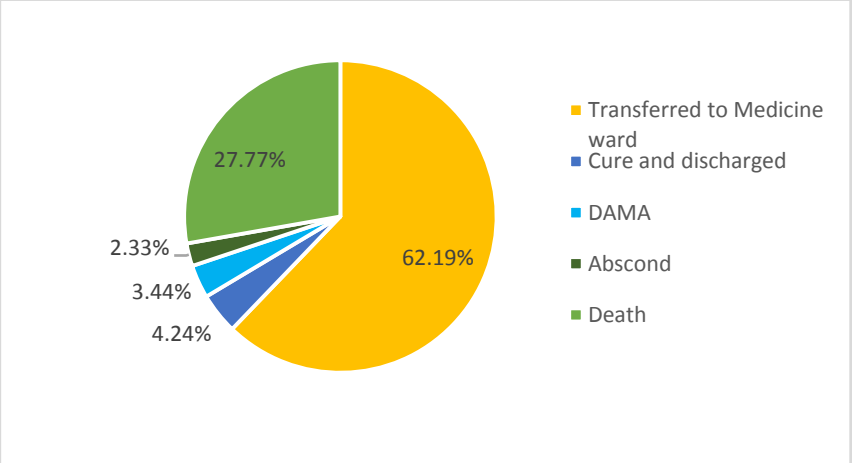

Table 4: Socio-demographic variable and outcome following admission of patients.

Characteristics	Outcome following admission n (%)		Chi-square, df and P Value
	Survival	Death	
Sex			
Male	686 (72.13)	265 (27.86)	χ^2= 0.010, df (1), P= 0.9195
Female	487 (72.36)	186 (27.63)	
Age group (years)			
<20	118 (78.14)	33 (21.85)	χ^2= 3.457, df (3), P= 0.3264
20 -39	449 (71.72)	177 (28.27)	
40 -69	474 (70.95)	194 (29.04)	
>69	132 (73.74)	47 (26.25)	
Length of stay (days)			
≤ 2	557 (68.59)	255 (31.40)	χ^2=10.74, df (2), P= 0.0047
3- 10	433 (76.09)	136 (23.90)	
>10	183 (75.30)	60 (34.69)	

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