# Retrospective review of disease patterns and outcomes of patients admitted in Medical Intensive Care Unit (MICU) of Government Medical College and Hospital, Srinagar (Uttarakhand)

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## Abstract

**Background:** The intensive care unit (ICU) is a health care delivery service for patients who are critical with potentially recoverable diseases. They can benefit from more detailed observation, monitoring, and treatment than is generally available in the standard lying-in ward or department. It becomes important to audit admissions and their outcome with the aim of modifying practices if necessary following thorough introspection, leading to better patient outcomes.
**Objective:** To assess disease patterns and outcomes of admissions into the MICU of Government Medical College and Hospital, Srinagar (Uttarakhand).
**Material and Methods:** A one-year retrospective study from January 2014 to December 2014 reviewed the admissions into the MICU of Government Medical College and Hospital, Srinagar. ICU records of all admissions, referred, discharges, and deaths were utilized for the purpose of this study. Statistical analysis was done using the Statistical Package for Scientific Solutions (SPSS) version 22.0.
**Results:** A total of 1109 patients (633 males and 476 females) were admitted into the MICU. Maximum Number of Patients (41.8%) admitted was in the age group of $\geq 60$ years. The overall mortality rate was 9.7%.
**Conclusions:** The leading cause of admissions in MICU was found to be cardiovascular, respiratory and neurological conditions. An effective ICU goes a long way in reducing mortality and morbidity and greatly facilitates the care of critically ill patients giving desirable outcome. Statistical significant relationship was found among different age groups and length of stay in MICU with outcome following admission in MICU.

**Keywords:** Disease Patterns, MICU, Audit, Outcome of Patients

## Introduction

The intensive care unit (ICU) is a health care delivery service for patients who are critical ill with potentially recoverable diseases. They can benefit from more detailed observation, monitoring, and treatment than is generally available in the standard lying-in ward or department.[1] The main purpose of the ICU is to prevent mortality by intensively monitoring and treating critically ill patients who are considered at high risk of mortality. This, however, comes at a huge cost to all the parties involved—the hospital, the personnel, and the caregivers of patients.[2] 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. 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.[3] Although mortality in patients depends on many factors such as demographic and clinical characteristic of population, infrastructure and non-medical factors (management and organization, time taken to reach health care), and admission practice, it is also affected by ICU performance.[4] This study is, therefore, conducted to audit the pattern of cases being admitted into our MICU and their outcome. The term "audit" implies a professional commitment to improvement and involves a systematic approach highlighting opportunities for improvement and positive change in clinical practice.[5] It becomes important to audit admissions and their outcome with the aim of modifying practices if necessary following thorough introspection, leading to better patient outcomes.

## Material and Methods

This retrospective study reviewed the admissions into the MICU of a Government Medical College & Hospital, Srinagar (Uttarakhand) in India from January 2014 to December 2014. This hospital is 500 bedded

hospital having a separate well-equipped 10-bedded MICU.

ICU records of all admissions, referred, 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. Outcome is classified as discharge, refer, left against medical advice (LAMA), discharge on patient request (DOPR) and death. Ethical approval was obtained from Institutional Ethical Committee.

Data was analyzed using Microsoft Excel 2007 and the Statistical Package for Scientific Solutions (SPSS) version 22.0. Proportions were calculated and Chi square test was used as a test for significance. A p value of less than 0.05 was considered significant.

### Results

A total of 1109 patients were admitted into MICU from Jan 2014 to Dec 2014. Of them, 633 (57.1%) were males and 476 (42.9%) were females. Maximum Number of Patients (41.8%) admitted was in the age group of ≥ 60 years (Table 1). The three most common conditions for admission in MICU were Cardiovascular (31.7%), Respiratory (17.2%) and Neurological (14.3%) and a higher proportion of both males (37.0%) and females (24.6%) presented with cardiovascular diseases (Table 2). The admission rates were in MICU were more or less same for Alcohol intoxication, Poisoning, Snake Bite, Anaphylactic shock and Multi Organ Dysfunction Syndrome (MODS). These miscellaneous diseases were kept in a separate group. Miscellaneous and Neurological conditions were the commonest cause of admission in the age group of < 20

years and 20-40 years respectively while 40 years and above cardiovascular disorder was the main cause of admission in MICU (Table 3).

About half (47.7%) of the patients were cured and discharged from MICU. 254 (22.9%) patients were referred to higher centre for further management and 47 (4.2%) left against medical advice (LAMA). The overall mortality rate was 9.7% (Table 4).

A higher proportion of males, 67 (10.6%) died following admission compared to females, 40 (8.4%) however the association was not statistically significant (p = 0.22). The patients in the age group of less than 20 years had 2 deaths while those 20 to 40 years and 40 to 60 years had 14 and 34 deaths respectively. Maximum number of deaths (57) occurred in the age group of≥ 60 years. The association between age group and death was found to be statistically significant (p= 0.03). (Table 5).

Mortality among patients who stayed for one day or less was 13.6%, while it was 16.0% for those who stayed for more than seven days. A significant association was observed between duration of stay at MICU and death (p= 0.00) (Table 6).

**Table 1: Age Group wise Distribution of Patients admitted in MICU**

| Age Group (in Years) | Male (%) | Female (%) | Total (%) |
|---|---|---|---|
| < 20 | 31 (4.9) | 45 (9.5) | 76 (6.8) |
| 20-40 | 92 (14.5) | 89 (18.7) | 181 (16.3) |
| 40-60 | 240 (37.9) | 149 (31.3) | 389 (35.1) |
| ≥60 | 270 (42.7) | 193 (40.5) | 463 (41.8) |
| Total | 633 (100.0) | 476 (100.0) | 1109 (100.0) |

**Table 2: Conditions causing admission into the MICU**

| Conditions | Sex | | Total (%) |
|---|---|---|---|
| | Male (%) | Female (%) | |
| Cardiovascular | 234(37.0) | 117 (24.6) | 351 (31.7) |
| Respiratory | 111 (17.5) | 80 (16.8) | 191 (17.2) |
| Neurological | 82 (12.9) | 76 (16.0) | 158 (14.3) |
| Infections/Sepsis | 38 (6.0) | 43 (9.0) | 81 (7.3) |
| Gastrointestinal | 41 (6.5) | 29 (6.1) | 70 (6.3) |
| Renal | 27 (4.3) | 22 (4.6) | 49 (4.4) |
| Endocrinal | 22 (3.5) | 22 (4.6) | 44 (4.0) |
| Haematologic | 18 (2.8) | 23 (4.8) | 41 (3.7) |
| Electrolyte Imbalance | 13 (2.1) | 17 (3.6) | 30 (2.6) |
| Miscellaneous | 47 (7.4) | 47 (9.9) | 94 (8.5) |
| Total | 633 (100.0) | 476 (100.0) | 1109 (100.0) |

**Note:** Miscellaneous include Alcohol intoxication, Poisoning, Snake Bite, Anaphylactic shock and Multi Organ Dysfunction Syndrome (MODS).

**Table 3: Conditions causing admission in MICU according to age group of patients**

| Condition | Age group (in Years) | | | | Total (%) |
|---|---|---|---|---|---|
| | < 20 (%) | 20 – 40(%) | 40 – 60 (%) | ≥ 60 (%) | |
| Cardiovascular | 01 (1.3) | 19 (10.5) | 140 (36.0) | 191 (41.2) | 351 (31.7) |
| Respiratory | 07 (9.2) | 25 (13.8) | 67 (17.2) | 92 (19.9) | 191 (17.2) |
| Neurological | 13 (17.1) | 34 (18.8) | 51 (13.1) | 60 (13.0) | 158 (14.3) |
| Infections/Sepsis | 09 (11.8) | 16 (8.8) | 26 (6.7) | 30 (6.5) | 81 (7.3) |
| Gastrointestinal | 15 (19.7) | 24 (13.3) | 20 (5.2) | 11 (2.4) | 70 (6.3) |
| Renal | 04 (5.3) | 08 (4.4) | 19 (4.9) | 18 (3.9) | 49 (4.4) |
| Endocrinal | 01 (1.3) | 11 (6.1) | 14 (3.6) | 18 (3.9) | 44 (4.0) |
| Haematologic | 05 (6.6) | 09 (5.0) | 13 (3.3) | 14 (3.0) | 41 (3.7) |
| Electrolyte Imbalance | 04 (5.3) | 04 (2.2) | 13 (3.3) | 09 (1.9) | 30 (2.6) |
| Miscellaneous | 17 (22.4) | 31 (17.1) | 26 (6.7) | 20 (4.3) | 94 (8.5) |
| Total | 76 (100.0) | 181 (100.0) | 389 (100.0) | 463 (100.0) | 1109 (100.0) |

**Table 4: Outcome of admitted patients in MICU**

| Outcome | No. of Patients | % of Total Admissions |
|---|---|---|
| Discharged | 529 | 47.7 |
| Referred | 254 | 22.9 |
| LAMA | 47 | 4.2 |
| DOPR | 172 | 15.5 |
| Death | 107 | 9.7 |
| Total | 1109 | 100.0 |

**Table 5: Distribution of patient's outcome following admission in MICU according to age and sex**

| Socio- demographic characteristic | Outcome Following Admission | | p-value |
|---|---|---|---|
| | Survival | Death | |
| **Sex** | | | |
| Male | 566 (89.4) | 67 (10.6) | 0.22 |
| Female | 436 (91.6) | 40 (8.4) | |
| **Age Group (in Years)** | | | |
| <20 | 74 (97.4) | 02 (2.6) | 0.03 |
| 20 - 40 | 167 (92.3) | 14 (7.7) | |
| 40 - 60 | 355 (91.3) | 34 (8.7) | |
| ≥ 60 | 406 (87.7) | 57 (12.3) | |

**Table 6: Outcome following admission in MICU according to length of stay**

| Length of Stay (in days) | Outcome Following Admission | | p-value |
|---|---|---|---|
| | Survival (%) | Death (%) | |
| ≤1 | 412 (86.4) | 65 (13.6) | 0.00 |
| 2 – 7 | 548 (94.2) | 34 (5.8) | |
| >7 | 42 (84.0) | 08 (16.0) | |

## Discussion

Intensive care unit requires a vast use of up to date equipment and highly skilled staff. Intensive care also demands a tremendous amount of time and effort on behalf of the medical and nursing staff to treat and improve survival of the critically ill patients[6]. The outcome of patients admitted into the ICU will also depend on the level of training and experience acquired by staff. In developing countries like India where financial resources are limited and training and re-training of staff may not be adequate, MICU play a very crucial role in saving the lives of patients.

The present study yielded Cardiovascular (31.7%), Respiratory (17.2%) and Neurological (14.3%) conditions as the leading cause of admissions to MICU. Cardiovascular diseases were presented in higher proportion in males (37.0%) as well as females (24.6%).

The length of stay in MICU ranged from ≤ 1 day to > 7 daysin this study whereas in Onyekwulu et al[7] study the length of stay ranged from < 1 day to ≥ 3 days. Admission of patients with poor prognosis and/or prolonged use of the ICU facility result in other patients with a better prognosis being denied care; many of these die, as a result. Resources are also used up, and

this adds further stress on the health care system in a developing country.

Among patients admitted into the MICU, 43% of them spent ≤ 1 day with 13.6% mortality in this group. On the contrary study by Arabi et al[8] showed in their study that this group of patients formed 27.8% of all ICU admissions, with an ICU mortality rate of 26.3%.

A mortality rate of 9.7% (107 patients) was observed, and 62.6% were males and 37.4% were females. The mortality rate and sex distribution observed in our study is contrary to previous studies by Parikh et al[9] in Mumbai, Bolaji et al[10] in Nigeria, Isamade et al[11] in Nigeria and Chyla et al[6] in Tanzania. This difference may be due to clinical events that occurred, the quality of care provided prior to stay in MICU and the length of stay in MICU are all factors that inter-relates in determining the outcome of patients.

## Conclusions and Recommendations

The present study highlights cardiovascular, respiratory and neurological conditions to be the leading cause of admissions in MICU, thus indicating these conditions to occupy a large chunk for causing Mortality. We suggest that there is a need for well-planned, systematic and large-scale studies by using standardized methodologies to estimate the leading cause of admission in the MICU with the representation of the different regions of India so that an effective ICU goes a long way in reducing mortality and morbidity and greatly facilitates the care of critically ill patients giving desirable outcome. We also recommend a prospective study is for determining other factors responsible for outcome in MICU.

## Limitations of the study

The limitations of the study include the retrospective design and the available data only supported categorization of patient by primary diagnosis.

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