

A Study on The Congestion In ICUS of Various Departments By Calculating The Bed Utilization Indices And Ascertaining Need Of Intermediate Care Unit Based on Review of Current Literature, At A1150 Bedded Tertiary Care Institute.

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Abstract: *This study was done at Nizam's Institute of medical Sciences to estimate the congestion being faced by the ICU s of the various depts. NIMS has 158 ICU beds out of a total of 1150 beds which is around 15 %. These beds have an average bed occupancy rate of above 90%. This is leading to congestion of beds in the casualty of Emergency dept and this is resulting in diversion of cases to other hospitals. Based on the review of various journals on similar topic, it has been suggested to have a Step down unit or Intermediate care unit to reduce the burden on the ICU beds.*

Keywords: *ICU, Congestion , Step Down Unit, Intermediate Care unit*

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I. Introduction

Nizam's Institute of Medical Sciences is a 1150 bedded tertiary care teaching institute. The bed occupancy of ICU beds and EMD beds is an average 90-95 %.The bed occupancy of ICU beds differs among various departments with some departments having 100% occupancy to some having around 80-90%.Instances of non availability of ICU beds is commonly seen. The increasing availability of intensive care unit (ICU) beds is costly, but the alternative option of foregoing this expansion raises the concern of potential delays in admission of patients from wards and emergency departments. Step down beds, also referred to as intermediate care beds or high-dependency beds, are one possible approach to providing higher levels of care while improving the efficiency of patient flow.

NEED FOR THE STUDY

Due to congestion and lack of availability of vacant beds in the Intensive Care units, the patient flow from the EMD to respective Dept ICU is getting affected leading to congestion of beds and Ventilators in EMD which in turn leads to congestion and non availability of bed in EMD. This is leading to increased length of stay of patients in the EMD and sometimes leading to referral of the case to other hospitals leading to financial loss to the institute.

II. Review Of Literature

Hospitals are responsible for the largest component of national health care expenditures and are therefore under pressure from government and private payers to become more cost efficient¹⁴. Intensive care units (ICUs), which provide the highest level of care, are the most costly inpatient units to operate. The estimated annual cost of critical care in the U.S is between \$121 and \$263 billion, accounting for 17.4%-39% of total hospital costs¹⁴.

ICUs care for the sickest patients and consume a disproportionate share of total health care costs (nearly \$82 billion annually)¹⁴, which amounts to 20-35% of total hospital costs with ICU beds occupying only 5-10 percent of inpatient beds .An SDU provides an intermediate level of care for semi-critically ill patients who are not sick enough to require intensive care but not stable enough to be treated in the general medical/surgical ward. These units, which are also commonly referred to as intermediate care units and transitional care units, are found in many, but not all, hospitals in developed nations.

The nomenclature of the IMCU consists of various names¹¹, such as Intermediate Care Unit, step-down unit, High Dependency Unit, Progressive Care Unit, Medium Care Unit, High Care Unit, Transitional Care Unit, Special Care Unit, Sub intensive Care Unit, Semi-Intensive Care Unit, and many synonyms of these.

III. Aims & Objectives

- To determine the bed indices for ICU beds of various departments including Emergency department.
- To determine the requirement of an Intermediate care unit based on the bed utilizational indices and review of current literature.

IV. Methodology

- The study was carried out in the Emergency Medicine Department and Intensive Care Units of various departments of Nizam’s Institute of Medical Sciences.
- A retrospective study of patient data of the period of 3 months from June 2015 to August 2015 was reviewed. Data was analyzed to determine the bed indices.
- BOR is calculated using the formula : Occupancy rate = Total number of inpatient days for a given period x 100 / Available beds x Number of days in the period
- Average Length of Stay is calculated by : ALOS= Inpatient days/Admissions
- Bed Turnover Ratio is calculated by: BTR= (Total patient admissions)/(Number of beds)
- Relevant literature was reviewed to determine the requirement and benefits of having an intermediate care unit.

V. Observations

Intensive Care unit beds amount to 158 beds out of a total of 1150 beds which is a percentage of around 15 % of the total beds. The remaining 85% is constituted by the general ward and in patient room beds. Emergency medicine Department has 32 beds. have any intermediate care unit or step down unit beds.

ICU beds list in NIMS

Department	Total Beds	BOR
Respiratory Intensive Care Unit	12	60%
Intensive Cardiology Care unit	38	82%
Acute Medical Center	16	92%
TRR	8	86%
Cardio Thoracic Intensive Care Unit	14	82%
Neurology Intensive Care Unit	10	94%
Stroke Unit	6	100%
Acute Renal Care Unit	8	96%
Spinal Cord Intensive Care Unit	12	90%
Neuro Surgery Intensive Care Unit	12	92%
Surgical Critical Care Unit	9	90%
Emergency Dept Medical ICU	5	100%
Emergency Dept Surgical ICU	8	100%
TOTAL	158	

VI. Discussion

An Intermediate Care Unit is logistically situated between the Intensive Care Unit and the general ward. It can act as a “step-up” or “step-down” unit between the general ward and the ICU but can also be used to admit patients from the Emergency Department or Recovery ward. There is ongoing debate about the role of the SDU in the medical community. Those who advocate the use of SDUs see them as an alternative to either maintaining larger ICUs or jeopardizing patient care due to premature, demand-driven, discharge of patients from ICUs to general care units¹³

In general, the use of SDUs has evolved without substantial evidence as to their benefits and what their role should be. Some studies argue that these units provide a safe and cost-effective environment for semi-critical patients and can serve as a bridge from hospital to home thereby improving patient outcomes and efficiency¹⁵. Other studies argue that SDUs should not be used as there is not enough evidence of their cost-effectiveness¹⁶

Thus, depending on bed availability, a semi-critical patient could have three possible routings: (a) if an SDU bed is available, the patient is transferred to an SDU bed, (b) if the SDU is full, but the ICU has available beds, the patient remains in the ICU and is considered reverse access blocked (RAB), and (c) if both the SDU and the ICU are full, the patient is rerouted to the ward to make room for new ICU patients.¹³

There are a number of papers which examine the impact of ICU admission decisions on patient outcomes¹⁷⁻²²

Empirical findings suggest that SDU care is associated with reduced in-hospital mortality of 6%, shortened hospital length-of-stay of 1.08 days, reduced ICU readmission rate of 4%, and reduction in the hospital re admission rate of 8%.¹

The purpose of an SDU is to treat patients who are more severe than the typical ward patient, but who do not require as intense monitoring as the most critical ICU patients¹⁰⁻¹³. The basic premise of having an SDU is that it can both care for sicker patients and, at the same time, take pressure off the ICU, thereby resulting in both better patient outcomes as well as increased efficiency¹⁴. Semi-critical patients who can be treated in the SDU can generally be treated in the ICU without any impact on their quality of care.

Conversely, due to the lower staffing requirements in the SDU, Critical patients who are treated in the SDU will not be able to receive the high level monitoring and care provided in the ICU, resulting in substantial degradation of their quality of care. Hence, not only do ICUs provide care for the sickest patients, they can also be considered 'flexible servers' in the sense that they can also treat moderately severe patients. However, largely due to the high nurse-to-patient ratio requirement, they are more costly to operate than SDUs¹²

Patient flows into SDUs can come from various sources. For instance, patients can be directly admitted to an SDU from the Emergency Department if they are deemed too sick for the ward, but not so sick that they require ICU care¹³. Alternatively, some SDUs are used for post-operative patients with fairly standard recovery patterns, but who need additional monitoring in the event of complications due to surgery.

SDU beds can be specific stand-alone units, adjacent to but physically distinct from an ICU or general ward, or designated beds located within ICUs or general wards. SDU beds co located within ICUs or wards can be separate beds reserved for only intermediate care or "flexible" beds that change designation based on patient needs.¹⁵

As per various studies, a total of 51.4% IMCUs treated only surgical patients, while 35.1% treated both surgical and medical patients, 10.8% treated only medical patients, and 2.7% treated emergency patients of surgical and medical specialties.¹² In total, 56.7% had an open format IMCU, in which the attending specialist remains in charge during admission at the IMCU. The other 43.3% had a closed format IMCU, with a designated specialist in charge of the IMCU.¹²

Of a total of 27 IMCUs (69.2%) the location was reported. Of these, 4 IMCUs were integrated in the ICU, while 10 IMCUs were independent, but adjacent to the ICU. In total, 11 IMCUs were independent, separate units and 2 units were part of the hospital ward. (12)

Studies suggest that the number of IMCU beds ranged from 2 to 24 with a median of 6 and an inter quartile range of 4 to 10. The median numbers of beds were 8 in an IMCU integrated in an ICU, 6 in an independent, adjacent IMCU, 9 in a separate independent IMCU, and 2 in an IMCU as part of a hospital ward¹²

Empirical findings suggest that SDU care is associated with reduced in-hospital mortality of 6%, shortened hospital length-of-stay of 1.08 days, a reduced ICU readmission rate of 4%, and a reduction in the hospital readmission rate of 8%.¹³

VII. Conclusion

Based on the findings of various studies, we can conclude that having an intermediate care unit is advantageous to the hospital. NIMS being a premier tertiary care institute in the state of Telangana, has a high bed occupancy rate. Considering the shortage of ICU beds in the institute and high patient loads faced by these beds as seen by the high bed occupancy rates, it can be suggested that NIMS should plan for Step down units for various departments or a multi disciplinary Intermediate care unit.

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