

■ *Original Article*

ICU admission and outcomes in a community-based tertiary care hospital: an audit of one year

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Abstract

Background: The most serious patients requiring advanced organ system support are admitted in the Intensive Care Unit (ICU) of hospitals for achieving better outcome. B.P.Koirala Institute of Health Sciences (BPKIHS) hospital ICU is the only multidisciplinary unit that has been catering care for the whole of the eastern region of Nepal. Medical audit of ICU provides important feedback for improvement in care and policy making. **Objectives:** To audit the indications analyse and outcome of patients admitted to the multidisciplinary ICU of BPKIHS in a period of one year. **Methods:** Data of all the ICU admitted patients for the period of one year were analyzed retrospectively from the ICU register and patients' folder. The variables analysed included age, gender, diagnosis, duration of ICU stay and outcome. **Results:** Altogether 255 patients were admitted in the study period; 150 (58.8%) males and 105 (41.2%) females. Majority (49%) were surgical patients followed by medical (39%). Mean duration of stay was 8 days. Discharge rate was 61% and the mortality rate was 26%. Thirteen percent of the patients left against medical advice (LAMA). Admission from operation theatre and emergency ward was associated with better outcome while admission from general wards was associated with poor outcome. Peritonitis with sepsis was associated with the worst outcome; organo-phosphorous poisoning was associated with good outcome. **Conclusion:** The most common patients admitted in the multidisciplinary ICU of BPKIHS are mostly general surgical and general medical. Significant fractions of the patients admitted in the ICU are taken home by their relatives against medical advice.

Keywords: intensive care unit, organ support, audit, BPKIHS.

Introduction

The intensive care unit is a special unit primarily concerned with the care of patients with critical illness and demands a broad based knowledge to achieve good outcome. Intensive care unit requires a vast use of up to date resources such as advanced monitors, organ support equipments and highly skilled staff. Besides allocation of resources, 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. As patients are admitted from every department in the hospital,

staffs in intensive care need to have a broad range of clinical experience and a holistic approach to patient care.

Medical audit is being increasingly utilized for improving medical practice. Different from the use of the term audit in business, it implies a professional commitment to improvement and involves a systematic approach highlighting opportunities for improvement and positive change in clinical practice. This study has been carried out to audit our patient's admissions into our ICU and their outcome of one year.

Methods

This study is a one year (1.1.2007 to 31.12.2007) audit that was carried out in the eight bedded multidisciplinary ICU of BPKIHS, a community based tertiary care hospital in the eastern region of Nepal. The hospital is

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700 bedded fully residential training centre and also serves as a referral centre for most of the hospitals in the eastern region of Nepal. It operates a well equipped 8 bedded modern multidisciplinary ICU. Eight trained ICU nurses, 1 consultant anaesthesiologist and 2 resident doctors and one trained technician are present in the ICU round the clock.

In the present study, data of all the ICU admitted patients during the specified period were retrieved from the ICU register and patients folder for analysis using Epi info 2005 (version 3.3.2). The variables analyzed include patient's initials, age, genders, diagnosis, date of admission, duration of ICU stay and the patients outcome. In assessing outcome of the patients, those who were managed in the ICU and successfully transferred back to the general ward or were successfully stabilized enough to be referred to other centers were considered to have successful outcome and those who died in the ICU as unsuccessful outcome. Those patients who were taken by the

relatives from the ICU against medical advice were referred to as LAMA.

Results

A total of 255 patients were admitted in the study period of one year. Among them, 150 (58.8%) were male and 105(41.2%) were females. The age ranged from 1 year to 94 years with a mean \pm SD of 43.15 \pm 18.76 years. Most of the patients admitted to the ICU were from Sunsari District (34%) other places included Jhapa, Morang, Saptari, Siraha, Dhankutta. Ten (4%) patients were from India also. Department wise majority were surgical (49%). Department wise patient's distribution is given in table 1.

The sources of admission of the patients were mainly from emergency operation theater (25%), routine operation theatre (23%), medicine ward (20%), emergency department (19%), surgical ward (4.3%) etc.

The patients admitted in the ICU presented with the diagnoses shown in the table 2.

Table 1: Distribution of frequency of admission based on primary admitting departments

Departments	No of patients	Percentage
General surgery	127	49.8
Medicine	99	38.8
ENT	12	4.7
Obstetrics and Gynaecology	11	4.3
Dental	2	0.8
Orthopaedics	4	1.6

Outcome of patients admitted in the ICU

Out of the total 255 admissions, 154(61%) were discharged, 67 (26%) expired and 34 (13%) left against medical advice. Diagnosis wise outcome of patients is given in table 3.

Table 2: Diagnoses of patients admitted to ICU

Diagnosis / Department	Surgery	Medicine	ENT	OBG	Ortho	Dental	Total
Peritonitis	34	0	0	2	0	0	36
Post op cancer patients	23	3	9	0	0	1	36
Post operative monitoring	25	0	1	3	0	0	29
OP Poisoning	0	25	0	0	0	0	25
Sepsis / MODS	3	19	1	1	0	0	24
Pneumonia	0	10	0	0	0	0	10
Intestinal Obstruction	11	0	0	0	0	0	11
COPD	0	7	0	0	0	0	7
Others	31	35	1	5	4	1	77
Total	127	99	12	11	4	2	255

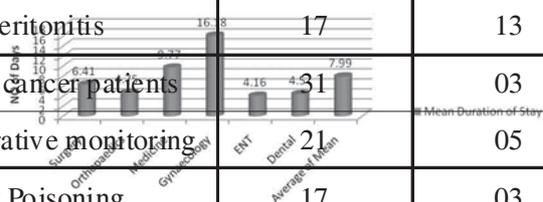
MODS: Multiple organ dysfunction syndrome

Table 3: Diagnosis wise outcome of patients

The outcome were more favourable for cancer operated patients, organophosphorous compound poisoning and patients admitted in the ICU for postoperative monitoring, than patients with sepsis or MODS.

Duration of stay in ICU

Figure 1 shows primary department wise average duration of stay of patients in the ICU.

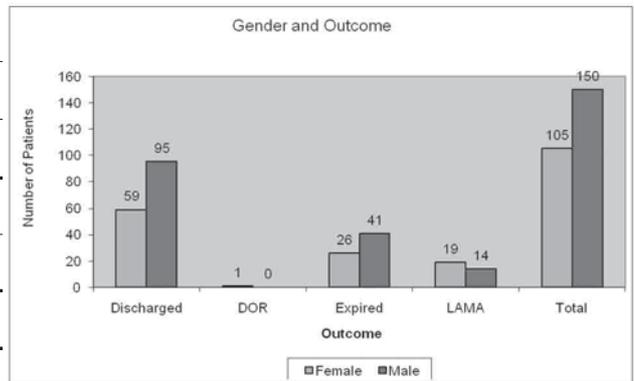


Diagnosis vs Outcome	Discharge	Expired
Peritonitis	17	13
Post op cancer patients	31	03
Post operative monitoring	21	05
OP Poisoning	17	03
Source of Admission vs Outcome		
Sepsis / MODS	05	16
Pneumonia	05	04
Intestinal Obstruction	06	01
Admission pattern and spectrum of disease	04	02
COPD	04	02
Others	40	20
Total	155	67

The present study has shown that patient's admitted in the multidisciplinary ICU of BPKIHS are predominantly surgical followed by general medical cases. Surgical patients were almost 50% while medical patients contributed to almost 40% of all admission.

The workload is similar to other places in the world where most of the admission in the ICU are surgical patients.¹ The spectrum of disease was also similar to

Figure 2: Gender and outcome



DOR: Discharge on Request

Out of the total patients admitted to the ICU 95 male patients and 59 female patients were discharged. The incidence of LAMA was slightly higher with the female patients.

other studies.² Surgical patients admitted in the ICU were mainly post operative cases of peritonitis, post-operative monitoring, cancer operated patients and multiple trauma patients. OP poisoning and MODS were the most frequent medical cases showing typicality of a community based hospital in a developing country.

Table 4 shows the results of source of admission versus outcome.

Table 4: Outcome of patients and source of admission

The best outcome was for patients who were admitted in the ICU after routine surgery for post operative monitoring. The patients coming from surgical ward to ICU had the worst prognosis. Figure 2 shows results of gender and outcome.

Outcome

The traditional goals of intensive care are provisions of haemodynamic monitoring and life support which have increasingly allowed complicated and complex modern surgeries to be carried out even in patients with poor physiological reserve and significant comorbidities.² Equipped with multi-parameters facilities for monitoring invasive/non invasive blood pressure, electrocardiogram, heart rate, oxygen saturation and temperature, our ICU is capable of providing multisystem life supportive measures with the use of mechanical ventilators, defibrillators, nebulizers, infusion pumps, gas analyser, suction apparatus and resuscitative drugs. Our patients discharge rate of 61% and mortality rate of 26% are at least comparable to that of any multidisciplinary ICU if not better. This reflects optimal quality of care being provided in our ICU. Round the clock presence of qualified personnel in the ICU and laboratory backup for hematological, biochemical and microbiological investigations further enhance the point of time care being provided. Significant proportion of patients admitted in the ICU are being taken home by their relatives against medical advice is a unique finding of our set up. Financial problem owing to poor socio economic status of the people in general coupled with high direct and hidden

cost of ICU care is the most likely contributory factors for this unique finding.

One interesting finding revealed by our study is that more female patients were taken home by their relatives against medical advice as compared to male patients. The ratio is in contrast to the gender ratio of total admission in which males are more than females. This undoubtedly reflects existence of skewed attitudes against female gender even in getting treatment in the ICU. The ICU mortality rates vary depending on the case mix, age, length of stay and organisational aspects of the unit.³ The severity of illness before ICU admission and presence of co-morbid conditions are significant factors in patient survival. Age and the duration of stay in the intensive care unit have been found to be inversely proportional to survival.³ The best outcome in our study was found in patients who needed ICU admission following elective surgery which was followed by those admitted after emergency surgeries. Expectedly patients with organophosphorous poisoning had a very good outcome. Our findings are similar to the findings of Abubakar et al where the total ICU mortality was 35%.⁴

In our ICU the category of patients with highest

mortality was in patients with sepsis and multi organ failure, excluding those who were taken by their relatives against medical advice, only one fourth of the patients of sepsis with MODS survived and was discharged from the ICU. Patients with pneumonia also had bad prognosis. The patients who were admitted with the diagnosis of peritonitis also had a high mortality. The ultimate cause of death in these patients was also sepsis leading to multi organ failure. Therefore there were total 49.2% of patients who expired of multiorgan failure. This is similar to the mortality in the study conducted by Victoria et al in which multiorgan failure contributed to 47% of ICU mortality.⁵

Patients who were admitted from surgical ward in our study also had a high mortality of more than 50%. Mortality of patients admitted to ICU from surgical ward has been shown to be up to 58%.⁶ This high mortality has been reported to be associated with readmission from surgical ward.

Disease specific points

Patients with organophosphorous poisoning had a mean duration of ventilation of 15 days whether the compound was highly toxic or intermediate toxicity compound. Patients operated for intestinal obstruction tend to get discharged by the end of first week, longer duration of stay predicts poor outcome. These findings are valuable for reviewing policies, conducting tracheostomy, monitoring and weaning from mechanical ventilator.

Outcome and source of admission

Favorable outcome has been seen in patients who were directly admitted from the emergency ward, routine operation theatre and from emergency operation theatre. Initial admission to wards followed by admission in the ICU was associated with poor outcome. These findings reflect the lack of step up or down intermediate care unit in our hospital. Establishing step- up/down intermediate level care high dependency unit or/and at least a surgical post operative ward can not only be expected to widen the scope of care but also reduce the burden on the only

multidisciplinary ICU of the hospital. Further studies with larger sample size and better study design can clarify many unclear findings of our study. Small sample size and limited duration of study are the two major limitations of our study.

Conclusion

General surgical and general medical patients constitute the most frequent admissions in the multidisciplinary ICU of BPKIHS. In view of the available resources the outcome of admission in the ICU is quantitatively and qualitatively comparable to other similar ICU. Availability of step-up/down unit (intermediate level care unit) might help improve outcome in the present set up.

References

1. Towey M, Ojara S. Intensive care in the developing world. *Anaesthesia* 2007;62: 32-37.
2. Brian H, C, Nigel R W. The role of the intensive care unit in the management of the critically ill surgical patients. *J.R.Coll.Surg.Edinb.* 1999; 44: 294-300.
3. Soni R, Desikan B.B, Jones K, Syed A, William C. Out after ICU admission in patients over ninety years old. *Anaesthesiology* 2007; 107: A331.
4. Adamu S A, Ojo E O, El-Nafaty A U, Edomwonyi N P. An audit of one year intensive care practice in a developing country. *The internet journal of Anesthesiology.* 2008;18;2.
5. Viktoria D M, Martin W D, Veronika G, Stefan J, Gunter L, Hanno U et al. Causes of death and determinants of outcome in critically ill patients. *Critical Care* 2006; 10: R 154.
6. Turkistani A. Incidence of readmission and outcome in a surgical intensive care unit. *The internet journal of Anesthesiology* 2004; 8:1 <http://www.ispub.com/ostia/index.php?xmlFilePath=journals/ija/vol8n1/> (accessed on March 23, 2011).