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Patterns Of Intensive Care Unit Admission And Associated Factors Among Surgical Patients In Jimma University Medical Center. Jimma, South West Ethiopia

Research Article

Sakalo, Birhanu Mengistu*, Yeabsira Tesfaye

Institute of Health, Faculty of Medical Sciences, Jimma University, Jimma, Ethiopia.

Abstract

Background: An intensive care unit (ICU) is a specially staffed and equipped, separated area in a hospital, dedicated to the management of patients with life threatening illnesses and which incorporates patients that need advanced respiratory, airway or hemodynamics support. Even though there is ICU in JUSH the quality as well as the quantity is inadequate. Therefore studying the frequency of admissions in the ICU, reasons for admission in the ICU, the average duration of stay in the ICU and also whether or not the admitted patient needed mechanical ventilation or not, may help understand the problems present regarding to the ICU and help advance the service.

Objective: To review the pattern of admission and associated factors among surgical patients admitted to the ICU of JUSH, Jimma, Ethiopia in the last one year (January 2020-January2021).

Method: One year retrospective analysis was done on patterns of ICU admission among all surgical patients of JUSH. The study includes the cause of admission, the average duration of stay in ICU. The data was collected using questionnaire and obtained result is displayed using tables and graph .The data collected is analyzed manually by using scientific calculator.

Result: There were 152 surgical admissions to ICU making 39.69% of total ICU admissions male to female ratio was 1.47:1. Twenty eight patients (18.42%) were pediatric surgical patients. The total duration of ICU stay was 853. 75 days and the median duration of ICU stay was 5.62+ 6.33 days. Seventy eight patients were mechanically ventilated out of which 48 patient were died; only 15 patients were died out of 42 patients who were not mechanically ventilated. Majority of admissions were due to acute abdomen 36.84% and head injury patients 26.97% . Over all sixty seven patients (44.08%) were survived while seventy nine patients (51.98%) were died. Seventy eight patients are mechanically ventilated. The highest mortality was seen in head injury patients 65.85% and acute abdomen 55.36%.

Conclusion: Acute abdomen and head injury were by far the commonest of admission to ICU and have highest mortality as well. Mechanical ventilation was also associated with high mortality. Reduction of preventable causes of admission that leads to high mortality and morbidity like severe head injury will not only lessen the burden of care but also improve the outcome of our ICU care

Recommendation: Based on the finding of the study collaborative effort of both government and JUSH is important to reduce admission and mortality.

Keywords: ICU; Jimma University; Surgery.

Abbreviations: AMI: Acute Myocardial Infraction; BPH: Benign Prostate Hyperplasia; DKA: Diabetic Ketoacidosis; HW: Health Workers; ICU: Intensive Care Unit; LOS: Length of Stay; LUTH: Lagos Teaching Hospital; MICU: Medical Intensive Care Unit; SICU: Surgical Intensive Care Unit; TAH: Total Abdominal Hysterectomy.

Introduction

Intensive care unit (ICU) is a special unit primarily concerned with the care of patients with critical illness and demands a broad based knowledge to provide for all aspects of management of these patients to achieve good outcome. [1]

In 1854, Florence Nightingale left for the Crimean war, where tri-

***Corresponding Author**:
Sakalo, Birhanu Mengistu,
Institute of Health, Faculty of Medical Sciences, Jimma University, Jimma, Ethiopia.
Tel: +251937146926
E-mail: birhanumengistu8@gmail.com

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age was used to separate seriously wounded soldiers from the less-seriously wounded was observed. Until recently, it was reported that Nightingale reduced mortality from 40% to 2% on the battle field.

Although this was not the case, her experiences during the war formed the foundation for her later discovery of the importance of sanitary conditions in hospitals, a critical component of intensive care. [2]

In 1950, anesthesiologist peter Safar established the concept of advance support of life, keeping patients sedated & ventilated in an intensive care environment. Safar is considered to be the first practitioner of intensive care unit medicine. [2]

In response to polio epidemic (where many patients required constant ventilation and services), Bjorn Agelbsen established the first ICU in Copen Hagen in 1953. [2]

The first application of this idea in the United States was by Dr. William Mosenthal, a surgeon at the Dartmouth-Hitchcock medical center.

In the 1960s, the importance of cardiac arrhythmias as a source of morbidity and mortality in myocardial infarction (heart attack) was recognized. This used to the routine use of cardiac monitoring in ICUs, especially after heart- attack. [2]

Over the years ICU have emerged as a distinct discipline and ranged in scope from general, medical, surgical, neuro- surgical, cardiothoracic, Neonatal, pediatric, coronary care, burn, and trauma ICUs to name but few. [2]

Worldwide, ICU requires a vast use of up to date resources like, advanced monitors, organ support equipment's and highly skilled staff. This however, often takes the most resilient health system even of the developed nations. In most developing countries where there are several financial limitations resulting from poor funding of the health care generally and the ICU specially, there is often a limit to the availability and specialization of this form of care. [3]

Even though there is no published data showing about the JUSH, ICU, generally in developing countries ICU is confounded by inadequate staffing, training, diagnostic and interventions limitations.

Statement of the Problem

Caring for critically ill patient is a challenge in developing countries, where health needs often out strip available resources. Necessary equipment is scarce and often malfunctions, and trained man power is limited.[2]

Intensive care unit in such settings is reduced to high dependency nursing care, yet the patients are critically and need intensive care, and so cannot to be turned away from the hospital.[10]

Intensive care unit in most of the developed nations are high technology facilities with the most advanced medical technologies, electronic monitoring, mechanical ventilation and other life support measures, as well as up to date drugs and highly trained and skilled personal. In tropics however, various levels of care for the critically ill patients have been described, and intensive care in the developing countries have been defined as doing the best for the critically ill with the resources available. [3, 4]

Methods and Materials

Study Area & Period

The study will be conducted in JUSH, Intensive care unit. JUSH is found in Jimma zone, Jimma Town, located 350km southwest of Addis Ababa. It was established in 1930. It is the only referral hospital located in southwest Ethiopia serving over 2.8 million people. It has a bed capacity of 800 and a total of greater than 750 staffs of both supportive and professional. Provides services for 15,000 in patient and 160,000 outpatient attendances in a year; coming from the catchment area of about 15 million people. It provides surgical service for over 500 patient's. It has nine operation rooms and one adult ICU room which have six beds in my study period which is from January 2020 to January 2021.

Study Design

Retrospective analysis of surgical patients admitted ICU of JUSH over the last one year will be done.

Population

Source population: All surgical patients admitted to ICU of JUSH

Study population: All surgical patients admitted to ICU of JUSH in last 1 year (January 2020-January2021)

Inclusion and exclusion criteria: Inclusion criteria - surgical patient in ICU.

Exclusion criteria - non surgical patient in ICU

Sampling technique and sample size

No sampling technique is used. All surgical patients admitted to ICU of JUSH in the study period were included.

Study variables

Dependent variable : Pattern of ICU admission.

Independent variables

- ✓ Age
- ✓ Sex
- ✓ Length of ICU stay
- ✓ Co- morbidity
- ✓ Trauma
- ✓ Post-operative surgery

Data collection instrument and methods

Data collection tool was adapted after review of relevant litera-

ture. Data was collected by two trained data collectors used to retrieve information about patient socio demographic characteristic, causes of ICU, admission, ICU stay and patient out come through patient record or card review.

Data quality control

The data collection instrument was pretested on 10% of surgical patients admitted to ICU in the last year prior to the actual data collection to check missed information so as to make possible amendments. Selection and training of two diploma level nurses for data collection was done. To checking for completeness and consistency of collected data at the end of each days done throughout data collection period.

Data processing and analysis

After checking the completeness of the data, it was tallied and compiled on tally sheets and analyzed manually using scientific calculator. Finally data was presented in tables and graphs as necessary and cross tabulation with the statistical test for association.

Ethical consideration

Prior to data collection a formal letter of permission was collected from JU student research program office and forwarded to JUSH administrative office. Patients records was kept confidential

Limitation of the study

Some of the patients records (cards) was incomplete available or lost. Some of the patient had been discharged without being registered in to ICU patients register log book.

Dissemination of Results

After data analyzed conclusion and recommendation was made, the result was result submitted to concerned body.

Result

Description of surgical patients admitted to ICU

152 (39.69%) surgical patients were admitted to ICU out of 383 patients in the last one year, among which 89 patients were male and 63 patients were female making male to female ratio of 1.41:1. 28 (18.42%) were pediatric surgical patients and the rest 124 patients (81.58%) were adult. Out of adult patients 36.84%, 17.76%,20.4%, 6.58% were in age group 16-30, 31-45,46-60 and >61 years old respectively (Table 1).

Length of stay

The total length of ICU stay was 853.75 day and the lowest and highest stay was 6hrs and 24 days respectively making the range of 23.75 days .The mean length of ICU stay was 5.62+6.33 days. 78(51.32%) stayed in ICU for <5 days and 5(3.29%) patients stayed for >3 weeks, while 38 (25%), 24 (15.79%) and 7 (4.6%) were stayed for 4-7, 8-14, 15-21 and >21 days in ICU (Table 2).

Cause of Admission

The leading causes of surgical admission to ICU were acute abdomen 56 (36.84), head injuries 41(26.97%), post thyroidectomy 19(12.50%), Extracraninal injuries 12 (7.89%), burn injuries 7(4.60%) and other (post elective surgeries like BPH, esophageal cancers, colon ca. and submandibular abscess and upper air way obstruction), 17 (11.18%) (Fig1).

Highest mortality was seen in head injury (65.83%) patients and acute abdomen (57.14%) while post thyroidectomy, burn and extra cranial injuries had mortality rate of 47%,37% ,28,57% and 25% respectively. The other which includes BPH, malignant cancers, and necrotizing fasciitis which account 35% (Fig 1).

Care given to the patients

The patient admitted to JUSH ICU were provided necessary care and monitored using frequent vital sign monitoring and system

Table 1. Frequency of cases of surgical patients admitted to ICU of JUSH by age group, January 2020 - January 2021.

Age	Frequency	%
1-15	28	18.42
16-30	56	36.84
31-45	27	17.76
46-61	31	20.4
>61	10	6.58
Total	152	100%

Table 2. Length of ICU stay of surgical patients admitted to the ICU of JUSH from January 2020-January 2021.

Length of ICU stay (in day)	Frequency	%
<3days	78	51.32
4-7 days	38	25
>-14 days	24	15.79
15-21 days	7	4.6
>21 days	5	3.29

Figure 1. Causes of admission and out come of surgical patients admitted to ICU of JUSH from January 2020-2021.

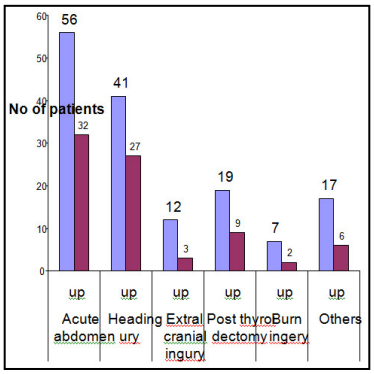

Table 3. Association between mechanical ventilation and outcome of surgical patients admitted to ICU of January 2020-January 2021.

Mechanically ventilated	Frequency		Total	percent
	Died	Survived		
Yes	50	28	78	65
No	15	27	42	35
Total	65	55	120	100

monitoring in addition to routine nursing care and medical therapies. Out of care given, 120 patients were analyzed for mechanical ventilation from which 78 (65%) were ventilated and 15(35.7%) of non-ventilated patients were died.

The study showed that there is an association between ventilation and poor outcome (Table -3).

Discussions

In this review 39.9% of the cases admitted to JUSH ICU the last one year This was near to the study done in ICU of prince Rashid Hospital of Jordan, where 29% of ICU admissions were surgical patients. The slight difference can be In the studies made in Nigeria and Burkina Faso it showed 66.7% and 81% of total ICU admissions were surgical respectively. This difference can be explained by the fact that they included gynecology and Obstetrics patients as surgical. There was male to female ratio of 1.41:1 which was similar to that of study done in Malawi. [7, 10, 11].

18.42% were pediatric surgical patients and the rest 81.58% were adult patients. Of the adult patients 36.84% were in the age group 16-30 years. And 20.4% were in the age group of 46-60 years, while 17.76% were in 31-45 years and 6.58% were in the group of 61-75 years age. In the study done at price Rashid hospital, Jordan, pediatric surgical patients were 43% this difference can be explained by study period.

The total duration of ICU stay was 853.75 days and the median duration of ICU stay was 5.62+6.33 days. About 51.32% were stayed in ICU for 3 days or less while only 3.29% were stayed for more than 3 weeks.25% were stayed in ICU for a period of 4-7 days. 15.79% were stayed for two weeks while 4.6% were stayed for three weeks. The lowest ICU stay was six hours. This is similar to the study done in Jamaica where average duration of stay was 6.3+8.4 days [1].

Acute abdomen was the leading cause of admission accounting for 36.84% followed by head injury patients who accounted for 26.97%.Extra cranial injuries which include chest injury, thoraco-abdominal injury, abdominal injury, pelvic injury and poly- trauma accounted for 7.89%.Admission to ICU after thyroid surgery was (12.5%). There were seven burn injury patients (4.60%). The others were cases post-elective surgery like benign prostatic hyperplasia, esophageal cancer, colonic cancer, and sub- mandibular abscess and upper air way obstruction which accounted for seventeen cases (11.18%). These results are similar to the study done in Burkina Faso where post-operative cases accounted for 35% and head injury accounted for 31% of admissions [10]. (Table 2).

There were over all 79 patients (51.98%) died and 67 patients (44.08%) survived, while the outcome of 6 patients was not indicated (Table). This figure is high when compared to the reported ICU mortality rate which varies form 15-35% depending on the case mix, age LOS and organizational aspect of the unit. This difference is may be due to socio-demographic and economic factors the patients admitted at to hospital last stage of disease after staying at home for a long time and going to the near health centers.

In this study it was found that acute abdomen was the leading cause of death followed by head injury. The mortality rate was highest for head injury patients 67.5% followed by acute abdomen 57.4%. This is similar to the study done in Malawi where the mortality among the head injury was 70% and the study done in Burkina Faso where the mortality rate was 70.5% for traumas and 48.5% for post-operative cases (10.11). These two countries are among the poorest countries in the world like Ethiopia. Post thyroidectomy, burn and extra cranial injuries had mortality rate of 47.08%, 28.57% and 25% respectively. This showed there was high mortality among head injury patients.

Mechanical ventilation is a supportive measure for all patients in any form of respiratory failure until the primary cause is reversed. The cause for respiration failure ranges from a failure of central nervous control to the peripheral mechanical failure and /

or problem in the lungs primary affecting gas exchange.[16]. Although studies have shown higher mortality in ventilated patients, ventilator support is essential in cases like acute severe asthma, multiple trauma and Abdominal sepsis [17]. Seventy eight patients were mechanically ventilated out of which 48 patients were died. Only 15 patients were died out of 42 patients who were not mechanically ventilated. Thirty two patients were not analyzed because their cards were not found. And this study showed that there was an association between mechanical ventilation and outcome of patient similar to studies done in Nigeria and Burkina Faso. [9, 10].

Accurate record keeping is part of the high standard of care required of medical personnel and admission and discharge summaries should be documented for every patient. Accurate records are helps for the purpose of audit, teaching and research and for medico- legal issues [14]. In our ICU documents were entered on log book by nurses, some being illegible to be read. Some patient's cards were also not found or lost due to various reasons. Computerization of the records would have been considerable in maintaining accuracy and retrieving relevant data.

Conclusion

According to this study 152 surgical patient were admitted to JUSH ICU in the last one year, making female to male ratio of 1.4:1. The mean length of stay in ICU was 5.62+6.33. Among determined causes of admission acute abdomen (36.84%) constitutes the most common diseases entity responsible for admission in ICU followed by trauma related cases which were severe head injuries (26.97%) and extra cranial injuries 7.89%. Burning injuries were the least caused of admissions.

Out of admission 51.98% were died and 44.05% were survived. The highest mortality was seen in head injuries (65.85%) followed by acute abdomen (57.14%). The least was extra cranial injuries 25%. Higher mortality in ventilated patient than non-ventilated patients was observed.

Finally most of causes of admission and out comes were preventable which then decrease hospitalization and significant amount of budget of health care.

Recommendation

Based on the finding of the study, the following recommendations are forwarded.

✓ Emphasis should be given by the government in reducing road traffic accident to prevent traumas which will directly reduce causes of admission and hospital and individual budget.

✓ JUSH should give early intervention of case of acute abdomen as quickly as necessary and should have good interconnection with satellite hospital and Health centers in referral cases and training.

✓ JUSH record office should keep all patient records, if possible its better to computerize data of patients.

✓ Lastly we recommend further study to investigate why mechanical ventilation had association with mortalities.

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