Full Length Research Paper

Clinical outcomes of patients admitted in intensive care units of Nigist Eleni Mohammed Memorial Hospital of Hosanna, Southern Ethiopia

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An intensive care unit is a special department of hospital or health care facility that provides intensive treatment medicine. Critically ill patients are admitted to the intensive care unit to reduce morbidity and mortality associated with acute illness, trauma or surgical procedures. This study aimed to assess clinical outcomes of patients admitted in intensive care units of Nigist Eleni Mohammed Memorial Hospital of Hosanna from January 2015 to January 2016. Institutional based cross sectional study design was conducted. All the study participants admitted to intensive care unit were included. Regular supervision and follow up was made. Data was entered into Epi info version 7 by investigators and was transported to SPSS version 20 for analysis. Bivariate and multivariate analysis was used to identify factors associated with patient's outcome. A total of 280 clients were enrolled into the study of which 46.42% died. About 26% of patients were found in the age group of 20 to 24 years and majority of them were male (58.2%). Patient with head injury is about six times more likely to die in the intensive care unit than patients with small bowel obstruction (AOR 6.620 (95% CI ((468-93.584). There were poor outcomes of patients admitted to intensive care unit so that it was strongly recommended to improve quality of care.

Key word: Ethiopia, intensive care unit, cause of death, hospital discharge.

INTRODUCTION

Intensive care unit is a fused area of hospital where patients with acutely life threatening illness/injuries receive a specialized medical and nursing care, such as mechanical ventilation and invasive cardiac monitoring (Donaldson et al, 2000; Winter, 2013). The modern concept of intensive care was founded by anesthetist in Denmark during the polio pandemic (Berthelsen and Cronqvist, 2003). Since then, intensive care units (ICUs)

have significantly improved the quality of care and outcomes of critically ill and injured patients, mainly in high-resource settings (Calvin et al., 1997; Bleck, 2009; Grenvik and Pinsky, 2009). In recent decades, intensive care medicine has developed into highly specialized discipline covering numerous fields of medicine (Berthelsen and Cronqvist, 2003).

Admission into ICU may be required if the patient

experiences hemodynamic instability requiring frequent monitoring of vital signs, invasive hemodynamic monitoring, rapid titration of intravenous medication with concurrent monitoring. Apart from causing death, type and severity of illness can directly affect the length of ICU stay (De Lange et al., 2009). In sub-Saharan Africa, ICUs have varying qualities and quantities of infrastructure necessary for the provision of proper critical cares services (Baelani et al., 2011; Dünser et al., 2006). The reported disease characteristics and mortality rates of patients admitted to ICUs in sub-Saharan Africa vary widely from one population to another (Oke, 2001; Okafor, 2009; Merah et al., 2006).

Critically ill patients are admitted to the intensive care units to reduce morbidity and mortality associated with acute illness, trauma or surgical procedures (Braber and van Zanten, 2010). Up to fifth of patients will die in the ICU (Cook, 2006). Patients that survived in the ICU were discharged to the ward environment. Although, some patients died soon after ICU discharge, such deaths are predictable and cannot be avoided (Campbell et al., 2008; Campos et al., 2011). However, another study revealed that deaths occurring after ICU discharge are unexpected and may be prevented with better standards of care (Chaboyer et al., 2008; McLaughlin et al., 2007). Despite widely analyzed pathophysiological processes and new treatment methods in laboratory and clinical research, less data are available on the causes of death, short- and long-term outcomes of critically ill patients, and associated risk factors. Frequently, data on specific predictive criteria for single diseases have been identified (Benoit et al., 2003; Wunsch et al., 2008; Afessa et al., 2002; Arabi et al., 2004). But, little is known on the exact causes of death and the influence of general risk factors that may consistently complicate the course of critically ill patients regardless of the underlying disease (Estenssoro et al., 2002; Khouli et al., 2005 Chang et al., 2006). Thus, the aim of the study was to determine clinical outcomes of patients admitted in intensive care units of Nigist Eleni Mohammed Memorial Hospital of Hosanna.

MATERIALS AND METHODS

Study setting

The study employed a cross-sectional study design at Nigst Eleni Mohammed Memorial Hospital (NEMMH) from January 2015 to January 2016. NEMMH is one the governmental hospitals in Ethiopia which is found in Hosanna town. Hosanna town is administrative city of Hadiya zone and it is located at a distance of 230 km to the south of Addis Ababa, capital city of Ethiopia. The hospital has 9 wards. Adult intensive care unit was considered as it has been providing services for all critically ill patients admitted from different departments excluding neonatal unit. The hospital has a total of 220 beds including 8 and 7 beds in neonatal and adult ICU, respectively.

Source population

All charts of the patients admitted in intensive care unit of Nigst Eleni Mohammed Memorial Hospital.

Study population

Selected charts of patients admitted in intensive care unit of Nigst Eleni Mohammed Memorial Hospital from January 2015 to January 2016.

Sample size determination and sampling technique

All consecutive patients admitted in intensive care unit of Nigst Eleni Mohammed Memorial Hospital from January 2015 to January 2016.

Data collection tools and procedure

Data was collected using pretested structured questionnaires by two BSc anesthetists and supervised by one MSc holder anesthetist. Patient's charts were reviewed. At the end of data collection, patient's charts were replaced with its original place properly.

Data quality assurance

The structured questionnaire was prepared in English first and translated to the local language, Amharic and again translated back to English to ensure consistency of the questionnaire. Pretest was done on 5% of the sample population. Data collectors and supervisors were trained on each items included in the study tools, objective, relevant of study, right of respondents. During data collection, regular supervision and follow up was made. Investigator cross checked for completeness and consistency of data on daily basis.

Data analyzing and processing

The data was entered into epi info version 7 and was exported to SPSS version 20 computer program for analysis. Descriptive statistics was used to summarize data, tables and figures for display results. Bivariate and multivariate analyses were used to see the effect of independent variable on outcome variable. Variables which were significant on bivariate analysis at p-value less than 0.2 were taken to multivariate analysis. In multivariate analysis, p- value of less than 0.05 was used as a cut of point for presence of association. Strength of association was measured by 95% confidence interval and/odd ratio.

Operational definitions

Clinical outcome

In this research, clinical outcome indicated either patients survived or died at the time of discharge.

Post-ICU patients

Patients who are transferred from ICU to inward environments.

Survived

Patients who are alive at the time of discharge.

Table 1. Distribution of sex and age group of patients admitted to intensive care unit at Nigst Eleni Mohammed Memorial Hospital, Hosanna, from January 2015 to January 2016.

Variables	Category	Frequency	Percentage
Sex	Male	163	58.2
	Female	117	41.8
	15-19	61	21.8
	20-24	73	26.1
	25-29	28	10.0
	30-34	29	10.4
Age group	35-39	24	8.6
	40-44	20	7.1
	45-49	16	5.7
	50-54	19	6.8
	greater than 60	10	3.6
	Orthodox	176	62.88
	Protestant	51	18.21
Religion	Muslim	41	14.64
	Missing	7	2.50
	Others*	5	1.77
	Hadiya	132	47.14
	Kembata	63	22.50
Ethnicity	Silte	48	17.14
	Gurage	7	2.50
	Missing	18	6.44
	Others**	12	4.28

Others* Jehovah witness and wakefata; Others** Wolaita, Oromo and Amhara.

Died

Patients who are not alive at the time of discharge.

Ethical consideration

Ethical clearance and approval was obtained from ethical review committee, Anesthesia Department, Wolaita Soddo University. Permission to conduct was obtained from the hospital. Informed verbal consent was secured from every study participants. The obtained data was only used for study purpose. Confidentiality and anonymity were ensured.

RESULTS

A total of 280 clients were enrolled in the study of which 46.42% died in the ICU. Majority of the patients, 26.1% were between the age group of 20 and 24 years. The mean age of respondents was 31.27 ± SD (14.019), (minimum 15 and maximum 67). Regarding the sex composition of the sampled respondents, about 58.2% were male, while the remaining 41.8% were female. This means that majority of sampled respondents were male (Table 1).

Admission diagnosis to intensive care unit

Patients with different diagnosis were admitted in intensive care unit of which small bowel obstruction (SBO) was 15.4% and followed by head injury (13.9%), shock (10.4%) and CHF (10.4%). The study also found that about 4.6% of all patients were admitted with acutely exacerbated bronchial asthma and for post-surgical observation (Table 2).

Cross tabulation of level of consciousness, condition of admission and length of ICU stay over patient's outcome

The relationship between time of ICU admission and level of consciousness on survival condition showed that late admitted patients (28.2%) and unconscious patients (25.36%) died in the ICU. This showed that early admitted and conscious patients are more likely to survive than the others (Table 3).

Factors affecting clinical outcome of patients admitted in ICU

The association between factors affecting outcome of patient admitted to ICU revealed that level of consciounesss, sex and leangth of ICU stay for more than 14 days were strongly associated with clinical outcome of patients at p-value less than 0.05. The result of the study also showed that patients with head injury is about six times more likely to die than a patients with small bowel obstruction (Table 4).

DISCUSSION

This study attempted to determine clinical outcome of patients admitted in ICU of Nigst Eleni Mohammed Memorial Hospital. According to findings of this study, relatively higher proportions of patients were found between the age group of 20 and 24 years of age. It was also found that there was male predominance which was consistent with other study (Sawe et al., 2014). A similar finding was reported by other studies of ICUs in sub Saharan Africa as there was a predominantly young-age ICU population (Okafor, 2009; Ohaegbulam et al., 2007; Mhando et al., 2008; Jamison et al., 2006). Similarly, the patient population in this study is younger when compared with patients admitted to ICUs in most developed world (Moran et al., 2008; Towey and Ojara, 2007). The overall young population and male

Table 2. Admission diagnosis of patients admitted to intensive care unit at Nigst Eleni Mohammed Memorial Hospital, Hosanna, from January 2015 to January 2016.

Admission diagnosis	Frequency	Percentage
Small bowel obstruction (SBO)	43	15.4
Sock	29	10.4
Congestive heart failure (CHF)	29	10.4
Community acquired pneumonia (CAP)	16	5.7
Eclampsia	28	10.0
Head injury	39	13.9
bronchial asthma	13	4.6
postsurgical observation	13	4.6
uterine rupture	28	10.0
Diabetic ketoacidosis (DKA)	28	10.0
Postpartum hemorrhage (PPH)	14	5.0

Table 3. Relationship between time of ICU admission, lenght of ICU stay and level of consciousness on survival condition of patients admitted to intensive care unit at Nigst Eleni Mohammed Memorial Hospital, Hosanna, from January 2015 to January 2016.

Variables	Category	Died	Survived	Total
Time of admission	Early admission	51	45	96
	Late admission	79	105	184
	Unconscious	71	96	167
Level of consciousness	Conscious	59	54	113
	Less than a week	75	75	150
Length of ICU stay	One week to two weeks	35	51	86
	More than two weeks	20	24	44

predominance in this study may be because of high prevalence of trauma which likely occurred due to the nature of work exposing majority of males on urban streets or the increased level of participation in high-risk activities among male individuals and higher working age male predominance (Towey and Ojara, 2007).

This study also revealed that about 46.42% of patients admitted to ICU died which is higher than a study conducted in University of Nigeria Teaching Hospital on neurological and obstetric patients of which the mortality rates were 43.5 and 33%, respectively (Okafor and Onwuekwe, 2004a; Okafor and Aniebue, 2004b). But, it is lower than the study conducted at National Hospital Abuja in Nigeria on severe head injury patients in the ICU which showed the mortality rate of 68.4% (Ohaegbulam et al., 2007). Another study on critical care obstetric patients in Burkina Faso revealed a mortality rate of 60% (Dao et al., 2003), while the mortality rate in the general ICU population in Uganda was found to be 25% (Gomersall, 2010).

These differences are most likely because the present

study includes all departments of patients admitted to ICU while the others include only specific department or specific diagnosis of patients in the ICU. These differences may also be due to differences in safety and quality of health care services among different health care facilities.

Survival is the main endpoint that is considered important for patients and society (Fernandez et al., 2010). Mortality is a clinical outcome which is easy to define and measure using empirical methods and mortality following ICU discharge is a quality indicator and frequently a predicted event (Fernandez et al., 2006; Frick et al., 2003). The sudden death of post-ICU patients who are expected to survive represents a waste of valuable healthcare resources and a missed opportunity to save life. The result of present study also revealed that about 26% of patients discharged from the ICU died in the ward which is similar to some other studies (Moreno et al., 2001; Green and Edmonds, 2004). This may be due to the fact that post-ICU patients may frequently need a complex care. But, it may be difficult to provide a

Table 4. Factors affecting clinical outcome of patients admitted in ICU of Nigst Eleni Mohammed Memorial Hospital, Hosanna, from January 2015 to January 2016.

Variables	Category	Df.	Sig.	Exp(B)	95% C.I. for EXP(B)	
					Lower	Upper
	15-19	8	0.092			
	20-24	1	0.824	1.203	0.237	6.117
	25-29	1	0.879	.883	0.177	4.403
	30-34	1	0.654	1.528	0.240	9.742
Age category	35-39	1	0.689	1.483	0.215	10.220
	40-44	1	0.204	3.754	0.487	28.933
	45-49	1	0.610	2.171	0.110	42.775
	50-54	1	0.359	2.579	0.341	19.487
	greater than 60	1	0.236	0.206	0.015	2.809
Consciousness level	Unconscious	1	0.000	0.279	0.137	0.567
Sex	Male	1	0.012	2.525	1.226	5.201
	SBO	10	0.710			
	Sock	1	0.911	1.120	0.154	8.130
	CHF	1	0.911	0.899	0.139	5.806
	CAP	1	0.930	0.903	0.095	8.604
	Eclampsia	1	0.614	0.558	0.058	5.385
Causes of admission	Head injury	1	0.162	6.620	0.468	93.584
	Bronchial asthma	1	0.351	0.371	0.046	2.973
	Postsurgical observation	1	0.946	1.067	0.164	6.941
	Uterine rupture	1	0.222	0.276	0.035	2.182
	DKA	1	0.487	0.536	0.093	3.104
	PPH	1	0.735	0.709	0.097	5.178
Time of admission	Early admission	1	0.429	1.425	0.592	3.427
	less than 7days	2	0.104			
Length of ICU stay	7-14days	1	0.277	2.084	.555	7.828
	more than 14days	1	0.039	4.113	1.074	15.761

complex care in the ward environment. (NICE, 2007). This may also be because inexperienced nurses and doctors struggle to provide the necessary complex care (Endacott et al., 2007). This may also be due to intensive care staff that did not closely follow patients' progress on the ward for a few days to monitor recovery of multisystem disease and assure good continuity of care. Limitations of this study were relative scarcity of clinical data available on the patient's chart and lack of some socio demographic variables as the data was collected retrospectively.

Conclusion

Intensive care units provides patients with severe and life-threatening illnesses and injuries, which require

constant, close monitoring and support from specialist equipment and medications in order to ensure normal bodily functions. Majority of ICU patients in Nigst Eleni Mohammed Memorial Hospital were male. Early admitted and conscious patients are more likely survive than the others. Over two fifth of the patients admitted to ICU died. There may be a limited infrastructure, personnel, and resource which likely contribute to high mortality rates. Therefore, it is very important to have well organized and adequate infrastructures, personnel and resources to provide optimal care for critically ill patients.

ABBREVIATIONS

ICU, Intensive care unit; **JUSH,** Jimma University Hospital; **NEMMH,** Nigst Eleni Mohammed Memorial

Hospital; **SSA,** sub-Saharan Africa.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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