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Comparison Between Medical and Surgical Intensive Care Unit-A Ten-Year Review of The Management of Patients in A Resource-Poor Setting in The Niger-Delta Region of Nigeria.


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Abstract

Purpose: To compare the outcome of patients admitted to the ICU with Medical diagnoses against those with Surgical diagnoses.

Methodology: This is a ten-year retrospective study conducted at the University of Port Harcourt Teaching Hospital. Ethical approval for the study was sought and gotten from the hospital's ethical committee. The information gotten includes history, age, sex, diagnosis, length of admission, and outcome. The data collected was analyzed and presented in tables and charts.

Findings: Three-quarters of the patients admitted to the ICU had surgical diagnoses. More patients with Medical diagnoses (102,19.7%) were discharged from the ICU compared to patients with surgical diagnoses (78,5%). More patients with Surgical diagnosis (919, 52.9%) were transferred out compared to patients with Medical diagnosis (140,27.1%). Patients admitted with medical diagnosis tend to be older and paid more and stayed longer in the ICU compared to patients with surgical diagnosis and this was statistically significant. Three-quarters of the patients admitted to the ICU have surgical diagnoses. More patients with medical diagnoses died in the ICU. Patients with medical diagnoses were older, stayed longer, and paid more for their ICU admission than surgical patients.

Unique contribution to theory, policy and practice: More patients with medical diagnoses died in the ICU. Hence the need for proper management of common medical ailments.

Keywords: *Intensive Care Unit, Medical ICU, Surgical ICU, Outcome, Sex, Bill, Hospital stay*.

Introduction

An Intensive care unit is a specialized unit in the hospital that cares for patients with life-threatening ailments, who require close supervision and support to ensure normal homeostasis.[1,2]ICU admission is indicated for patients with potentially recoverable conditions.[3,4] The management of patients in the ICU requires 24-hour coverage by skilled multidisciplinary medical professionals. The ultimate goal of critical care is to provide organ support, stabilization, and subsequent transfer to the High Dependency Unit HDU, ward, or home discharge. Critical care resources are limited and expensive.[5,6] This cost is even worse when the patient pays out of pocket.[1,2,6] The appropriate utilization of ICU beds is essential but poses a complex challenge to attain.[5]

Patients who receive critical care can broadly be subdivided into medical and surgical patients. These patients tend to differ in age, bills paid, duration of hospital stay, outcome, and infection rate.[7,8,9,10,11]Surgical intensive care patients are usually in a critical state because of perioperative critical events and some have had some form of trauma.[1] There seems to be an increase in surgical ICU patients because of innovations in surgery and better surgical techniques.[12] The Medical ICU is associated with worsening co-morbidities requiring one or more organ support.[2]

Although, studies about the ICU have been conducted in Nigeria, and South Nigeria,[1,2,13-18] there seems to be a paucity of literature comparing the challenges and outcomes of surgical and medical ICUs in the Niger Delta region of Nigeria. We, therefore, compare the outcome of patients admitted to the ICU with Medical and Surgical diagnoses. The outcome of this study will add to the already growing knowledge base of ICUs in the sub-region.

Materials and Methods

This study was carried out in Port Harcourt, Rivers State, Nigeria. Port Harcourt is an industrial city located in the Niger Delta region of Nigeria. All surgical patients admitted into the ICU of the University of Port Harcourt Teaching Hospital UPTH from January 2013 to December 2022 were evaluated. Hospital ethical committee approval was sought and obtained from the hospital ethical committee.

Data were obtained from the ICU ward register, theatre register, discharge records, and medical records. Information gathered include name, age, sex, bill, duration of admission, sub-specialty, number of survivors, number discharged home, and number transferred out. Patients with incomplete records were excluded from the study. The data from the folders were collected and entered using Microsoft Excel 2016 version and transferred into the statistical package for social sciences (SPSS) for Windows (version 25) (IBM SPSS Inc. Chicago, IL) for analysis. A ninety-five percent confidence interval and a p-value less than 0.05 was considered significant. Frequencies, percentages, mean, and standard deviation were used to summarize the data as appropriate. Categorical data were presented in the form of frequencies and percentages using tables. Continuous variables were presented in means and standard deviation. Results were presented in tables and charts.

Results

Within the study duration of ten years, a total number of two thousand and seventy patients were admitted into the ICU, 1553 had surgical diagnoses while 517 had medical diagnoses.

Figure 1

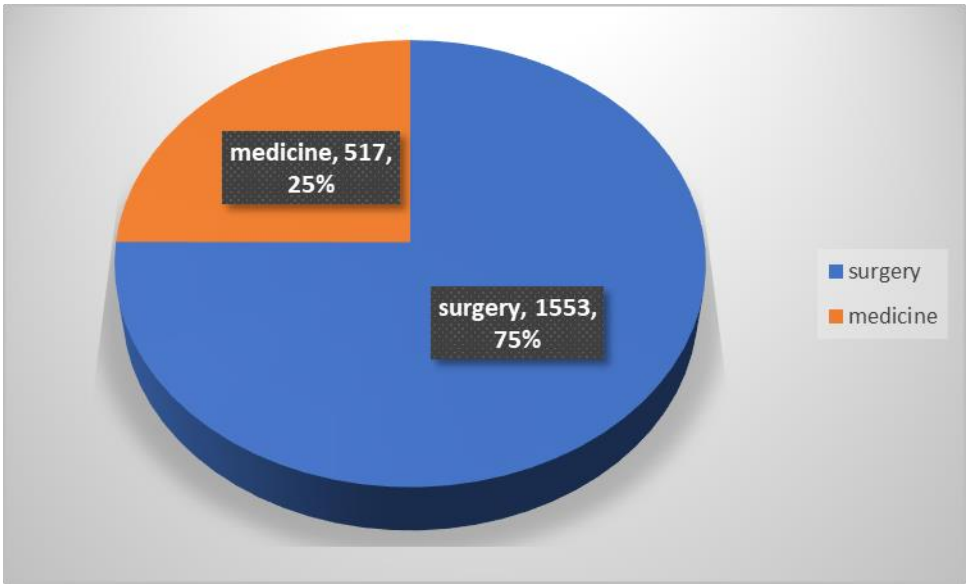

Figure 1 shows the distribution of patients within the study duration. Twenty-five percent (517) had medical diagnoses while seventy-five percent (1553) had surgical diagnoses.

Table 1 shows the outcome of patients managed in the ICU. More patients with surgical diagnoses (537) died compared to patients with a medical diagnosis (258), however, the percentage of medical patients who died was more (49.9%) compared to patients managed for surgical conditions. More patients with Medical diagnoses (102,19.7%) were discharged from the ICU compared to patients with surgical diagnoses (78,5%). More patients with Surgical diagnosis (919, 52.9%) were transferred out compared to patients with Medical diagnosis (140,27.1%).

Outcome	Group			
	Surgery		Medicine	
	N	**(%)**	**N**	**(%)**
Died	537	(34.6)	258	(49.9)
Discharged	78	(5.0)	102	(19.7)
Not stated	7	(0.5)	7	(1.4)

Referred out	5	(0.3)	5	(1.0)
SAMA	5	(0.3)	4	(.8)
Self-discharged	2	(0.1)	1	(.2)
Transferred	919	(59.2)	140	(27.1)
Total	**1553**	**(100.0)**	**517**	**(100.0)**

Table 2 shows the age, bill, and duration of hospital stay of patients with medical and surgical diagnoses admitted in the ICU. Patients admitted with medical diagnosis tend to be older and paid more for their ICU admission compared to patients with surgical diagnosis and this was statistically significant as the *p-value* was less than 0.01. Patients with a medical diagnosis on average (6.59 days) stayed longer in the ICU compared to those with a surgical diagnosis (4.98 days) and this was also statistically significant.

	Group			
	Surgery	**Medicine**	t-test	p-value
	Mean	Mean		
Age	35.88	51.41	265.725	<0.0001
Bill	47114.68	80718.55	83.194	<0.0001
Duration of hospital stay	4.98	6.59	11.941	0.001

Table 3 shows the age and sex distribution of patients admitted into the ICU. The 30 to 39-year-old age group tends to have the highest number of admissions with surgical diagnosis while the 50 to 59-year-old age group had the highest number of admissions with medical diagnosis and this was statistically significant as the *p-value* was less than 0.05. There were more females (884 + 249=1,133) admitted into the ICU during the study period compared to males (669 + 268 = 937). More females were admitted with surgical diagnoses during the study period compared to males. While more males were admitted with medical diagnoses compared to females, this was also statistically significant.

Group		**Chi-square**	***p-value***
Surgery	**Medicine**		

	N	(%)	N	(%)		
Age group						
0-9	131	(8.4)	16	(3.1)		
10-19	77	(5.0)	18	(3.5)		
20-29	353	(22.7)	46	(8.9)		
30-39	429	(27.6)	68	(13.2)		
40-49	217	(14.0)	74	(14.3)	271.59	<0.0001
50-59	145	(9.3)	96	(18.6)		
60-69	111	(7.1)	87	(16.8)		
70-79	48	(3.1)	74	(14.3)		
80-89	24	(1.5)	32	(6.2)		
>90	2	(.1)	2	(.4)		
Not stated	16	(1.0)	4	(.8)		
Sex						
Female	884	(56.9)	249	(48.2)	12.01	<0.0001
Male	669	(43.1)	268	(51.8)		
Total	**1553**		**517**			

Table 4 shows the outcome of patients admitted in the ICU within the time of study. For patients with surgical diagnosis more males died while more female died for patients with medical diagnoses and this was statistically significant.

		Group							
		Surgery				Medicine			
		Sex				Sex			
		Female		Male		Female		Male	
		N	(%)	N	(%)	N	(%)	N	(%)
Outcome	Died	283	(32.0)	261	(39.0)	130	(52.2)	135	(50.4)
	Discharged	52	(5.9)	26	(3.9)	48	(19.3)	54	(20.1)
	Referred out	2	(.2)	3	(.4)	0	(.0)	5	(1.9)
	SAMA	1	(.1)	6	(.9)	0	(.0)	5	(1.9)
	Transferred	546	(61.8)	373	(55.8)	71	(28.5)	69	(25.7)
	Total	884	(100.0)	669	(100.0)	249	(100.0)	268	(100.0)

Chi-square = 16.44, p= 0.002

Chi-square = 9.79, p=.044

Discussion

The outcome of patients admitted to the intensive care unit is multifactorial and depends on the level of training and experience of staff, availability of resources, and types of equipment available, sex of the patient, age, severity of illness, decreased functional status, and intercurrent illnesses are factors that determine the outcome of patients in the ICU.[18,19,20,21] The diagnosis and how early the diagnosis was made is also vital.[22]

In our study, most patients had a surgical diagnosis (75%) compared to a medical diagnosis (25%) as seen in **Figure 1**. Several studies conducted in Port Harcourt noted a similar trend.[13-17] The increased awareness and use of the ICU during difficult post-operative care may and the increased usage of the ICU for obstetric complications may account for this difference.[1,14,16] In Africa and other developing economies of the world, mortality is still very high in critically ill patients due to the late presentation of patients, unavailability of well-trained staff, and lack of organ support equipment.[23] The current brain drain in Africa may also have an impact on the outcome of ICU admissions and healthcare delivery in general.[24,25,26]

In our study, the percentage of medical patients who died was higher than that of surgical patients as seen in Table 1. This result was similar to that of a 3-year retrospective study by Jonathan E et al.[18] which showed that death in Medical patients in their ICU was higher than deaths in surgical patients (45.9% and 24.7% respectively). Za Smith et al. (20) also had similar results with the index study which showed a higher mortality rate for medical ICU patients (53.6%) than surgical ICU patients (48.0%). The reason may be that medical patients were older and aging is associated with comorbidity which can lead to an increase in mortality. In this index study, 153 patients were admitted with cerebrovascular accident CVA. Abhulimen et al.[2] noticed this high mortality amongst medical patients and recommended proper management of comorbidities like

hypertension may prevent complications like CVAs and ICU admission.[2] The percentage of patients transferred out directly from the ICU with medical was also more than that transferred with surgical diagnosis. The reason is that out of the 102 medical patients discharged from the ICU 28 had had transient Ischaemic attacks (TIAs) and made full recovery in the ICU and were discharged after a period of close observation. More patients were also transferred out of the ICU with surgical diagnosis compared to those with medical diagnosis, the reason may simply be because the patients were allowed to continue their postoperative recovery in the wards or High Dependency Unit (HDU).

Patients with medical diagnosis admitted to the ICU tend to have a higher mean age (51.41 years) compared to patients with surgical diagnosis (35.88 years) and this was statistically significant as seen in **Table 2**. Medical problems and comorbidity tend to be associated with older age. Increased age is associated with co-morbidities, decreased immunity, decreased organ function, and therefore increased mortality. Patients are usually billed based on length of stay and care received in the facility. Patients with medical diagnoses spent more money in the ICU and this was also statistically significant as shown in **Table 2**. In our study, medical ICU patients stayed longer and therefore incurred higher bills than surgical ICU patients. Dosta J et al.[28], identified longer duration of stay in the ICU and days of mechanical ventilation as major culprits in the increased amount of bills. Mechanically ventilated patients were older and spent longer duration in the ICU and therefore incurred higher bills as compared to those not Mechanically ventilated.[28] This result is similar to the index study where a higher number of medical ICU patients with increased age stayed longer in the ICU.

Increased age is associated with various intercurrent illnesses needing greater care and various forms of organ support including mechanical ventilation which is associated with substantial costs.[28] Vasilevskiy et al.[29] found a significantly increased cost acquired by ICU patients with delirium and Coma. This is in support of our study, as decreased GCS of less than 8 is an indication of mechanical ventilation. Moreover, patients with medical diagnoses were older and had more comorbidities requiring more extensive investigations and care before discharge or transfer from the ICU. Patients with surgical diagnoses admitted to the ICU were younger and those who had elective surgeries may have had extensive preoperative investigations done before their surgeries were carried out therefore requiring less extensive postoperative investigations.

More females were admitted into the ICU during our study period overall and more female admissions were recorded with surgical diagnosis while more males were admitted with medical diagnosis as seen in **Table 3**. This finding agrees with previous studies conducted by Mato et al.[14] Females with obstetric complications are usually admitted in the ICU. However, Peter D et al.[30] found that more males than females were admitted into the ICU. This difference from our study may be due to other determinants of health which may or not be sex related. This study was conducted in a developed country (British Columbia, Canada). Contrary to our study, Tasting IL et al.[31] showed that more men than women were admitted to the ICU. The authors suggested that estrogen has protective effects in critical care but also pointed out that other factors like the severity

of the illness also had a great influence on the outcome. A retrospective cohort study conducted in Australia also discovered that men are more likely to be admitted to ICU with sepsis and have worse survival for up to 3-years.[32]

Table 4 shows the outcome of patients admitted to the ICU within the time of study. For patients with surgical diagnoses, more males died while more females died for patients with medical diagnoses and this was statistically significant. We are unaware of the reasons for this discrepancy. Comparison of sex and gender-related indications for ICU admissions and patient's outcome are not well studied and therefore there is a dearth of studies done. Further studies will need to be done to identify the reasons for this difference.

Conclusion

Three-quarters of the patients admitted to the ICU have surgical diagnoses. More patients with medical diagnoses died in the ICU. Patients with medical diagnoses were older, stayed longer, and paid more for their ICU admission than surgical patients.

Recommendations

1. Government should allocate more funds and equipment such as ventilators to hospitals especially the ICUs in Africa.
2. Physicians and patients should manage chronic diseases such as hypertension to prevent complications such as CVAs.
3. Pregnant women should use prenatal and antenatal care to prevent obstetric complications.

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