



## Demographics and Outcome of Referrals of Critically Ill Patients from a University Teaching Hospital, Uyo, South – South, Nigeria

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### Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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### ABSTRACT

**Background:** Referral of critically ill patients from one centre to another is an integral part of healthcare system.

**Aims:** To evaluate the outcome of referral practices from the Intensive Care Unit of the University of Uyo Teaching Hospital.

**Patients and Methods:** This was a retrospective study of all consecutive critically ill patients referred from the intensive care unit (ICU) of the University of Uyo Teaching Hospital, Uyo, to other hospitals between January 2009 – December 2014. All patients studied were transferred by medical personnel in either land or air ambulances. The primary and secondary outcomes measured were whether the patients received the proposed treatment and mortality respectively. Data from the referring centre were obtained from the ICU admission and discharge register and patient's folder, while data during transfer and outcome were obtained from the accompanying medical personnel and patient's family members. Data analysis was done using SPSS version 16.

**Results:** Thirteen patients referred were analysed. Majority of the patients (77%) were referred for neurosurgical review, mechanical ventilation and CT-Scan and/or MRI. Two patients were referred for specialized burns care, and one patient for radiotherapy. Seven patients (54%) were transferred

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with land ambulance, while six (46%) were transferred with air ambulance. Regarding outcome, eight (62%) patients were successfully transferred to their destination hospitals, and all received proposed treatment. A total of three patients survived while ten died, thus giving an overall mortality rate of 77%.

**Conclusion:** The outcome of critically ill patients referred from our centre to other hospitals is poor. Therefore, appropriate personnel should be employed and equipment provided in our centre to manage the patients.

*Keywords: Referral of patients; inter-hospital transfer; critically ill; outcome.*

## 1. INTRODUCTION

Referral of patients from one hospital to another, variously called inter-hospital (IHT), Inter-facility or secondary transfer, is commonly indicated when the diagnostic and therapeutic facilities, as well as specialized skill required for a patient's care are not available at the given hospital [1,2].

The ultimate goal of inter-hospital transfer is the restoration of health and well-being of the patient. The decision to refer a critically ill patient should be carefully and timely taken, as poorly managed referral process may increase morbidity and mortality risk for patients [3].

Previous studies have shown that transferring a critically ill patient to another center is associated with improved outcome [4]. In contrast, other studies have documented increased undesirable outcome in transferred patients, including increased morbidity and mortality [5,6] still, some researchers have reported no difference in outcome between transferred and directly admitted critically ill patients in the ICU [5]. These differences may be attributed to differences in the patient characteristics, level of care in the referring hospital, transfer practices, as well as the capacity of the referral centre [2].

In this study, we evaluate the outcome of critically ill patients referred to other hospitals from the Intensive Care Unit of the University of Uyo Teaching Hospital.

## 2. PATIENTS AND METHODS

This was a retrospective study of all patients who were referred from the Intensive Care Unit (ICU) of the University of Uyo Teaching Hospital, Uyo, Akwa Ibom State from January 2009 to December 2014. The ICU is a 3-bedded, open ICU, with two ventilators which were not functioning when patients in this study were admitted. The ICU is covered by four consultant

anaesthetists, in addition to anaesthesia resident doctors and ICU nurses.

The study was approved by the Institution's Research and Ethics Committee. All consecutive patients referred from the ICU to other hospitals, who were accompanied by doctors and/or nurses were included in the study. Patients who were escorted by family members without an accompanying medical personnel were excluded from the study.

The referral process is usually initiated by the ICU team in conjunction with the primary medical or surgical team. A medical report is usually given to the accompanying personnel, with or without a prior contact with the receiving hospital.

Transfers occur by fixed-wing airplanes, helicopters, or by ground ambulances depending on the distance from the referring hospital, and the patient's financial capacity. The ground ambulances are often ordinary buses with a platform to lay the patient, without any life support equipments. Also, some of the airplanes and helicopters are not usually equipped to handle any emergencies during transfer. Almost always accompanying medical personnel carry drugs, oxygen in cylinders, airway tubes and other resuscitation equipment to provide treatment as required during transport.

For this study, data from the referring hospital was extracted from the ICU admission and discharge register, and patients' folders, while data during transfer was obtained from the accompanying medical personnel either through written report or oral interview, and data from the referral or receiving hospital which was mainly whether the patient received the proposed treatment, and mortality or survival was obtained from the accompanying medical personnel or the patients' family members through either physical or telephone conversation.

The following data were collected: Age, sex, diagnosis, duration of admission, and reasons for

referral. Other variables extracted included mode of transportation, cadre of accompanying medical personnel, and the location of the receiving hospital. The primary outcome considered was whether the patient received the proposed treatment in the receiving hospital, while the secondary outcome was survival or mortality. Continuous data were presented as means with range, and categorical data as frequencies and percentages. All data analysis were done using SPSS Version 16.

### 3. RESULTS

A total of 464 patients were admitted in our ICU between January 2009 and December 2014. Nineteen (4%) of whom were referred to hospitals outside Akwa Ibom State for services not available at the University of Uyo Teaching Hospital. Thirteen out of the nineteen patients referred were accompanied by doctors and/or nurses, while six patients were transferred by the patient's family members unaccompanied by medical personnel, hence, they were excluded from the study, bringing the study population to 13 (Table 1).

Of the 13 patients studied, 11 were males, and 3 were females, giving a male to female ratio of 5.5:1. The mean of age of the patients was 48.2 years with a range 11-81 years. The average duration of hospital stay was 3 days, with a range of 1-6 days. (Table 2).

Table 3, shows that five patients had severe head injury, two of whom were polytraumatised. Five patients had respiratory failure following aspiration pneumonitis from cerebro vascular accident (CVA) and spinal cord injury. Two patients had major degree burns, while one patient was managed for persistent haematuria secondary to carcinoma of the prostate (CAP).

Majority of the patients (77%) were referred for neurosurgical review, mechanical ventilation and CT-Scan and/or MRI. Two patients were referred for specialized burns care, and one patient for radiotherapy.

**Table 1. Number of patients admitted and referred**

Year	No. admitted	No. referred
2009	56	2
2010	50	4
2011	68	0
2012	107	5
2013	97	5
2014	86	3
Total	464	19

**Table 2. Demographic characteristics of the patients**

Category	Number (n)
<b>Age (years)</b>	
Mean	48.2
Range	11-81
<b>Sex</b>	
M	11
F	2
<b>Duration of admission</b>	
Mean	3
Range	1-6

Seven patients (54%) were transferred with land ambulance, while six (46%) were transferred with fixed-wing airplanes or helicopters. Nine (69%) patients were accompanied by nurses, while four (31%) were accompanied by doctors. Majority of the patients (85%) were transferred to hospitals within Nigeria, while two patients (15%) were transferred to hospitals abroad, in South Africa and India (Table 4).

**Table 3. Diagnosis at admission and reasons for referral**

Diagnosis at admission	No	Reasons for referral
Severe head injury	5	Neurosurgical review, mechanical ventilation, CT/MRI
CVA with respiratory failure and aspiration pneumonitis	4	Neurosurgical review, mechanical ventilation, CT/MRI
Cervical spine injury with respiratory failure	1	Spine surgery review, mechanical ventilation, CT/MRI
Major burns	2	Specialised burns care
Persistent haematuria secondary to advanced CAP	1	Radiotherapy

CVA- Cerebro vascular accident, CAP- Carcinoma of the prostate

**Table 4. Mode, personnel and destination of transfer**

Category	No.	Percentage (%)
<b>Mode of transport</b>		
Land ambulance	7	54
Air ambulance	6	46
<b>Accompanying personnel</b>		
Doctor	4	31
Nurse	9	69
<b>Destination hospital</b>		
Within Nigeria	11	85
Outside Nigeria	2	15

Regarding outcome (Table 5), eight (62%) patients were successfully transferred to their destination hospitals. Two (15%) patients developed serious complications during transfer which warranted emergency admission in intermediate hospitals where they died, while three (23%) patients died during transit before reaching the destination hospitals.

**Table 5. Outcome of referral**

Category	No.	Percentage (%)
Reached destination hospital	8	62
Received proposed treatment	8	62
Reached intermediate hospital	2	15
Died after proposed treatment	5	63
Died in transit	3	23
Died in intermediate hospital	2	15
Overall mortality	10	77
Survival	3	23

All the eight (62%) patients who reached their destination hospitals received the proposed treatment for which they were referred. A total of three patients survived while ten died, thus giving an overall mortality rate of 77%.

#### 4. DISCUSSION

Inter-hospital transfer (IHT) of patients is an integral and essential component of health care system, as patients will continue to have need for advanced care not available in the hospitals of primary admission [2]. In this study, only 4% of the patients admitted in our ICU during the period under review were referred to other hospitals.

This number appears small when viewed against the background that majority of our patients had head injury, similar to previous studies on disease category of patients admitted in ICU, [7] frequent ventilator malfunction in our ICU, and non-availability of neurosurgical services in our centre. It can be deduced therefore, that perhaps more patients required referral to other centres who were not transferred. A major reason for patient's or patient relatives' refusal of referral to other hospitals in our environment is financial constraint. Inter hospital transfer either by land or by air is a costly venture. Majority of the patients involved in this study were privileged people in the society who were funded by the government, corporate organizations or privately. The poor ones either refused referral or were carried by their relatives in car taxis to the referral centers, churches for spiritual intervention or home.

The overall mortality rate in this study was high (77%), half of which could not reach their destination hospitals. This result is not only poor but wasteful considering the amount of resources deployed during each transfer. The outcome of inter-hospital transfer is determined by the patients characteristics, the quality of care at the referring hospital, during transfer, as well as at the referral centre [2,8].

Mortality rates in the ICU strongly depend on the severity of illness and the patient population analysed [8]. In the United States, 6.4% to 40% of patients were reported to die despite receiving ICU care across different ICUs [4,8].

In this study, the three patients who survived had isolated severe head injury, with an average hospital stay of 2.1 days. In contrast, two other patients with severe head injury who were polytraumatized, with an average hospital stay of one day died. Also, all our patients with cerebrovascular accidents, and severe burns (>60%) died irrespective of their duration of hospital stay before transfer.

This suggests that severity of illness is an independent predictor of mortality in critically ill patients [8,9]. Mortality prediction is important for patients' or patients' family information and consent, comparison of ICU results, monitoring quality of ICU care and can be used to stratify patients for clinical research [9].

Several scoring systems have been developed in ICU practice. The Acute Physiology and Chronic

Health Evaluation (APACHE) II and III scores, and simplified Acute Physiology Score (SAPS) II are commonly used scoring systems in most ICUs [9]. In our ICU, like most ICUs in Nigeria, [7] these scoring systems are not commonly practiced, probably due to arterial blood gases required for their calculation which are not frequently available in our ICUs. Estimation of severity of illness as well as prediction of mortality is important in avoiding unnecessary and wasteful referrals. One of our patients with over 85% burns referred to South Africa for specialized burns care developed acute kidney injury during transit from Uyo to Lagos and eventually died during emergency dialysis in a Lagos hospital. It is probable, that with good patient and patient's family education, the referral of such a critically ill patient with almost zero percent chance of survival even in the best burns centre in the world would have been avoided.

The variability in the observed outcomes of patients transferred from different centres may lie in the differences in transfer practices among centres [8]. In our centre, there is no standardized protocol on inter-hospital transfer. Recently, various international professional organizations, including the American College of Critical Care Medicine, and Society of Critical Care Medicine have formulated guidelines to conduct safe inter-hospital transfer [1]. Majority of these guidelines have stressed pre-transport coordination and communication, qualified and trained accompanying personnel, appropriate transport equipment, standard monitoring and documentation as key elements of a safe transfer [1].

In majority of transfers in our study, communication was not established with the receiving hospitals because the contacts of the receiving doctors or hospitals were not readily available. Poor communication between sending and receiving hospitals has been identified as a risk factor for adverse event during IHT, due to delays in accessing treatment [1]. Ideally, the IHT should be organized such that the patient bypasses the emergency department admission and directly reaches the intended destination like the operating room or ICU [1].

Our results showed that majority of our transfers were performed by single nurses or doctors who had no advanced life support certifications, in a poorly equipped land or air ambulances. Most transfer guidelines recommended a minimum of two appropriately trained medical personnel to

accompany critically-ill patients during IHT, in well equipped land or air ambulances. A previous study in the Netherlands documented a decline in adverse event during IHT following the induction of Mobile Intensive Care Unit (MICUs) and specialized retrieval team [10].

Inter-hospital transfer either by land or air ambulances is associated with physiological disturbances which may result in major adverse events including cardiac arrest and death. [11] Factors responsible for these disturbances include vibration, noise, motion sickness, acceleration and gravitational forces, temperature and humidity, as well as altitude [1,11].

The physiological effects of high altitude are explained by Boyle's and Dalton's Laws, which can result in expansion of gas in body spaces. Hence, high altitude flights are contraindicated in patients with air trapped in pathological body spaces, e.g untreated pneumothorax, pneumocephalus, recent abdominal surgery, gas gangrene etc. [11]. One of our patients referred to India on account of post laparotomy abdominal distension, respiratory failure and sepsis had a cardiac arrest during transfer which necessitated emergency landing in Saudi Arabia where he eventually died. It is possible that increased intra-abdominal gas may have worsened his condition resulting in sudden cardiac arrest. Also, our patient with over 85% burns referred to South Africa may have died due to increased vascular permeability from pressure changes during flight leading to third space losses, hypovolemia and acute kidney injury.

Our study revealed that majority of the patients were referred for neurosurgical reviews, ventilatory support and radiological investigations. The overall poor outcome of referral practices in this study may be directly related study to poor patient's selection, lack of appropriately trained personnel and equipment, as well as poor transfer logistics management. Therefore, an urgent establishment of a neurosurgical unit in our centre should be given top considerations, as well as provision and maintenance of ventilators in our ICU, and CT/MRI machines in our radiology department. These measures will reduce the number of referrals from our centre, and for the few patients who may require referrals for other reasons, local transfer protocols should be developed to ensure that our transfer practices comply with international guidelines.

## 5. CONCLUSION

The outcome of critically ill patients referred from our centre to other hospitals is poor. Therefore, appropriate personnel should be employed, equipment provided and maintained. Also, a local inter-hospital transfer protocols should be established in order to reduce this catastrophe.

## CONSENT

It is not applicable.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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