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Knowledge and Utilization of ICU Admission Criteria and Guidelines, Lusaka, Zambia

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ABSTRACT

The University Teaching Hospital is the only national tertiary hospital in Zambia. During the period the University Teaching Hospital Main Intensive Care Unit was developed, the yearly admissions had risen from 450 to over 900 between 1984 and 1988. The increase was contained by keeping an average bed- occupancy rate of six patients per day. The ICU team concentrated on prompt diagnosis, treatment and insisted on discharge once patient's condition stabilized and was out of danger. In 2001, the admission criteria and guidelines for ICU were developed. However, since the formulation of the criteria and guidelines in 2001 there has been no formal evaluation.

Purpose: To determine nurses' knowledge and utilization of intensive care unit admission criteria and guidelines.

Design and Measures: A descriptive study was conducted on a randomly selected sample of fifty nurses working in the emergency department, obstetric wards, medical wards, surgical wards and theatres at the University Teaching Hospital. A self administered questionnaire was used to collect data.

Results: A total of 50 respondents aged 24 to 59 took part in the study. Eighty six percent were female, 48% were single and 36% had worked as nurses for 8 to 14 years. Two-thirds (60%) of the respondents were registered nurses and only 4% were specialized in critical care nursing. Majority of the respondents had high level of knowledge of ICU admission criteria (94%), and admission guidelines (92%). Almost all respondents (98%) had high level of utilization of ICU admission criteria and all respondents had high level of utilization of ICU admission guidelines.

Conclusion and Implications: The results of the study have shown that although nurses have a high level of both knowledge and utilization of ICU admission criteria and guidelines, almost all of them have not trained in critical care nursing. High knowledge influences utilization of the criteria and guidelines positively. The implication of this study is that, nurses should appreciate the importance of utilizing ICU admission criteria and guidelines so that only the type of patients enshrined in the criteria are admitted to ICU. In this way, admissions for social reasons will be avoided and the scarce resources will be reserved for those patients who really need critical care.

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INTRODUCTION

An Intensive Care Unit (ICU) is a place where critically ill patients are grouped together for observation and treatment[1, 2]. It may be a separate ward, or in smaller hospitals, an area of a ward[1]. It is beneficial for all health care institutions to set-up intensive care units because appropriate treatment protocols can be established which result not only in better management of patients but also in more efficient use of resources, thereby reducing the total cost of care of the critically ill by the hospital. Good intensive care results in a reduction of a number of medical evacuations from a country and scarce foreign exchange is also conserved[1].

The University Teaching Hospital (UTH) situated in the capital city of Zambia is both a teaching and tertiary hospital[3]. Despite its funding being for

tertiary health services, UTH also provides first and third level health care services because of the absence of the district and provincial hospitals in the city[3]. It services the five districts around it namely: Kafue, Chongwe, Luangwa, Mumbwa and Lusaka, with an estimated 3 million people[3]. Approximately, 95,000 patients are hospitalized at UTH per annum with admissions rising from 77,500 in 2007 to 78,451 in 2008[3]. The overall staff establishment is 3,574 but currently there are only 2,582 with a staff deficit of 28%. The medical doctor establishment is 373 but only 233 are currently employed with a deficit of 38%. The establishment for nursing is 1, 311 but currently the institution only has 611 nurses with a deficit of 53%[3]. About 286,185 patients pass through UTH every year for specialty and general health care and are attended to by a skeleton staff[3]. Some of the patients that come to UTH for either general or specialty care need intensive care.

The Main Intensive Care Unit at UTH is a 10-bedded unit[4] in a 1,800 bedded teaching hospital[3]. In 2008, ICU admitted 425 patients with an average bed occupancy rate of 53%[5]. The standard of care appropriate for critically ill patients can be considered on three different levels: one, two and three[2]. The Main Intensive Care Unit has five level one and five level two beds and unfortunately, does not have any level three beds[1]. An essential principle of critical care is a high nurse-to-patient ratio, therefore, the actual number of patients admitted to ICU at any given time depends on the number of nursing staff and functioning equipment available[1].

During the period UTH Main ICU was developed, the yearly admissions had risen from 450 to over 900 between 1984 and 1988[1.] The increase was contained by keeping an average bed- occupancy rate of six patients per day [1, 4]. The ICU team concentrated on prompt diagnosis, treatment and insisted on discharge once patient's condition stabilized and was out of danger[1.] The open admission policy begun to be abused in different ways such as concealing the real diagnosis of the patient especially if condition was infectious for fear that patient would be denied access into ICU, thereby increasing the risk of cross-infection. The unit admitted a disproportionate number of VIPs and terminally ill patients[1] just as it was discovered in the Nigerian study[6]. Such patients spent a lot of days in the unit blocking critically ill patients whose chances of survival were high. Staffing and bed capacity became inadequate.

In 2001, the then Head of Surgical Department formed a team to develop the admission criteria for ICU. The admission criteria describe the type of patients to be admitted to ICU[7, 8]. The admission criteria also outlined the admission and discharge policies [6, 7, 8, 9]. Further, the team developed admission guidelines for ICU. See table 1 below:

Table 1: ICU Admission Guidelines and Criteria

No.	Guidelines	Criteria
1	All patients in respiratory distress should be intubated before transfer to ICU.	Patients needing cardio-pulmonary support for air-way support ventilation and cardiac monitoring such as: cardio-vascular accident in coma, myocardial infarction, post-operative respiratory failure and pulmonary oedema.
2	Baseline procedures such as intravenous cannulation, naso-gastric tube insertion, intercostal drainage tube insertion, urethral catheterization should be done before admitting patient to ICU.	Comatose patients, for example, those with head injury, diabetic coma, cerebral malaria, eclampsia, drug poisoning and neurotoxic snake bite.
3	Stat doses of drugs should always be given and signed for before admitting patient to ICU.	Patients with pericardial effusion needing surgical decompression.
4	All patients who are unconscious should have their blood sugar checked to rule out hypoglycaemia before admitting them to ICU.	Patients with acute renal failure, status asthmaticus, status epilepticus and embolic phenomenon.
5	Patients with head injuries should always have head injury observations done and documented with specific emphasis to coma scale, pupil size and reaction to light.	
6	ICU nurses should be informed in advance about patient to be admitted to ICU, explaining indication for seeking critical care, level of coma scale and baseline procedures performed on the patient.	

Due to high disease burden and growing population, the admissions to ICU have continued to increase. However, ICU still has only 10 beds, limited equipment, with only seven cardiac monitors and four suction machines instead of ten each as required in a level two unit. The number of critical care nurses is inadequate such that the ratio of one nurse per patient is not practical. Lack of intensive care when needed due to limited beds and other equipment lead to delayed therapeutic intervention and high mortality rate.

The admission criteria and guide-lines were disseminated to all departments and wards that admit patients to the unit such as casualty, obstetrics & gynaecology, admission and medical-surgical wards. The criteria and guide-lines have the intention to improve patient care and manage UTH main ICU. The guide-lines are quite beneficial to new nurses on the unit who are still under-going orientation and may not be familiar with routine nursing care. It is imperative for nurses to know and adhere to the admission criteria and guidelines in order to improve ICU management and consequently improve the quality of care.

PURPOSE

The purpose of this study was to determine nurses' knowledge and utilization of ICU admission criteria and guidelines.

METHODS

Study Design

A descriptive study design was used[10].

Study Sample and Site

The study size consisted of 50 randomly selected nurses working in the emergency department, obstetric department, theatre and general medical-surgical wards. The nurses from the selected areas were more likely to utilize the ICU admission criteria and guidelines because they transfer patients to ICU.

Data Collection

A self administered questionnaire was used to collect data. The questionnaire was developed by the investigator, reviewed by the research supervisor to maintain validity. It consisted five sections. Section A sourced information on knowledge of ICU admission criteria (definition of ICU, type of patients to be nursed in ICU, benefits of using ICU admission criteria, doctors from outside UTH should follow established referral system, admission and discharge policies, ideal nurse-patient ratio for ICU). Seven questions were asked with a total mark of 22 as more than one answer was needed.

Section B sourced information on knowledge of ICU admission guidelines (basic procedures performed on patients before ICU transfer, what is done before admitting patient to ICU in accordance to guidelines and what Glasgow Coma Scale assesses on patients with head injury). Three questions were asked with a total mark of 20 because more than one answer was needed. The total score for knowledge questions was 42.

Section C elicited information on utilization of ICU admission criteria (observing what is laid down in the ICU admission criteria, checking that patients are not admitted for social reasons such as being a chief, checking that patients are not admitted for administrative reasons such as being a Very Important Person in society, ensuring that doctors from outside UTH who admit patients in ICU follow the established referral system via the admitting firm and ensuring that patients are reviewed by registrar or consultant of the admitting firm before ICU transfer). This section contained a four-point scale, always, sometimes, rarely and never. It had a total of five questions. Four marks were allocated to “always”, 3 to “sometimes”, 2 to “rarely”, 1 to “never” answer. The total score for utilization of admission criteria was 20.

Section D elicited information on utilization of ICU admission guidelines (checking pupil size on patients with head injury or those unconscious, checking pupil reaction to light on patients with head injury or those unconscious, inserting urethral catheter before patient transfer to ICU, giving stat doses of drugs before patient transfer to ICU, making sure that patients in respiratory distress are intubated before transfer to ICU, inserting intravenous cannula before transfer of patient to ICU, inserting naso-gastric tube before patient transfer to ICU, giving patient's clothes to relatives before transfer to ICU, checking blood sugar level on unconscious patients to rule out hypoglycaemia before transfer to ICU, informing ICU by either phone or written message that patient will be transferred to the unit and informing ICU by either phone or written message the reasons or indications

for transferring patient to the unit). This section contained a four-point scale, always, sometimes, rarely and never. It had a total of eleven questions. Four marks were allocated to "always", 3 to "sometimes", 2 to "rarely", 1 to "never" answer. The total score for utilization of admission guidelines was 44. The total score for utilization questions was 64.

Section E sourced information on demographic variables (age, sex, and marital status, religious denomination, how long in service, basic professional qualifications and area of specialization).

Permission to collect data from the institution was obtained from the Executive Director of the hospital and authorities from various departments and general wards where data were collected. Written informed consent was obtained from all respondents.

Definition of Variables

Knowledge was related to what nurses knew about ICU admission criteria and guidelines and was assessed through asking questions on what the criteria and guidelines stated.

Utilization was defined as the ability of nurses to follow what is laid down in the ICU admission criteria, to check type of patients admitted to the unit and indications; and to perform basic procedures laid down in the admission guidelines.

Statistical Analysis

Data were edited for completeness and clarity; data from open-ended questions were categorized, grouped and coded. Data were then entered on data master sheet, tallied and analysed.

RESULTS

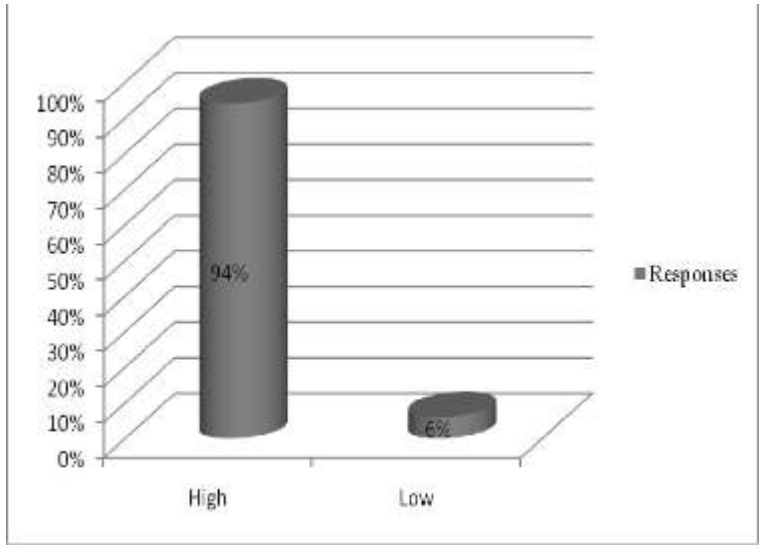
Sample Characteristics

The age of respondents ranged from 24 to 59 years, 86% were female, 48% were single, 42% were married and 10% were widowed or divorced. Regarding religious denomination 32% were Pentecost and 22% were SDA, 18% UCZ, 10% Catholic and 18% belonged to other denominations. Eight to fourteen years in service was attained by 36%, 1-7 years 32%, 15-21 years 18%, below one year 12%, 22 and above 2%. Majority of respondents were registered nurses 60%, while the rest 40%, were enrolled nurses. About 18% of nurses were registered midwives, 6% psycho-social counsellors, 4% critical care nurses, another 4% enrolled midwives, 2% operating theatre nurses while 66% had no area of specialization.

Knowledge of ICU Admission Criteria

Majority of respondents (88%) gave correct definition of ICU. Almost all respondents (98%) knew the benefits of using ICU admission criteria. Majority of respondents (84%) knew that doctors from outside UTH should follow the admission criteria. Almost three-quarters (72%) of respondents knew that an ICU should not be looked upon as a terminal care ward. Half (50%) of respondents were aware that ICU advised when patient was ready for discharge from the unit. Majority of respondents (84%) knew that the ideal nurse-patient ratio is one nurse to one patient. Ninety-four percent of respondents had high level of knowledge of ICU admission criteria as shown in figure 1.

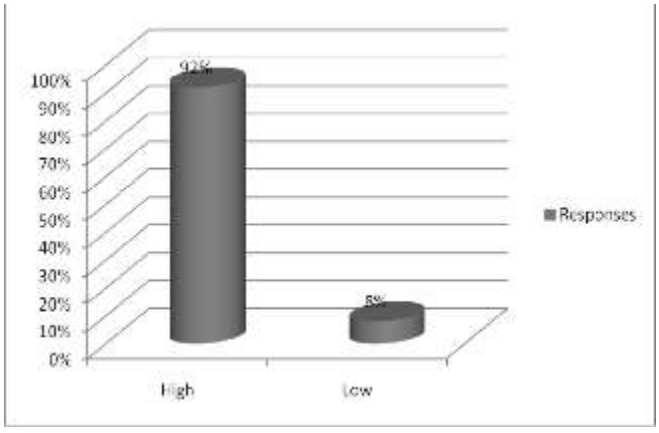
Figure 1: Distribution of Respondents' Level of Knowledge of ICU Admission Criteria (n= 50)



Knowledge of ICU Admission Guidelines

Ninety-six percent of respondents knew that urethral catheterization is a basic procedure performed on patients before transfer to ICU and only 8% were aware that intercostals drainage tube insertion was also a basic procedure. Fifty-six percent of respondents were aware that dextrostix should be done on all unconscious patients to rule out hypoglycaemia before ICU admission. Sixty percent of respondents knew that a written message could be sent to ICU indicating reason for admission. Sixty-two percent of respondents were aware that critical cases should not be rushed to ICU for resuscitation by expert clinicians. Seventy-six percent of respondents knew that patients in respiratory distress should be intubated before transfer to ICU. Ninety-two percent of respondents knew that GCS is used to assess verbal response and 78% were aware that GCS also assesses spontaneous eye opening. Ninety-two percent of respondents had high level of knowledge of ICU admission guidelines as shown in figure 2.

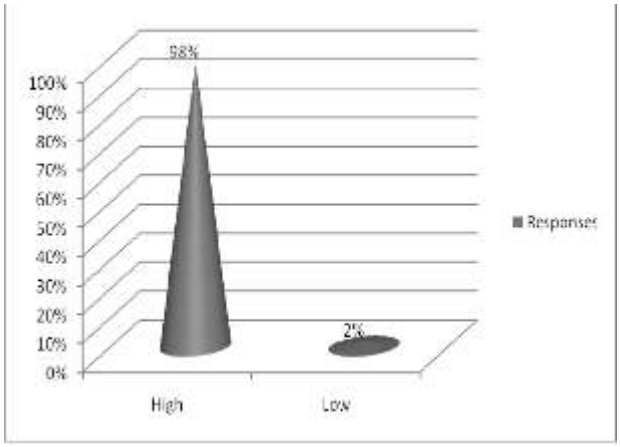
Figure 2: Distribution of Respondents' Level of Knowledge of ICU Admission Guidelines (n= 50)



Utilization of ICU Admission Criteria

Fifty-six percent of respondents always observed what are laid down in the ICU admission criteria, forty-six percent always checked that patients were not admitted for social reasons, while 40% always checked that patients were not admitted for administrative reasons. Seventy-four percent always ensured that doctors from outside UTH who admitted patients in ICU had followed the established referral system via the admitting Firm. Sixty–two percent always ensured that patients had been reviewed by registrar or consultant of admitting Firm before ICU transfer. Ninety-eight percent of respondents had high level of utilization of ICU admission criteria as shown in figure 3 below:

Figure 3: Distribution of Respondents' Level of Utilization of ICU Admission Criteria (n= 50)



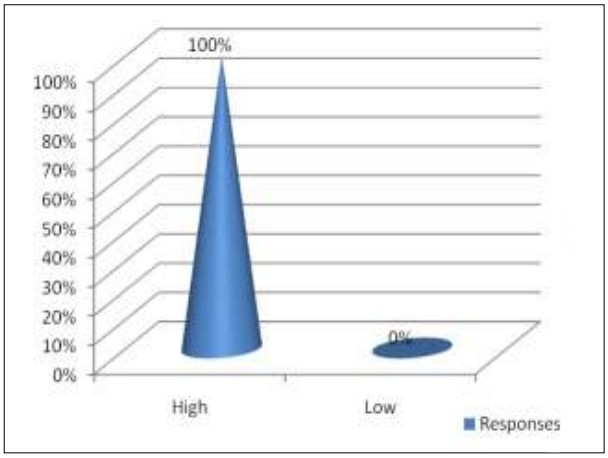
Utilization of ICU Admission Guidelines

Seventy-six percent of respondents always checked for pupil size on patients with head injury or those unconscious. Seventy-eighty percent always checked for pupil reaction to light on patients with head injury or unconscious. Eighty-two percent of respondents always inserted urethral catheter before patient transfer to ICU. Seventy-eighty percent gave stat doses of medications before patient transfer to ICU. Fifty-eighty percent always made sure patients in respiratory distress were intubated before transfer to ICU. Ninety-four percent always inserted intravenous cannula before patient transfer to ICU.

Fifty percent of respondents sometimes inserted a naso-gastric tube before patient transfer to ICU, while only 40% always inserted. Fifty-four percent sometimes gave patient's clothes to relatives before transfer to ICU, while 40% always gave clothes to relatives. Forty-eighty percent of respondents sometimes checked blood sugar on unconscious patients to rule out hypoglycaemia before transfer to ICU and only 42% always checked. Ninety-four percent always informed ICU by either phone or written message about patient transfer. Eighty-six percent always informed ICU by either phone or written message the reasons or indications for

patient transfer. All respondents had high level of utilization of ICU admission guidelines as shown in figure 4 below:

Figure 4: Distribution of Respondents' Level of Utilization of ICU Admission Guidelines (n= 50)



DISCUSSION

Few data are available on intensive care unit patient populations and critical care practices in developing countries [6, 11].

Knowledge of ICU Admission Criteria

Popper[12] states that knowledge acquisition involves complex cognitive processes: perception, learning, communication, association and reasoning. The term knowledge is also used to mean the confident understanding of a subject with the ability to use it for a specific purpose if appropriate[12]. Criteria for admission into the intensive care unit include patients needing technological support such as mechanical ventilation and/or invasive monitoring[7]. It also includes patients who are critically ill but recoverable who need care other than that available in the general wards.

The findings of this study on knowledge of ICU admission criteria showed that 94% of respondents had high level of knowledge of ICU admission criteria, despite lacking specialised training in critical care nursing, as only 4% were trained intensive care nurses. This is because the criteria have been disseminated and displayed both in ICU and general medical-surgical wards and departments that helps nurses to know. These findings are in disagreement with findings at the San Juan City Hospital (SJCH) study which revealed that, generally, admissions at SJCH were done according to national guidelines. But 42% of admissions were without criteria. These were a very high number of admissions which signified wrong admission criteria. This finding correlates with the deficiencies in admission criteria knowledge among medical admission officers[13].

The outcome of a critically ill patient is affected by the standard of monitoring and accuracy in conducting observation, prompt intervention and or timely reporting to ICU team. This can only be achieved if the critical care nurse has knowledge in ICU admission criteria and intensive care. A study was conducted in Ireland[14] on health care professionals' knowledge of managing emergency complications in critically ill patients with tracheostomy to ascertain the life-saving strategies to be instituted. The conclusion was that health care professionals had significant gaps in knowledge regarding management of tracheostomy-related emergencies. It was argued that insufficient knowledge levels can be addressed through training to maximize the safety of critically ill patients. The Ireland study results could have been in agreement with the current study findings if UTH participants were trained. The health care professionals in the Ireland study were not trained hence the low level of knowledge.

In another study, a multi-national survey to the World Federation of Critical Care Nurses (WFCCN) member countries[15] was conducted on critical care nursing leaders regarding their opinions of critical care nursing certification. It was concluded that certification results in formal recognition and is essential to support improved quality of critical care nursing. This simply shows that for a nurse to be certified as a critical care nurse then, she or he has the knowledge and competency needed to care for the critically ill patients whose survival is in the hands of the clinicians looking after them. Therefore, nurses who care for critically ill patients require knowledge about the patient's physiology, psychological and spiritual responses to critical illness as well as skills to manage sophisticated technology and equipment. In this context, certification is seen to be one of the ways to

assure that an appropriate level of education and knowledge is available to ensure high quality care is provided to all critically ill patients. Certification also enables nurses who completed the programme in one country to interact internationally.

In another study conducted in Washington on staffing levels in the intensive care unit[16]; where researcher emphasized that, the number of nurses required for a particular level of health care matters less. This is because the health care industry is reluctant to agree on a universal staffing ratio for more complex patients that need more nursing care. They say that all patients require the same amount of care regardless of the illness or complexity. The study findings showed that knowledge levels in nurses taking care of the critically ill patients are important so as to meet patients' needs. This is to provide care that supports healing, recovery, independence and self esteem; death and dying. It is not a matter of having many nurses on the unit who may be incompetent because they lack the knowledge and skill due to inadequate training opportunities but those who can deliver quality care. Knowledge, competency and skill are important but the number of knowledgeable and competent nurses in the critical care unit is equally important to offer quality nursing care. This is especially more in developing countries where the number of critical patients is high and equipment for monitoring is scarce.

Knowledge of ICU Admission Guidelines

Guidelines are an official recommendation indicating how something should be done or what sort of action should be taken in a particular circumstance[17]. Knowledge of ICU admission guidelines was measured by asking respondents on how they prepared patients before transfer to ICU. The results showed that, 92% of respondents had high level of knowledge of ICU admission guidelines. This study is supported by the London's survey entitled confidential inquiry into quality of care before admission to ICU [7, 18, 19].

The results were that, sub-optimal care before ICU admission contributed to morbidity or mortality in most instances. The main causes of sub-optimal care were failure of organization, lack of knowledge, failure to appreciate clinical urgency, lack of supervision and failure to seek advice[19]. Possible solutions would include improved teaching or training of clinicians on how to respond to clinical signs of life threatening; dysfunction of air-way, breathing and circulation, rather than relying on an intensive care team to do basic resuscitation. Other researchers emphasized that an ICU is not an emergency department where primary assessment and treatment of emergencies is done[1]. But that initial assessment and emergency treatment should be done by the referring team[1, 20].

Utilization of ICU Admission Criteria

Utilization means to make use of something, or find a practical or effective use for something[17]. Utilization in this context is linked to the effective act of using ICU admission criteria and guidelines by nurses. Utilization of ICU admission criteria plays an important role in stream-lining the type of patients to be admitted in the unit so as to reserve expensive drugs and therapies for patients who have a relative prospect of recovery by virtue of being nursed in ICU. Utilization of ICU admission criteria depends on the knowledge that respondents have of the admission criteria. However, there are few studies that have examined utilization of the criteria for ICU admission throughout the world.

Participants were requested to state how far they uphold the admission criteria. Ninety-eight percent of respondents in this study reported high level of utilization of ICU admission criteria. The findings of this study are attributed to the inaccuracies of self reports by participants and also to the attention researchers give to participants whilst conducting study. There was also a possibility that respondents had chance to consult each other because the questionnaire was self administered and respondents were found in same setting. This could have compromised the results of the study as participants ticked the ideal answers and not their actual practice.

This corresponds with the study conducted at the University of Benin Teaching Hospital[6], where patients got admitted in ICU for social factors, i.e., Very Important Persons (VIP), post-surgical patients needing care in a high dependency unit and moribund patients were also found to be admitted into the unit. This emphasises the need for accurate prediction of outcome if inappropriate admissions are to be avoided in ICU. This signifies inappropriate utilization of the ICU admission criteria. This should be discouraged by strict

adherence to and utilization of the admission criteria.

A study conducted in America sought to provide criteria for ICU admission, discharge and triage of adult patients to ICU, which was based on expert opinion and relevant literature[21]. It was concluded that, although little scientifically rigorous data exist validating the criteria for admission, discharge and triage of adult patients to ICU, current literature and expert opinion support the criteria to stream-line the admission, discharge and triage process. Therefore, for efficient utilization of expensive resources, it is beneficial for intensive care units to generally be reserved for those patients with reversible medical conditions who have a reasonable prospect of substantial recovery. With the recent changes in the health care environment, efficient use of ICUs has become a priority.

Another study was conducted in an urban part of South Africa from 1980 -1997 to investigate the incidence of Fatal and Near Fatal Asthma (NFA) [22]. The study was designed to investigate the epidemiology of deaths and ICU admissions due to asthma. Patients admitted to ICUs represent those with life threatening attacks, a proportion of whom might have died had this intervention not been available. The relatively high asthma mortality rate out-side health facilities and on week-ends suggest problems with access to ICU care with poor utilization of admission criteria. Hospital deaths may have been avoided had suitable ICU facilities with good utilization of ICU admission criteria been available. Therefore, interventions to further reduce asthma mortality should focus on provision of quality health care through effective utilization of ICU facilities and good utilization of ICU admission criteria.

Utilization of ICU Admission Guidelines

Utilization of admission guidelines required respondents to answer on how they prepared patients at the time they transferred them to ICU. Seventy-six percent of respondents utilized ICU admission guidelines well because they checked for pupil size in patients with head injury or unconscious. However, there were about a 25% of respondents who still did not check for pupil size in patients with head injury or unconscious implying poor utilization of the admission guidelines. This study has been supported by the survey which was conducted at Toronto Western Hospital in Canada[23]. The Canada study results were that ICU admissions were based on the referring physician's assessment of the medical need of the patient for an ICU bed and ICU admission guidelines were not used. Utilization of ICU admission guidelines is important because patients receive emergency care promptly and reduces risk of complications.

On the other hand, ICU admission guidelines were poorly utilized because of inadequate man-power to prepare patient effectively prior to ICU admission. The inadequacy in man-power could be because of low wages resulting in man-power flight over-seas in search of greener pastures and inadequate opportunities for professional development. This correlates with the Nigerian and UK study findings which had similar challenges concerning critical care services that were also hampered by inadequate staffing[24,25].

CONCLUSION AND IMPLICATIONS

Nurses showed high level of knowledge of ICU admission criteria and guidelines despite lacking specialised training in critical care nursing. This is because the criteria and guidelines have been disseminated and displayed in ICU, general wards and departments. Lack of specialised training reduces the safety of the critically ill patients and failure to utilize ICU admission criteria and guidelines. Therefore, hospitals elsewhere world-wide have developed ICU admission guide-lines/ or policies/ or criteria to reflect the best standards that guide them to make difficult decisions about utilization of ICU facilities. A more effective approach would be to determine accurate admission and discharge criteria that could reduce resource wastage on patients who are too sick or too well to benefit from intensive care. ICU should be reserved for patients whose risk of death may decrease by virtue of the care they receive in the unit. It seems inevitable that the requirement for intensive care facilities will continue to increase over the next years. It is the responsibility of the intensive care team to allow all appropriate patients, with reversible pathology and a reasonable chance of returning to an acceptable, reasonable quality of life, to benefit from intensive care. This can only be achieved by effective utilization of ICU admission criteria.

The implication of this study is that, nurses should appreciate the importance of utilizing ICU admission criteria and guidelines so that only the type of patients enshrined in the criteria are admitted to ICU. In this way, admissions for social reasons will be avoided and the scarce resources will be reserved for those patients who really need critical care. Improvement of patient care in ICU is dependent on evidence based practice which is only possible through conducting research to bring in new ideas. Research explores opportunities to strengthen knowledge and utilization of ICU and or the admission criteria and guidelines.

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