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INTERNATIONAL PERSPECTIVES IN EMERGENCY, TRAUMA AND CRITICAL CARE NURSING



CENTRE FOR INTERNATIONAL HEALTH PARTNERSHIPS

CCNAZ
Critical Care Nurses Association of Zambia

Contents

Welcome from the Dean of the Faculty of Health, Education & Life Sciences

Prof Ian Blair, Executive Dean, Faculty of Health, Education & Life Sciences, Birmingham City University, UK

It has been with a growing sense of pride that I have watched the exciting developments associated with the Birmingham City University (BCU) projects in Africa. These have resulted in the revised and re-validated advanced diploma and the first Zambian BSc programmes in Emergency and Trauma and in Critical Care Nursing. These programmes have cemented Zambia's place in leading practice and education in the region and has seen seconded students supported by more than one Ministry of Health in recognition of that leadership. I am pleased that BCU expertise has helped to support and guide Zambia to such a sector leading position.

Our inputs have been modest but transformative as we pump-primed the faculty though our Professional Practice offer. As a result of this approach our partners, Lusaka College of Nursing, were able to continue to independently deliver the Advanced Diploma and BSc programmes and will see their first BSc cohort successfully graduate this year. Given the global pandemic challenges this was an outstanding achievement in such a short period of time.

However, there is a significant need for the progress we have made jointly to be reviewed, recorded, and disseminated. Research and evidence-based practice is the only way knowledge can be effectively shared nationally and internationally and this Journal provides an ideal mechanism though which this can be achieved. The sharing of our collective expertise is only the beginning, but it is vital that your progress is recorded though publications. These are the lifeblood of research and without such publications your experience and progress would go unrecorded.

I commend this journal to you and will continue to watch with interest how it develops and grows as the research base builds. I am delighted that BCU has played a part in its creation.

Be Bold, Be Brave and have a go

There is an increasing recognition that student journals can play a key role in supporting the development of skills in writing for publication (Small & Levy, 2013. UCL, 2021). Emergency, trauma, and critical care nursing are relatively new specialities in sub-Saharan Africa, and it is therefore, essential that those who study at a higher level share their knowledge and expertise with their peers, students and the wider nursing community. This journal is unique as it has been set up in an area where there is not only limited evidence and challenges in accessing the evidence that is there and relates to critical care practice (Ng-Kmstra et al., 2016).

The aim of the journal is to enable students completing the Birmingham City University Master of Science and Bachelor of Science (with Honours) Professional Practice (Adult Critical Care) course to work in a supportive environment to gain the skills they need to move the specialist nursing agenda forward. Students may face a dilemma because their new levels of nursing knowledge, competencies and skills are still unknown to many of their peers within nursing, other healthcare professionals and the community. Therefore, they need to learn how to change practice and embed their new knowledge and skills into practice.

Evidence from South Africa has shown that providing a mentorship programme through a journals author assist programme, resulted in improved quality and quantity of publications from novice authors (Bruijns et al., 2017). Further, Al-Busaidi et al (2019) reported undergraduate students who published in a student journal were more likely to publish in international journals and hold an academic position during the seven-year follow-up. Therefore, this venture provides an opportunity to mentor students through the writing for publication journey, which will ultimately, help them to raise the profile and understanding of specialist emergency, trauma, and critical care nursing.

The establishment of the International Perspectives of Emergency, Trauma and Critical Care Nursing journal is a collaborative venture with the Critical Care Nurses Association of Zambia (CCNAZ). We are delighted to have this opportunity to work with the team for the sustainability of this journal and we are in the process of growing the editorial board and peer reviewers, which includes students, academics, and clinical staff from across the globe. We welcome students from across the Birmingham City University programme to submit articles and we encourage students on other programmes to consider submitting articles. Our advice would be, be bold, be brave, you have the solutions for the challenges you face, and this way you can start to change practice with support from your tutors. We would like to thank all the authors in this edition for their courage in publishing their work and we hope that you find this edition informative, inspiring, and useful for your clinical practice.

Assc Prof Chris Carter & Professor Joy Notter
Centre for International Health Partnerships, Faculty of Health, Education & Life Sciences, Birmingham City University, UK

Email contact: joy.notter@bcu.ac.uk / chris.carter@bcu.ac.uk

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The Evolution of Critical Care and Emergency and Trauma Nursing in Zambia

At every point, for every patient, the nurse is crucial. Patients with complex trauma and /or critical illness need to have a specialist nurse to lead their care. In the past decade significant changes have occurred in emergency, trauma, and critical care nursing, with the development of specialised and specialist practice which will facilitate the achievement of this World Health Organization (WHO) requirement (2020). Critical care nursing, started over a decade ago, the revised Advanced Diploma in Critical Care Nursing is now offered in three Colleges of Nursing and the Bachelor of Science programme will have its first graduates this year. While emergency and trauma nurses commenced specialised education and training programme in 2019 and their Bachelor of Science programme commenced in 2023. These changes will have a radical impact on both the role of the nurse, the level of care offered to patients and patient safety (Woo et al., 2017).

Zambia made a positive decision to develop the emergency and trauma and critical care nursing specialisms as separate entities. The advantage of this decision is that strategic planning focuses on two areas rather trying to stretch a single specialist workforce across different areas. With limited nurse leaders who have undertaken these specialist education programmes, the introduction of new under and post graduate programmes will provide an opportunity for Emergency and Trauma and Critical Care Nurses to move into senior and management positions, thus raising the profile of these specialties and enabling them to have their voice heard by policy makers and ultimately take on the role of policy makers.

The recent turbulent times which include the Covid-19 pandemic have led to critical care and emergency and trauma nurses being internationally recognised as crucial cutting-edge practitioners able to respond in times of crisis, while at the same time maintaining their ongoing service provision. This has placed us in a unique position, we are pioneers in a new world, we need to grasp the baton and lead both communities of practice forward. If we specialist nurses do not respond positively and seize the opportunity, it may never come again because once the status quo is accepted it is much harder to initiate innovation and change.

However, nurses need demonstrate what they can do, conduct research, use the evidence in practice and be confident in using their competence within the multi-disciplinary team. Only when other healthcare professionals can see the benefits offered by Emergency, Trauma and Critical Care Nurses will the full potential of these specialists nurses be recognised and accepted. The future offers endless opportunities but only if we recognise that it sits within our grasp.

Patricia Banda, Senior Lecturer, Emergency & Trauma Nursing Programme, Lusaka College of Nursing

Sabelo Maphenduka, Lecturer, Critical Care Nursing Programme, Lusaka College of Nursing and President Critical Care Nurses Association of Zambia.

Email contact: patricia.banda@mail.bcu.ac.uk / sabelo.maphenduka@mail.bcu.ac.uk

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Prevention of Sepsis in a Patient with a Complex Thoracic Wound due to a Hippopotamus Bite

Mwaka Chongwe, Senior Lecturer, Lusaka College of Nursing, University Teaching Hospital, Nationalist Road, Lusaka, Zambia

Email contact: Mwaka.chongwe@bcu.ac.uk

Abstract

Traumatic wounds have been identified cause of sepsis and this case study illustrates the complexity of critical care nursing when dealing with a complex thoracic wound which could lead to sepsis. Given the nature and size of the wound a range of treatment strategies were required including the use of intravenous and topical antimicrobials, wound cleaning, topical negative wound therapy and enhanced nutrition. This paper explores each of the concepts in relation to the case study and critical care nursing practice. It demonstrates the need for higher level knowledge, skills and competence, illustrating the importance of life-long learning.

Key words: Complex Wound, Sepsis, Aseptic Technique, Topical Negative Wound Therapy

This case study critically examines the assessment and prevention of sepsis in a critically ill patient with a complex thoracic wound in Zambia. In mid-winter a male teenager was attacked by a hippopotamus while fishing on Lake Kariba on neighbouring territorial waters. The patient sustained a complex open chest wound measuring approximately 23cm x 12cm, with an 18cm tunnel into the chest from the bites. He spent two days at a foreign local clinic and seven days at a Zambian second level hospital situated along the border with Mozambique, before being referred to the tertiary hospital situated ninety kilometres away.

Prior to admission to the Intensive Care Unit (ICU), a thoracotomy was performed in which debridement of the open infected chest wound was carried out, sternal repair attempted, and a right sided intercostal drain (ICD) was inserted (picture 1). Post operatively, the patient remained intubated and mechanically ventilated. With such a complex wound, already infected, an initial cause for concern was the possibility of the patient developing sepsis and preventive measures needed to be instigated.

Picture 1: Initial wound

Sepsis is a syndromic host response to infection resulting in life-threatening organ dysfunction (World Health Organisation [WHO], 2020); Singer et al., 2016). It is the second largest cause of preventable death worldwide (Rudd et al. 2018; Kempker et al., 2018). In 2017, 48.9 million cases were recorded globally of which 11.0 million resulted in sepsis related deaths representing 19.7 % of all deaths world-wide. The highest burden, approximately 85% occurred in Sub-Sahara Africa (Rudd et al., 2018). The Global Burden of Disease (GBD) indicated the need for enhanced prevention and treatment of sepsis especially in sectors of the world with a low Social Demographic

Index (SDI) such as Zambia. Given the high mortality rates, sepsis remains an under-prioritised disease with governments focusing on other infectious diseases such as Ebola, malaria, tuberculosis (TB), human immunodeficiency virus (HIV) and now Covid-19 and monkey pox. The Zambia National Health Strategic Plan (MOH, 2017) focuses on preventive primary health care approach of service delivery; however, it is a cause for concern that sepsis is not formally addressed in this policy document.

Open traumatic wounds are prone to sepsis because they are often contaminated (Iheozor-Ejiofor, et al., 2018) and altered skin integrity creates an unprotected entry site for pathogens. Wounds are ranked the second major causes of sepsis; therefore, wound care not only provides an opportunity to prevent sepsis but also assess and initiate treatment for patients with signs of sepsis (Rudd et al. 2018). National Institute of Clinical Excellence [NICE] (2020). Traumatic wounds such as animal bites, cause a release of inflammatory mediators such as cytokines from damaged tissue, which may enter bloodstream and cause sepsis (Gyawali et al., 2019). For the patient described in this case study, given the cause and complexity of the wound, it is important that critical care nurses have the knowledge and skill not only to manage complex wound but also, be able to recognise and respond to sepsis early (Keeley and Nsutebu, 2021).

For effective sepsis management, source control is crucial, therefore, surgical debridement was essential in this case study, for removal of necrotic tissue and foreign bodies which could have been a potential source of sepsis (Kristensen et al., 2020). Another key area is the administration of appropriate antimicrobials. In this case study, the choice of intravenous antimicrobials were Ceftriaxone 2g once daily and Metronidazole 500mg 8 hourly as initial antibiotic cover. Ceftriaxone is a broad-spectrum cephalosporin that is used as surgical prophylaxis and is a treatment for complex skin and soft tissue inflections as well as bone and joint infections (British National Formulary, 2020). Metronidazole is an antimicrobial drug used for anaerobic bacteria and protozoa (Joint Formulary Committee [JFC], 2022). This combination of antimicrobials because of the history of his injury and in recognition no one antimicrobial would be sufficient to prevent the infection leading to sepsis (Centre for Disease Control and Prevention [CDC], 2017). Prior to transfer to the referral hospital the patient had received anti tetanus toxoid vaccine.

During the first 24 hours of ICU admission, the patient remained stable. He was extubated 48 hours later and remained self-ventilating, however, he needed regular analgesia and chest physiotherapy. Patients with complex wounds, although they may have received aggressive initial management, it must be remembered that there is potential for rapid deterioration that might lead to sepsis (Sezgin et al., 2021; Fernandez et al., 2019). ICU care allows for constant observation, monitoring and early identification of deterioration and rapid escalation in treatment if needed (Seymour et al., 2017).

Wound assessment and aseptic technique are a core competence for critical care nurses, taught and assessed during pre-service nurse education programmes. However, it is important to point out that practice will evolve as nursing care advances, also, specialist practice facilitates higher level competence, important for patients in critical care. All registered nurses are required to maintain their clinical competence through education, research and self-motivated learning (Nursing and Midwifery Council of Zambia [NMCZ], (2019). Specialist nurses are no exception and must accept the concept of life-long learning, continuing to assess and extend their knowledge and skills throughout their professional careers. They are, therefore, able to use innovative solutions, where access to sterile packs and equipment may be limited. They may find healthcare professionals using clean but not sterile equipment (Sonoiki et al., (2017). However, as Gumble and Maddison (2020) argues that there is statistical difference between clean and sterile technique and infection rates. Therefore, they need to discourage this practice and reinforce the need for aseptic technique (Hall et al., 2019, Gupta, 2018; Hegarty et al., 2018; NICE, 2019; Clare and Rowley, 2018).

Due to the extent of this patient's injuries, he had a prolonged stay in hospital and several trips to the operating theatre for surgical debridement. It is important to note that the financial costs here are borne in part by the family, therefore, the burden of sepsis had economic and physical sequelae for the patient, family, and the healthcare system. The cost of sepsis in Africa is unclear; however, the high incidence and mortality rates indicate a high cost (WHO, 2017). Therefore, improving sepsis care in low-income countries (LIC) would prevent the depletion of limited resources that could be utilized in other health programmes. However, critical care services are cross cutting because they admit the critically ill patient often regardless of diagnosis. Therefore, the prevention of sepsis by

improved wound care practices may initially require increased funding, but it could be argued that the long term the expenditure is lower due to reduced numbers of patient with complications.

Current international revised definition of sepsis guidelines has been adopted by many countries including LIC. However, it has been noted that the guidelines may not be directly appropriate and will need adaption to local contexts (Kwizero et al., 2018; Levy et al., 2018). For example, an attempt to use an international early resuscitation protocol in emergency patients in Zambia, resulted in a higher mortality of 48.1% in the treatment group compared with 33.0% in the control group (Andrew et al., 2017). The research is unclear regarding compounding factors that could have included these figures. These may include patients present in late stages of disease process, demographic differences in terms of younger population, a different burden of disease, co-morbidities, such as TB, HIV and the high prevalence of trauma particularly traumatic brain injury (TBI) (Andrew et al., 2017). Therefore, it is crucial to conduct research in local settings rather than relying on outputs from other contexts and healthcare systems.

Even though aggressive wound care measures were put in place for this patient, regular assessment of his wound played a major role in sepsis prevention (Churpek et al., 2017). Also, comprehensive recording and interpretation of vital signs checked for the subtle changes that could indicate sepsis (Husabø et al., 2020). The use of screening tools has been shown to improve detection of sepsis and acute deterioration, however, evidence on the use of the sequential organ failure assessment (SOFA), quick SOFA (q-SOFA) and early warning scoring tools in LIC have produced inconsistent findings (Schultz et al., 2017; Schmedding et al., 2019; Huson et al., 2017; Moore et al., 2017). This emphasises the need for validated context-based clinical assessment in sepsis prevention. In consequence, for this patient, assessment tools had to be specifically adapted, and used with modified, international wound assessment guidelines.

Consent for medical photography allowed for visual comparisons over time, and at the same time measurement strategies included wound margins, depth of the cavity, amount of exudate, colour of the wound bed. These were reviewed and completed every time wound care was carried out. This guided the wound care plan which included the use of sterile saline and antiseptic solutions, such as hydrogen peroxide, acetic acid and povidone-iodine for irrigation, washout and packing during wound dressing (Schedler et al., 2017). Bernardelli de Mattos et al. (2020) and Luze (2020) demonstrated the efficacy of antiseptic solutions against microbes on and in wounds. However, in the case study, availability of, and access to, these solutions was limited, and an innovative treatment regime had to be developed.

One of the challenges of such complex bites is that they can be heavily contaminated resulting in infection that is deep seated and hard manage. This occurred with this patient and at day 40, a green foul-smelling exudate was noted, microbiology swabs for microscopy, culture and sensitivity were immediately taken, to provide guidance on specific antibiotics sensitive to isolated pathogens (Ferrer et al. 2018; Murray et al., 2022; Kramer et al., 2018). Intravenous antibiotics were commenced with both cephalosporin (ceftriaxone) and a gyrase inhibitor (ciprofloxacin) which are effective against gram positive and negative pathogens were initiated (Gyawali et al., 2019; Murray, 2022). The decision to use these drugs was based on the knowledge and understanding of pathophysiology and sepsis. The clinical decision was more difficulty as there no Zambia antimicrobial guidelines to support practice. To target infected areas, antimicrobials were introduced directly to the wound bed during dressing changes. This approach fitted with most studies on wound care, which have, as Duane et al (2020) reported incorporated topical use of antimicrobial agents to wound care guidelines.

Given the size and complexity of the wound, ongoing wound management added negative pressure wound therapy (NPWT). This involves applying sub-atmospheric suction pressure (Logan et al., 2021; Kirsner et al., 2021; Horch et al., 2018), and is helpful for removal of wound extracellular fluid, resulting in a decrease of bacterial colonisation that could cause infection and sepsis (Ge et al., 2018; Kim et al., 2020). This approach was deemed beneficial as it could support the evacuation of exudate, as Hodson et al (2019) suggests, from the ‘hard to reach’ posterior thoracic bed, through the 18cm long tunnel in the chest created from hippopotamus bites (picture 2).

Picture 2: Topical Negative Wound Therapy

A key factor in recovery was nutrition, a complex area of critical care nursing practice, particularly where there is limited availability of commercial feeds. Patients at nutritional risk have higher rates of infection; complications including malnutrition, delayed wound healing, increased mortality, and longer hospital stay and suffer from organ failure (Singer et al., 2019). In this case study, the patient was self-ventilating and able to take oral feeds, however, it was recognised that his daily nutritional intake was inadequate, in consequence, additional supplements in the form of a low-cost, highly sustainable feed (Critical Care Lusaka Birmingham [CCLUB] porridge) was given. To measure its effectiveness, the mid-upper arm circumference was recorded to track changes in weight. The nutritional supplements continued after he was discharged from the ICU to the ward.

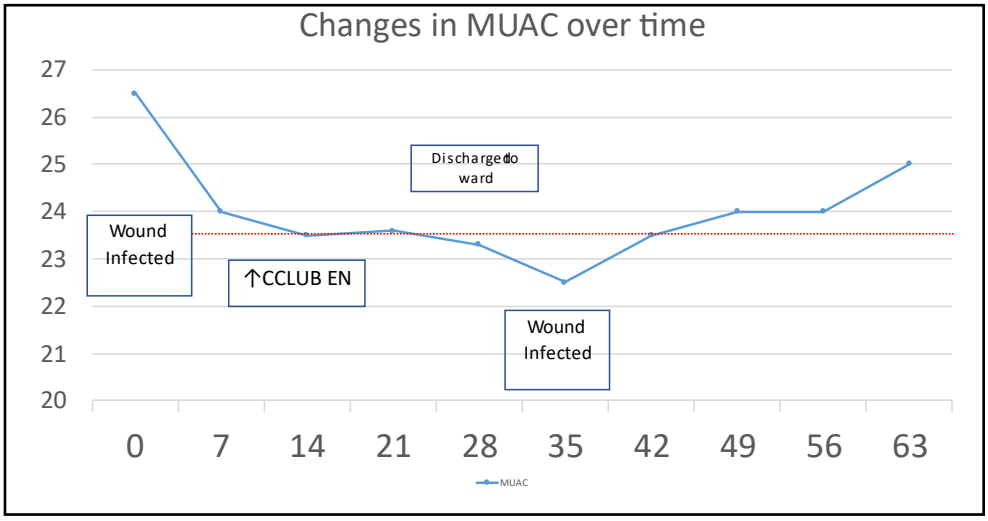

Figure 1: Measurements of MUAC over time

Initially, the patient received two additional CCLUB porridges per day, however, as figure 1, this did not provide sufficient additional nutrition and it was increased to 3 supplements per day. It is important to note the rapid weight loss during the first seven days of admission and when the wound became infected, and how this was reversed once additional supplementary feeding was instigated. This also lead improved wound healing. Picture 3 the wound after 77 days and prior to discharge home.

Picture 3: Wound prior to discharge home

In conclusion, this case study critically examined the care and management of a patient with a complex thoracic wound from animal bites. It demonstrates that prevention of sepsis requires a multi-disciplinary team approach. It is suggested that this team go on to develop evidence based local guidelines which can be trialled in practice. Wound care is the domain of the nurse and for patients admitted to ICU, the critical care nurse must have the knowledge and skills to successful, assess, manage, and support patients regardless of the aetiology and resources available.

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Consent
Written and verbal consent for this case study was given by the patient and his Guardian.

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Advancing Renal Care in Zambia: Considerations for Critical Care Nurses

Major Richard Kahalu, Critical Care Unit, Maina Soko Military Centre, Lusaka, Zambia

Contact email: richard.kahalu@mail.bcu.ac.uk

Abstract:
Zambia continues to face a huge burden of renal disease, in consequence, the Ministry of Health has increased the number of dialysis units and the National Health Insurance Management System (NHIMA) has agreed to support renal services including transplantation. However, within critical care units, there remains a limited availability of haemofilter machines which reduces the ability to provide continuous renal replacement therapy (CRRT), resulting in patients needing to be transferred to renal units. Coupled with limited specialist renal nurses, this means critical care nurses are often involved in the care and management of patients requiring dialysis. The introduction of renal transplantation will require the establishment of renal critical care units, which will need healthcare professionals to be appropriately educated and trained. Therefore, this paper critically examines the advances in renal care and considerations for critical care nurses in Zambia.

Key words: Acute kidney injury, chronic kidney disease, renal replacement therapy

This paper critically examines the provision of critical care and renal nursing management in Zambia, where the decentralisation of national renal services to the provinces, has increased the number of national renal units to five (Ministry of Health [MOH], 2017). However, there remains a significant shortfall in specialist nursing and medical workforce, making it difficult to provide more advanced therapies, including kidney transplant. There remains limited access to education and training for this new and emerging speciality, because there are no Zambian renal nursing programmes, and as a result there are very few specialist renal nurses. In consequence, critical care nurses are often required to plan, deliver, and evaluate care for a range of renal patients, including those with acute kidney injuries (AKI), end stage renal disease (ESRD) and in the immediate post operative period following renal transplantation.

Acute Kidney Injury

The recognition of AKI is based on monitoring serum creatinine (sCr) levels, with or without an adequate urine output (0.5-1ml/kg/hr). Causes of AKI can be identified by three categories, pre-, intra or post-renal condition (table 1) (Baid et al., 2016. Edwards & Williams, 2019. National Institute for Health and Care Excellence [NICE], 2018). If untreated it will eventually escalate to renal cellular damage and ultimately intrinsic renal disease (Makris and Spanou, 2016).

Table 1: Causes of AKI (Baid et al., 2016. Edwards & Williams, 2019)

Pre-Renal	• Hypovolaemia e.g., haemorrhage, gastrointestinal losses, excessive diuresis, and third spacing due to ascites, pancreatitis. • Hypotension and low cardiac output states, e.g., myocardial dysfunction, arrhythmias • Sepsis
Intra-Renal	• Hepatorenal syndrome • Cortical necrosis • Acute tubular necrosis e.g., nephrotoxins (e.g. radiographic contrast, aminoglycosides, rhabdomyolysis). • Acute interstitial nephritis—drugs including penicillin and NSAIDs. • Vascular e.g., emboli.
Post Renal	• Raised intra-abdominal pressure causing reduced renal venous drainage. • Intra-ureteral conditions—calculi, tumour, blood clot. • Extra-ureteral conditions—retroperitoneal fibrosis, tumour, aneurysm. • Bladder obstruction • Urethral obstruction

The Kidney Disease Improving Global Outcomes (KDIGO) guidelines provide a framework for the classification of AKI (Table 2). An AKI is defined as an increase in serum creatinine (SCr) by ≥ 0.3 mg/dl (≥ 26.5 µmol/l) within 48 hours; or increase in sCr to ≥ 1.5 times baseline, which is known or presumed to have occurred within the prior 7 days; or urine volume <0.5 ml/kg/h for 6 hours (table 2).

Table 2: KDIGO Criteria and Staging of AKI (2012)

Stage	Serum creatinine		Urine output
1	Increase of 1.5 – 1.9 times the normal baseline	Increase of ≥ 0.3 mg/dl (≥ 26.5 µmol/l)	Decrease of <0.5 ml/kg/h for 6 hours
2	Increase of 2.0 – 2.9 times the normal baseline		Decrease of <0.5 ml/kg/h for ≥ 12 hours
3	Increase of 3 times the normal baseline	Increase of ≥ 4 mg/dl (≥353.6 $\mu mol/l$)	Anuria for ≥ 12 hours

All critically ill patients must have hourly accurate fluid balance including cumulative balances recorded. However, calculating insensible losses e.g., tachypnoea and fever, may be difficult to achieve. Urinary catheter care should include checking of colour of urine and for any signs of debris, check catheter site and prevention of the catheter dragging or pulling on the urethra. Using the KDIGO (2012) guidelines, initiation of renal replacement therapy (RRT) in AKI should be based on individual clinical assessment. Indications for initiating treatment including metabolic acidosis (pH >6.5), hyperkalaemia (7.6mmol/l), fluid overload, toxicity (drugs, poisons and toxic compounds), severe uraemic symptoms, urea >30mmol/L and rising, creatinine >300mmol/L and rising, oliguria for 12 hours (‹30 ml/h for 6 hours, not responding to diuretics or hemodynamic optimization), hyperthermia, persistently high lactate associated with metabolic acidosis and clinically significant organ oedema.

AKI is a global public health problem (Annigeri et al, 2017), with treatment guidelines differing epidemiological factors, management, and prognosis. Annigeri et al, (2017) point out that in low- and middle-income countries (LIC / LMIC) only 20% to 25% critically ill AKI patients receive RRT. For those with chronic kidney disease (CKD), the picture is no better, with prevalence in LIC / LMIC on the higher side of the global figures, with prevalence varying between countries 13.9% and 30% in sub-Saharan Africa (SSA), compared to from 11 to 13% in high income countries (HIC) (Hill et al., 2016. Stanifer et al., 2014). The challenge for critical care and renal services in Zambia, is that the statistics are unclear, with limited research in this field of nursing practice.

Renal Replacement Therapy

There are several types of RRT, these include Continuous Arteriovenous Haemo(dia)filtration (CAVH/D), which is rarely used in practice today. Slow Continuous Ultrafiltration (SCUF) is regulated by gravity or pump and generates ultra-filtrate. Continuous venovenous haemofiltration (CVVHF) which involves a pump generating a hydrostatic pressure, with ultra-filtrate produced. Continuous venovenous haemodialysis (CVVHD) involves dialysate fluid being added to the haemofilter and a pump uses convention to move dialysate. Continuous venovenous haemodiafiltration (CVVHDF) is a combination of both CAVHF and CVVHD and is deemed the most effective and most frequently used (Richardson and Whatmore, 2014). The choice of treatment modality depends on the needs of the patient and physician preference. Critically ill patients requiring RRT need a multidisciplinary approach to maximise optimum symptom management and the provision of support during advanced CKD or end stage renal disease (ESRD) (Frandsen et al., 2021). However, the cultural and socioeconomic aspects together with limited resources, reduced availability of trained staff and equipment all add to the challenges faced by critical care nurses in LIC's (Annigeri et al, 2017. Wearne et al, 2020).

Although there are increasing numbers of renal units and RRT machines, there are a few critical care units providing continuous renal replacement therapy (CRRT). This situation has seen critically ill patients that could benefit from CRRT being transferred to a renal unit and receiving for intermittent RRT which is less effective (Tandukar and Palevsky., 2019, Fathima et al., 2019). It is important to point that renal units have been specially designed to have continuous power supply, dialysate fluid and specially trained staff. As a result the current situation is challenging for both critical care nurses and patients, as Chironda et al (2021) argue, the critical care nurse is educated to have

a wider skill set rather than the narrow focus renal care requires. They go on to state there is an urgent need for nurses qualified in the care of chronically ill patients needing haemodialysis. Their argument supports the perspective of Annigeri et al (2017) who point out that AKI, CKD and ESRD all require nurses with enhanced education and training. Without specialist renal nurses, critical care nurses may be best placed to offer care and support, however, managing such complex patients without the appropriate education and training can affect the long-term outcomes and quality of life post illness (Rawal et al., 2017).

Given the prevalence of AKI in critically ill patients, an estimated 50% of patients experience an episode of AKI with 8-12% needing RRT for the severe form of AKI (Chironda et al,2021). Nevertheless, it is important to recognise that Wearne et al's (2021) perspective is that RRT should only be used when patient benefits can be identified and not just to prolong life. Decisions on timing of when to initiate RRT in AKI patients remains difficult, due to limited clinically validated tools (Clark et al, 2017). Therefore, a shared decision-making process to initiate RRT should include the attending physician, the critical care nurse, patient, and family. This does not remove the ethical dilemma faced by the healthcare team, of whether or when, to commence RRT in patients whose prognosis is poor due to significant acute and chronic comorbidities (Annigeri et al, 2017).

RRT should be considered as a matter of priority when life-threatening changes in fluid, electrolytes, and acid-base balance are unresponsive to medical therapy, also, when damage to the kidneys occurs (Annigeri et al, 2017). However, evidence indicates that RRT in the critically ill patient in critical care should be commenced in the absence of absolute indication (Tandukar and Palevsky., 2019). Adeel et al (2019) identified that early initiation of RRT is associated with decreased mortality, though there are different definitions of early and delayed parameters, such as Biochemical markers (e.g. BUN, Creatinine), clinical markers such as urine output and fluid balance from the onset of AKI (Adeel et al., 2019). The right time to initiate RRT still remains controversial, and may differ depending on the condition, for example, surgical patients may benefit from early commencement of therapy on the other hand septic patients with multi organ failure may benefit from delayed initiation (Adeel et al., 2019). Implementation of the consensus recommendations for the management of continuous renal replacement therapy (CRRT) as identified by the Acute Disease Quality Initiative (ADQI) remains challenging (Rewa et al., 2019). Further, a high burden of physical and psychosocial symptoms, poor outcomes and higher cost of care are often associated with advanced CKD (Wearne et al, 2020). In addition, in LIC's it has been identified that fear and anxiety may impact on the willingness receive RRT. Given the acuity and rapid onset of symptoms, patients and family members may feel pressured by limited availability of health insurance, access, and coverage of services, as well as the ongoing financial constraints that come with RRT (Annigeri et al, 2017).

All patients with AKI should have access to RRT and decisions regarding its implementation or should be made by the multi-disciplinary team, in partnership with patients and their families. Frandsen et al, (2020) suggest that relatives should be recognised as a source of support for the patient, otherwise they may experience a lack of involvement and miss being part of the decision-making team (Ho et al., 2021). Therefore, information on the impact the illness and treatment on daily life, is essential for both patients and relatives (Jesus et al., 2019, Ho et al., 2021). Proactive family meetings can help to align treatment goals and initiate palliative care early where necessary (Beckstrand., 2018) reducing the level of stress, caused from the long-term treatment, and the need to change lives and lifestyles.

Lifestyle restrictions include fluids and diet, travel limitations, fatigue, financial burden all impact on employment and relationships, and in the absence of renal nurses, critical care nurses need to work with patients to help them develop coping mechanisms (Subramanian et al., 2017). As Vijayan et al (2021) point out this is essential to enable families to understand the full implications of RRT and how to live with it, within their community. For critically ill patients that recover from AKI, the outlook is positive as they may have little or no complications. However, should the patient fail to recover and progress to ESRD, renal transplant should be explored as a long-term possibility.

Kidney Transplantation

Globally, kidney transplantation is recognised as the best option in the management of patients with ESRD (Laupacis et al., 2016). Not surprisingly, research findings report that the highest rates of ESRD treatment are found in HIC, and the lowest in LIC / LMIC. Kidney transplantation is carried out in few African countries, namely South Africa, Nigeria, Mauritius and recently Ghana and Zambia (Naicker et al.,2018). The cultural and socioeconomic aspects as well as limited resources, reduced availability of trained staff and equipment poses additional challenges to clinicians in these settings (Annigeri et al, 2017). Nevertheless, there is increasing availability for kidney

transplantation in Zambia, due to the National Health Insurance Management Authority (NHIMA) Scheme adding in renal services and transplantation (MOH., 2023, Banda et al., 2022). While this is welcome, there is an impact on service provision, with critical care nurses taking on the immediate post-operative care for these patients. This is a new area of practice, and it must be recognised that additional education and training are needed to expand their scope of professional practice, to enable them to deliver the best possible care.

In any discussion of kidney transplantation it has to be acknowledge that international studies have shown a significant association between social-demographic characteristics and willingness to accept a kidney transplantation (Tan et al., 2017, Saran et al., 2015, Patzer et al., 2012). For example, a US cross sectional study of factors affecting the willingness of ethnic minority patients to receive a kidney transplant found that barriers such as fear, pain of surgery, financial concerns and physician mistrust were important (Goovaerts et al., 2015). Similar findings also reported by Wilkinson et al (2019) and Salter et al (2014). In contrast, Rees et al (2017) found that in the Philippines the major limitation was the shortage of organs available for transplantation. In Ghana, it was reported that patient education regarding kidney transplantation improved the chances of acceptance (Boima et al., 2021). While lessons learnt from establishing a kidney transplant service in Nigeria reported that although there are advances in treatment options, only 2.5% of ESRD patients underwent transplantation. Challenges identified including poverty, lack of information, lack of organs, limited availability of laboratory and or pharmaceutical support all impacted on the incidence of transplantations (Umezurike et al., 2015). In addition, Moosa et al's (2019) study in South Africa reported a decline in the numbers of transplants, although this service has been in place for over a 25-years, the reasons the reported were structural and policy issues, and patient follow up challenges.

Zambia continues to face a high burden of renal disease and with limited availability of RRT in critical care units for patients who develop AKI, this poses a complex challenge for the health system, policy makers and healthcare professionals in practice. The increased availability of renal services and the introduction on renal transplantation in country are a welcome step forward, however, it must be recognised these are still in their early stages. There is an urgent need to increase the education and training of healthcare professionals and conduct research into the short and long-term outcomes of AKI and ESRD in terms of patients and service provision. There also has be recognition of the overlap and boundaries of renal and critical care nurses, each one has a specific defined role, however, currently due to situation discussed above, the latter are required to cover both roles. This situation must be addressed, if Zambia is to move forward and take its place and provide enhanced renal services nationally.

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Prevention of Maternal Sepsis in an Obstetric Intensive Care Unit at a Tertiary Hospital in Lusaka, Zambia

Sabelo Maphenduka, Lecturer, Critical Care Nursing, Lusaka College of Nursing & President Critical Care Nurses Association of Zambia

Contact Email: sabelo.maphenduka@mail.bcu.ac.uk

Abstract

This paper critically discusses the importance effective hand hygiene as a key strategy in the prevention of maternal sepsis in an obstetric intensive care unit (OICU). Maternal sepsis: a life-threatening condition defined as organ dysfunction resulting from infection during pregnancy, childbirth, post-abortion, or postpartum period. It is amongst the leading causes of mortality in obstetrics and represents 11% of maternal deaths. Given the high prevalence of maternal sepsis, early detection and treatment of infections is key to prevention. One of the simplest infection prevention and control measures, that is often overlooked by healthcare professionals, is hand hygiene. Collectively, this paper presents improvements that could have key implications for the reduction of the risk of healthcare associated infections and through that improvement of patient safety in critical care units in Zambia.

Key words: sepsis, infection prevention and control, maternal mortality, hand hygiene

Reduction of maternal mortality is a global priority and one of the United Nations Sustainable Development Goals [SDG] to improve maternal health and reduce maternal mortality to less than 70 per 100 000 live births by 2030 (UN SDG, 2023). Zambia recognises the need to act on international recommendations and has set its own targets through the National Health Strategic Plan (ZNHSP) (Ministry of Health, 2017). As part of the plan to reduce maternal mortality, Zambia now has obstetric intensive care units (OICU) in the larger referral hospitals. It is accepted that obstetric patients require critical care for a variety of complications, however, it is important to note that these patients are at risk of developing sepsis due to altered physiology and insertion of invasive devices (Lorente et al., 2022). Globally, there are serious concerns regarding sepsis recognition and management, with prioritising preventive measures seen as crucial in both terms of patient outcomes and health system resourcing (World Health Organization, [WHO], 2023). Consequently, it is essential to prioritise hand hygiene, a simple but effective procedure that the WHO (2009) could reduce sepsis by up to 40%, however, currently adherence is poor (WHO, 2021). This paper explores the importance of preventing sepsis through effective hand hygiene by all healthcare professionals in the OICU.

The full global burden of maternal sepsis is unknown (Chen et al., 2020), partly because in some countries reporting is patchy and /or inaccurate, in addition, given the complexity in the causes, recognition of sepsis is challenging. It is a cause for concern that in low-income countries (LIC) who carry the greatest burden of maternal deaths and complications, programmes often focus on the maternal complications, forgetting that the cause of sepsis many be unrelated to the pregnancy and could have arisen from healthcare acquired infection (HCAI). Therefore, for patients admitted to OICU, it is crucial to assume sepsis could be an issue, regardless for the reason for admission, also, should there be any deterioration, critical care nurses should ask ‘could it be sepsis?’ (Casey, 2016). In Zambia, the national statistics has been fluctuating, however, there is no steady decrease, with the most recent Maternal Mortality Rate (MMR) being 183/100,000 (Gianett et al., 2019).

Sepsis is the third most common factor in maternal death (Ali et al., 2019). While Musonda et al., (2019) argue that sepsis is an overarching factor to maternal death, making a differential diagnosis difficult to make, particularly in resource limited settings, where diagnostic tools may be limited. A further challenge is that in Zambia, sepsis has no local name, compounding the problem of explaining to the community exactly what it is. Therefore, post childbirth there are interlinked issues that may delay diagnosis, discharge home and lack of knowledge amongst the local community reinforcing the need to develop appropriate language terms for this global burden. Early discharge from hospital after childbirth has been identified as another factor that contributes to delays in diagnosis and timely treatment of maternal sepsis (Lindblad, et al., 2021). In Zambia, due to limited bed space and resources, when a

woman delivers in the morning, they are discharged the same day to create space for new admissions (Muleya et al., 2018). However, in Tanzania, the use of a phone for surveillance yielded results revealing that this approach allowed for mothers with sepsis were identified and followed up (Nguhuni, et al., 2018).

In addition, healthcare workers may not have been trained in sepsis recognition and early treatment strategies, further delaying interventions. Internationally, the focus is moving to prevention, however, it is essential that in LICs there remains an increase focus on early diagnosis and management in both the community, clinic, and hospital settings. This is supported by the WHO Global Maternal Sepsis Study Research Group (GLOSS) (Bonet et al; 2018) which showed infections and associated complications such as sepsis led to maternal deaths much more frequently than previously realized. Intra-hospital maternal infections are highest in upper-middle-income countries with 106 per 1000 live births and lowest in high income countries (HIC) with 39 per 1000 live births (Bonet et al; 2018). Regionally, and in Zambia, there is no data on intra hospital maternal infections making it difficult to show the burden of disease. However, worldwide the prevalence of puerperal sepsis alone in live births is 4.4% equating to 5.7 million cases per year, with a greater burden in low resource countries of around 7% compared to HIC with an incidence of 1 – 2 % (Bonet et al; 2015). Over the last two decades puerperal sepsis in Zambia has not declined (Valley et al., 2005. Mukonka et al., 2018), and therefore, there is an urgent need to develop strategies to identify and manage infections and prevent sepsis.

In critical care settings, patients are at risk of developing a HCAI (WHO, 2016). Therefore, prevention strategies including hand hygiene, a clean healthcare environment, sterile medical tools, and implementation of infection prevention strategies are crucial to reducing the high MMR. However, it is a cause for concern that in low resource settings, decontamination and sterilizing of equipment may not eradicate all micro-organisms, due to limited infection prevention and control (IPC) measures. It is important to remember that the commonest transfer of infection is through poor hand hygiene by healthcare professionals (WHO, 2021). For example, Mwamungule et al's (2015) study revealed that health workers transferred infections from their hands and their laboratory coats to the patients. In consequence, improved hand hygiene would help reduce spread of infection and hence the high MMR (Peters et al, 2020. Ataiyero et al., 2019).

It is accepted that in resource limited healthcare settings, barriers to hand-hygiene include access to continuous running water and use of alcohol hand gels. However, major government resources in Zambia have been devoted to publishing through different media the need for good hand-hygiene. It was therefore, concerning that Ataiyero et al., (2019) found that hand hygiene practices and compliance across low resource settings in sub-Saharan Africa was poor among healthcare workers. In addition, inappropriate use of non-sterile gloves was found to adversely affect hand hygiene compliance, with gloves becoming a vector for microbial transmission (Flores et al., 2020).

Over four decades ago, guidance to protect healthcare workers (HCWs) exposed to blood, fluids and sharps were implemented (Kermode et al., 2005). However, globally, implementing and maintaining standard precautions in particular hand hygiene and appropriate glove use has been a cause for concern for all healthcare settings (Linberg et al., 2020). Global campaigns to reduce Healthcare Acquired Infections (HCAI) have resulted in many low-middle income countries forming their own national public health and infectious diseases organisations, led the Ministry of Health. Zambia is no exception, and has created a national public health institute, which has taken on the role of developing and disseminating guidance, protocols and surveillance nationally. At a local level, hospitals need to develop infection prevention control teams to enhance patient safety and contribute to preventing use of scarce resources for the treatment of HCAIs (Dramowski et al., 2022). The WHO (2009) hand hygiene guidelines (figure 1) offer an effective strategy to reduce the spread of sepsis but are only effective when practiced consistently with efficiency and effectiveness in mind.

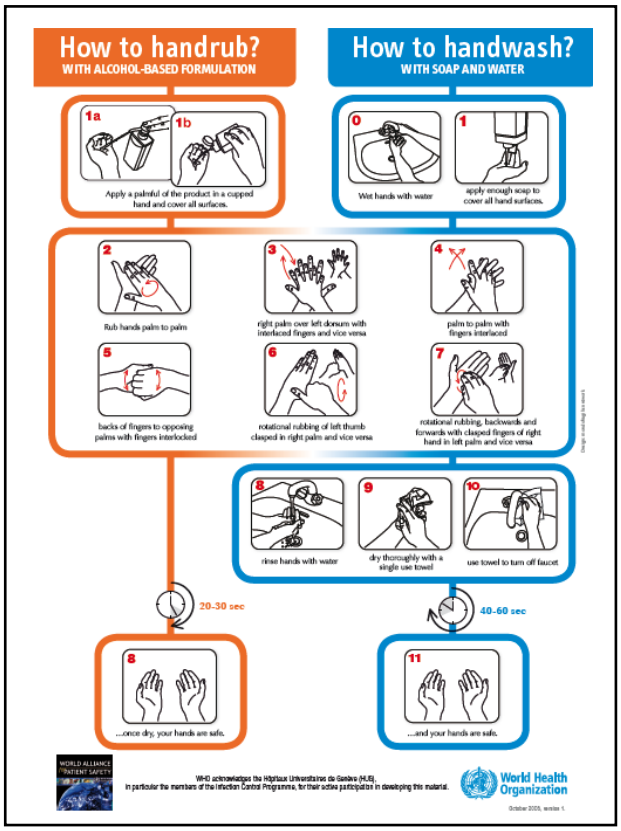

Figure 1 WHO Hand Hygiene Guidelines

To improve compliance with hand hygiene, no one strategy can be seen as effective, instead a combination of measures need to be put in place. The WHO (2009) has recommended an all-encompassing approach to improving hand hygiene that includes five parallel interventions. However, a Cochrane review (Moralejo et al., 2018) reported there was only a marginally increased hand hygiene compliance, suggesting an optimal combination of interventions has yet to be identified. Therefore, strategies need to be developed with take account of best practice and the local context.

In summary, this article has identified the importance of effective hand hygiene amongst healthcare professionals working OICUs. Collectively, these improvements could have important implications for reducing the risk of HCAIs and improving patient safety in other critical care units in Zambia. With such a complex issue as sepsis, the challenges that need to be addressed are not linear, because any algorithm or guidance needs to recognise the multiplicity of causative factors to prevent the transmission of opportunistic bacteria throughout hospital facilities. Given the burden of maternal mortality and morbidity, strategies to reduce the risk of complication such as HCAIs are crucial and urgently required.

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Impact of Nurse-Led Enteral Nutrition Protocols in Improving Outcomes of Critically Ill Patients in Lower Income Countries

Katoka Thomson, Senior Lecturer, Department of Critical Care and Theatre Nursing, Livingstone College of Nursing and Midwifery, Zambia

Email Contact: Katoka.thomson@mail.bcu.ac.uk

Abstract

Enteral nutrition (EN) is currently regarded as the best choice for nutrition support to critically ill patients despite malnutrition being a problem in many critical care units (CCU). Different protocols guiding nutritional management in CCUs have been developed to standardise clinical nutrition management for critical care patients and direct practice among the multidisciplinary team. The implementation and practice of nutrition protocols among health professionals has however, been a matter of concern as lack of compliance with nutritional set standards and inconsistencies in practice have been observed especially in low- and low-middle-income countries (LIC /LMIC). This critical review aimed to evaluate the role of nurse led EN protocols in critically ill patients in resource limited settings. The findings revealed that inconsistencies in implementing critical care nutrition guidelines between high income countries and LIC/LMICs exist, with the urgent need for protocols to be developed in these settings. Critical care nurses play a key role in nutritional support as they are responsible for the timely initiation and appropriate administration of enteral feedings than other healthcare professionals.

Keywords: Critical care nursing, nutrition support, enteral feeding, feeding protocols, parenteral nutrition, malnutrition.

Recent technological and medical developments have led to growing complexity in managing critically ill patients. O'Leary-Kelley and Bawel-Brinkley (2017) notes that such marked increase in complexity in care may lead to healthcare professionals forgetting fundamental matters of care such as nutrition, a crucial component of care in the hospital setting especially within the critical care unit (CCU). Growing evidence reveals malnutrition to be a major problem affecting critically ill patients in both high-income countries (HICs) and low and low-middle income countries (LIC /LMIC), with the latter being more affected (Mula, et al. 2014, Yilka and Cheko, 2019; Dixit et al. 2021). Therefore, admission to the CCU, regardless of the setting, presents a myriad of nutritional challenges to the critically ill patient mainly as a result of the stress response to critical illness, underfeeding and decreased intake due to anorexia (Casaer and Van den Berghe 2014; Li et al, 2017). Therefore, this paper will critically review and evaluate the impact of a nurse led enteral nutrition protocol in critically ill patients in a resource limited referral hospital.

In a systematic review study, a 38% to 78% prevalence of malnutrition in critically ill patients was shown (Lew, et al, 2017), while Yilka and Cheko (2019) in their study reported an undernutrition prevalence of 18.2% to 40%. These prevalence rates are a challenge to health professionals, reinforcing the need to consider strict nutrition support follow up in critically ill patients. In the African region due to non-availability of reliable statistics and inconsistent nutritional screening of critically ill patients it is difficult to gauge the extent of the problem, however, global estimates suggest a malnutrition prevalence range of 11-74% (Blaauw, et al, 2019).

Nutritional support is an essential element of the care of the critically ill patient. Two techniques of nutrition support are mainly used in CCUs, enteral nutrition (EN) and parenteral nutrition (PN). Both routes aim to ameliorate the stress induced metabolic responses, reduce disease severity and improve clinical outcomes (Singer et al, 2019). EN is presently regarded as the best choice for nutrition support to critically ill patients (Kim et al, 2017; Dixit et al. 2021b; Sharma et al 2021). Utilisation of the enteral route has been shown to explicitly lessen the severity of disease by reducing the hypermetabolic response as it evades the high morbidity observed when PN is used (Padar et al., 2017). Early initiation of EN after admission to the CCU is chosen over a late initiation, as it improves patient outcomes (Sharma et al., 2021).

Different protocols guiding nutritional management in CCUs have been developed such as those by the European Society for Parenteral and Enteral Nutrition (ESPEN) and the American Society for Parenteral and Enteral Nutrition (ASPEN). These protocols have been developed to help standardize clinical nutrition management for critical care patients and direct practice among the multidisciplinary sphere (Jordan and Moore, 2020). However, their practice and implementation among health professionals has been a matter of concern as lack of compliance with nutritional set standards and inconsistencies in practice have been observed especially in LIC/LMICs (Morphet et al., 2016; Padar et al, 2017; Blaauw et al, 2019; Dixit et al, 2021b). While acknowledging the inconsistencies in nutritional support management among critically ill patients, Mula et al (2014) identified the key role that nurses play in nutritional support. CCU nurses are essentially responsible for the timely initiation and appropriate administration of enteral feedings (Orinovsky & Raizman, 2018).

The most relevant studies were identified by conducting a literature search in three databases, namely CINAHL, MEDLINE and COCHRAINE library. All searches were limited to study articles between 2014 to present. Inclusion criteria included articles written in English with a focus on EN protocol for adult populations, critically ill adult patients. Exclusion criteria included paediatric populations and any study not presenting a protocol. Further, additional sources were found in the reviewed literature. Table 1 contains two studies critically analysed to illustrate the processes needed when reviewing literature.

While a variety of evidence-based hospital protocols regarding EN have been developed to standardize its delivery, their implementation has not been consistently adhered to (Morphet et al; 2016, Padar et al, 2017). The population/patient, intervention, comparison, and outcome (PICO) method was utilised to guide this critical review, of whether a nurse-led enteral nutrition protocol produces better outcomes than using a non-nurse-led enteral nutrition protocol. This review sought for empirical research as it focuses on adherence to fixed guidelines of reasoning, measurable phenomena and set principles and predictions (Bloomfield and Fisher, 2019). Kumatongo and Muzata (2021) support the use of primary research strategies in nursing, as it supports the collection and dissemination of empirical data, which can then be used to support current theories and knowledge. Considering the weight loss observed in many critically ill patients admitted to the CCU such as the one used for this study, careful monitoring is needed to provide suitable nutrition to the patient to prevent weight loss and support healing. This can only be achieved if an EN protocol is developed and adhered to routinely by reviewing and/or referring to previous literature that have worked well elsewhere.

Reviewing the literature made it very clear, that there are discrepancies in implementing critical care nutrition guidelines between HIC and LIC/LMICs. However, implementing nutrition protocols solely produced by HICs may not be appropriate and feasible for low resource settings, therefore, there is an urgent need for research to be carried out in LIC/LMICs. Dixit et al, (2021a) support this view, rejecting the use of a “one size fits all” approach and encouraging development and utilisation of an all-inclusive nutrition protocol which recognises both settings and in consequence, is of benefit to critically ill patients in either setting. In addition, protocols from HICs tend to be complex and resource intensive, a challenge for resource limited areas. It is imperative that guidelines are simple, easy to follow and meet the aspirations of those caring for critically ill patients.

Table 1: Study Characteristics

Author (s)	Question/Aim (s)	Research Methods/Design	Results/Findings	Critical Analysis
Mula et al, 2014	1. To assess nurse's level of knowledge in enteral feeding 2. To describe nurse's current practice in enteral feeding documentation 3. To determine challenges experienced in enteral feeding practice.	Quantitative Non-experimental descriptive survey Retrospective case file review Sample: 53 nurses from Malawian referral hospital. 78 case files reviewed	• Overall results revealed opportunities for improving tube feeding practices of nurses • Pre-service training in naso gastric tube nutrition taught to participants. • Varied level of knowledge majority (98%) had satisfactory understanding in many areas, while others lacked data in certain areas (e.g., nutrition assessment) • Majority reported poor practice in checking gastric residual volume, daily inspection of nostrils and documentation (71%). • No enteral nutrition guidelines present in referral centre • Challenges: Tube and feed shortage; patient/guardian refusal of EN - may affect nurses' practice. • No statistical relationship between age and knowledge; level of training and enteral feeding competency	Strengths • Adherence to current EN guidelines • Conceptual framework for construct validity available • Design congruent with study purpose • Research methods clearly stated • Clear inclusion criteria • Rigour generally achieved • Described limitations and strengths of the stud Weaknesses: • Reliance on unverified data e.g., didn't check availability of protocols • No randomization – convenience sampling used • Single-centre study • Did not consider patient clinical outcomes – retrospective study
Orinovsky, and Raizman, (2018)	To examine whether EN in critically ill patients could be improved by implementation of a nurse-led evidence-based feeding protocol	Quantitative design: Pre-(retrospective) and post-test (interventional) design	EN initiated early in the intervention group (52.3%) while later in control group (70.3 hours) Significant increase in EN intake and significant reduction in cessation of feeding due to intolerance with use of a nurse-led feeding protocol in intervention group No adverse events noticed	**Strengths** • Clear EN protocol in place • Data analysis was specified • Limitations of the study described • Despite a small sample size, patient outcomes were assessed • Randomisation **Weaknesses** • Small sample size to evaluate clinical outcomes - generalisation difficulty • Different patient characteristics compared

Jordan and Moore (2020) recognised these disparities and acknowledge the lack of standardization among EN protocols as a cause of variability in results. Additional factors include limited knowledge, combinations of different EN practice in one protocol, non-measurement and no clear definition within the protocols. Therefore, various measures have been suggested to ameliorate such challenges in implementing nurse led EN guidelines. Jordan and Moore (2020), go on to argue that areas of non-compliance may be identified through regular chart audits. Process improvement tools can be developed and standardized to identify gaps, develop checklists, and improve adherence. Protocol compliance is an ongoing, quality improvement challenge. Future research focusing on measurement of patient outcomes in addition to utilisation of similar EN guidelines across practice setting is encouraged.

Critical care nurses are in a unique position to initiate early EN within 24-48 hours of admission, and as Koontalay, Suksatan and Teranuch's (2021) meta-analysis demonstrates nurse led early enteral feeding enhances clinical outcomes, including re-admission to CCU, duration of mechanical ventilation, and mortality. However, they also note, the nutrition needs a multi-disciplinary approach through which nutritional requirements are regularly reviewed and met (Padar et al., 2017). Their findings support the argument made by Wikjord, Dahl and Søvik (2017) that early initiation of EN using a flow chart-based, nurse-driven nutritional support protocol resulted in more appropriate nutritional support and reduces the need for TPN, a challenge for resource limited countries.

This critical review reveals that implementing nurse led early EN guided by evidence-based protocols has benefits in improving patient outcomes, using a multi-disciplinary approach. Critical care nurses in Zambia, are in a pivotal position to lead the introduction of early EN and thereby improve and enhance patient care and outcomes. While it is recognised there are limited numbers of critical care nurses, nevertheless, they are the leaders in critical care nursing and have the knowledge and skills to lead and guide implementation of early EN by their peers.

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Guidance for Authors

The International Perspectives in Emergency, Trauma and Critical Care Nursing is the journal for students completing the Birmingham City University Professional Practice (Adult Critical Care) programme and has been developed in partnership with the Critical Care Nurses Association of Zambia. The journal will be managed by the BCU HELS Centre of International Health Partnerships and on completion of the education programmes, CCNAZ have agreed to continue the journal using it as a vehicle to promote emergency, trauma and critical care nursing across Zambia and the wider region.

This peer reviewed journal will provide a platform for emergency, trauma and critical care nurses across our partnership and will span nursing practice, research, education, or management relating to emergency, trauma and critical care nursing. This will support and facilitate opportunities for nurses to learn publication skills, to enable them to share and disseminate best practice. The ethos of the journal is the promotion of quality and excellence of care for critically ill patients. The journal will be published twice yearly (February and October) and will be open access. Any income generated will be used to promote critical care nursing, through publication costs and study days on writing for publication.

Articles from the following categories will be considered:

- Original research
- Quality improvement reports
- Systematic reviews with/without meta-analysis
- Reviews
- Editorials
- Current insights in emergency, trauma and critical care nursing
- Case studies
- Letters to the Editor
- Conferences & scientific meetings

Guidance for Authors

- Peer reviewed articles should be a maximum of 3,500 words (including references)
- Opinion pieces should be a maximum of 1,000 words (including references)
- Harvard Referencing should be used.
- Submissions double spaced and must include:
    - Abstract (maximum 300 words)
    - Key words
    - Front cover including:
        - All authors (in order of contribution)
        - Professional Qualifications for each author
        - Role and organisation for each author
- Contributors' photographs can be submitted – as separate JPGs, not embedded in Word documents. These must have permission from all participants, patient consent and for under-18s parental consent. Authors must adhere to any data protection for their establishment/Institution. Proof of consent must be supplied with articles and ideally photos should be at least 300dpi (at least 1mb).
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