Nosocomial Infections among Burns Patients at the University Teaching Hospital, Lusaka, Zambia

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ABSTRACT

Background: For many years now, nosocomial infections have always been a source of concern for the University Teaching Hospital Management Board. Hence this study was prompted by a reported increase in mortality of 21% magnitude among burns patients in the Surgical Department (G Block) of the University Teaching Hospital.

Objectives: To establish the magnitude of the problem, to pinpoint the source of the infecting micro-organisms and to evaluate the treatment and the nursing management of the burns patients in the clinical areas.

Design: A descriptive, retrospective cross-sectional study with quantitative and qualitative dimensions consisting of 170 patients admitted at the **G** Block, Surgical Department of the University Teaching Hospital, Lusaka, Zambia. The study was carried out between July–September, 1995 using a non-probability convenient sampling method. Data was collected using an observation guide, retrospective record review and wound sampling for microscopy, culture and sensitivity using sterile mounted swabs for laboratory analysis Statistical analysis of data was done by using frequency tables, percentages and the Pearson's Chi-square test was used to compare mortality among Firms. The cut-off point for statistical significance was set at 5% level.

Results: The isolation of *Staphylococcus aureus, Proteus mirabilis, Acinetobacter, EnterococcuscColi, Diphtheroid species, and Pseudomonas aeruginosa* from wound sampling. These caused the wound infections among the burns patients. Swabbing from the bathtub outlet also isolated *pseudomonas aeruginosa* while observations showed irregular availability of sterile wound dressing packs, unacceptable levels of wound management by both the health care providers and the relatives who were caring for the patients.

Conclusions: Future outbreaks can best be prevented by ensuring that care providers abide by the guidelines and recommendations of the HICC which focuses on the observation of the minimum set standards of infection prevention in the clinical areas. This would motivate nurses to improvise sensibly without compromising nursing care so our hospital should be seen 'as not doing harm to the patients'. The Hospital Infection Control Committee (HICC) cannot conclusively say that the high mortality was caused by *Pseudomonas aeruginosa* infections (x2=7.12,df=1, P<0 001) as the observed difference was of statistical significance.

INTRODUCTION

Zambia is located in Sub Saharan Africa where it occupies 2.5% of the Southern part of Africa. It is bounded in the north by The Democratic Republic of Congo and Tanzania, in the East by Mozambique and Malawi, in the south by Botswana and Zimbabwe, in the West by Angola and Namibia in the southwest. Zambia has three distinct seasons hot season in September and October and the rainy season from November –April which are the winter dry season from May-August. Burns can occur at any time but mainly during the cold winter months when people use 'mbaula' an appropriate technology-heating device used for cooking, boiling hot water in big pots and for keeping warm.

This study was prompted by a reported increase in mortality of 21% magnitude among burns patients in the Surgical unit (G Block) – the study location-of the University Teaching Hospital (UTH) between July to September 1995.

The specific objectives of the study are to establish the magnitude of the problem by pinpointing the source of the infecting micro organisms, to evaluate the treatment and the nursing management of the burns patients by both the health care providers and the relatives. in the clinical areas.

Keywords: Nosocomial infections, burns, micro-organisms, mortality, morbidity, *Pseudomonas aeruginosa,*

METHODS

The study design was a descriptive, retrospective cross-sectional study with quantitative and qualitative dimensions that included all the patients who were admitted in the G Block These were selected using a non-probability convenient sampling method.

Data was collected using an observation guide, retrospective record review and wound sampling tools. The observation guide was used to collect data on the care of the burns patient by the nursing staff, the cleaners and the relatives at the study location. The cleaners were seen emptying their dirty mops in the baths where the burns patients were bathed.

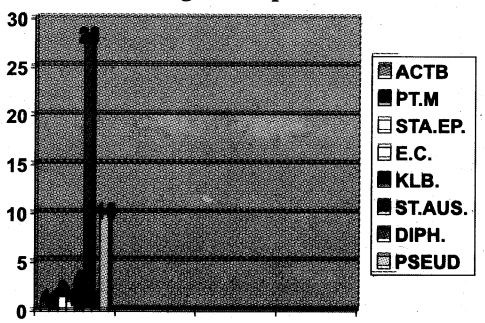
Retrospective record review was done to collect information on the treatment modalities, the infecting micro-organisms and the care of the burns patients in G Block. Sampling of the wound entailed swabbing the patients' wounds for microscopy, culture and sensitivity using sterile mounted swabs for laboratory analysis. All relevant information was extracted from the retrospective record review of the patients' files, observations of infection prevention practices of the relatives and health care providers in the wards, laboratory results from the wound sampling and entered into the computer for analysis.

Using frequency tables, percentages, did statistical analysis of data and the Pearson's Chi-square test was used to compare mortality among Firms. This helped to determine any significance association between the Firms. The cut-off point for statistical significance was set at 5% level.

RESULTS

The laboratory isolated the micro organisms shown in figure 1 from the culture of the burns wounds from forty-seven patients.

Figure 1: Micro-organisms causing nosocomial Infections among Burns patients in UTH. Lusaka.



Source: UTH laboratory Records.

The study noted that 36 (21%) out of 170 patients died due to nosocomial infections and the effects of the burns of which 10 (6%) were infected with *Pseudomonas aeruginosa* while 28 (16%) were infected with *Staphylococcus aureus.* (x^2=7.12,df=1,P=<0.001).

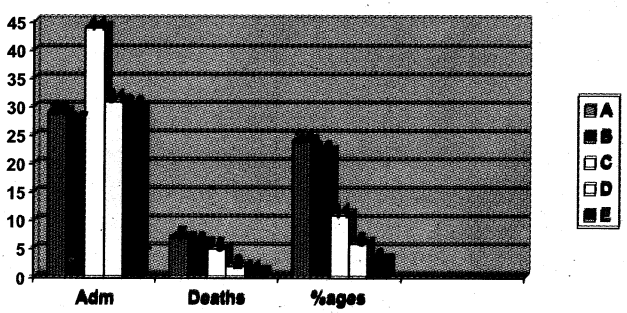
FIRM	ADMISSIONS	DEATHS	PERCENT
A	29	7	24%
B	27	6	22%
C	44	5	11
D	31	2	6
E	30	1	3
TOTAL	161	21	13

Health Information System, UTH.

Table 2 showed that there was no significant association between the Firms and mortality (p = .063)

Mortality was highest in the wards located on the ground floor and least in the wards located on the topmost floor.

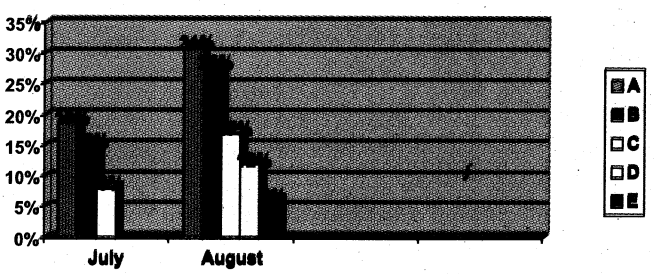
Figure 2:



Shows the mortality levels in the different Firms.

There was an increased trend in mortality between July and August in the wards.

Figure 3



Shows the increasing trend in mortality among Burns patients between July and August.

The swabbing from the bathtub outlet grew *Pseudomonas aeruginosa* This could be due to the cleaners emptying their mops into the bath-tubs.

The study also noted that there was unacceptable infection prevention practices used in the nursing management of the burns wounds by both health care providers and relatives. Major hospital facility like the autoclave in the CSSD Department breaks down frequently leading to lack of sterile dressing packs in the wards.

Observations showed that the same nurses in the wards on the ground floor nursed both urology and burns patients. This has implications on infection prevention practices of the nurses in an environment with meagre nursing care items for both sets of patients. This was due to an acute shortage of nurses in the wards.

There were compromised infection prevention practices as a result of irregular supply of nursing and medical care items needed in the care of the burns patients.

It was also observed that patients are kept in the Surgical Admission Wards for long periods of time ranging from 10-24 hours without cleaning their wounds before being transferred to their respective wards. There were no showers in the Admission Wards. It was also noted that there were no nurses trained in Infection Prevention in the wards.

When burn injury occurs, the barrier offered by the skin is lost and a moist, protein-rich avascular eschar tissue replaces the skin. Since this eschar tissue has no blood supply, it supports bacterial growth and prevents the immune cells from migrating to the site of the wound to fight the offending microorganisms.

DISCUSSION

It is evident that infections among burns patients occur mostly in low-income countries where the patients are nursed in overcrowded ward environments with limited infection prevention resources and poor nursing care practices.

Bathtubs and 'bath basins' should be decontaminated and cleaned with 0.5% hypochlorite solution before and after each patient's wound care. The study showed that the Classified Daily Employees (CDE- Cleaners) wash mops and empty dirty buckets in bath tubs where the burns wounds were dressed. The isolation of *Pseudomonas aeruginosa* from the bathtub outlet is a very important finding in the study as another survey in the same hospital isolated pseudomonas aeruginosa in wet environments in clinical settings[1].

Children are the ones who are mostly affected and also got infected most in this study. A group of authors confirmed that in the USA, 3%-7% of all infections in patients with burns injury occur mostly in children followed by elderly patients[2].

The study noted that 36 (21%) out of 170 patients died due to nosocomial infections and the effects of the burns. In this study, 10 (6%) were infected with *Pseudomonas aeruginosa* while 28 (16%) were infected with *Staphylococcus aureus.*

It was noted that high mortality (24%) occurred mostly in the wards situated on the ground floor due to increased trafficking of people. The probable suggestions for the high mortality could be because these wards also housed urology patients. The nurses handle urinary catheters and drainage bags with poor hand washing practices increasing the chances of cross infection in our patient-mixed and resource limited ward environments. Another study concluded that infections are the highest cause of mortality among hospitalised burns patients[3]. The same study showed that most infections occur in the severely burnt patients who are usually hospitalised for long periods increasing their chances of acquiring infections during their prolonged hospital stay. When accompanied by multisystem organ dysfunction, the mortality rate can soar up to 75%[3].

In this study, mortality was least (3%) in the wards located on the top floor due to less people trafficking and good ventilation. *Pseudomonas aeruginosa* is a multi-drug resistant micro organism so this has raised some policy issues for the Ministry of Health whose role is to formulate policies and create enabling environment in all public health institutions. This means that the bath tubs need to be cleaned thoroughly with 0.5% hypochlorite solution before and after each patient use. This could be achieved by instituting a National Infection Control and Prevention Policy from which guidelines can be drawn. Guidelines give direction to health care workers to work confidently in health care environments with manageable resources. The study noted that Guidelines for nursing burns patients were not being reinforced. A very important guideline would be to take wound swabs for microscopy, culture and sensitivity for laboratory investigations on admission, 48 hours after admission and every three days thereafter.

The Pharmaceutical Directorate of the Ministry of Health should ensure that reserve drugs to which the multi-drug resistant *Pseudomonas aeruginsa* is sensitive, like

ticarcyline, imipenem, should be reserved for burns patients. This would necessitate the review of the Antibiotic Policy as indiscriminate use of antibiotics in the treatment of any patient also has its own problems. This study showed that patients are kept far too long in the Surgical Admission Wards without cleaning their wounds. Early transfer to their respective wards would lessen their chances of acquiring infections. Another study confirmed that early referral of the patients from the Admission to the specialist wards can contribute to the reduction of suffering and optimising results [4].

If finances allowed, showers could be installed in the Admission Ward, so the patients can be showered, where possible within 24 hours of admission. Severe cases of burns should be dressed in the Operating Theatre under aseptic technique.

The hospital management should consider establishing a Burns Ward as a pilot scheme in-order to cut on the expenditure of establishing a Burns Unit; this would ensure that they receive optimum management and care under skilled staff. The top most floor with its good ventilation and less traffic could be utilised for this purpose. It may not be acceptable to use patient relatives as extra hands in this ward. Severe burns patients may need to be isolated to prevent cross infection.

The mattresses in the wards should be covered with thick plastics, which are easy to clean, and would ensure proper carbolising of the beds after each patient discharge.

This study also noted that there was an acute shortage of staff. This is responsible for the wrong notion that nurses are abdicating their role in-patient–care to the relatives. Hence the patients' relatives are used as extra hands in-patient care without supervision. It was observed that relatives used unsterile cotton wool balls, gauze swabs and bare hands during wound dressing.

Further, the relatives and health care providers did not wear protective clothing over their 'chitenges' or uniform dresses respectively. Relatives who dress patients' wounds should have bathing facilities and hospital gowns.

There was irregular supply of sterile dressing packs used for burns dressings due to frequent breakdown of major hospital facility like the autoclave at the CSSD Department. Flamazine, which is the antibiotic cream of choice in, burns treatment and normal saline were both out of stock.

No ward was designated for burns patients. Patients with severe burns were not isolated. Plastic sheets were used to cover the burns wounds in order to keep it moist and aid in easy removal of wound slough. This facilitated inoculation of microorganisms directly into exposed raw skin. Patients' immediate environment should be cleaned with 0.5% hypochlorite solution as appears in the ward cleaning routine. Burns Management updates should be conducted regularly, paying special attention to the prevention of nosocomial infections.

Further, the hospital management should continue to support the Infection Prevention and Control Programme by giving it a Cost Center. This will motivate the Committee to develop an activity-based budget for its operations. Infection Prevention Liaison nurses can be trained to monitor, reinforce and supervise the practices of relatives and nurses caring for the patients. Guidelines need to be set out and be followed by the nurses. An Infection Control Secretariat and audit system can be set up to monitor the care of the burns patients. The public education needs to sensitize people on the dangers of burns accidents.

REFERENCES

1. Chanda, D. O., An Infection Prevention Manual For Community and Health care Institutions in Developing Countries, Lusaka, Maiden Publishers, 2004;128,131-132.
2. Sheridan R., WeberJ., Prelack K.,et al, Early Burn Center Transfer Shortens the Length of Hospitalisation and Reduces Complications in Children with Serious Burn Injuries. *J. Burn Care Rehabilitation,* Medline 1999; 20:(5) :347-50
3. Schwarz K., and Dulchavsky S., Burns Wound Infections, 2005; http;//www.emedicine.com/med/topic258.htm
4. Sheridan R., Burns Thermal Injuries, 2005, http;// www.emedicine.com/med/topic258.htm