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Abstract

Purpose: Worldwide, burn injury is a problem causing intense pain. Long-term morbidity is often a significant problem for burn survivors that create suffering for the individual as well as for family and community. Poor management of burn injury can results into many complications such as disability (amputations and disfigurement), infections, and prolonged hospital stays as well as death**.** Objective of this study was to assess factors determining nursing management of burn at CHUB.

Materials and Methods: Descriptive cross-sectional design and sampling technique were taken into consideration with a sample size of 84 nurses. Data were collected through a questionnaire. A consent statement was provided to participants of this research. The researcher provided information concerning the situation at a given time. Data collected were analyzed using the Excel Frequencies and percentages were computed.

Findings: The current study indicates that the most factors determining nursing management of burn are lack of burn unit (50%, n=42), followed by nurse workload (25%, n= 21), no training received (23.8%, n=20), lower level of education (25%, n=21). Concerning the reasons why training on burn management was not offered at CHUB, the study indicated that 50.0% of respondents revealed the lack of fund; 29.8% of respondents revealed the lack of trainers; 15.5% of respondents mentioned the lack of time; while 4.8% of respondents indicated the lack of training place. The study also revealed that 76.1% of respondents revealed that the reasons why the burn unit was not available at CHUB was due to the lack of place for it; 13.1% of respondents revealed that this is due to the lack of nurses working there; 6.0% of respondents indicated that it was due to the lack of sterile towels; while 4.8% of respondents revealed that it was due to the lack of anaesthetist working in that place. Throughout the study finding, there were many weak factors in nursing managements of burn at CHUB.

Unique Contribution to Theory, Practice and Policy: different stakeholders will know what could be done to strength factors determining nursing management of burn and inform policies makers to address availability of burn unit and providing training to the nurses' staffs about burn management in hospitals.

Key Word: *Burns (I10), Nursing (J44), Management (I18), Factors (I12)*

INTRODUCTION

Worldwide, Burn injuries are a major cause of death and disability globally. The World Health Organization (WHO) launched the Global Burn Registry (GBR) to improve understanding of burn injuries worldwide, identify prevention targets, and benchmark acute care. More than half of pediatric patients (52%) sustained a major burn (≥15% total body surface area) and 48% received surgery for wound closure during the index hospitalization.(1)

Data from both the American Burn Association (ABA) and the National Fire Protection Association helped lend scope to the problem: Between 2011 and 2015, approximately 486,000 fire or burn injuries were seen in emergency departments.(2)

A study done on analysis of factors associated withburn injury, the outcomes in low and middle- income countries in 2021 showed that low middle income countries health settings had not many resouces available, which could detailed high mortality while high income countries had less overall mortality regardless with higher rates coincident injuries, as well as extended stay.(3)

The study done from 2015 to 2023 used article review analyzed published studies on infection control and prevention in burn victims:the role of nurses found that most of patients dead from burn injuries as a result of exposure to infection and many nurses were not advised about infection control adequately and also found that nurses'duties include proper hand hygiene, wound care, used of protective equipment, antibiotic medication,cleaning the patients surroundings, and protecting patient contamination.The nurses in burn units should be informed on infection prevetion and control measures to prevent spread of infections among the patients and also to educate patients and their families was very important.(4)

In Tanzania Scald was the common cause of burn in this population 213 (73%), children of 2yeas were the most affected group by 32.3% (94) and the mortality rate was 1.7%. Majority of childhood burn injuries at this hospital were scald and most affected children with two years of age which gave a needs of community based education of children and infant protection from burn injury.(5)

A burn is an injury that cannot cause disability, if proper treatment is provided on time. However, if the injury is inadequately treated or not following standard rules and principles, burn injury can seriously threaten the patient's life, and complications such as disabilities that increase burden to family, community and the nation may arise. Hospitalized burn patients exhibit physiological changes which need to be recognized and treated appropriately by skilled health care providers.(6)

In Rwanda, a descriptive study conducted at the University Teaching Hospital of Kigali (CHUK) on burns in children admitted revealed that burns continue to be the amongst major cause of mortality and morbidity in pediatric population. Compared to other studies done in developing countries which report mortality rates of 11.9%, findings revealed a higher mortality rate of 16.7%.(7) The length of hospital stay ranged from 1 to 105 days with a mean and median of 20.9 and 15 days respectively. The mean length of hospital stay for the non-survivors was 14.8 days with their hospital stay ranging from 2 to 39 days. This was due to the delayed presentation to the tertiary center as the wounds had become severe and/or superinfected necessitating extended length of stay.(7)

1. Global Burden of Burn Injuries

Burn injuries are a significant cause of morbidity and mortality worldwide. According to the World Health Organization (WHO), burns are among the leading causes of death and disability,

particularly in low- and middle-income countries (LMICs). To address this issue, the WHO launched the **Global Burn Registry (GBR)** with the aim of improving the global understanding of burn injuries, identifying prevention targets, and benchmarking acute care outcomes. Data from the GBR revealed that over half of pediatric patients (52%) sustained major burns (≥15% total body surface area), with 48% undergoing surgery for wound closure during initial hospitalization.(1) Similarly, between 2011 and 2015, the **American Burn Association (ABA)** and the **National Fire Protection Association** reported approximately 486,000 fire or burn injuries treated in emergency departments across the United States, illustrating the substantial burden even in high-resource settings.(2)

2. Burn Injuries in Low- and Middle-Income Countries (LMICs)

Despite the global burden, LMICs face disproportionate challenges due to limited healthcare resources. A 2021 analysis of burn injury outcomes found that LMICs often experience higher mortality rates due to inadequate facilities, limited access to specialized care, and delayed treatment. In contrast, high-income countries report lower mortality rates despite higher rates of coincident injuries and extended hospital stays .(3) These disparities underscore the urgent need for context-specific strategies to improve burn care and outcomes in resource-limited settings.

3. Role of Nursing in Burn Management

Nurses play a pivotal role in burn care, particularly in infection prevention and control. A review of studies from 2015 to 2023 highlighted that many burn-related deaths were linked to infections and inadequate infection control measures among nursing staff.(4) Key nursing responsibilities in burn units include maintaining proper hand hygiene, wound care, use of personal protective equipment, administration of antibiotics, environmental cleaning, and patient education. The study emphasized that training nurses in infection control is critical not only for protecting patients but also for empowering families with knowledge to prevent complications and improve recovery outcomes.

4. Rwanda-Specific Burden of Burn Injuries

In Rwanda, burn injuries remain a major public health issue. A study conducted at the University Teaching Hospital of Kigali (CHUK) revealed that burns are a leading cause of pediatric morbidity and mortality, with a reported mortality rate of **16.7%**, significantly higher than the **11.9%** average in other developing countries. (7) Factors contributing to this high mortality rate included delayed presentation and advanced wound infections. The length of hospital stays varied widely, with non-survivors having a mean stay of 14.8 days**,** often complicated by late-stage infection and systemic complications.

5. Justification for the Study

Despite the severity and frequency of burn injuries in Rwanda, particularly among vulnerable populations such as children, there is limited research focusing on factors determining nursing management of burns in Rwandan tertiary hospitals. The University Teaching Hospital of Butare (CHUB), as one of the country's main referral centers, plays a critical role in managing severe burn cases. However, the effectiveness of nursing care remains under-examined. Understanding the factors that influence nursing management at CHUB is vital for improving patient outcomes, optimizing resource use, and developing targeted training and policy interventions. This study seeks to bridge that gap by exploring the determinants of nursing management of burn injuries CHUB.

The study conducted in Ghana in 2013 found that burn survivors experienced significant functional disabilities which were scar contractions affecting their social and economic well-being, even with medical intervention.(8)

Statement of the Problem

In University Teaching Hospital of Butare (CHUB) burn injuries are common in surgical department and contribute significantly to morbidity and mortality. In January 2019 up to December 2019in surgical department of CHUB, 59 patients were admitted due to burn injury and among them 44.1% of patients had complications due to burns (n=26) while 3.4%of patients died (n=2). Infection is the leading cause of morbidity and mortality among burn patients. Despite this situation, in CHUB, no study has been done on this domain. In addition, guidelines and protocols on burn management are missing at CHUB. Therefore, this study was to assess the factors contributing poor nursing management of burn at CHUB from January 2019 up to December 2019.

MATERIALS AND METHODS

Study Design and Study Setting

This study used quantitative approach, descriptive cross-sectional design to explore factors determining nursing management of burn. In this study, registered nurses working in Surgery Department, Emergency Department and pediatric Department at CHUB were the target population of this study. The target population of this study included 106 nurses working in surgical and emergency and pediatric departments of CHUB from January 2019 up May 2020.

Study Population, Eligibility and Exclusion Criteria

The target population of this study included 106 nurses working in surgical and emergency and pediatric departments of CHUB from January 2019 up May 2020. The research took into account all nurses working permanently in surgical department and Emergency Department at CHUB who agreed and sign consent form to participate in the study during the data collection.

The exclusion criteria for this study were nurses not permanently working in Surgery Department, Emergency Department and Pediatric Department as well as those who participated in the pilot study.

Sample Size and Sampling Procedure

Sample size refers to the number of units or people that are chosen from which the researcher wish to gather information or data .A sample is defined is simply a subset of the population. The number of elements within the sample is called sample size.

A sample size of 84 respondents was selected for the study. The sample size was determined using Slovin’s formula (1960) below.(9)

$$n = \frac{N}{1+N(e)^2}$$

Where;

n- The sample size

N - The population size (106)

e - The acceptable sampling error (0.05)

$n = \frac{106}{1+106(0.05)^2}$ =84 participants

From the sample size calculation above, the total sample size from the study was 84 nurses.

Data Collection Tool and Procedure

The questionnaire had 2parts. Part1 A. Emphasized on socio-demographic characteristic of respondents that were composed by 4 variables including gender, age group, educational level and work experience. Part2 has 2sections: A. Questions on nurses related factors determining nursing management of burn. And the last one B. Questions on hospital related factors determining nursing management of burn at CHUB. After pre-testing the instrument, the revised questionnaire was administered to collect data from the selected sample. The researcher administered in face-to-face way and manually the questionnaire to respondents in order to collect information. The questionnaires were personally administered to the nursing staff during working hours and it took 25 to 30 minutes for completion. After completion, the questionnaire was returned to the researcher in a closed envelope. A consent statement was developed and sent to respondents before answering to the questionnaire

Validity and Reliability of the Questionnaire

The researchers confirmed that the tool was valid according to the research objectives as well as research questions. The quality of the data collection tools was confirmed by pre-testing the questionnaire among few members of the sampling frame before the actual data collection process.

Statistical Analysis and Data Management

Data analysis refers to as gathering elements or data together to present a clear picture of all of the information collected. This involves organization of information generated during data collection in a more meaningful manner. Data analysis aimed at making sense of the data received. The data analysis took place when all of 84 surveys were returned. In this context, the researcher undertook the data cleaning, data entry as well as the data validation. Data analysis was done using excel and findings from participants were expressed in form of frequencies and percentages.

Ethical Considerations

This study was reviewed and approved by the Ethics committee of CHUB (Approval No: RC/UTHB/002/2020). Participants had the right to consent freely after being explained the benefits and the risks of participating in the study. The participants' privacy and confidentiality were preserved by omitting all identifiers. Throughout the study, all data was kept confidential, privacy was carefully maintained, and the identities of respondents remained anonymous to ensure their protection and confirmed ethical standards. Before conducting interview, all respondents provided informed consent after receiving comprehensive information related the study.

FINDINGS

Table 1: Distribution of Respondents According to their Demographic Characteristics

Variables	Frequencies	Percentage (%)
Gender of the respondents		
Male	33	39.3
Female	51	60.7
Total	**84**	**100.0**
Age of the respondents		
25-32 years	28	33.3
33-39 years	37	44.0
Above 39 years old	19	22.6
Total	84	100.0
Educational background of the respondents		
Advanced diploma	56	66.7
Bachelor's	25	29.8
Masters	3	3.6
Total	**84**	**100.0**
Experience of the respondents		
0-5 years	31	36.9
5-10 years	30	35.7
10-15 years	14	16.7
Above 15 years	9	10.7
Total	**84**	**100.0**

The study findings in the table 1 above include the gender of the respondents. In fact, the research established that 60.7% of the respondents were females; Besides, The research found that 44% of the respondents were between 33 and 39 years. In addition, the study findings revealed the level of education of the respondents during the research. The research indicated that 66.7% of the respondents had A1. Concerning, the work experience of the respondents in CHUB, the research found that 36.9% of the respondents were working at CHUB for the period between 0-5 years.

Table 2: **Management of Burn Patients**

Variables	Frequencies	Percentage (%)
How long do you manage burn patients		
Never	6	7.1
Occasionally	46	54.8
Frequently	27	32.1
All the time	5	6
Total	**84**	**100**
Equipment missing as factor determining nursing management of burn at CHUB		
Thermometer	28	33.3
BP machine	14	16.7
Oxymeter	25	29.8
Glucometer	17	20.2
Total	**84**	**100**
The nurses related factors determining nursing management of burn		
Less work experience	8	9.5
No training received	37	44.1
Nurse workload	39	46.4
Total	**84**	**100**

Table 3: **Hospital Related Factors Determining Nursing Management of Burn**

Variables	Frequencies	Percentage (%)
Hospital factors determining nursing management of burn		
Availability of equipment	10	11.9
Availability of policies	2	2.4
Organizational structure	3	3.6
Lack of burn unit	69	82.1
Total	**84**	**100**
Reasons why burn unit is not available at CHUB.		
Lack of sterile towels	5	6.0
Lack of place for it	64	76.2
Lack of nurses working there	11	13.0
Lack of anesthetist working there	4	4.8
Total	**84**	**100**
Reasons why training on burn was not offered at CHUB		
Lack of trainers	25	29.8
Lack of time	13	15.5
Lack of fund	42	50
Lack of place for training	4	4.7
Total	**84**	**100**
Most factors determining nursing management of burn at CHUB		
No training received	20	23.8
Lack of burn unit	42	50
Lower level of education	1	1.2
Nurse workload	21	25
Total	**84**	**100**

The current study indicates that the most factors determining nursing management of burn are lack of burn unit (50%, n=42), followed by nurse workload (25%, n= 21), no training received (23.8%, n=20), lower level of education (25%, n=21). Concerning the reasons why training on burn management was not offered at CHUB, the study indicated that 50.0% of respondents revealed the lack of fund; 29.8% of respondents revealed the lack of trainers; 15.5% of respondents mentioned the lack of time; while 4.8% of respondents indicated the lack of training place. The study also revealed that 76.1% of respondents revealed that the reasons why the burn unit was not available at CHUB was due to the lack of place for it; 13.1% of respondents revealed that this is due to the lack of nurses working there; 6.0% of respondents indicated that it was due to the lack of sterile towels; while 4.8% of respondents revealed that it was due to the lack of anaesthetist working there.

Besides, research findings will contribute to improve the nursing management of burn.

Discussion

The aim of this study was to assess factors determining nursing management of burn at CHUB. The current study indicates that the most risk factors are lack of burn unit (50%, n=42), followed by nurse workload (25%, n= 21), no training received (23.8%, n=20), lower level of education (25%, n=21) which was similar to what was found in the study done in Dar el Salaam in Tanzania in 2019 ,they was nurses increased workload, lack of standardized skills in burn nursing care in turned which was increased the likely hood of infections.(10) And also the similar study showed that involvement of training in nursing management burn was required.(11) As the same study done 2020 in low and middle income countries demonstrated that lack of resources, equipment and training contributed to negative nursing burn managements.(12) The same as the study done in Toronto Canada 2021 revealed that the burn unit was necessary infrastructure and equipment for caring burn patients hospital for prevention and control infection.(13) To have burn unit with all necessary in health facility for nursing management of burn was crucial in improving health status of burn patients.

The researcher agreed with the study done on burn teams and burn centers, emphasized the importance of a comprehensive team approach to burn care, and stated that nursing staff formed the largest section of the multidisciplinary burn team, were responsible for executing the daily continuous care of burn patients. Severely burned patients were very challenging to care for, requiring intensive physical and emotional support.(14)

The findings from CHUB align with broader trends in LMICs concerning burn care challenges, especially in terms of infrastructure, training, and workload. However, the emphasis on low education levels as a significant factor represents a unique divergence that may require tailored interventions in Rwanda. Strengthening formal nursing education and establishing dedicated burn units could be pivotal strategies for improving outcomes in this setting.

Interpreting CHUB's findings through the Donabedian lens reveals that gaps in structure (burn units), process (training, workload), and potentially outcomes (infection control, recovery) must be addressed in a coordinated effort to improve nursing management and patient recovery in burn care. The study at CHUB revealed that both nurse-related and institutional factors contribute to the challenges in burn management. While the absence of a burn unit and inadequate training infrastructure represent major systemic barriers, nurse-specific issues such as high workload and insufficient educational background also play a significant role.

Limitation

The small sample size because it was selected in one Tertiary Hospital and the results should not be generalized in all national tertiary hospitals. There should be possibility of some respondents wishing to escape or lie to some questions.

CONCLUSION AND RECOMMENDATION

Conclusion

Factors determining nursing management of burn include nursing related factors and hospital related factors. The results of the study found that nurse work load; lack of training and less work experience of the nurses contributed to weak factors of nursing management of burn. Besides, the researcher wanted to find out hospital related factors determining nursing management of burn at CHUB. Indeed, the research found that lack of burn unit in hospital, unavailability of equipment in hospital, organizational structure and unavailability of policies in hospital all contributed to weak factors nursing management of burn. Based on overall the

study founding, it will be better to inform policies makers to address availability of burn unit and providing training to the nurses' staffs about burn management in hospitals.

A pilot test of the questionnaire was conducted with 10 nurses at CHUB to assess clarity and relevance of items. These participants were excluded from the final sample to prevent response bias. Feedback from the pilot led to minor revisions in wording and sequencing of questions.

Recommendations

1. Hospital leadership and health policymakers prioritize the establishment of a dedicated burn unit at CHUB.
2. Training programs in burn management be integrated into nursing continuing education, with funding allocated for trainers, materials, and protected time for learning.
3. Health workforce planning addresses staffing shortages and promotes recruitment and specialization in burn care.
4. Infrastructure planning considers space reallocation or expansion to accommodate a burn unit.

Authors' Contribution

Dorothee Niyonsaba was the primary investigator and led the study design, data collection, data analysis and manuscript preparation, Theogene Twagirumugabe contributed to study design, data analysis, manuscript review and critical revision, Gratien Nzayikorera was responsible study design, Sylvain Habarurema was responsible for study design, data collection and data analysis, Theogene Ndahayo was responsible for data collection and data analysis, and Felicite Mukamana was for manuscript review. All authors were revised the study with a common understanding.

Conflict of Interest

There are no competing conflicts of interest to disclose.

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