Knowledge and Practice of Essential Burn Care among Health Professionals working in Health Centers in Addis Ababa.

A research thesis to be submitted to Addis Ababa University, College of Health Sciences, School of Medicine, Department of Emergency Medicine

January, 2024 G.C.

Addis Ababa, Ethiopia

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In Partial Fulfillment of the Requirements for Postgraduate

Specialty Certificate in Emergency and Critical Care Medicine

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Title of the study:

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List of Abbreviations

AAU – Addis Ababa University

ABA – American Burn Association

ABC – Advanced burn care

ABLS – Advanced Burn Life Support

BSC – Bachelor scholar

CI – Confidence interval

EBC – Essential burn care

ED – Emergency department

ER – Emergency room

FMOH – Federal Ministry of Health

HC – Health center

HCW – Healthcare workers

HIC - High-income countries

HMIS – Health management information system

HO – Health officer

HR – Human resources

ICU – Intensive care unit

KAP – Knowledge, Attitude, and practice

LMIC - Low middle-income countries

MCH – Maternal and Child health

NGO – Non Governmental Organization

OR – Operation room

PI – Principal Investigator

S. Aureus - Staphylococcus aureus

TASH – Tikur Anbessa Specialized Hospital

WHO – World health organization

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Abstract

Background:

Burn has been described by the World Health Organization as the 'forgotten global public health crisis'. Although, there has been many efforts to control this crisis by many organizations, treatment is frequently delayed, inappropriate, and inadequate.

Objectives:

This study aimed to assess the knowledge and practice of essential burn care among health care professionals working in fifteen health centers in Addis Ababa, Ethiopia.

Methods:

Institution based cross-sectional study was conducted to collect primary data from 94 health professionals working in fifteen health centers in Addis Ababa from August to November, 2023. Data was collected using structured questionnaire adapted from previous study. Descriptive statistics such as mean, frequency to summarize the data, and logistics regression was used to identify factors associated with knowledge and practice level of essential burn care.

Result:

A total of 94 health care workers from 15 health centers were include in this study over a 4 month period in 2023. Most of the health personnel in this study have been in their profession for 3 to 6 years (33, 35.1%). Concerning the knowledge level of the health professionals involved in this study, majority of them have sufficient essential burn care knowledge (81, 86.2%) and fair practice (55,58.5%) to manage burn victims at the health center level. Most personnel (49, 52.1%) do not believe in applying first aid medicine at home leads to better outcome, whilst, majority (62, 66%) agree with using antibiotics in any burn management as mandatory. Only 58.1% of healthcare workers consistently apply ABCs of life to any burn victim, about half prioritize triaging the silent burn victim (48, 51.6%), and a small percentage of healthcare workers can identify burn victims who are candidates for burn center care (21, 22.3%). There is positive relationship among mean practice score with job position (AOR=3.39, CI [1.47-7.79], *P=0.004*); while negative association with years of experience (AOR=0.59, CI [0.36-0.97], *p =0.038*).

Conclusion:

Most healthcare workers at health center level have sufficient knowledge as well as fair practice of essential burn care. Nevertheless, this study has showed that the majority of health professionals can not identify burn center candidates and close to half of them always apply ABCs of life to burn victim, when they all should have. A lot of the respondents have insufficient knowledge on antibiotics usage. Finally, this study concludes that there is still a demand for training on burn first aid and judicial prescription of antibiotics to the burn victim from governmental and/or non-governmental organizations.

Keywords: Essential burn care, Healthcare workers, Knowledge, Practice, Health center, Ethiopia

1. Introduction

An injury to the skin or other tissue brought on by heat, radiation, radioactivity, electricity, friction, or chemical contact is known as burn. When hot liquids (scalds), hot solids (contact burns), or flames (flame burns) kill part or all of the cells in the skin or other tissues, it results in a thermal burn. [1]

The World Health Organization has dubbed burns the "forgotten global public health crisis." Globally, burn injuries account for a significant portion of unintentional injuries. Potokar. T 2020 stated that "whilst most burn deaths are due to infection , burns are not an infectious disease and whilst burns are the most common cause of mortality in women aged 15-35 in India (i.e. child-bearing age), it is not a maternal health issue." In nations with lower and intermediate incomes, burn injuries have continue to be a major cause of death and disability. Major burn injuries have a higher yearly frequency than HIV and tuberculosis combined, with about 11 million new cases reported worldwide each year. [1,2]

In several nations, it is the primary cause of injury-related deaths. An estimated 11 million people annually require medical attention due to burns. Persons in LMICs (low- and middle-income countries) suffer 95% of these issues; 70% of these persons are children. One of the top five injuries in the world that have an impact on child mortality is burn. South-East Asia is the core of burns worldwide; of the 320,000 fatalities worldwide due to fire-related burns, more than half (184,000) take place here. The majority of these burn realted injuries affect the feminine side.[1, 2]

Children under the age of ten make up more than 80% of burn patients in Sub-Saharan Africa. Most burns happen at home or at work. According to community studies conducted in Ethiopia and Bangladesh, 80–90% of burns happen at home. Women and children are typically burned in home kitchens, when cook stoves explode, or when hot liquids or flames spill into unguarded containers. In the workplace, burns from fire, scalds, chemicals, and electrical currents are most common among men.[2–4] With an estimated 11.6% mortality rate, burn injuries account for 1.5% to 9% of all injuries in Ethiopia and between 4% and 15% of pediatric injuries.[5]

Hospital infection prevention and control has always been a significant issue for health services; nevertheless, this issue is especially crucial for those providing treatment for patients who have sustained substantial burns. [3,6] Additionally, the burn wound has avascular necrotic tissue (eschar), which creates a protein-rich environment that is ideal for the colonization and growth of microorganisms. In the continuous

fight against multi-resistant organisms, the development of novel drugs, the wise and proper use of antibiotics, and improved infection control techniques are critical.[7]

Several studies (Saudi Arabia, Egypt) concur with the idea that the HCWs of LMIC lack enough knowledge on providing acute care (i.e resuscitation) to burn victims in the first few hours since they arrive to the health care unit, as well as providing long term care (i.e. wound care and preventing complications from burn). [8,9]

There are many burn victims in government hospitals as a result of inadequate primary prevention, legislation, and decentralized burn treatment services.[1] A cross-sectional, multi-center hospital-based study conducted in Rwanda and published in 2014 revealed that: Although all the hospitals surveyed had the capacity to treat burn patients after initial resuscitation, none of them could provide comprehensive care because of deficiencies in staffing, equipment, protocols, and training.[2,10,11] Even though most caregivers (non health professional) have a positive attitude about burn first aid, a hospital-based cross-sectional study published in 2022 in Addis Ababa, Ethiopia found that there is a clear knowledge and practice gap in this area. [12]

As far as we are aware, research on healthcare workers' awareness of and familiarity with basic burn care has not yet been carried out in Ethiopia, although numerous studies evaluating people other than healthcare workers' burn first aid knowledge have been carried out all over the world. Thus, our goal was to assess the healthcare workers' knowledge and practice of first aid for burns, as well as the relationship with sociodemographic characteristics of the HCWs at health center level.

2. Statement of Problem

Although major burn is detrimental in all aspects, non-fatal burn injuries are also a major contributor to morbidity, which includes extended hospital stays, permanent disability, and scarring that frequently results in alienation and shame.[13]

Making the importance of treatment or outlining the options available is more challenging when working with people who are illiterate or ignorant. Access to burn care institutions and timely, effective treatment is compromised by inadequate communications and transportation infrastructure. This frequently plays a part in patients showing up later than expected and treatment complications brought on by infections and other variables, especially in nations where geography exacerbates the issues brought on by inefficient transportation. Many burn patients are quite impoverished and arrive at the hospital in a terrible pre-admission condition, such as malnutrition. Late patient presentation, particularly in government, nonprofit, or mission hospitals, increases complications like infections or contractures that make providing quality care and achieving positive results more challenging. Patients may need days or weeks to get to the burn center, especially in nations with difficult terrain and numerous isolated or distant rural settlements. This is made worse by the lack of decentralized burn services, creating minimum standards for burn care in Low- and Middle-Income Countries. [1,2,14]

It is appropriate and pertinent for facilities functioning in low-resource LMICs to receive training and instruction in burn care. There is a serious shortage of personnel, particularly in government facilities, such as severe shortage of nurses in many institutions, and many facilities are completely devoid of physiotherapists. Many LMICs also have a poor understanding of the concept of dedicated burns specialists with the necessary specialized training (both medical and nursing). Lack of clinical guidelines, protocols, standards for burn care, and inadequate first aid training results in deeper and more serious wounds.[2,5]

Burns are widely viewed negatively by health specialists. Within the medical and nursing fields, burns are frequently seen negatively, which has apparent detrimental effects on staff recruitment, motivation, and retention. In addition, the presence of too many visitors and family members makes the management of burn ward areas and effective use of staff time more difficult.[2,4,5,15]

Corruption and political interference in decisions that should be made on a purely medical basis have downplayed the importance of having standards and protocols. This has affected poor coordination between different types of facilities and different levels of service. [2,4,5]

3. Significance of the study

It is evident that adequate burn knowledge among HCWs is one of the pillars to achieving a better outcome for the burn victim. First aid has a critical role in deciding the course and severity of later problems following a mild burn injury, thus, prompt management can reduce the need for procedures like surgery and limit tissue damage.[16] Good result/outcome leads to an overall better patient satisfaction as well as HCWs job satisfaction and positive attitude.[15]

The first accredited burn and reconstructive facility in the nation, Yekatit 12 Medical College, is usually inundated with referrals for burn victims. The All Africa Leprosy Rehabilitation and Training Center (ALERT) and the recently opened Addis Ababa Burn Emergency Trauma Center (AABET) are likewise overflowing with patients. These three hospitals have the following issues: they are located in the nation's capital city and treat patients from both the city's outskirts and interior.[3] Addressing those burn victims that are not burn center candidates at primary care units may help alleviate the overburden faced by the above mentioned tertiary hospitals.

Health is considered one of the power points in this globalized world. Healthy nation immensely attributes to higher gross domestic product of a nation. Better knowledge and appropriate practice contributes to a burn victims quick healing, shorter length of stay at health care unit and faster re-integration to society and work force.

4. Literature Review

Because burn injuries have been less common in HICs over the past 50 years, there has been a shift toward centralized services, where the few burn cases that are treated are attended to by skilled and knowledgeable personnel in specialized facilities. Given the high rate of burn injuries in low- and middle-income countries (LMICs) there is a need to decentralize and offer high-quality burn treatment services outside of the few existing specialized clinics. A significant obstacle to the successful decentralization of burn services is the absence of qualified burn care specialists with access to sufficient training and resources outside of large urban areas. It is difficult to target training and education programs effectively or assess if they are actually improving the outcomes of burn patients in LMICs in the absence of clear operational standards and resource guidelines.[1,2,14]

The WHO recommendations establish attainable benchmarks for trauma treatment programs that might be made available anywhere in the world. They also specify the resources needed to guarantee that such care can be provided in a practical manner. These resources are arranged according to a "resource matrix," which lists the physical resources (supply, equipment, and infrastructure) as well as the knowledge and skills required at various levels of healthcare institutions.[1,2]

Burns have one of the lowest fatality rates among all injury causes in high-income countries (HICs), averaging less than 1.0 deaths per 100,000, but in LMICs such as South-East Asia, the average is 16.9 fatalities per 100,000.[2]

Of those who sustained burns in Sub-Saharan Africa, 55% were men. With 59% resulting from scald burns, followed by flames accounting for 33%. One in five burn sufferers would die, or an average of 17% of burn victims would die. Burns are also a leading cause of disability and disfigurement: fire-related burns alone are estimated to cause 10 million disability-adjusted life years (DALYs) per annum. In Ethiopia, electrical burn injury has increased by 27% over the past decade, and males are higher by fivefold to sustain it. [10,11,17]

In all, 3,213 health care workers took part in seven cross-sectional investigations in 2023, physicians made up 44.50% of the HCWs. This systematic review encompassed investigations carried out in Saudi Arabia, Australia, Turkey, the United Kingdom, Ukraine, and Vietnam. Regarding first-aid for burns, HCWs scored 64.78 out of 100, indicating a comparatively good level of competence. The knowledge of HCWs regarding first aid for burns was significantly improved by the parameters of age, prior burn trauma, and first aid training experience.[18]

A cross-sectional study conducted in Saudi Arabia between September 2 and December 5, 2019 found that healthcare professionals knew very little about providing first aid for burn patients and that burn patients frequently overused conventional medicines and antibiotics. Furthermore, this study supported the necessity of a successful educational program for healthcare professionals.[8]

In the Kingdom of Saudi Arabia in 2023, a cross-sectional survey revealed that the majority of doctors had not received burn first aid training and had only limited practical expertise of managing burns.[9]

A descriptive research carried out in 2021 at three Egyptian hospitals: Due to a lack of educational programs, training, and performance updates, the majority of nurses exhibited inadequate knowledge, bad practices, and a negative attitude. As a result, the study advised that a greater number of nurses should get ongoing education and updates on evidence-based nursing practices for patients with burns. Additionally, hospital administration should provide enough supplies and equipment so that nurses can carry out their duties in a high-quality, safe, and effective manner. [15]

The sub-Saharan population is uninformed of the ways to avoid burn damage. According to a retrospective study done in Attat Hospital over a 7 year period (1983-1989), the cumulative incidence of burns in 16 communities (total population = 10,183) served by the hospital was found to be 5-11%. Households in the study population don't know enough about burn prevention and burn first aid. In the villages, 32% of burn patients received harmful traditional chemicals. [19]

Furthermore, a large number of patients with needless referrals to the burn unit are brought in, which might had been handled by less advanced medical specializations in a non specialized health care unit. [10] Three districts—Dembiya, Limu Genet, and Tula—located in the regional states of Amhara, Oromia, and Southern Nations, Nationalities, and People's Region (SNNPR) respectively, underwent a cross-sectional survey in 2019. By employing a multi-stage cluster sampling technique, 651 households were chosen. The majority of victims, as indicated by this community survey, are youngsters; 84.6% of them have visited HC as a first contact treatment center. The community were assisted in learning about preventative measures for burns, appropriate first aid options, and appropriate referral practices when faced with a burn injury by means of community-based burn awareness activities. Local health leaders have acknowledged that there is a shortage of capacity in the local health services to handle patients presenting with burns. [3,20]

Compared to surgical wounds, burn wounds are more persistent and richer reservoirs of infection and offer an ideal environment for bacterial proliferation. One of the most often isolated pathogens in both community and clinical settings is Staphylococcus aureus. At Yeaktit 12 Teaching Hospital, a cross-sectional, prospective study was carried out from March to May 2011. A convenient sampling approach was used to collect a pus sample from the burn area, and drug sensitivity tests were conducted in accordance with WHO guidelines. Ultimately, the findings indicated that burn patients have a significant concentration of S. aureus isolates that are resistant to many drugs. Strict consideration for staphylococcus aureus infection and proper usage of antibiotic policy was recommended in minimizing the incidence and occurrence of multidrug-resistant S. aureus infections in Yekatit 12 Hospitals.[6,21,22]

5. Objectives

General objectives

- Assess knowledge and practice of EBC management among HCWs from August – Novemeber 2023 GC.

Specific objectives

- Evaluate knowledge of EBC among HCWs.
- Evaluate practice of EBC among HCWs.

7. Methodology

7.1 Study Design

HC-based prospective, multicenter, cross-sectional study took place between August and November, 2023.

7.2 Study participants and Setting

All HCWs working in 15 governmental health centers' ERs were chosen. 15 HCs across 5 sub-cities (Arada, Kirkos, Lideta, Yeka and Bole) of Addis Ababa, Ethiopia were chosen. These selected sites were used because they were relatively in the urban territory of the capital city (i.e. more patient traffic), majority had at least 1 physician working in the ER and closer to the PI's working site (TASH).

7.3 Source population

All clinicians, health officers and clinical nurses working in health centers under Addis Ababa Health Bureau.

7.4 Study Population

All clinicians, health officers and clinical nurses working in the selected HC sites ER that are under Addis Ababa Health Bureau.

7.5 Eligibility Criteria

7.5.1 Inclusion Criteria

- All clinical practicing nurses, health officers and physicians working in health centers ER that are under Addis Ababa Health Bureau from August – November 2023.

7.5.2 Exclusion Criteria

- Non-practicing clinical health professionals, including employment termination and retirement.
- All health professionals that are not involved in direct patient care.
- Any clinician, Health officer or Nurse not willing to participate.

7.6 Study Variables

7.6.1 Dependent Variable

- Knowledge and practice of essential burn care

7.6.2 Independent Variable

- Age & sex
- Job position
- Year of experience
- Marital status
- Health center
- Prior ATLS course participation
- Experience burn injury to self

7.7 Sampling Method

Sampling procedure & Sampling Size Determination

Sampling was done through convenient sampling after counting the HCW HR from the HCW registry from Addis Ababa Health Bureau. This sampling method was chosen because this was the first HC-based study concerning EBC as prior studies done on HCW were all hospital-based and/or among general population. In the beginning of this study, sample size was determined to address HCs that are catchments to TASH i.e. 12 HC in 3 different sub-cities, 91 HCWs. However, it was evident that there was a great difference between mandatory clinical HRs on paper and on the ground. On paper, there is a total of 10 HCWs that must solely be designated to the ER: emergency trained general practitioner (1), emergency trained HOs (2), clinical nurse (emergency trained) / emergency BSC nurse (6), emergency masters nurse (1). So with the initial 12 HCs as catchments to TASH, we would expect to have 120 HCWs. However, in reality, there were a maximum of 5 HCWs designated specifically to the ER both day and night times. Most HC cope with the help of other department working HCWs rotating night time to help. As such, HCs samples needed to increase by additional 3 in order to achieve 91 HCWs. In summary: we considered all consenting HCWs that work in the 15 HCs ER, whether designated or on extra-hour rotation, to get a 91 adjusted sample (102 with 10% non-response rate).

The required sample size for achieving a 95% confidence interval with a 5% margin of error and the proportion of HCW at HCs was unknown, so used 50%.
$n = Z\ \alpha/2^2 * P\ (1-P)/d^2$

n=Sample Size

P = Proportion of problem = 0.5 or 50%

d = Margin of error = 0.05 or 5%

Z $\alpha/2$ = is the critical value of the Normal distribution at $\alpha/2$ for a confidence level of 95%, $\alpha/2$ is 0.025 thus I'll be using the critical value of 1.96 from the Z score.

α = probability of making type 1 error = 0.05

$n = (1.96)^2 * 0.5(1-0.5) / (0.05)^2$

n = 384

= 384 ~ 10% (non-response rate)

= 422

Because the populations under consideration are less than 10,000, the above formula was modified by the following sample correction method:

n adj = n / (1+ (n/N))

n adj = 384 / (1+ (384/120)) = 91

With the addition of the 10% non-response rate > n adj/1 – 0.1 = 91/0.9 = 101.5 (approximating to 102)

n adj = Adjusted population
n = Calculated sample size
Where N= (Estimated Total number of HCW at emergency room of HC catchment to TASH)

7.8 Data Collection Tools, Collection Procedures and Quality Control

An English-based structured questionnaire was adapted and distributed to the study population by the PI. The questionnaire was adapted from a Saudi Arabia study with similar variables. The questionnaire comprised 33 questions divided into 3 sections: demographics and questions related to burn injury and its first aid measures, knowledge & practice. The first section included age, sex, job position, marital status, year of experience and HC location. The second section aimed to assess healthcare workers' knowledge about first aid for burns and the use of any kind of traditional remedies, for example, coffee, honey, Aloe Vera, toothpaste, or oil. The third is about the frequency & practicality of their knowledge. The questionnaire, then, was tested for validity on 10% of the study population conducted elsewhere from the selected study sites before the start of data collection. All the respondents gave oral and written consent for their participation prior to collection. The PI was available at all times to address any questions the participants might had. Data was collected, checked for completness and processed by the principal investigator.

7.9 Data Analysis

The data was evaluated for completeness, cleaned, coded and entered into SPSS version 27. It was used for the analysis of the data. Descriptive analysis was performed to summarize the findings while tables and diagrams were used to present the information. Logistic regression was conducted to test associations between dependent and independent variables. To control the effect of confounders, all variables with p-value cut-off point of < 0.25 on bivariate analysis were purposively selected for multivariable logistic regression analysis.

8. Operational Definition

Knowledge: the capacity to acquire, retain and use information; a mixture of comprehension, experience, discernment and skill. (WHO, Eastern Mediterranean Health Journal) [23]

Practice: the application of rules and knowledge that leads to action. (WHO, Eastern Mediterranean Health Journal)[23]

Essential burn care: non-specialist health professional treating burn patients. (Interburns, Operational Standards for Burn Services)[2]

9. Ethical consideration

Ethical clearance was obtained both from the Addis Ababa University Emergency and Critical Care Medicine Department and Addis Ababa Public Health and Emergency Management Directorate. Before any data was collected, informed consent was sought from each participant regarding the study's objective, overall written material, and structure. The explanation was provided in the language that each person preferred. During the data collection, the participants were informed that they could choose to participate in the study or not, and that they might leave the study at any moment. Additionally, they received assurances that the data would only be utilized for the study's objectives and would be managed by the investigators. Furthermore, the privacy of the data collected from every individual has been secured.

10. Plan of data dissemination

The data will be distributed to Addis Ababa University/TASH, School of Medicine, Emergency and Critical Care Department, as well as, Addis Ababa Public Health and Emergency Management Directorate. It will also be sent to Federal Ministry of Health, Ethiopia, further, it will be sent to national and international journals.

11. Result

A total of 102 samples were included in the analysis giving a response rate 90%. More than half of the study participants were females (58, 61.7%), 22-29 age range (48, 51.1%) and nurse by profession (57, 60.6%) as shown in table 1.

Table 1Baseline characteristics, (n=94)

characteristics		n	Percentage (%)
Sex	**Female**	***58***	***61.7***
	Male	35	37.2
Age(Years)	**22-29**	***48***	***51.1***
	30-39	*41*	*43.6*
	40-50	*5*	*5.3*
Marital Status	Single	*46*	*48.9*
	Married	*46*	*48.9*
	Widowed	*1*	*1.1*
	Divorced	*1*	*1.1*
Job Position	**Nurse**	***57***	***60.6***
	Health Officer	*29*	*30.9*
	Physician	*8*	*8.5*
Years of Experience	**3 - 6**	***33***	***35.1***
	7 – 10	*30*	*31.9*
	<3	*20*	*21.3*
	11 – 14	*6*	*6.4*
	>14	*5*	*5.3*
Health Center	**Hiwot-Amba**	***12***	***13***
	Aware	*10*	*11*
	Kirkos	*9*	*10*
	Kazzanchis	*8*	*9*
	Ras-Emiru	*8*	*9*
	Abinet	*8*	*9*
	Churchill	*6*	*6*
	Gotera-Massalecha	*5*	*5*
	Yeka	*5*	*5*
	Yeka Woreda 7	*5*	*5*
	Tekle-Haimanot	*4*	*4*
	Arada	*4*	*4*
	Bole 17/20	*4*	*4*
	Lideta	*3*	*3*
	Felege-Hiwot	*3*	*3*

The majority of HCWs have sufficient EBC knowledge (81, 86.2%) to manage burn victims at the health center level. Interestingly, most HCWs (49, 52.1%) do not believe in applying first aid medicine at home leads to better outcome, whilst, majority (62, 66%) agree with using antibiotics in any burn management as

mandatory. There are some professionals who believe dough (6, 6.4%) and toothpaste (7, 7.4%) are acceptable traditional remedies to treat burn wound which is wrong.

Table 2 Confounding factors

Moderator Variables		**n**	**Percentage (%)**
Participation in ATLS Before	***Yes***	***25***	***26.6***
	No	*69*	*73.4*
Experienced burn injury to self	***Yes***	***52***	***55.3***
	No	*42*	*44.7*
Knowledge of WHO Emergency Unit form for trauma	***No***	***48***	***51.1***
	Yes	*46*	*48.9*

Table 3 Percentage of correct answers for the burn knowledge-related questions

EBC Knowledge related questions		**Correct answer**	**Correct response (n)**	**Incorrect response (n)**
Knowledge of ABCs of life		Yes	*91*	*3*
Removing cloth/jewelry distal to burn site is important?		Yes	*82*	*12*
Water application to the burn site is the first correct step?		Yes	*78*	*16*
Covering burn site before heading to hospital decreases infection?		Yes	*71*	*23*
Applying first aid medicine at home leads to better outcome?		Yes	*45*	*49*
Acceptable traditional medicines for burn			*45*	*49*
	Dough	No		
	Honey	Yes		
	Toothpaste	No		
	Aloe Vera	Yes		
	Paraffin	Yes		
	None	No		
Applying water for ≥ 15mins to burn site is recommended?		Yes	*74*	*20*
In any burn management antibiotics use is mandatory?		No	*32*	*62*
Do not touch burn victim, if still in contact with electric current?		Yes	*84*	*10*
First action is turning off power source in electrical injury?		Yes	*89*	*5*
Mean knowledge score			***81(86.2%) correctly responded.***	

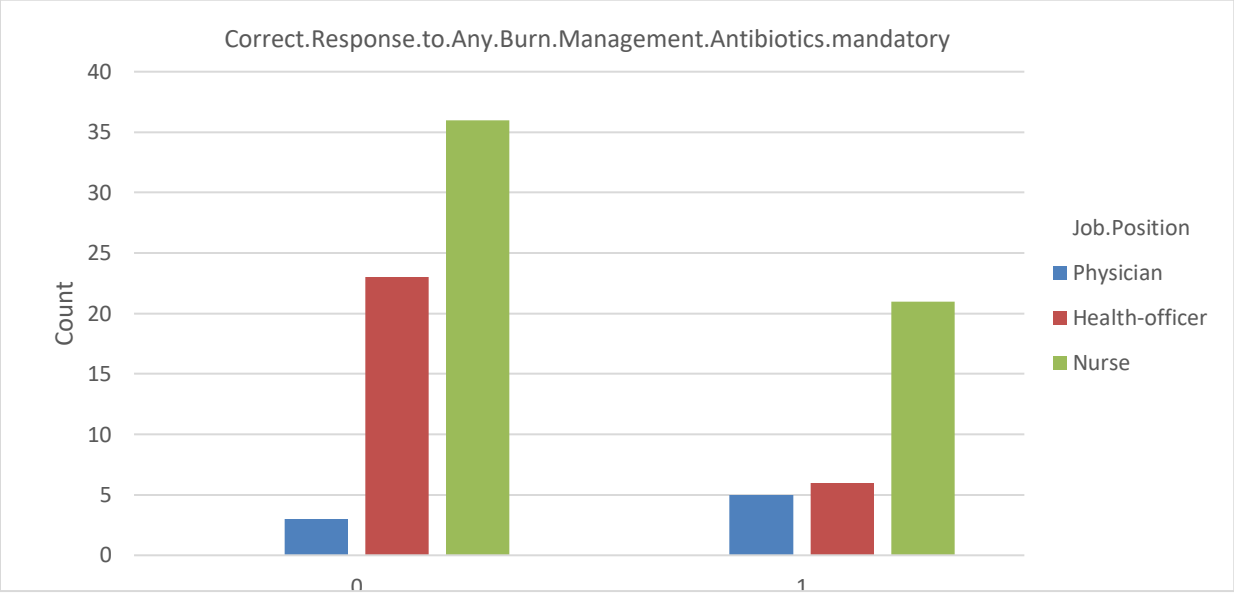
According to Table 4, the majority of health care workers in this study had fair EBC practices when it comes to handling burn victims at the primary healthcare unit level (55, 58.5%). ATLS, advanced burn life support, essential/basic burn care have all stated that HCWs must apply ABC's of life protocol to any burn victim. However, slightly more than half of the respondents consistently apply the ABCs of life (54, 58.1%) and prioritize triaging the silent burn victim (48, 51.6%), but a small percentage of HCWs can identify burn victims who are candidates for burn center care (21, 22.3%).

Table 4 Percentage of correct answers for the burn practice-related questions

EBC Practice related questions	Correct response	Correct response (n)	Incorrect response (n)
Frequency of ABCs of life application	Always	*54*	*40*
Frequency of triaging the silent burn victim first	Always	*48*	*46*
Frequency of TAT administration	Always	*56*	*38*
Identifying burn center candidates	All 10 ABA criteria fulfillers	*21*	*73*
Correct way of transferring patients	Communication, Documentation, ABCs secured, wound dressed	*71*	*2* *3*
Mean practice score		***55(58.5) correctly responded.***	

As illustrated in figure 1, it is clear that more physicians (5, 62.5%) believe in the concept of antibiotics are not mandatory in any burn management, however, some (3, 37.5%) agree with the majority of health officers (23, 37.1%) and nurses (36, 58.1) with using antibiotics as mandatory in any burn management.

Figure 1 Job position and Antibiotic use (1=Not mandatory, 0=mandatory)



The highest response was collected from Hiwot-Amba HC (12 HCWs), Kirkos sub-city. It is also the HC with the highest number of respondents, highest rank in sufficient knowledge (10, 83.3% sufficient vs. 12, 16.7% insufficient) and fair practice (7, 58.3% fair vs. 5, 41.7% unfair). The second highest ranking HC in fair practice was Kirkos (7 HCWs) scoring (7, 77.8% fair vs. 2, 22.8% unfair) also located in Kirkos sub-city.

Table 5 displays the positive relationship among mean practice score and job position (AOR=3.39, CI [1.47-7.79], *P=0.004*), while negative association with years of experience (AOR=0.59, CI [0.36 - 0.97], *p =0.038*). Antibiotic use in burn care is supported by the majority of healthcare practitioners (82.3%) in the Saudi [8]study and our respondents (66%). Thus, healthcare professionals still lack sufficient knowledge and understanding of antibiotics use as first aid for burn patients.

Table 5 Logistic regression factors associated with Practice of essential burn care with 95% CI

Variables	AOR	P value
Job Position	*3.39(1.47,7.79)*	*0.004*
Years of experience	*0.59(0.36,0.97)*	*0.038*

AOR – adjusted odds ratio

12. Discussion

Numerous studies have revealed a notable lack of information regarding burn prevention and first aid treatment among the general public worldwide. The purpose of this study was to evaluate healthcare providers' knowledge and practice with emphasis on providing first aid appropriately to burn victims. Our study found that the majority of the respondents have sufficient knowledge and fair practice to treat burn victims at primary health care unit level but a tremendous knowledge deficit on how to use antibiotics in burn first aid. Understanding and interpreting the findings will be covered in this section, along with comparison to previous research on related subjects. Albeit it was a convenient sampling method; we achieved 92% response rate which is comparable to H.Mortada study (81%). Throughout this discussion, the results will be compared to the H. Mortada study because, despite the non-normal distribution of their variables, we were still able to identify and compare variables at the final idea level.

Females comprised higher percentage in this study which is similar to H. Mortada's Knowledge and Awareness of burn first aid among HCWs in Saudi Arabia (68.2%). Nurses hold higher percentage of HCW HR and females commonly have higher number in this job position.

This study demonstrated that medical professionals with different levels of expertise are generally well-informed about essential burn care (i.e. sufficient knowledge 81, 86.2%), in contrast to the study conducted in Saudi Arabia (H. Mortada, 2020), which found that healthcare workers' knowledge of burn first aid was low. [8,24] However, similar to our study, a systematic review (Yarali, 2023) concerning studies conducted in Saudi Arabia, Australia, Turkey, the UK, Ukraine, and Vietnam showed knowledge rate of HCWs related to first aid for burns was 64.78 out of 100, which indicates their relatively desirable knowledge.[18] Overall, physicians had better knowledge and practice than health officers and nurses in our study. Physicians have longer periods (credit hours) and more intense way of receiving undergraduate training compared to their counterparts (HOs and nurses).

While participants in the Saudi Arabia (H. Mortada, 2020) had significant relationships among knowledge score and predictors: age, sex, marital status, job position, prior burn training course participation, and the experience of a burn injury to oneself or a family member; we have found none. This difference might be related to our relatively smaller sample.

Some (33.2%) of the participants in the Saudi study (H. Mortada, 2020) answered "washing the burned area with cool water is the first correct step in case of burn injuries" incorrectly, as most (72.1%) answered "In case of burn injury, apply water for ≥ 10mins" incorrectly. Saudi Arabia, China, Australia, and Cambodia [18][Yarali, systematic review, 2023] reflected a similar situation wherein only 5.8%, 13.7%, 9%, and 13% knew how to apply water to the burned wound, in stark contrast, majority of our respondents agreed with applying water ≥ 15mins to burn wound (74, 78.7%). The limitation to explain this difference is that these studies did not disclose their participants' monthly or yearly exposure to burn victims in ER or ED.

Healthcare professionals still lack sufficient knowledge and understanding of antibiotics use and time for prescription, only (32, 34%) answered correctly. Study done in Yekatit 12 [Staphylococcus Aureus Burn Wound Infection among burn victims, Alebachew T,2012] pointed out that it might have been from

persistent use of antibiotics with a broad spectrum of activity and disregard for a hospital's antibiotic policy that had led to the flourishing of multidrug resistant S. Aureus infection of burn wound.[6] Antibiotic overuse without caution will come at a cost to all involved. CPDs provided to health centers can help alleviate this problem by practice/knowledge improvement and developing antibiotics prescription policy at a national level.

Unlike knowledge score, practice score had associations with the predictors. However there are a number of associations that have been derived, we could not find a literature review concerned with burn care practice assessment among HCWs. Concerning EBC practice, job position and year of experience stand out. Relative to nurses, physicians had more than threefold likelihood of performing fair EBC practice. On the other hand, HCWs with <7 years of experience had a 0.59 likelihood of implementing fair EBC practice.

13. Limitations

There were several experienced limitations during the research activity, the participants' recall bias was one of them. Although, it was a multicenter study, convenient sampling was used, hence, making it vulnerable for selection bias and difficult to generalize. Another limitation to generalizing this finding is that all the respondents are from urban area of the country.

14. Conclusion

Most of the HCWs in this study have sufficient knowledge as well as fair practice of EBC. In contrast to ATLS and EBC/Burn first aid teachings, the majority can not identify burn center candidates and close to half of HCWs always apply ABCs of life to burn victim. Failing to identify burn center candidates will lead to delayed patient presentations. This raises the risk of complications such as contractures or infections, which further complicates the task of delivering effective care and producing favorable outcomes. A lot of the respondents have insufficient knowledge on when to use antibiotics may lead multidrug resistant infection which will subsequently complicate mangement. This antibiotics use issue needs to be more explored and dealt with further. Finally, the study's findings suggest that our EBC system, at the primary health care service level, is still in need for improvement.

15. Recommendation

Essential burn care education and training should be provided to HCWs in HCs. This will decrease deeper and more serious wounds as a result of inadequate first aid training. Thus, offering timely and well organized training, perhaps, through continuous professional development and NGO collaborations such as interburns might help to fill in the gap.

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17. Data Collection Format

17.1. Participants' Information Sheet

The purpose of this information sheet is to describe the research project in which you have been invited to participate. It outlines the study's purpose, your involvement in it, the benefits and dangers of participating in it and the confidentiality of the data you provide.

Purpose: The study's goal is to find out the knowledge and practice of EBC among HCWs at HCs catchment area to TASH.

Procedure: The electronic survey questionnaire will be sent to you via email or electronic media. If you prefer, paper-based questionnaire will be provided at your convenience. The questionnaire comprised 33 questions divided into 3 sections: demographics and questions related to burn injury and its first aid measures, knowledge & practice.

Risks: There are no risks associated with participating in this study, and there will be no consequences if you refuse to participate.

Benefits: The aim is to learn if there is gap between knowledge and practice towards Essential Burn Care. If present, this study aims to identify the contributing factors for the gap.

Incentives: There is no incentive or payment for taking part in this research.

Confidentiality: This study project's data will remain private. Only the research team will have access to your personal information.

Persons to contact: The ethical committee of Addis Ababa University's Emergency and Critical Care Department examined and approved this study endeavor. If you require further information, please contact the committee at the address shown below. You can contact members of the research team with any inquiries.

Ethics committee office: +251 115 538 734

Advisors: Dr. Temesgen Beyene (Associate Professor of EMCC) and Dr. Kalkidan Kebede (Assistant Professor of EMCC)

Investigator: Dr. Edom Ameha, Final Year EMCC Resident

Phone - +251 910 147 767, edally.rock@gmail.com

17.2. Consent Form

Dear participant, now that you've read about the study and know why it's being done, I'd like to ask for your consent to take part in it.

Participation in this study is entirely voluntary, and you have the freedom to withhold information, refuse to participate, or withdraw from the study at any moment without having to explain yourself to anyone. Withdrawing from the study will have no effect on you.

During the study, all of the information you provide will be kept private. Your candid responses to these questions will help us figure out the gap between knowledge and practice among HCWs at HC catchment to TASH.

You have the right to ask questions and receive answers at any time. If you have any queries or issues, please feel free to contact the research team at the following address.

Investigator:

Dr. Edom Ameha

Final Year EMCC Resident

Phone - +251 910 147 767, edally.rock@gmail.com

Respondent’s signature: _____

17.3. Questionnaire

This questionnaire was formulated based on my study's objectives and adapted from available questionnaires with similar objectives such as H.Mortada: Knowledge & Awareness of Burn First Aid among Health-Care Workers in Saudi Arabia. The questionnaire comprised 33 questions divided into 3 sections: demographics and questions related to burn injury and its first aid measures, knowledge & practice. The first section included age, sex, job position, marital status, year of experience and health center location. The second section aimed to assess healthcare workers' knowledge about first aid for burns and the use of any kind of traditional remedies, for example, coffee, honey, Aloe Vera, toothpaste, or oil. The third is about the frequency & practicality of their knowledge.

Knowledge and Practice of Essential Burn Care among Health Professionals working in the catchment Health Centers to TASH, 2023.

Categories	Variable	Remark
Part I- Socio-demographic		
1. sex	1. Male 2. Female	
2. Age (years)	1. 19-21 2. 22-29 3. 30-39 4. 40-50 5. >50	
3. Marital Status	1. Single 2. Married 3. Widowed 4. Divorced	
4. Job position	1. Physician 2. Health-Officer 3. Nurse	
5. Year of experience in your profession	1. < 3 2. 3 – 6 3. 7 – 10 4. 11 – 14 5. > 14	
6. Health-Center	1. Specify_____	
Part II- Burn-Related Knowledge Assessment		
1. Do you know the ABCs of life in any trauma victim, including burn?	1. Yes 2. No	
2. Have you ever participated in ATLS training course before?	1. Yes 2. No	
2.2. If yes to Qn.2: a. Which course have you taken?	1. BBC/EBC (Basic Burn Care/Essential Burn Care) 2. Other_____	

b. What organization provided you with the training?	1. Interburns 2. FMOH(Federal Ministry of Health) 3. Other_____	
3. Do you know the WHO emergency unit form for trauma?	1. Yes 2. No	
4. Do you know the WHO global burn registry data collection form?	1. Yes 2. No	
5. Have you ever experienced a burn injury before to self or family?	1. Yes 2. No	
6. Is removing all clothes and jewelry distal to the burn site important?	1. Yes 2. No	
7. Washing the burned area with cool water is the first correct step in case of burn injuries.	1. Yes 2. No	
8. In case of burn injury, covering the burned area before heading to the hospital can decrease the risk of infection.	1. Yes 2. No	
9. Applying for first aid medicine at home in a burned area leads to a better outcome.	1. Yes 2. No	
10. In case of burn injury, which one out of the following traditional medicine will you consider acceptable? (More than one answer is possible)	1. Dough 2. Honey 3. Toothpaste 4. Aloe vera 5. Paraffin 6. Other_____ 7. None	
11. In case of burn injury, applying water for 15 minutes or more is recommended.	1. Yes 2. No	
12. In case of any burn injury, it is mandatory to use antibiotics for the management.	1. Yes 2. No	
13. In case of an electrical burn injury, I should not touch the injured person if he/she is still in contact with the electrical current	1. Yes 2. No	
14. In case of an electrical burn injury, the first action is to turn off the source of electricity, if possible	1. Yes 2. No	
Part III- Burn-Related Practice Assessment		
1. How many burn victims have you encountered in this HC's ED monthly?	1. 0 2. 1 – 10 3. 11 – 30 4. > 30	
2. If you come across a person who's on fire, what's your first action? (More than 1 answer is possible)	1. Run in the opposite direction 2. Tell him/her STOP-DROP-ROLL 3. Cover him/her with a wet towel	

	4. Others	
3. How often do you practice ABC's for a burn victim when presenting to the ED?	1. Always 2. Usually 3. Sometimes 4. Never	
4. In cases of mass casualty related to burn injury, how often do you triage the quiet victim first as compared to the screaming victim requiring anti-pain?	1. Always 2. Usually 3. Sometimes 4. Never	
5. Which of the following Total burn surface area percent size calculators do you use?	1. Lund & Browder 2. Rule of 9 3. Rule of Palm 4. None	
6. If you use Rule of Palm to assess TBSA, which of the palms do you use?	1. Your own 2. The victim's	
7. How often do you administer TAT to the burn victim at ED?	1. Always 2. Usually 3. Sometimes 4. Never	
8. Which of these would you consider managing at your HC? (More than 1 answer possible)	1. Burn injury in patients who will require special social, emotional, or rehabilitative intervention 2. Burned children in hospitals without qualified personnel or equipment for the care of children 3. Any patient with burns and concomitant trauma 4. Burn injury in patients with preexisting medical disorders that could complicate management, prolong recovery, or affect mortality 5. Electrical burns, including lightning injury 6. Chemical burns 7. Inhalation injury 8. Partial-thickness burns greater than 10% of TBSA 9. Burns that involve the face, hands, feet, genitalia, perineum, or major joints 10. Third-degree burns in any age group 11. Keep all mentioned above 12. Transfer all to the burn care center	
9. How often do you fill out the WHO emergency unit form for trauma?	1. Always 2. Usually 3. Sometimes 4. Never	
10. How often do you fill out the WHO global burn registry data collection form?	1. Always 2.Usually 3.Sometimes 4. Never	
11. If your answer to qn. 9 and or qn. 10 is never, why?	1. The form is not available 2. The form is available but you're not instructed/trained to 3. The form is available but it's complicated to fill	

12. If you encounter a burn victim requiring a burn care center, how would you handle the transfer? (More than 1 answer possible)	1. Send him/her by private car 2. Send him/her by ambulance with a health personnel escort without communication 3. Send him/her by ambulance with a health personnel escort with communication & documentation 4. ABC's secured with Oxygen with/without oral airway, IV line 5. A simple dressing of the wound	