Addis Ababa University

College of Health Science

Department of Emergency Medicine

A DESCRIPTIVE CROSS SECTIONAL STUDY ON KNOWLEDGE, PRACTICE AND ASSOCIATED FACTOR OF NURSES ON HYPOTHERMIA PREVANTION AMONG TRAUMA PATIENTS, AT ADDIS ABABA BURN, EMERGENCY AND TRAUMA HOSPITAL.

BY: TIGIST GEREMEW BEKELE (BSC)

A RESERCH THESIS TO BE SUBMITTED TO ADDIS ABABA UNIVERSITY , COLLEGE OF HEALTH SCIENCES, SCHOOL OF EMERGENCYAND CRITICALCARE MEDICINE, IN PARTIAL FULFILLMENT FOR MASTER OF EMERGENCY AND CRITICAL CARE NURSING.

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Approval by the board of examination

This thesis by **Tigist Geremew** is accepted in its present form by the board of examiners as satisfying thesis requirement for the degree of master in emergency medicine and critical care.

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Statement of declaration

By my signature below, I hold and confirm that this thesis is my own original work in partial fulfillment of the requirements for the degree of master in emergency medicine and critical nursing. I have abided by all ethical principles of scholarship in the preparration, data aggregation, information analysis and completion of this thesis. All the sources of the materials used for this thesis and all people and institutions who gave support for this work are fully acknowledged. I confirm that I have mentioned and referenced all sources used in this text file.

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TABLE OF CONTENT

Content **page**

ABBREVIAITIONS AND ACRONYMS

AAU: Addis Ababa University

AaBET: Addis Ababa Burn, Emergency and Trauma hospital

ANOVA: Analysis of variances

ATLS: Advanced Trauma Life Support

ED: Emergency Department

EMCCN: Emergency Medicine and Clinical Care Nursing

GC: Gorgonian calendar

KP: Knowledge and practice

RTA: Road traffic accident

SPSS: Statistical Package for Social Sciences

LIST OF TABLE

LIST OF FIGURE

ABSTRACT

Background: Trauma patients are particularly prone to hypothermia for multiple reasons including exposure to environment or low ambient temperature, central nervous system injury, hypovolemic shock, administration of unaesthetic drugs and cold intravenous fluid, blood and blood products which all decrease the abilities for patients to maintain Normothermia and conserve body heat. Exposure or accidental hypothermia in adult trauma patients is associated with poor patient outcomes and considered an independent determinant of early death.

Objectives: the aim of this study was to assess knowledge and practice of nurses' and associated factors towards hypothermia prevention among trauma patients in Addis Ababa Burn, Trauma, and emergency (AaBET) hospital, Ethiopia, 2018/2019 G.C.

Methodology: A descriptive, cross sectional study design was conducted to determine Knowledge and practice of nurse's and associated factors on hypothermia prevention in Addis Ababa Burn, Trauma, and emergency (AaBET) hospital, Addis Ababa, Ethiopia from November 2018- May 2019.A total of 242 nurses were recruited by purposive sampling method. The data was collected by using semi structured, self-administer questioner. SPSS version 21.0 for windows was used for data entry and analysis, descriptive statistics, bivariate and multivariate logistic regression was used to analyze the data.

Result: More than half of 126(52.1%) of participants had good level of knowledge on hypothermia. Nurses who are indicate resource shortage is as a challenge 2.211 times more knowledgeable than nurses who didn't indicate resource shortage is as a challenge. **(AOR=2.211, 95 % CI: 1.061, 5.034),)** educational status and job place satisfaction were not found to be significant at 0.05 level of p-value. The findings also show that, above half 125(52.5%) study participants had good level of practice on hypothermia prevention. Work experience, resource shortage, and on job training were associate in bivariate analysis but were not found to be significant in multivariate analysis.

Conclusion and recommendation:

Although practice of hypothermia prevention in trauma patient appears to be easy, the nurse's knowledge on hypothermia and level of practice on hypothermia still has with big difficulties. This can have a significant impact on trauma patient that facilitate the increment of morbidity and mortality relating to trauma, therefore periodic on-job training and pre service training, regarding hypothermia and its prevention should be provided to all staff nurses and the development and subsequent implementation of simple algorithmic practice guideline is expected to improve the recognition and prevention of hypothermia in trauma patient.

Key words: **Hypothermia**, **Knowledge and Practice.**

INTRODUCTION

1.1 Background

The human core temperature is maintained by highly controlled regulatory mechanisms that balance heat production and heat loss(1) When this balance is interrupted, there are consequences for human physiology that are not yet fully understood. Extremes of temperature have a physiological impact on human cells. In some instances, such as cardiac arrest, traumatic brain injury, and organ transplantation, controlled hypothermia can be physiologically beneficial, but hypothermia in traumatic injury is distinctly different. In trauma, hypothermia often begins at the time of injury as a result of increased heat loss by conduction and convection due to exposure and reduced heat production due to decreased motor activity(2)**.**

A study conducted in developed country showed that the existence of a direct correlation between hypothermia and a number of physiologic alterations, such as cardiac arrhythmias, enhancement of mortality rates, incidence of infections, and bleeding which consequently increases the numbers of blood transfusion, as well as thermal discomfort and rise of healthcare related costs in the hospital(4).

According to the guideline of Advanced Trauma Life Support (ATLS), hypothermia, normothermia, and hyperthermia were defined as body temperatures of <36◦C, between 36◦Cand38◦C, and >38.1◦C, respectively, up on arrival to the emergency department(ED)(5)**.**

In trauma patients, however, the presence of hypothermia was associated with a much higher mortality than patients who had suffered exposure, Core temperature, less than 32. 8C was associated with 100% mortality, independent of the presence of shock, injury severity score, or volume of fluid resuscitation. prognosis associated with severe hypothermia in the trauma victim is so poor, hypothermia in the trauma patient is classified as mild (36—34.8C), moderate (34—32.8C), or severe (below 32.8C)(2)**.**

Hypothermia in adult major trauma patients is associated with poor patient outcomes.(7) Following major trauma, an admission temperature in the emergency department of < 35°C is reported to be an independent predictor of mortality.(7) Recording the temperature of an adult major trauma patient on arrival at trauma center is both challenging and problematic. However, this basic procedure remains an integral part of patient assessment during the emergency phase of care. Recording the temperature in trauma patients is necessary to assist clinicians to make informed decisions in the management of hypothermia and to evaluate the effectiveness of re-warming strategies. It is imperative that the effectiveness of care implemented is evaluated and documented, ensuring ‘best’ available care is provided in order to improve patient outcomes(8)**.**

Hypothermia in trauma patient is a significant contributor to a well-known cycle—"triad of death" hypothermia, acidosis, and coagulopathy (11). Triad of death, or lethal triad, refers to three important factors in major trauma – hypothermia, metabolic acidosis and coagulopathy – which interact and adversely affect patient outcomes if left unchecked (5). The combined presence of Acidosis (PH <7.35), hypothermia (T<36°C) and coagulopathy is associated with up to 90% mortality for patients with severe trauma(12)**.**Furthermore, hypothermia reduces wound infection resistance, contributes to pain by shivering and causes thermal discomfort in trauma patients(10)**.**

A possible cause of hypothermia is the severity of the injury. Both severe head injury and hypovolemic shock affect body temperature regulation. However, the contribution of other factors and their potential interactions are not known. They include, to list but a few, weather conditions (cold, wind, rain, and length of exposure) and pre-hospital care by emergency medical services (EMS). Although protecting the victim from the cold or warming them, whether passively or actively, might have a positive effect on body temperature(11)**.**

Hypothermia is not only has significant negative consequences for the health of the patient, but also incurs economic expense for society in terms of increased hospital stay and additional procedures and diagnostic tests. Thus, it is paramount that all Emergency nurses possess an in-depth understanding of accidental hypothermia, including risk factors, complications, and methods of prevention and re-warming strategy. It is only through use of knowledge that nurses can effectively fulfill their roles in the assessment, management, and prevention of hypothermia.(12)

According to the investigator finding, in Africa also in Ethiopia there is no study regarding magnitude of hypothermia in trauma patients but, to a certain extent there is study in magnitude of neonatal hypothermia.

1.2 Statement of the problem

Hypothermia usually found in trauma victims who suffer from central nervous injury, hypovolemic shock, and exposure to ambient environment, administration of anesthetic drugs and cold intravenous fluid, all these factors decrease the abilities of trauma victims to maintain normothermia and conserve body heat(17).

Several retrospective studies have found an association between higher death rate and an increasing degree of hypothermia in trauma patients , even accounting for differences in the severity of injuries and also the studies found no trauma patients whose core body temperature fell below 32°C survived and they regarded these as the critical temperature for survival.(8,11)

Prevalence of admission hypothermia is between 1% and 10% for all patients, but up to 36.8% for severely injured patients and an even higher incidence in patients after a prolonged extraction from scene(1,18)**.**

Hypothermia also is a well known exacerbating factor of morbidity and mortality in trauma victim which accounts 10 % of all deaths worldwide, however it is one of the preventable complications in trauma patient if there is consistent measuring, monitoring, managing and preventing low body temperature (3).

Therefore, nurses are the primary responsible body for temperature monitoring and they play a vital role to evaluate the methods of preventing and reducing the rate of hypothermia if they have adequate knowledge on hypothermia prevention **.**It is very vital for every emergency department nurses to know the monitoring, prevention and management strategies, and also knowing the cause and complication of hypothermia in trauma patients to minimize the morbidity and mortality of trauma patients due to hypothermia induced complication(19)

In Ethiopia, like other developing countries, injuries are common which is predisposing to hypothermia but little attention is being given to this problem, to the best of investigators knowledge there is no any studies regarding hypothermia and its prevention in Ethiopia which is directly relating with trauma patient survival.

1.3 Rationale of the study

Even though nurses play a vital role in prevention of hypothermia which is significance for trauma patient survival to the best of investigators knowledge, there is no study regarding nurse's knowledge, practice on hypothermia prevention and associated factors that affect the practice of nurses regarding hypothermia prevention in Ethiopia.

So, this study determine the knowledge, practice and associated factors of nurses regarding the monitoring and prevention strategies of hypothermia in trauma patients, which are important for Planners to make an informed decision to educational interventions and the adoption of practical guidelines, Programmers to evaluate their program (emergency department program) and for researchers as a baseline information about the knowledge and practice of trauma center nurses regarding hypothermia prevention.

The findings may also help to identify the problems encountered by nurses to prevent and manage hypothermia during patient resuscitation and admission. Identifying of these problems will help nurse managers to support their nurses and to give emphasis for hypothermia prevention and management.

Finally, the findings may be used as baseline information for other researcher which focuses more on nurse's knowledge in hypothermia prevention and management strategy

1.5 literature review

Until now, the area of nurse's knowledge and practice in relation to hypothermia prevention left over under investigation(16).

Literature indicates that, the existence of a direct correlation between hypothermia and a number of physiologic alterations, such as cardiac arrhythmias, enhancement of mortality rates, incidence of infection and bleeding, thermal discomfort and rise of health care related costs in the hospital (17).

Therefore, Trauma center nursing professionals must have the knowledge and the comprehension of the physiopathogenesis, the complications and the forms of preventing hypothermia, in order to play a competent role and be capable of applying such knowledge toward providing the patient with a high quality care in situations when hypothermia is not intentional.

1.5.1 Knowledge of nurses on hypothermia and its prevention

A descriptive study was conducted to determine the knowledge of nurses towards hypothermia prevention in Ireland an annual perioerative nursing conference. The study revealed that the nurses were unsure of the correct definition of hypothermia and normothermia, over all staff nurses have extensive knowledge in the area of hypothermia prevention and they identify a wide range of contributing factors in the development of hypothermia(16).

Another survey study conducted to determine the knowledge of nurses and medical staff member on hypothermia prevention among trauma patients in emergency and trauma center of Australia, Results revealed that nursing and medical staff members were unsure of how to define hypothermia, regarding to the cut-off temperature for hypothermia, also nurses are unfamiliar with simple means of preventing heat loss of re-warming patients rather they have awareness of sophisticated re-warming strategies which is not simply available in emergency(7).

In addition, this research revealed that nurses and medical staff members are unconfident of the severe complications of hypothermia which are metabolic acidosis and coagulopathy however they list the common complications associated with hypothermia in detail also all nurses are list the major re-warming strategies, in other hand, almost all nurses identify the common factors that prevent or limit the maintenance of normothermia, common contributory factors to the development of hypothermia.

Regarding complication associated with hypothermia majority of nurses identify the common complications.

The study conducted in Brazil surgical center to assess the effectiveness of educational programs toward both the change of knowledge levels and the improvement of nursing practices. The study identifies nurse's knowledge on hypothermia before and after educational program, result revealed that significance difference was seen between the knowledge presented by the nurses about hypothermia after the educational intervention. After the educational intervention the knowledge average scores of the nurse displayed an increment in comparison with the stage prior to the intervention .significance differences were observed in all aspects of knowledge after the educational intervention on none-intentional intraoperative hypothermia. It is worth highlighting that the major average differences related to; thermoregulatory center, prevention measure, and physiologic consequences hypothermia(20).

1.5.2Practice of nurses on prevention of hypothermia

A quantitative, descriptive study conducted, at general hospital of South Wales, United Kingdom, the study examine the current practice of temperature management by using a self-administered survey tool, and researchers collected baseline data on patterns of temperature measurement with respect to health care occupational group and frequency of temperature measurement. The researcher found that temperature measurement is frequently undertaken by all grades of nursing staff members. The researchers also revealed, however, that the group most involved in temperature measurement was the nursing auxiliary grade staff members who had the fewest years of clinical experience. In fact, a one-way analysis of variance (ANOVA) confirmed a relationship between reduced frequency of checking patient temperatures and increased years of experience in the clinical role (1,16) .

Another descriptive study conducted at an annual preoperative nursing conference to evaluate concerning practice of routine measurement of temperature for prevention of unintentional hypothermia only half of nurses are routinely measure the patient's temperature(21).

A further descriptive study was conducted to determine the practice of nurses towards hypothermia prevention in Ireland an annual perioerative nursing conference, study revealed that anatomical injury, access to the patients ,access to the necessary equipment and patient acuity are factor that affect obtaining a patients temperature. Also this result showed that majority of nurses monitor patients temperature regularly(7)

1.6 conceptual frame work

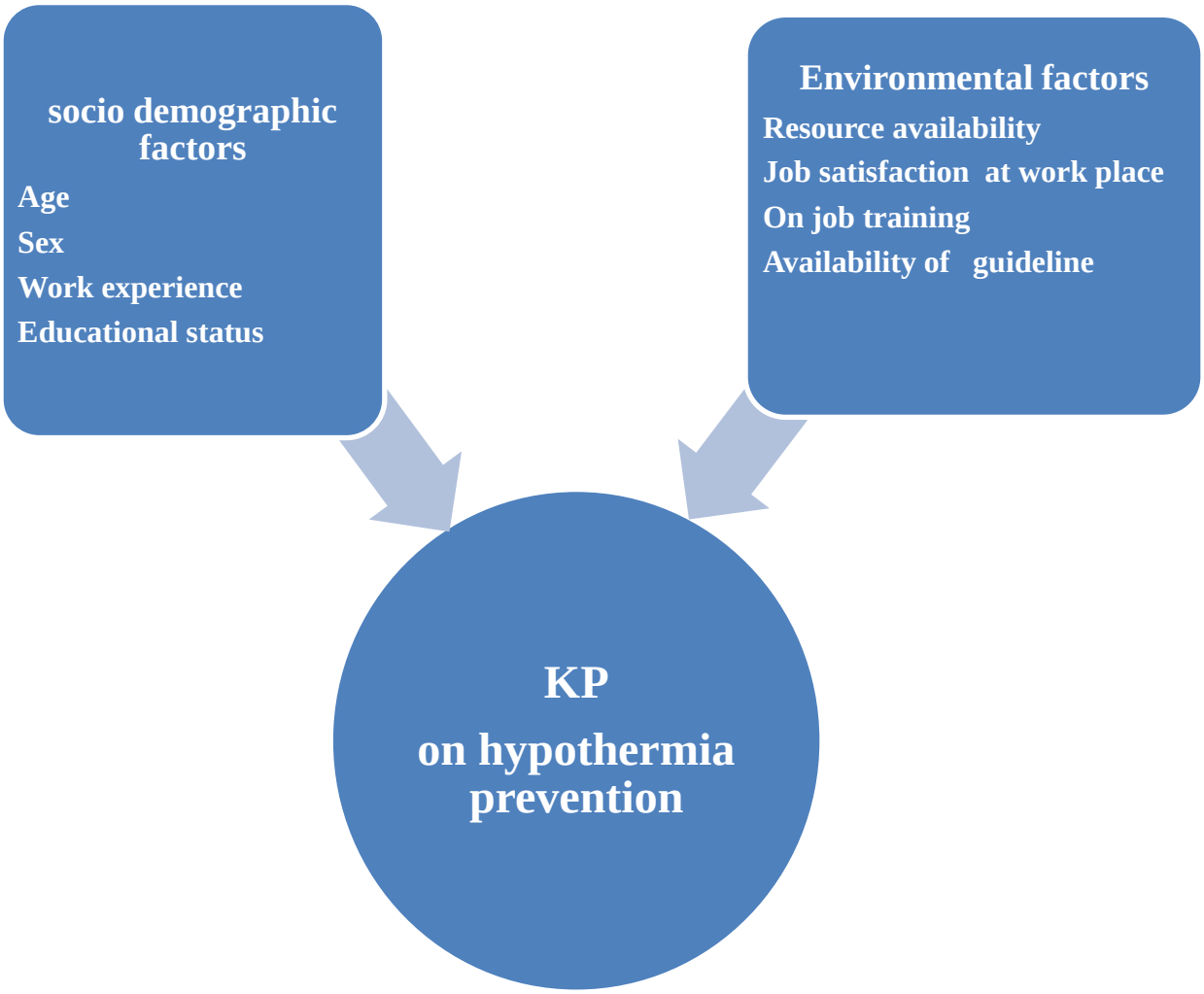

Fig 1 conceptual frame work which reflects the relationship b/n KP about prevention of hypothermia and associated factors

2. OBJECTIVES

2.1. General Objective

The general objective of this study was assessing knowledge and practice of nurses and associated factors regarding hypothermia prevention among trauma patients in Addis Ababa Burn, Emergency and Trauma Hospital.

2.2. Specific Objectives

- To assess knowledge of nurses regarding hypothermia.
- To determine practice of Nurses regarding hypothermia prevention.
- To identify factors that affect nurse's practice on hypothermia prevention.

3. METHODOLOGY

3.1 Study area and study period

The study was conducted in Addis Ababa burn, emergency and traumas centre from November, 2018 to June 2019 Addis Ababa, Ethiopia.

Addis Ababa is capital city of Ethiopia, with a population of 3.384,569 of people in an area of 540 square Kilometers. The city comprises 10 sub cities and 116 woredas. People from different regions of Ethiopia populate the city. The city consists of a total of 79 health facilities including Hospitals; out of which 6 hospitals owned by Addis Ababa Health Bureau, 4 hospitals owned by Federal Ministry of Health, 1 Addis Ababa University, 2 ministry of defense and 1 police force hospitals which provide different health services. In addition there are about 26 health center, 9 clinic, and 34 health posts. From the hospitals, 12 of them run by government, and more than 40 run by private.

AaBET Hospital is established in 2015GC under Saint Paul Millennium Medical College which is under the Federal Ministry of Health and it found in Arada sub city, woredas five. The Hospital gives an emergency, Trauma and Burn injury management services for 11 health center in Addis Ababa city and 29 health centers and primary hospital from Oromia regional state and referral cases from different regional states of Ethiopia. The hospital has 14 departments and 250 beds. It has been the main referral hospital for Trauma and Burn cases for the last 4 years and there are a total of 369 health professional staffs and 624 administrative staffs, from the total of health professionals 282 are Nurses.

3.2 Study design

A descriptive cross sectional study was conducted to assess Knowledge and practice of nurses and associated factors regarding hypothermia and its prevention among trauma patients.

3.3 Source population

All clinical staffs of AaBET hospital

3.4 study population

All nurses who are working in AaBET hospital.

3.5 Sampling technique

Because of less number of nurses in the study area, Purposive sampling technique was used to obtain the study unit.

3.6 Eligibility criteria

3.6.1 Inclusion Criteria

All nurses of AaBET hospital those are present on the time of study.

3.6.2 Exclusion criteria

Nurses who are not present on the time of study

3.7 Measurement variables

3.7.1 .Dependent variables

Knowledge

Practice

3.7.2. Independent variables

Age
Sex
Work experience of nurses
Level of Education
Job place satisfaction of the nurse
Resource availability
On job training
Availability of clinical guideline at work place

3.8 Data collection tools and procedure

The study questioner is adopted from the study conducted in Hong Kong ,"An evidence based guideline in preventing hypothermia for adult trauma patients in accident and emergency department" and The questioners are prepared in English language based on the study objectives, focusing on background information of hypothermia and its prevention. Before starting the actual data collection pilot test was done at ALERT hospital, 14 nurses were included in pilot test which is 5 % of the total sample size, after the pilot test result correction was done on the questioner.

3.9. Plan for Data collection

Data was collected with self-administer questioner. Two nurses were involved during the data collection and they are train on how to collect the relevant data using the data collection sheet. The Principal Investigator was continuously supervised the data collectors.

3.10. Quality control

The data collection sheet was standardize by testing in 5% of the sample size, before the study to make sure that the data collecting sheet is capable of yielding the required data for the study and some modifications was done according to the results found. The collected data was checked for completeness consistency and clarity

3.11. Plan for Data entry and analysis

The data entry and analysis was done by using SPSS version 20.0 for windows. The generated data was compiled by frequency tables, charts, and graphs. Descriptive statistics, bivariate and multivariate logistic regression was used to analyze categorical variables.

3.12. Ethical consideration

Ethical clearance was obtained from research and ethical review committee of the department of emergency medicine and critical care, faculty of medicine Addis Ababa University. Official letter of permission from the department was submitted to AaBET hospital in order to conduct the research. All the collected data was kept confidentially and no one except the members of the research team had

access to the collected information. Nurses whom the data was collected were informed and written consent was obtained.

3.13. Plan for Dissemination of the result

The finding of the study will be present to the department of Emergency Medicine and Critical care/ AAU. It will also be disseminated through presentations in different professional association meetings and annual conferences. The paper will also be submitted to national or international peer reviewed scientific journals for possible publication.

3.14. Operational definition

Hypothermia: A core body temperature lower than 36º C in major trauma patients.

Normothermia: is normal body temperature in major trauma patient which is 36º C -38º C

Knowledge: skills acquired through education or experience, and the theoretical or practical understanding of hypothermia and its prevention method. Based on this research the percentage scores will be graded as 'poor', and 'good ‘to determine the knowledge level. Grading was classified according the mean score of the study result.

Practice: activities acting by nurses in order to prevent hypothermia or re-warm the patient. Items in this category of the Likert scale will intend to determine the frequency of performing certain interventions to prevent hypothermia and to increase patient comfort. The response categories will coded as 1 to 4 for ‘Never’ ‘Sometimes’ ‘Almost always’ and ‘always’ respectively. In order to discuss these in a more meaningful way, the categories never and sometimes (1 and 2) was grouped together and was interpreted as **poor practice**, while Almost Always and Always (3 and 4) was also grouped together and was interpreted as **good practice**. Grading was classified according the mean score of the study result.

4. RESULT

This chapter gives an account of the study findings on nurse's knowledge and practice on hypothermia prevention in trauma patients and associated factors that affect the practice of nurses in hypothermia prevention in AaBET hospital. The overall response rate was 97.1 %. From the total of 285 AaBET hospital nurses 242(84.9%) were participated in the study, 36 nurses were not found in the hospital during data collection period.

4.1 Socio-demographic characteristics of respondents

This section describes the gender, age, work experience and educational back ground of the participants in order to determine whether some of these characteristics might influence the respondent's knowledge and practice in hypothermia prevention. Among 242 nurses 158(65.3%) were females with F: M ratio of 2:1. The mean age of participants was 28 year and the predominant age group 174 (71%) is below 30.Majority of the study unit 193(79.7%) were > 2 year work experience; the mean work experience of the participants was 6 year. Out of 242 nurses 185(76.4%) were BSc holders and there were only 2 MSC holder nurses the rest were diploma holders nurses. **(Table 1: Socio-demographic characteristics of participants)**

Variable	**Response**	**Frequency (n = 242)**	**Percentage (%)**
Sex	Male	84	34.7
	Female	158	65.3
Age(mean age=28yrs	< 25 year	78	32.2
	25-45 Year	160	66.1
	> 46 year	4	1.6
Educational status	Diploma	55	22.7
	Degree	185	76.4
	Master	2	0.8
Work experience	< 2 year	49	20.2
	2 – 5 year	85	35.1
	6 – 10 year	74	30.5
	>10year	34	14.0

4.2 Knowledge of study participants on hypothermia.

Majority of, 126(52.1%) respondents had good knowledge on hypothermia prevention. Among 242 nurses 193 (79.8%) of nurses recognize the effect of hypothermia in tissue oxygen delivery system. Majority 178 (73.6%) of respondent answer correctly the effects of cold IV fluid and blood products in heat loss. larger part of participants 171(70.7%) can't answer the definition of hypothermia in trauma patient.

Among 242 nurses 233 (96.3%) of respondents correctly respond, the risk of burn injury for hypothermia. Only 62(25.6%) of respondents correctly respond the effect of hypothermia in blood viscosity. Majority of nurses 170(70.2%) know the risk of increasing wound infection in trauma patients. Among 242 nurses, 150(62.0%) correctly respond the risk of spinal cord injury for hypothermia and 194(80.2%) of nurses correctly respond the risk of head injury for hypothermia. Only 74(30.6%) of participants know the effect of anesthetic drug in heat loss in trauma patients.

Most of 190(78.5%) participants respond the correct severe complication of hypothermia in trauma patient.

Majority 206(85.1%) nurses know the major source of heat loss. Regarding risk age group 212(87.6%) participants respond correctly the high risk age group for hypothermia. Only 64(26.4%) of respondents know the effect of alcohol in decreasing heat production and majority of 186(77%) nurses respond correctly the effective way of preventing heat loss.

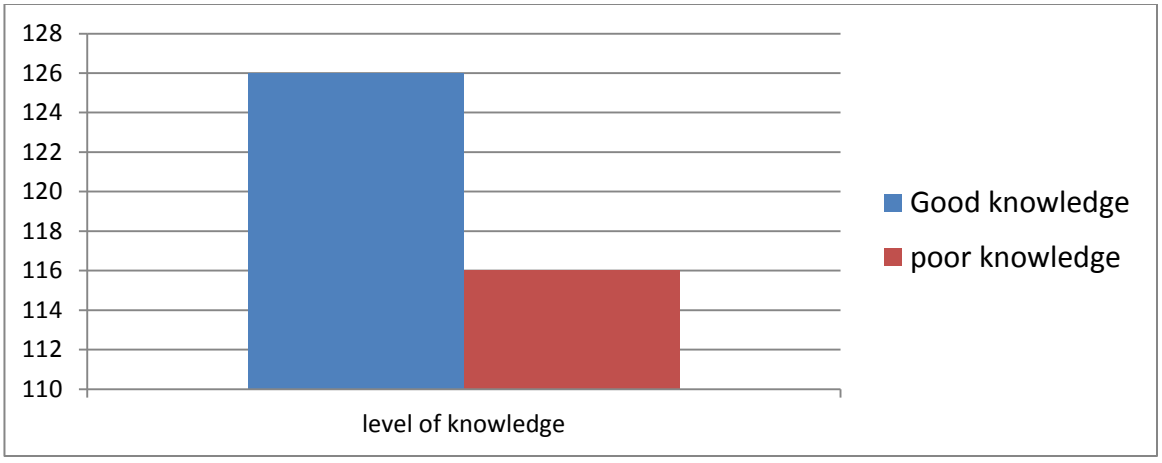

Figure 2: level of KP of nurses towards hypothermia prevention

4.3 practice of nurses on hypothermia prevention

More than half of respondents 125(52.5 %) had good practice on hypothermia prevention. Majority 142 (58.6 %) of nurses respond they measure patient temperature as soon as patient arrival regarding the practice of regular measurement of patient temperature 155(64 %) of nurses responded they measure patient's temperature regularly Among 155 (63.6%) of respondents respond they check all wet clothe and gauze under the patient during patient arrival.

Majority of 200(82.6 %) nurses responded they didn't warm IV fluid, blood and blood products before administration. Regarding practice of wrapping trauma patients on arrival, 130 (53.3%) nurses respond they always wrap trauma patients with blanket on the arrival.

Majority 137(56.6%) of respondent respond they never warm blanket before wrapping the patient. Above half of 126(52.8%) of nurses respond they always cover the mattress plastic sheet with linen before admitting the trauma patient. Among 242 nurses, 156(64.7%) of respondents respond they never warm the room or the environment with heater for trauma patient. Majority, 156(64.4%) respondents responded they always document patients temperature and 136(56.2%) of nurses responded they had a trend of discussion with doctors about patients temperature result.

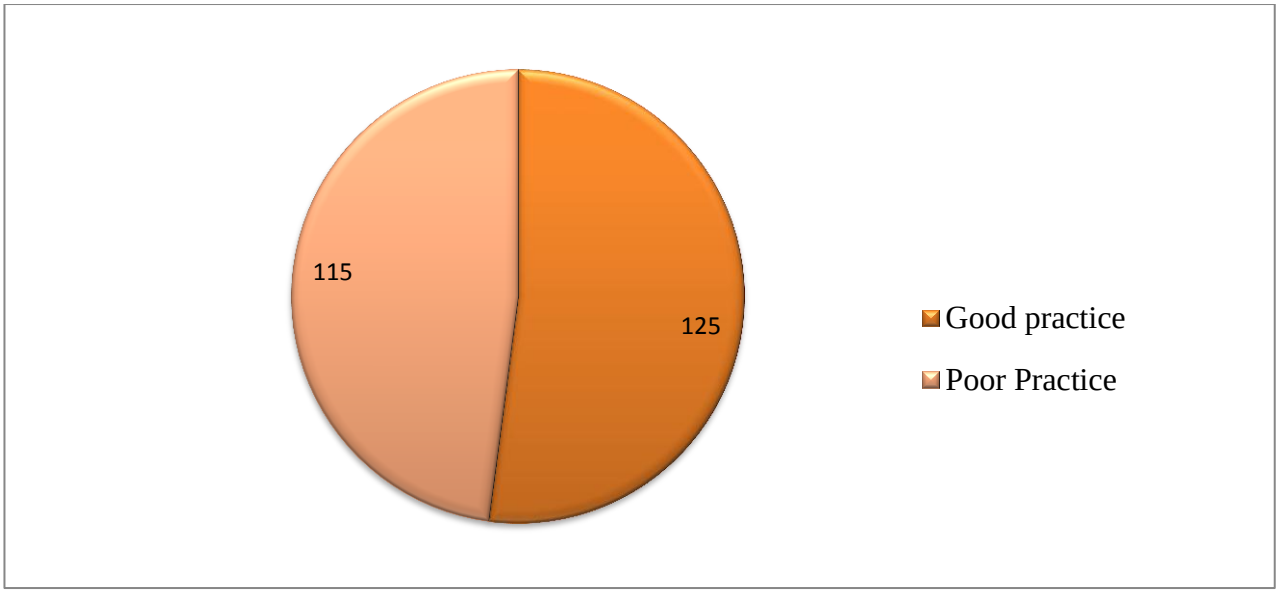

Figure 3: level of practice of participants towards hypothermia prevention in AaBET hospital, Addis Ababa Ethiopia, May 2019

4.4 factors affecting the KP of nurses on hypothermia prevention

Majority of 198 (81.8%) participants hadn't got any on job training regarding hypothermia prevention; this result shows that larger proportion of nurses who work in AaBET hospital hadn't got any on job training concerning hypothermia prevention. Regarding job place satisfaction, above half of 132(54.5%) weren't satisfied on their job place.

Among 242 nurses, 204 (84%) of participants responded there was no clinical guideline regarding hypothermia prevention at their work place.

About 210 (87%) participants said there are different types of resource shortage at their work place which is vital for the prevention of hypothermia in trauma patients.

Fig 4: factors that affect the knowledge and practice of nurses on hypothermia prevention in AaBET hospital, Addis Ababa Ethiopia, May 2019

4.5 Factors associated with level of knowledge on hypothermia

In the bivariate logistic regression analysis the factors found to be significantly associated with knowledge of nurses were sex, educational status, and resource shortage and job place satisfaction. From

the variables associated with knowledge of nurses in bivariate logistic regression; only resource shortage was statistically significant to predict knowledge of nurses in the multivariable logistic regression. Nurses who are indicate resource shortage as a challenge 2.211 times more knowledgeable than nurses who didn't indicate resource shortage is a challenge.(AOR=2.211, 95 % CI: 1.061, 5.034), This association indicate that nurses who had good knowledge on effective hypothermia prevention method can't change their knowledge in to practice to prevent hypothermia because of resource shortage .Even though in bivariate analysis, there is association between on job place satisfaction and educational status there were not found significance association with multivariate analysis. Age, sex, work experience, and availability of guideline were not associate in bivariate analysis (p-value < 0.25) Hence it was inferred that knowledge of staff nurses were not influenced by the above mentioned variables.

4.6 Factors associated with level of practice on hypothermia prevention

In the bivariate logistic regression analysis the factors that associate with practice of nurses were: work experience, resource shortage and absence of clinical guideline at work place, however in the multivariate logistic regression analysis there were no variable found to be significant at 0.05level of p-value. Age, sex, educational status, job place satisfaction, and on job training were not found associate with the level of practice on hypothermia prevention. Hence the result inferred that practice of staff nurses were not influenced by the above mentioned variables. In general in binary logistic regression analysis there were not found significant association between the level of practice and the variables which mentioned above.

DISCUSSION

This study is tried to find out the level of nurses knowledge and practice on hypothermia prevention and factors that associate for hypothermia prevention. Because nurses are primarily responsible for the recognition and prevention of hypothermia, knowledge surrounding the concept of hypothermia is central for the successful prevention and management. The nurse who took part in this study were experienced, with a majority having more than four years work experience in addition, majority of nurses were BSC qualification. Because the respondents were well educated and experienced, the investigator anticipates that these nurses would be quite knowledgeable about hypothermia. We found however, that majority 86 % of nurses were unsure of the correct definition of hypothermia, similar study conducted in Ireland,(7) majority of nurses were unsure of the definition of hypothermia. This

confusion on the definition may be a result of the lack of clarity in the literature as to a standard definition of hypothermia. This result highlights the need to standardized guidelines.

The fact that Hypothermia decrease blood viscosity which is major risk factor for bleeding, because of the series of enzymatic reaction of the coagulation cascade are strongly inhibited by hypothermia, (16,22) only fewer respondents 25.6% rated hypothermia as a major risk factor for decreased blood viscosity. Similar study conducted in Ireland (7) majority of nurses 46.2% rated that hypothermia can decrease blood viscosity. This result further suggests that the importance of on job training and pre service training on the effect of hypothermia that increase the risk of bleeding in trauma patient.

Moreover, the fact that anesthetic drug is a major risk factor in the development of hypothermia among trauma patients, because of loss of behavioral response to cold and impairment of thermoregulatory heat preserving mechanism (23) only 30.6% of respondents agree that of the risk of anesthetic drug in trauma patient. The result of the study conducted in Ireland shows that of majority 62%) of nurses rated that hypothermia can decrease blood viscosity. These results suggest that the need to raising awareness among staff working in trauma centers.

The primary and major variable for the recognition and monitoring of hypothermia in trauma patients is measuring temperature on the arrival of patients. Among 242 nurses only 58.6% of them measure temperature as soon as patient arrival, similar study conducted in Ireland show that 96% of nurses measure trauma patient temperature as soon as arrival, this deferring practice may be a result of resource shortage and luck of knowing the need of temperature measuring on the arrival of patients, this result highlights the need to standardized guidelines.

One of the cornerstone of prevention and treatment of hypothermia has been the use of devices or practices to allow heated resuscitation fluid(1,11). Only 17.4% of nurses warm IV fluid, blood and blood products before administration for trauma patients ,similar study conducted in Ireland (16)showed that majority of nurses 54.6 % rated as they warm IV fluids, blood and blood products before administration.

These result discrepancies may be the result of unavailability of warming devices and luck of knowing the necessity of warming fluids for trauma patient resuscitation. This result highlights the need to standardized guidelines, on job training and the availability of warming devices.

This finding shows that, more than half of respondents 52.1% had good Knowledge on hypothermia prevention and it is not comparable with similar study done in India mysuru hospital (23) in which 83.3% of the participants had good knowledge on hypothermia. This discrepancy might be due to the types of hospital which is different in setting, types of service delivery and opportunity for frequent training for nurses.

The study result shows that 125(52.5%) of respondents had good practice level on hypothermia prevention and it is comparable with the same study done in mysuru hospital, India, in which 96.6% of participants had good practice on hypothermia prevention. Also this discrepancy could be due to types of hospital which is different in setting and types of service delivery and level of training of nurses and availability of resource.

The result revealed that **resource shortage** has strongly associated with level of knowledge of nurses on hypothermia. Nurses who are indicate resource shortage is a challenge 2.211 times more knowledgeable than nurses who didn't indicate resource shortage is a challenge. **(AOR=2.211, 95 % CI: 1.061, 5.034)**.This association indicate that nurses who had good knowledge on effective hypothermia prevention method can't change their knowledge in to practice to prevent hypothermia because of resource shortage **.**Even though in bivariate analysis, there is association between on job place satisfaction and educational status there were not found significance association with multivariate analysis. Age, sex, work experience, and availability of guideline were not associate in bivariate analysis (p-value < 0.25) Hence it was inferred that knowledge of staff nurses were not influenced by the above mentioned variables.

In general, the overall study findings shows that above half of study participants had good knowledge and practice regarding hypothermia prevention on trauma patient however, the finding also show us there is knowledge and practice gap in a lot number of nurse.

Conclusion

Even if the knowledge and practice of Nurses working AaBET hospital was relatively good they still have knowledge gap about hypothermia and prevention method. The gap of knowledge and level of practice on prevention of hypothermia have a significance impact on trauma patient.

Raising awareness for the need to be practical in the monitoring and prevention of hypothermia is required. The development and subsequent implementation of simple algorithmic practice guideline is expected to improve the recognition and prevention of hypothermia in trauma patient. Working collaboratively with pre hospital providers to establish practical ways to prevent further heat loss in patients who suffer traumatic injury is another priority.

Limitation of the study

Qualitative way of data collection was also not used and this might have not enabled the study to exhaust all possible responses.

Having one study area might affect estimation of the parameters.

Recommendation

Based on the findings of this study, AaBET hospital should plan to offer periodic on job training and pre-service training to all educational level of nurses regarding hypothermia and its prevention is mandatory to increase the knowledge and practice of nurses for the sake of patient comfort and survivance.

Availability of guideline should be mandatory to improve practice level of nurses because hypothermia prevention is a part of nursing care therefore Trauma centers is expected to prepare guideline regarding hypothermia prevention and rewarming strategy.

Resource also crucial to increase the level of nurse's practice on hypothermia prevention so, emergency and trauma centers should be equipped with materials which are necessary for hypothermia prevention.

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ANNEXE

Annex I: Information sheet

Title: Assessment of Knowledge and practice of Nurses and associated factors towards Hypothermia prevention among Trauma Patients.

Principal investigator: Tigist Geremew Bekele

Name of the institution: Addis Ababa University, School of Medicine, College of Health Sciences.

Introduction of interviewer

Greetings!

My name is Tigist Geremew. I am a master's student in Addis Ababa University, school of Medicine. Currently I am doing a research in AaBET Hospital. This information sheet is prepared to enable Nurses understand the purpose of the study consciously, ask for further explanation and participate voluntarily. The study involves with filling the self administered questioner by Nurses who are permanent employee and working in AaBET hospital of all department.

Purpose of study: The purpose of this research is to understand Knowledge and practice of Nurses towards hypothermia prevention among Trauma Patients. If you agree to take part in this study; you will be fill the questioner for about 10-15 minutes.

Study procedure: Volunteer participants in this study will fill the questioner regarding their Knowledge and practice of hypothermia and its prevention method. In addition you will be asked to sign on the consent form for your voluntariness. Findings of this study will be share through presentation, but your name will not be mentioned with the report.

Possible risks/ discomforts: The study is not associated with any harm. However you might be exhausted with your work during data collection time. In case you experience any severe discomfort you can stop filling the questioner and will be continued if you fell like.

Possible benefits: At the moment, this study will not be of direct benefit to you, but I hope the findings from this study may help the hospital managers to make decisions in designing appropriate programs and strategies that will advantage indirectly to you and other nurses in emergency setup regarding of guideline preparation and on job training about hypothermia prevention.

Data confidentiality: All collected data will be handled so as to protect your confidentiality. No names will be mentioned and the information will be coded. I would like to assure you that all information be protected from the public and your personal identity will not be mentioned in any report of this study.

Voluntary participation and right to leave the research: Participation to this study is voluntary and you have the right to decide whether to participate or not. You also have the right not to participate in this study or withdraw from the study if you wish without any worry.

Payment: there is no payment for study participant since; the questioner is to be filled while the participants are performing their routine job at their work place.

Contact for additional information

If you need more clarification about this study, you can call or contact the researcher;

Tigist Geremew 0923339634, *email:* **tgnahale616@gmail.com**

Annex II: Written consent form

The above information sheet describing the study purpose and procedure, benefits and risks, confidentiality issues, voluntary participation and rights to withdraw for the research title "Assessment of knowledge and practice of Nurses towards hypothermia prevention among trauma patients'' I read and understand the purpose of study. I have been given an opportunity to ask any question for more explanation about the research. I agree to participate as a volunteer.

_____ _____

Date, Name and signature of volunteer

I certify that purpose of the study, potential benefits and possible risks associated with participating in this study was explained to the above individual.

_____ _____

Date, Name and signature of researcher

Annex III: Semi structured Questioners

Identification number: _____

Back ground information of participant

101. Age; _____

102. Sex; A. male B. female

103. Work experience A. < 1 year B .1yr-5yr C.>5yr

104. Educational status A. Diploma B.BSC C.MSC

105. Do you have any on job training relating hypothermia? Yes_____ No_____

106. Are you satisfied in your Job place? Yes_____ No_____

107. Do you have guideline related to hypothermia prevention in your work place? Yes ___ No___

108. Is there any resource constraints which are important for prevention of hypothermia prevention?

Yes_____ No_____

If yes, what type of resource constraints**?** You can circle above one answer if appropriate

A. Blanket
B. Linens
C. Fluid warmer
D. Air warmer/heater
E. Blanket warmer

I. Questions related with knowledge of hypothermia and its prevention in trauma patients. Please tick the appropriate column

No	Question	Yes	No
201	The definition of hypothermia in trauma patient is< 36°C.		
202	The definition of normothermia in trauma patient is 36°C to 38°C		
203	Impaired tissue oxygen delivery is adverse effects of hypothermia in trauma.		
204	Cold IV fluids and blood products increase heat loss.		
205	Burn injury is not risk factor for hypothermia.		
206	Hypothermia decrease blood viscosity of trauma patient.		
207	Hypothermia Increase wound infection rate in trauma patient.		
208	Spinal cord injury is risk factor for hypothermia.		
209	Anesthetic drugs increase heat loss in trauma patient.		
210	Coagulopathy and metabolic acidosis are the major and severe complication of hypothermia		
211	Environment exposure is the major source of heat loss in trauma patient on pre hospital and hospital setting.		
212	Alcohol decrease heat production.		
213	Patients at extreme age are at risk of hypothermia.		
214	The major source of heat loss in adult is not head		
215	Head injury is not a risk factor for hypothermia in trauma.		
216	Covering the head is not effective to prevent hypothermia in adult trauma patients.		

Adopted from; Ireland S, Murdoch K, Ormrod P, Saliba E, Endacott R, Fitzgerald M, et al. Nursing and medical staff knowledge regarding the monitoring and management of accidental or exposure hypothermia in adult major trauma patients(7).

II. Questions in relation with practice

Q1 .How much do you do the following procedures to prevent hypothermia in severely injured patients

No.	Question	Never 1	Sometimes 2	Almost always 3	Always 4
301	DO you measure temperature as soon as patient arrival?				
302	Do you measure temperature regularly?				
303	Do you check wet cloth or bandage under or on the patient at arrival?				
304	Do you warm IV fluid and blood products before administration?				
305	Do you wrap trauma patients with blanket on arrival?				
306	Do you warm the blanket before wrapping the patient?				
307	Do you cover the mattress plastic sheet with dry linen before patient admission?				
308	Do you warm the environment with heater or air warmer?				
309	Do you document every temperature measurement regularly?				
310	Do you discuss with doctors about the measurement result?				

Adopted from;Perlman R, Callum J, Laflamme C, Tien H, Nascimento B, Beckett A, et al. A recommended early goal-directed management guideline for the prevention of hypothermia-related transfusion, morbidity, and mortality in severely injured trauma patients. Crit Care [Internet]. 2016;20(1):1–11. Available from: http://dx.doi.org/10.1186/s13054-016-1271-z(22).

Annex IV: Assurance of Principal Investigator

The undersigned agrees to accept responsibility for the scientific ethical and technical conduct of the research project and for provision of required progress reports as Per terms and conditions of the Research Publications Office in effect at the time of Grant is forwarded as the result of this application.

Name of the student: Tigist Geremew

Date._____ Signature _____

Approval of the primary Advisor

Name of the primary advisor: Professor Akililu Azeze

Date._____ Signature _____