COLLEGE OF HEALTH SCIENCE SCHOOL OF NURSING AND MIDWIFERY

KNOWLEDGE AND PRACTICE TOWARDS CARDIOPULMONARY RESUSCITATION AMONG NURSING STUDENTS OF NURSING SCHOOLS IN ADDIS ABABA, ETHIOPIA, 2023.

PRINCIPAL INVESTIGATOR: **MERON KIFLE (BSc)**

A THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY, SCHOOL OF NURSING AND MIDWIFERY, DEPARTMENT OF NURSING, IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR A MASTER OF SCIENCE IN CARDIOVASCULAR NURSING.

JUANARY, 2023

ADDIS ABABA, ETHIOPIA

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APPROVAL BY THE BOARD OF EXAMINATION

This thesis by Meron kifle is accepted in its present form by the board of examiners as satisfying the thesis requirement for the degree of master's in cardiovascular nursing.

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STATEMENT OF DECLARATION

By my signature below, I declare and affirm that this thesis is my own work. I have followed all ethical principles in the preparation, data collection, data analysis and completion of this thesis. All scholarly matter that is included in the thesis has been given recognition through citation. I affirm that I have cited, and referenced all sources used in this document. Every effort has been made to avoid plagiarism in the preparation of this thesis.

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ACRONYMS AND ABBREVIATIONS

AAU	Addis Ababa University
AHA	American heart associations
AED	Automated external defibrillator
ALS	Advanced Life Support
AOD	Adjusted Odd Ratio
BLS	Basic Life support
CCR	Chest Compression-Only Resuscitation
CI	Confidence Interval
CVD	Cardiovascular Disease
CPR	Cardiopulmonary resuscitation
COR	Crude Odd Ratio
EMS	Emergency Medical Services
ER	Emergency Room
MICU	Medical Intensive Care Unit
MI	Myocardial Infraction
PICU	Pediatric Intensive Care Unit
SCA	Sudden cardiac arrest
SD	Standard Deviation
SPSS	Statistical Package for Social Sciences
WHO	World health organization

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ABSTRACT

Background: - Cardiac arrest is leading cause of death all over the world. Studies have showed that prompt delivery of Cardiopulmonary Resuscitation as an important predictor of survival. Knowledge and, practice to simple Cardiopulmonary Resuscitation techniques ensure the survival of the patient till experienced medical help arrives. However, knowledge and skills gap among health care professionals about Cardiopulmonary Resuscitation is a global problem. However little known Knowledge and Practice level of health care professionals and take appropriate intervention for gaps identified**.**

Objectives: To assess the knowledge and practice level towards Cardio-pulmonary Resuscitation among nursing students at nursing schools in Addis Ababa, Ethiopia, 2022.

Methods:-Institutional based cross-sectional study design and systematic random sampling technique was employed to recruit 417 study participants. Structured and pretested questionnaire was used to collect data. Data was analyzed using SPSS version 26. Descriptive statistic was used to summarize Socio-demographic and health related factors. Odds ratio was used to identify factor associated with the outcome variable and statically significant was declared at *P*-value < 0.05.

Results: The study included 395 students were participated in this study. More than one third (37.7%) of the respondents had good knowledge, while one third (33%) of the respondents had good practice towards Cardio-pulmonary Resuscitation. The mean age was 25.33±3.99. Further, female gender (AOR: 1.92, 95% CI: 1.260-2.949 P 0.002), Addis Ababa residence (AOR: 1.73, 95% CI: 1.159-2.730P 0.008), the school from where the students recruited (AOR: 1.57, 95% CI: 1.029-2.391,P 0.037), employed students (AOR=1.6; 95% CI (1.045-2.457,P 0.031) were found statistically significantly associated with knowledge level of the study respondents while only formal training (AOR: 4.67, 95% CI: 2.093-10.426, P 0.000) was found statistically significantly associated with practice level of the study respondents.

Conclusion and recommendation: Despite their importance's to reverse sudden death occasions, significant proportion of the study respondents were found with deficient level of knowledge and practice towards Cardiopulmonary Resuscitation. Gender, occupation, residence, type of school and being employed were found statistically significantly associated with knowledge level of the study participants while formal training was the only variable statistically significantly associated with practice level of study respondents. Therefore, the policy maker, researcher, nursing schools should develop effective intervention mechanism to reverse the low level of knowledge and practice towards Cardiopulmonary Resuscitation.

Keyword: Cardiopulmonary Resuscitation, Cardiac Arrest, Knowledge, Practice.

CHAPTER ONE

1. INTRODUCTION

1.1. Background

Cardiac arrest is the cessation of normal circulation of blood due to failure of the heart to contract effectively . Cardiac arrest may occur in and out of hospitals due to different reasons, such as traumatic injuries of any cause, cardiac diseases and stroke (2). It is known that Cardiopulmonary arrest is a major public health problem(3). Studies have shown it is more common in low socio-economic areas (4) and is one of the most common unfortunate incidents that may occur in and out of the health facilities (5) .Cardiopulmonary resuscitation (CPR) is an emergency procedure which is sought in an effort to return life of a person from cardiac arrest(6). Cardiopulmonary Resuscitation (CPR) is a critical component of Basic Life Support (BLS) and Advanced Life Support (ALS) (7). CPR is an important lifesaving procedure that can keep cardiac arrest patient alive long enough for definitive treatment to be delivered (7). Cardiopulmonary resuscitation (CPR) is the combination of chest compressions and rescue breathing. It forms the basis of modern basic life support (8) .

Non communicable disease like cardiovascular disease (CVD) has been identified as the leading cause of mortality, accounting for more than 40% of all deaths in Africa. Sudden cardiac death is the most prevalent, yet preventable clinical problem, heart diseases are estimated to cause about 300,000 to 400,000 deaths annually (9). Effective CPR is vital for survival of cardiac arrest victims. The chances of survival in cardiac arrest decreases by between 7 and 10% for each minute of CPR delay (8)It could also decrease the number of days prior to hospital discharge (10) .

Cardiopulmonary resuscitation (CPR) is the standard treatment used for the management of cardiac arrest and combines chest compressions with ventilation. Adequate knowledge and skills of healthcare givers regarding the maneuvers and techniques for CPR prevents irreversible organ damages and improves the chances of survival of cardiac arrest victims. As a result, CPR requires comprehensive efforts, with adequate knowledge and skills as well as interests and positive attitude to help victims (1).

The quality of CPR mainly depends on the sufficiency of the knowledge, attitude and skill of health professionals who deliver the CPR(11). The American Heart Association (AHA) resuscitation guidelines recommend that all under graduated students who are in contact with the client who need health care should have regular resuscitation training(1). A study show most of the nurses have poor knowledge and performance related to CPR pre the training program. And Nurses' knowledge and performance related to CPR was strongly increased immediately and slightly decreased one month post training program(12). Because of the nature of their profession, nurses spend significant time alongside patients and also often the first to realize in-hospital sudden cardiac death. Thus, they are the ones who respond by providing cardio pulmonary resuscitation. Although their contribution to effective CPR is essential , either individually or as a member of a rapid response team, studies have often detected that they have average knowledge and poor skills in light of international guidelines and recommendations (13).

Knowledge about cardio pulmonary resuscitation is a familiarity, awareness, or understanding of nursing students, regarding CPR facts. And it is measured in terms of knowledge scores and practice about CPR refers to the application of CPR knowledge or theory into demonstration of CPR skills. And it is measured in terms of practice scores(14).

As demonstrated by Curry and Gass, who found that nurses participating in a CPR training program will start performing CPR more frequently than nurses without training, cardiopulmonary resuscitation training is crucial in nursing practice(15). Research also demonstrated that nurses who participated in resuscitation training after earning their nursing degrees had much higher knowledge in this area and were more assured of their resuscitation abilities. Nursing work requires extensive training in cardiopulmonary resuscitate(16).

The factors associated with level of knowledge of nurses was researched and work experience, number of work setting, taking training and reading CPR guide line was the factor associated with nurses level of knowledge about CPR(17). Nurses who work in developing century have inadequate CPR knowledge and skills at pre assessment, which could have negatively impacted the effective CPR performance. The study revealed statistically significant improvement in both knowledge and skills of CPR for all nurses post training. Continuous training and practice for the nurses to acquire competency and maintain the knowledge and skills (18)

1.2. Statement of the problem

According to the American heart association (AHA), Cardiac arrest is defined as: “the cessation of cardiac mechanical activity, confirmed by the absence of a detectable pulse, unresponsiveness, and apnea” (19) .Cardiac arrest is leading cause of death all over the world. Different studies have showed half of sudden cardiac death that has occurred in young individuals , who were asymptomatic (20).The world health organization (WHO) estimated that more than 17.5 million people died from cardiovascular diseases such as heart attack and stroke in 2012 and more than three out of four occur in low-income countries (21). Sudden cardiac death (SCD) may occur at any time, at any place to any person (21).

Cardiopulmonary resuscitation (CPR) is a lifesaving technique that's useful in many emergencies, such as a heart attack or near drowning, in which someone's breathing or heartbeat has stopped (20). CPR can be lifesaving when provided by well-trained person. Studies have showed that prompt delivery of CPR as an important predictor of survival (22). Cardiac arrest patients who are resuscitated immediately have higher survival rate compared to those who did not receive immediate CPR (8.2% vs. 2.5% respectively) (22).Studies showed knowledge of Basic Life support (BLS) and practice of simple CPR techniques ensures the survival of the patient long enough till experienced medical help arrives (22). Ideally, everyone should know BLS and CPR, but its awareness to medical personnel is invaluable so qualifying nursing students with knowledge, and practice/skill of CPR are paramount to significantly save the life of cardiac arrest victims (21). However, knowledge and skills gap among health professionals with regard to CPR and management strategies for cardiac arrest is a global problem (22).

As there is increase in the number and frequency of cases such as accidents, drug poisoning, drowning, MI, Ventricular rhythm abnormality and many other medical and surgical emergency cases, they require effective, quick, sufficient and well-timed CPR. As the nurses are the spine in functioning of a hospital, they should have essential knowledge, skills, training and meet any emergency quickly and effectively (23).

CPR is a fundamental and crucial component of emergency medical care. It is administered to people who are believed to be in cardiac arrest and consists of a combination of rescue breathing and chest compression. A significant public health issue is the inability to react

swiftly and successfully to cardiac arrest, which is thought to be responsible for 15% to 20% of all fatalities. Cardiopulmonary resuscitation (CPR) is a procedure that, when administered in a timely manner, can generally avert sudden death. Medical professionals and nursing staff are expected to possess the fundamental knowledge and abilities required to conduct CPR because they are significant members of the healthcare delivery team (22).

In developing country like A study done in Kenya the overall mean percent for CPR knowledge score was 41.83%±8.29, with only 50% had good knowledge about CPR(24). Cardiopulmonary resuscitation (CPR) is considered a core emergency skill in which all health care professionals must be proficient but, CPR remains a new procedure in developing compared to develop countries. The study revealed statistically significant improvement in both knowledge and practice of CPR for all nurses post training(18).

In Ethiopia, insufficient data are present which addresses the knowledge and practice of nursing students, regarding the highly effective easy maneuver. A study among graduating health students at university of Gondar showed that knowledge levels of the study participant for CPR were low (44.1%) (25).This study aims to investigate the knowledge, and practice and associated factors in performing CPR among nursing students at selected government nursing schools which will help in understanding the deficits and for further formulating medical education protocol/curriculum.

1.3. Significance of the Study

Cardiac arrest continues to be a serious explanation for death in much of the planet today. Although there are studies done on other health professionals in other universities, there are still no studies done on assessments of knowledge, and practice and associated factors towards CPR among nursing students in Ethiopia particularly in Addis Ababa. This study was emphasize on assessments of knowledge, and practice and associated factors in performing CPR among nursing students and this provides an update possibly new information regarding knowledge and practice and associated factors of nursing students towards CPR in Ethiopia specifically in Addis Ababa, this help curriculum designers and different stakeholders for improvement in teaching-learning processes and intervention strategies in clinical care. Furthermore it helpful for researchers as a source of information for further investigation in the related area. Additionally, it can serve as source of information for other researchers and health care professionals who will be interested on the related field.

CHAPTER TWO

2. LITERATURE REVIEW

2.1. Overview of Cardiopulmonary resuscitation

Sudden cardiac arrest (SCA) is a medical emergency if not treated immediately, it causes sudden cardiac death. Survival is possible with fast and appropriate medical care. Cardiopulmonary resuscitation (CPR) is an evolving lifesaving technique of modern medicine that comprises a series of lifesaving actions that can improve the survival rates following SCAs (26).

Studies showed that immediate CPR after collapsing due to ventricular fibrillation doubles or even triples the chances of survival. In contrast, survival chances decrease by 7%–10% for every min CPR is delayed (27).It's known that nurses spend significant time alongside patients and are often the first to realize in-hospital SCAs. Thus, they are the ones who respond by providing CPR (13). Although nurse's contribution to effective CPR is crucial, different studies have often detected that nurse had average knowledge and poor skills considering international guidelines and recommendations (28) .

2.2. Practice of Nurses towards CPR

The critical role of CPR in cardiac emergencies requires that health care professionals are knowledgeable and competent in carrying out cardiopulmonary resuscitation. When patients face a life-threatening event such as cardiopulmonary arrest, successful management relies on the competence and skill of healthcare professionals. The need for nurses to have adequate knowledge and skill on how to perform basic and advanced life support cannot be overemphasized as they often encounter situations requiring this skill in their practice (29). Different studies showed that when patients face a life-threatening event such as cardiopulmonary arrest, successful management rely on the competence and skill of healthcare professionals (30).A study done in Ghana on knowledge and practice of cardiopulmonary resuscitation among nurses 53% of the respondents had good practiced cardiopulmonary resuscitation on patients (31).

A study also carried out in Nigeria to assess the knowledge and practice of CPR among public health nurses revealed that, 57% of the public health practitioners had never heard of CPR(32).

Similar to this, a study conducted at Ahmadu Bello University Teaching Hospital in Zaria revealed that 10% of medical professionals lack complete knowledge of cardiopulmonary resuscitation and as a result do not know how to perform it(33).

Cardiopulmonary resuscitation is one of the most evolving areas of modern medicine which comprises of series of life-saving actions that improves the survival rates following cardiac arrest. Although, the optimal approach to cardiopulmonary resuscitation may vary depending on the rescuer, the victim, and the resources available, the important challenge rest on how to achieve early and effective cardiopulmonary resuscitation. Given this challenge, prompt recognition of arrest and action by the rescuer continue to be priorities for the 2015 AHA Guidelines (1).

Lack of skills to perform BLS and ALS by nurses and doctors has been identified as a backing factor to poor outcomes for cardiac arrest victims. The survival rate of patients after cardiac arrest is highly related to the time taken for resuscitation and defibrillation to commence. In the hospital setting, the nurse is the health care personnel who are most likely to observe a patient suffering a cardiac arrest, because it is the nurse that spends 24hours with patients(34).

The practice of cardiopulmonary resuscitation in the developing countries is too low since only about not more than five percent of health professional have training on CPR. Furthermore 12% and 7% of nurses had ever practiced CPR and practiced it regularly respectively in a study by Offiong in Nigeria (31).

2.3. Knowledge of nurses towards cardio pulmonary resuscitation

Nurses' competency in cardiopulmonary resuscitation is a critical factor in determining successful patient outcomes from a cardiac arrest (35) . Studies have shown that knowledge of healthcare professionals including nurses on cardiopulmonary resuscitation (CPR) in developing countries is low (35).

A study in India showed only 28% nursing interns' participants have performed CPR any time and The knowledge score as well as practice score among nursing interns was found less (22). A study showed that nurses with higher educational level tend to be more knowledgeable in cardiopulmonary resuscitation than nurses with lower educational level(31). Also, another

study in Kuwait, showed that nurses' knowledge of cardiopulmonary resuscitation was high and appreciative (36).

A study done in Turk found that nursing students had good knowledge about the advantage of CPR. However, most of them had an average score regarding accuracy of CPR and effectiveness of CPR. The permanent training program in basic life support and advanced life support resulted in important increments in the level of knowledge and skill of nursing professionals (37). Another study also showed that many health professionals do not have a clear understanding of the meaning of cardiopulmonary resuscitation (31) .

Another study in India among nursing students showed that the students had good knowledge about the importance of CPR in clinical practice and stood average in knowing its indications and effectiveness. The mean score was 64.62±17.84 out of 100 points. While only 11% of them were completely aware about the universal compression ventilation ratio, 16.2% were aware of the current compression depth. In addition, 21.8% of participants have only indicated the order of CPR being compression, airway, and breathing (37).

A study in Nigeria among public health nurses revealed that, 57% of the public health practitioners had never heard of CPR. The knowledge of cardiopulmonary resuscitation among Public Health Nurse Practitioners denotes that majority of the respondents had never heard about CPR (57%). And also show all participants knew the term CPR and documented diverse source of knowledge (31).

Another study carried out in Ghana on assessments of the knowledge of nurses on CPR practice indicated that 70% of the nurses had knowledge about CPR through training, out of this 36% were able to accurately define the meaning of CPR whiles 48% were able to clearly state out properly the reasons for performing CPR(31). A study conducted in Greece revealed low levels of BLS theoretical knowledge, where nurses failure to comply with sequence in performing basic life support was 84.2% (38). Studies also showed that health professionals have good knowledge in BLS/ACLS, such as in the use of automated external defibrillator, compression rate, compression to ventilation ratio and checking the pulse for signs of life (31).

Other study done in Asia revealed that only Sixty percent of nurses the respondents reported that they knew how to operate an automated external defibrillator (AED), and 38% had

attended AED training. Only 36% were willing to perform mouth-to-mouth ventilation during CPR, and 53% preferred chest compression-only resuscitation (CCR) to standard CPR (39) .

A study in northern Ethiopia showed the mean knowledge scores of nurses, midwifery nurses and psychiatry nursing students were 9.84 (SD=2.5), 8.77 (SD=2.6) and 8.43 (SD=2.4) respectively (22)

Knowledge of infant CPR, such as in the case of chest compression, after gathering a thumb and a middle finger or a middle finger and a ring finger, place the part of the first joint on the sternal area of an infant, and press it 30times strongly and fast with a speed of over 100times a minute and to a depth of about 4cm (1/2~1/3 of the diameter of the front and the rear of chest. The knowledge and technological performance ability of infant CPR acquired while in a university affects the confidence and attitude on emergency treatment of infants in the emergency as well as at a workplace after graduation. A study in Korea, reported that the knowledge score of infant CPR of nursing students was noticeably low (40) . A study conducted in rural communities in Hong Kong on knowledge of CPR among 157 public health nurses revealed that only 12% of the study population had received CPR training (41) .

2.3. Factors associated with knowledge and practice of nurses towards CPR

Different literatures revealed that opportunity of training on CPR, work experience, duration since receiving training were identified as predictors for knowledge and practice CPR. A study conducted in Kwazulu Natal, South Africa, showed that knowledge and practice increases as one get a formal training on CPR (42) .A study done in Uganda 53.3% of nurse have good knowledge towards CPR pre training but after training there knowledge percentage score increase to 82.3 %. it shows the association between training and knowledge level (18).

A study conducted in rural communities in Hong Kong on Knowledge of CPR among 157 public health nurses revealed that only 12% of the study population had received CPR training [29]. Another study conducted in South Africa reveled exposure to prior training and difference in experience documented a significant CPR knowledge retention (43).Another hospital-based study in Malaysia revealed that being a junior in clinical practice significantly increased the level of confidence in performing CPR (43).

A Study in Nepal showed, knowledge score was significantly higher in those who had taken CPR training with in 5 years' duration than those who had taken training of more than 5 years' duration and those who had not taken CPR training at all (1). A study done in India among nurse bout long-term impact of formal training cardiopulmonary resuscitation program and show that training increase increases CPR knowledge and practice (44).

2.4. Conceptual framework

The conceptual framework is constructed by reviewing different literatures which are expected to explain how those factors that affect knowledge and practices of CPR includes socio demographic factors including age, gender, and institutional factors like Institution of training, CPR teaching (training), MICU/PICU/ER attachment.

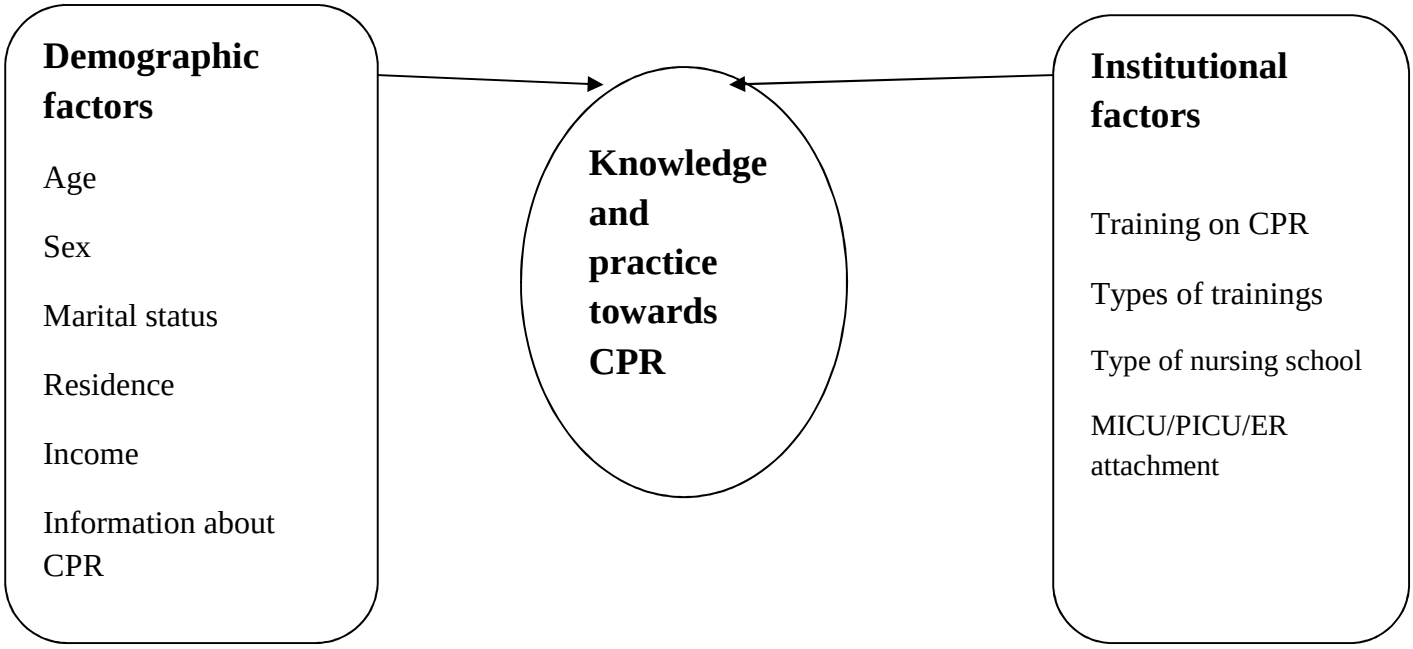

Figure 1. Conceptual frame work shows factors of knowledge and practice towards cardiopulmonary resuscitation (14, 38).
Note: Abbreviations; CPR = Cardiopulmonary resuscitation, MICU = Medical intensive care unit PICU = Pediatric intensive care unit, ER = Emergency room.

CHAPTER THREE

3. OBJECTIVES

3.1. General Objective

1. To assess knowledge and practice towards Cardiopulmonary Resuscitation among nursing students at selected nursing schools in Addis Ababa, Ethiopia, 2022.

3.2. Specific Objectives

2. To determine knowledge level on Cardiopulmonary Resuscitation among nursing students at selected nursing schools in Addis Ababa, Ethiopia, 2022.
3. To estimate practice level of Cardiopulmonary Resuscitation among nursing students at selected nursing schools in Addis Ababa, Ethiopia, 2022.
4. To identify factors associated with knowledge of Cardiopulmonary Resuscitation among nursing students at selected nursing schools in Addis Ababa, Ethiopia, 2022.
5. To identify factors associated towards practice of Cardiopulmonary Resuscitation among nursing students at selected nursing schools in Addis Ababa, Ethiopia, 2022.

CHAPTER FOUR

4. METHOD AND MATERIALS

4.1. Study area

This study was carried out in Addis Ababa, the capital city of Ethiopia. The city has a subtropical highland climate. According to 2007 estimation, Addis Ababa has a population of 3,384,569 people but by 2020 it is estimated as more than 7.5 million(45). There are 25 nursing schools including four governmental and 21 private schools in the city. The study was conducted in 8 randomly selected schools namely College of Health Sciences, Addis Ababa University; KeaMed Medical College; St. Lideta Health Science College; Yanet Health College; Enat Medical College; Alkan University College; Addis Ababa Medical and Business College and Menenik II Medical College.

Addis Ababa University: Addis Ababa University College of Health Sciences (CHS) at Addis Ababa University (AAU) is one of the professional colleges of health sciences, established in 2009/10 through the reorganization of institutions formerly separate healthcare under the same roof. CHS consists of four schools and a teaching hospital. The four schools are the School of Medicine (SoM), the School of Pharmacy (SoP), the School of Public Health (SPH), and the School of Allied Health Sciences (SAHS). SAHS provides professional education in nursing, midwifery, and medical laboratory technology. AAU graduates more than 250 nursing students each year (46).

Kea Med Medical College is one of the schools in Addis Ababa and offers nursing education at MSc and BSc levels. It works on three bases. The degree program operates at two locations in Arada and Hyahulet. The school sends students to various medical facilities for clinical practice during training. There are no student dormitories or dormitories on campus, for both male and female students. There are 95 fourth-year nursing students in the two fields where the degree program is underway, and final-year students have graduated according to information obtained from the school's dean. There is also a diploma course for nurses at the school(47).

Enat Medical and Business College is one of the leading private higher education institutions in Ethiopia. It was established in 2005. Enat Medical and Business College each year graduates more than 70 nursing student. Enat Medical College train health professionals including

Nurses, Pharmacy in degree program in its own building in bole Addis Ababa by renting the building according to the information gained from the school. The school has demonstration room and the students demonstrate during their training. There is no dormitory the students go to their home after class finished (48).

Yanet Health College is one of the private higher institutions established in 1999 EC in Addis Ababa Ethiopia. Yanet Health College trains medical professionals including nurses in its own building in Sefere Selam by renting the building based on information obtained from the school. The school has implemented a diploma program in nursing. The school has a demonstration room and the students show off during their training. Students are assigned to various medical facilities for their clinical practice. The school does not have a dormitory(49).

Alkan Health Science Business & Technology College is one of the centers of excellence in education, research and community service in Addis Ababa. Alkan was established in December 2002 under the auspices of Alkan Private Limited and offers seven programs. Since its establishment until now, the school has trained more than 14,000 graduates who have obtained diplomas and diplomas (level IV) in various disciplines and have held various positions in the field of education(50). Every year it trains more than 100 students with the field of nursing(51).

Addis Ababa Business and Health College (AAMBC) have been providing quality education and training since 2004. The school has grown from a single base of a few students and staff, mainly is the Sidest killo, into a base of six. College, which prepares students well for the medical world and provides opportunities for students to learn fundamental skills, take refresher courses, take non-credit courses, and earn certificates and diplomas. Grant. As part of its open enrollment policy, the school strives to provide academically stimulating programs for all students. Every year it produces more than 300 students in the field of nursing(52).

Menelik II Medical College Menelik II College of Health Sciences is part of the Addis Ababa City Government Health Institute. The school offers various courses in basic clinical nursing, public health, midwifery, medical laboratory technology, pharmacy, and radiology at the certificate level. It was founded in 1949 as an Auxiliary Education in Health Sciences. The school has a demonstration room and the students show off during their training. Students are

assigned to various medical facilities for their clinical practice. The school does not have a dormitory according to information gained from college(53).

St. Lideta College of Business and Health Sciences. Lideta Lemariyam is privately owned. College of St. Lideta is located at Sao Thome & Principe St, Addis Ababa, Ethiopia with latitude 9.01 and longitude 38.7. It was created in Courses offered by medical laboratory technicians in general nursing and public health. The school has a demonstration room and the students show off during their training. Students are assigned to various medical facilities for their clinical practice. The school does not have a dormitory according to the information gained from college(54).

4.2. Study design and period

An institutional based cross-sectional study was conducted, from Feb 01 to April 28 2022

4.3. Population

4.3.1. Source Population

The source populations were all nursing students at nursing schools in Addis Ababa, Ethiopia.

4.3.2. Study Population

The study populations were all nursing students at selected nursing schools in Addis Ababa, Ethiopia.

4.4. Inclusion and Exclusion Criteria

4.4.1. Inclusion Criteria.

1. All final year nursing students from governmental and private nursing schools in Addis Ababa Ethiopia.

4.4.2. Exclusion Criteria

1. Not giving consent or unable to participate in the study for different reasons
2. Sick and unable to respond

4.5. Sample Size Determination

The sample size was determined by using the formula for estimating single population proportion formula. Hence, using the formula for single population proportion, the sample size is calculated as follows:

$$n_o = \frac{Z\,(\alpha/2)^2 * p\,(1-p)}{d^2}$$

Were,

Z = (Standard value for 95% confidence interval) = 1.96

CI = (Confidence interval) = 95%, D = (Marginal error) = 0.05

P = 44.1% (25)

So, $n_o = (1.96)^2 * (0.441)\,(0.559) / (0.05)^2 =$ **379**.

The final sample size with 10% non-response rate will be **417**

4.6. Study Variables

4.6.1. Dependent Variables

1. Knowledge of respondents about the CPR
2. Practice of respondents towards CPR

4.6.2. Independent Variables

1. **Sociodemographic Characteristics:** Age, sex, marital status, monthly income, residence, occupation, information about CPR
2. **Institutional factors**: Training on CPR, training duration, source of information, type of nursing school, and MICU/PICU/ER attachment.

4.7 Operational definition

Knowledge: - is a familiarity, awareness, or understanding of nursing students, regarding CPR facts. And it is measured in terms of knowledge scores. Knowledge scores below mean and above or equal to mean score was categorized as having 'poor' and good' knowledge, respectively (14).

Practice: - Refers to application the CPR of knowledge or theory into demonstration of CPR skills. And it is measured in terms of practice scores. Practice scores below mean and above or equal to mean score was categorized as having 'poor and 'good' practice, respectively (14).

4.8. Sampling procedure and techniques:

From a total of 25 nursing school eight nursing school was selected from private and governmental school by lottery method then proportionally allocated to each selected schools and the study participants were selected using the systematic random sampling technique.

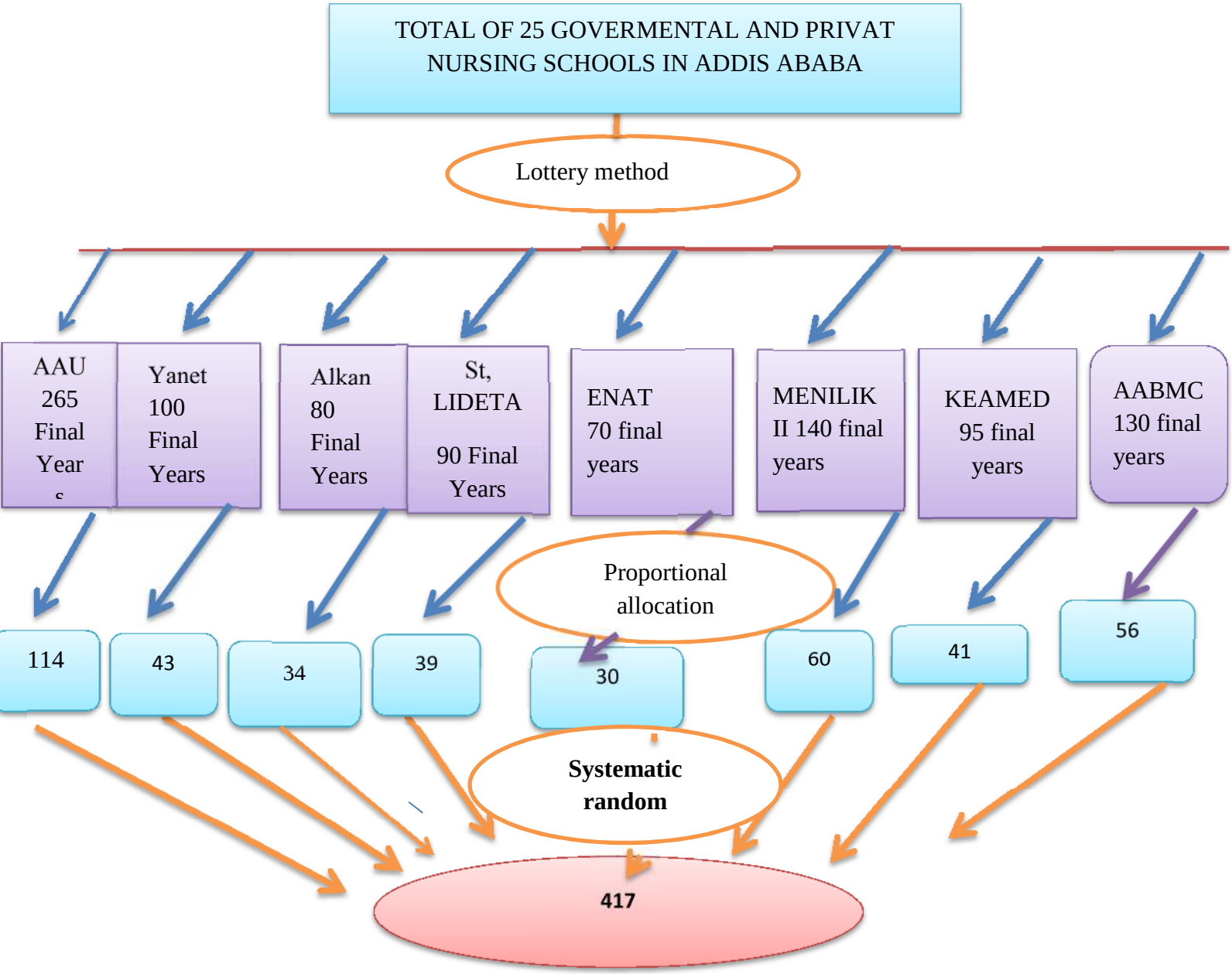

Figure 2: Schematic presentation of sampling techniques used to select study subjects.

4.9. Data Collection Tool, and Measurement Method

A structured and pretested self-administered questionnaire and a checklist first prepared in English and the advisor validate the study tools. The questionnaire was adapted from previous studies conducted in other settings and had three sections: Socio demographic characteristics, comprehensive knowledge of CPR, practices about CPR [14].

The overall knowledge of the study participants was assessed using a summary of 12 multiple choice questions each question containing 1 point for positive response and 0 for negative response. Those participants respond above or equal to the mean categorized as good knowledge and those below the mean categorized as poor knowledge.

Practice was measured by observing the students while demonstrating CPR on doll using a 20 item checklist adapted from the American Heart Association(34). The checklist items were classified in 6 cluster: assessment and cycle 1 CPR (activation, adult compression, adult breath) cycle 2 CPR, use AED, resume compression the outcome variable were measured with 0, 1, and 2 that denoted by Not at all, attempted and satisfactory done, respectively. Those participants score above the mean categorized as good practice and those who score below the mean categorized as poor practice (14).

Two supervisors and four data collectors, who have BSc degree in nursing, were recruited to assist in the data collection process. Three days before the actual data collection period a one-day training was given for the supervisors and data collectors on the objectives of the study, the questions and extent of explanations, the way to keep privacy and confidentiality and other ethical issues. The supervisors were coordinating the overall data collection processes.

4.10 Data Quality Assurance

To ensure the quality of data, the questionnaire was pretested on 5% (21) of the sample size, at a study setting in Rift Vali University. The result of the pretest was discussed, and all the necessary amendments were made. During the study period, all were checked for completeness by the supervisors and the principal investigator immediately after the data is collected. The principal investigator and the supervisors were closely worked to monitor the data collection process.

4.11. Data Processing and Analysis

After data collection, the data was coded and entered using Epi-data 3.1 Statistical program and was exported to SPSS Version 26 for further analysis. Descriptive statistics were used to calculate frequencies, mean, and standard deviation of the variables. Then, the data was presented in the form of tables, charts, and graphs that were constructed with excel. A multivariate logistic regression model was used to check the association of different factors and knowledge and practice of nursing student. In multivariable logistic regression analysis variables with the *P*-value, < 0.05 were considered statistically significant.

4.12. Ethical Consideration

Ethical clearance letter was first obtained from Addis Ababa University (AAU), College of Health Sciences Institutional Review board. Then to obtain support letter from the respective department of facilitate permission and cooperation collect the data. The letters were taken to the respective nursing schools to obtain permission to conduct the study. All participants were asked for their willingness to participate in the study and were told that it was not have any risk on them. After brief explanation of the purpose of the study, the confidentiality of their responses, and the importance of providing the right information that help the study achieve its objective then informed consent was obtained from each study subject prior to the data collection process. Confidentiality of the information was assured, and privacy of the respondent was maintained.

4.13. Dissemination of Findings

The result of the study was submitted to AAU College of health sciences, school of nursing and midwifery department of Cardiovascular Nursing then, it was disseminated to respective nursing schools and to all other concerned bodies who may utilize the findings in one way or another as deemed necessary. Again, it will be presented at AAU and other research symposiums. Finally, it will also be sent for publication to a reputable journal.

CHAPTER FIVE

5. RESULTS

5.1. Socio demographic characteristics of the study subjects

Three hundred ninety five students were included in the study making the response rate 95%.The mean age and standard deviation of the respondents was 25.32±3.95. Among them two hundred seven (52.4%) were between the age of 18-24 years. Among the participants (51.6%) were males, and (60.5%) of the participants were single. About 187 (47%) learn in governmental nursing College and University. Furthermore 184 (46.4%) work in MICU. Additionally, about 147 (37.2%) had got formal training about CPR and more than half of them 104 (72.7%) were take training one times only (table1).

Table 1: Respondents socio demographic characteristics (n=395).

Socio-Demographic Variables	Category	Frequency (%)
Age	18-24	207 (52.4%)
	25-34	105 (38.7%)
	≥ 35	35 (8.9%)
Occupation status	Employed + Student	171 (44.6%)
	Student	219 (55.4%)
Marital status	single	239(60.5%)
	married	148 (37.5%)
	Divorced	3(0.8%)
	Widowed	5(1.3%)
Sex	Male	204 (51.6%)
	Female	191 (48.4%)
Monthly income	<5000 ET birr	204 (51.6%)
	≥5000 ET birr	191 (48.4%)
Residence	Outside Addis Ababa	179 (45.3%)
	Addis Ababa	216 (54.3%)
Nursing school	Government	187 (47.3%)
	Private	208 (52.7%)
Work in MICU	Yes	184 (46.4%)
	No	211(53.4%)
Formal training on CPR	Yes	147 (37.2%)
	No	248 (62.8%)
Frequency of train attended	Once	88 (22.3%)
	Twice	28 (7.1%)
	More than two times	31 (7.8%)

Note: Abbreviations; CPR = Cardio-pulmonary resuscitations, MICU = Medical Intensive Care Unit, ET = Ethiopian Birr, Governmental school: Addis Ababa University college of Health sciences, Menenik II Medical College, Privet school: KeaMed Medical College, St. Lideta Health Science College, Yanet

Health College, Enat Medical College, Alkan University College, Addis Ababa Medical and Business College, Unmarried include: single, divorced, windowed.

5.2. Knowledge and Practice Level of Respondents about CPR.

The mean knowledge percentage was 53.02±15.10. Slightly more than half 246 (62.3%) of the respondents had poor knowledge about CPR, and about (37.7%) had good knowledge about CPR. This study showed that the majority of the respondents answered spasms of the vocal cord (38%) and hemothorax (36.2%) were the possible consequence of ventilation with high pressure and rate. Similarly, the intermammary line was listed as the location for chest compression in infants by most of the participants (40%) followed by one finger breadth below the nipple line (35%). Additionally, 157 (39.9%) of the study respondents responded as they may start chest compression if found someone unresponsive in the middle of the road, followed by 149 (37.7%) who will open the airway. Of total 155 (39.2%) of the study participant activate EMS for somebody not responding to you even after shaking and shouting at him. Of the total participants only 58 (14.7%) answer correctly depth of compression in adults. (Figure 3)

The level of practice was 33% had good practice wards CPR and the mean percent of practice score was 70.98% ±17.90 SD. Additionally from the total (51.4%) of the respondents attempted chest responsiveness while only 34.4% check breathing satisfactorily. Similarly only 55.9% of the respondent shout for help satisfactorily. Similarly only 176 (44.6%) of the respondents successfully performed compression while 228 (57.7%) of them safely deliver a shock. (figure 3)

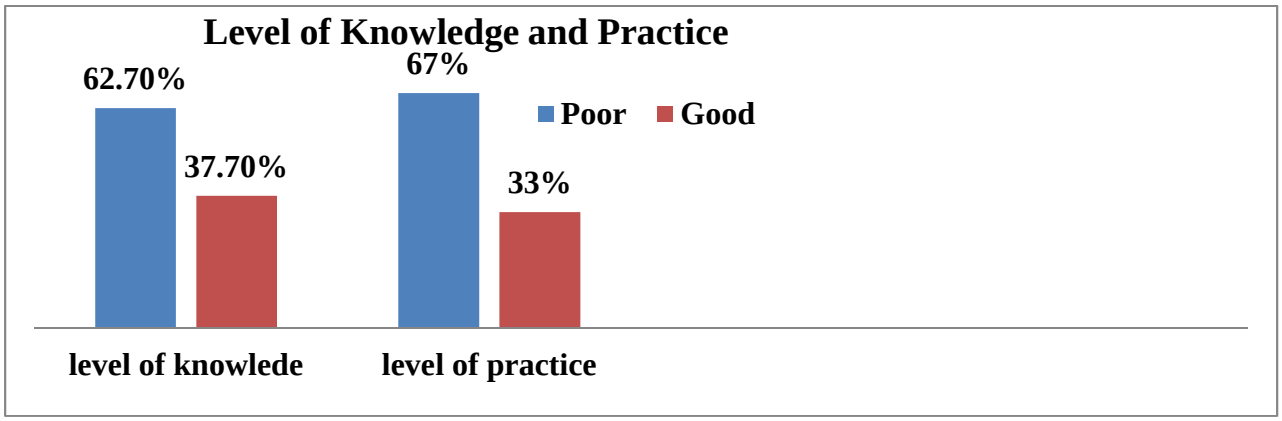

Figure 3: Respondent's comprehensive knowledge and practice of CPR, among nursing students (n=395).

5.6 Factors associated with knowledge level towards CPR.

To determine the association of the independent variables, binary logistic regression was used. The binary logistic regression analysis revealed governmental nursing school (COR=1.5; 95% CI (1.005-2.285)), students who live in Addis Ababa (COR=1.73; 95% CI (1.146-2.634)) and female gander(COR=1.833; 95% CI (1.215-2.767)), students who work and learn (COR=0.85; 95% CI 0.691-1.040))were found statistically significantly associated with knowledge level towards CPR at $P < 0.2$ and then interred into multivariate logistic regression. In multivariate logistic regressions analysis found, type of nursing school, residence, occupation and sex had significant association with knowledge towards CPR. Females nurse student had 1.9 times more likely to have good knowledge compered to male towards CPR (AOR=1.92; 95% CI (1.260-2.945)). Similarly, those students who resides in Addis Ababa were 1.8 times more likely to have good knowledge than who live outside towards PCR (AOR=1.78 95% CI (1.159-2.730)). Those students who work and learn 1.6 more likely to have good knowledge than those only a student (AOR=1.6 95% CI (1.045-2.457)). Those students who learn in governmental school 1.57times more likely to have good knowledge than private school (AOR=1.57 95% CI (1.029-2.390)). (Table4)

Table2: Factors associated with knowledge towards CPR among final year nursing students in Addis Ababa Ethiopia 2022

Variables	Knowledge Level towards PCR				
	Good 149(37.7)	Poor 246(62.3%)	COR(95%CI)	AOR(95%CI)	P-Value
Sex					
Male	63 (42.3%)	141 (57.3%)	1		
Female	86 (57.7%)	105 (42.7%)	1.8(1.215-2.7667)	1.92(1.260-2.945)	0.002**
Occupational status					
Employed student	74 (49.7%)	102 (41.5%)	0.85(0.691-1.040)	1.6(1.045-2.457)	0.031**
Student	75 (50.3%)	144 (58.5%)	1		
Residence					
Addis Ababa	55 (36.9%)	124(50.4%)	1.73(1.146-2.634)	1.78(1.159-2.730)	0.008**
Outside Addis Ababa	94 (63.1%)	122(49.6%)	1		
Category of Nursing School					
Government	74 (49.7%)	97 (39.4%)	1.5(1.005-2.285)	1.57(1.029-2.391)	0.037**
Private	75 (50.3%)	149 (60.6%)	1	1	

5.7 Factors associated with practice level towards CPR

Regarding association towards practice level of study participants towards CPR; the bivariate logistic regression revealed; five variables: age of the participant, marital status, history of work in MICU, and PICU, getting formal training about CPR, level of knowledge about CPR, and numbers of training taken were found significantly associated at *P < 0.2*. However, checking these variables under multivariate regression model; the multi variate logistic regression model revealed only formal training about CPR was found statistically significantly associated with practice level towards CPR. Those who had formal training about CPR were 4.67 times more like to have good practice than those who didn't take formal training about CPR. (AOR=4.67, 95% CI: 2.093-10.426, P=0.000) (Table5).

Table 3: Factors associated with knowledge towards CPR among final year nursing students in Addis Ababa Ethiopia 2022

	Practice Level towards PCR				
	Good	Poor	COR(95%CI)	AOR(95%CI)	P-value
Age					
18-24 years	56 (43.1%)	151 (57.0%)	0.4490.212-0.916)	0.52(0.228-1.194)	0.124
25-34 years	58 (44.6%)	95 9)35.8%	0.73(0.346-1.521)	0.67(0.289-1.5560)	0.352
>= 35 years	16 (12.3%)	19 (7.2%)	1		
Marital status					
Single	69 (53.1%)	170 (64.2%)	0.61(0.100-3.724)	1.46(0.197-10.848)	0.711
Married	59 (45.4%)	89 (33.6%)	0.99(0.161-6.132)	0.78(0.106-5.741)	0.808
Divorced	0 (0.0%)	3 (1.1%)	0.00	0.00	0.999
Widowed	2 (1.5%)	3 (1.1%)	1		
Worked in MICU/PICU for at least 2 weeks?					
Yes	46 (35.4%)	117 (44.2%)	0.69(0.449-1.069)	0.64(0.338-1.218)	1.75
No	84 (64.6%)	148 (55.8%)	1		
Training on CPR?					
Yes	57 (43.8%)	90 (34.0%)	1.5(0.988-2.333)	4.67(2.093-10.426)	0.000**
No	73 (56.2%)	175 (66.0%)	1	1	

** Significant at P <0.05

CHAPTER SIX

6. DISCUSSION

Simple CPR procedures can be carried out by any person. Despite the difficulty of providing an immediate reaction to a cardiac arrest in resource-constrained and underdeveloped nations, medical service providers must nonetheless possess the fundamental knowledge, skills (29). Currently, over 90% of cardiac arrest victims outside of a hospital pass away. However, CPR can increase those chances. CPR can double or treble a person's chance of life, if it is administered within the first few minutes following cardiac arrest (55).

In the current study slightly more than half (62.3%) of the respondents had poor level of knowledge about CPR. even though all final years student should have good knowledge about CPR only 37.7% had good knowledge about CPR. This finding is higher than a study done in Kurdistan where 4.7% of the student nurses had good knowledge about CPR (56), but lower than lower than the study done in Nigeria, and Ghana where 74.9% ,63% of the respondents had good knowledge of cardiopulmonary resuscitation respectively (9) and other study done in Ethiopia where 54% of nursing interns had good knowledge score (22, 31). The difference is due to Firstly, this might be due to difference in study settings. Secondly, research design difference, most of the research done in developed countries by prospective cohort study design. But the study is in line with a study done in Ethiopia where a study in northern Ethiopia(57). This may be because of the same methodology.

Current study showed that females are 1.9 times more likely had good level of knowledge those males about cardiopulmonary resuscitation. This result supported by a study done in Saudi Arabia (58). This maybe be because of males didn’t give more time to study about cardiopulmonary resuscitation in detail. This finding contradict with the research finding done in Ghana, this is maybe be because of the difference in study area (31). This study shows those who learn in governmental nursing school 1.57 times more likely to have good knowledge about CPR than those who learn in privet nursing school. The difference might be because of variation in curriculum. They may not include CPR training in the cores of education.

This study also shows that those who live in Addis Ababa were more likely to have good CPR knowledge than those who live outside Addis Ababa. This may be because of the access to internet and more time than those who live outside Addis Ababa. Also this study shows those

students who work and learn had 1.6 more likely to have good knowledge than those only students. This is might be because of those nurse who learn for upgrade have more knowledge about CPR from the previse training that than who learn from grade 12.

The study also showed only 37.2% of the respondents received some form of CPR training and majority of the study participants received only once. This finding is higher than a study in Hong Kong where only 12% of the study population had received CPR training (41).

This study also revealed that associations between knowledge of nursing students, type of nursing school, residence and sex have significant association with knowledge level towards CPR. But no association was found between knowledge level towards CPR and training on CPR. This find is in contrast with studies done in Nepal where knowledge score was significantly higher in those who had taken CPR training of 5 years' duration than those who had taken training of more than 5 years' duration and those who had not taken CPR training at all (59) and in South Africa, where knowledge increases as one get a formal training on CPR (60).

Regarding practice the study showed the mean percent of practice score was 70.98% (±17.90 SD) and 67.1% of the respondents had poor practice towards cardiopulmonary resuscitation. Even though all final students expected to perform CPR effectively only 32.9 % had good practice. This finding is lower than a study done in Ghana where 53.% of the respondents had good practice cardiopulmonary resuscitation on patients (31). The difference is might be firstly, due to difference in study settings. Secondly research design difference, most of the research done in developed countries by prospective cohort study design.

As to questions on chest compression in adults, only 9.4 % of the participants could identify that the right location of the hands for chest compression is the center of the chest between two nipples, and only 32.7% of the respondents said the compression rate is 100/min. similarly only 34.7% of the participants knew that the recommended depth of chest compression in an adult is 1.5-2 inches. This finding is in line with another study where nearly half of the participants could identify that the right location of the hands for chest compression is the center of the chest between two nipples in adults, the compression rate is 100/min, 30% of the participants knew that the recommended depth of chest compression in an adult is 1.5-2 inches (59).

This study also showed that those who had formal training about CPR were 4.67 times more like to have good practice than those who didn't take formal training about CPR. This is

maybe because training increases their level of awareness, refreshing their knowledge about CPR, and it adds new updated knowledge on them so this will helps to practice CPR more effectively. This finding is supported by the research done in Kwazulu Natal, South Africa, and in Ethiopia ,Jimma where practice increases as one get a formal training on CPR (60) (14).

CHAPTER SEVEN

STRENGTH AND LIMITATION

7.1 Limitation.

Some question need long term memories that will lead the respondents to introduce recall biases and lack of recent literatures on the topic. The study design was cross sectional and therefore it cannot establish cause and effect relationships.

7.2 Strengths

This study can be used as a base line study for nursing students towards knowledge and practice towards CPR. The study had also tried to explore the factors affecting the nursing student's knowledge and practice towards CPR

CHAPTER EIGHT

8. CONCLUSION AND RECOMMENDATION

8.1. Conclusion

This study found 37.7% and 33% of students have good level of knowledge and practice respectively. This study reflects the need to increase level of knowledge and practice about cardiopulmonary resuscitation. Despite its crucial importance in reversing sudden death occasions, significant proportion of the study respondents were found with deficient level of knowledge and practice towards cardiopulmonary resuscitation. Gender, occupation, residence and type of school were found statistically significantly associated with knowledge level of the study participants while formal training was the only variable statistically significantly associated with practice level of study respondents. Even though this study has limitation it shows insight into the level of knowledge and practice of the nursing students.

8.2. Recommendations

For University and College

Nursing schools in Addis Ababa should include CPR trainings in their academic curriculum

Structured CPR training program incorporating lectures, role plays, practices and guidelines should be prepared to train and educate nursing students.

For researchers

Prospective studies should be done to assess the knowledge and practice of nursing students and its associated factors in depth. Further studies are needed to determine other factors that influence CPR knowledge and practice of nursing student

For Policy maker

The policymakers emphasize this emerging issue and develop programs that increase the level of knowledge, practice of nursing student. And include CPR course as independent course for those graduated nurse.

For health care provider employer

For health care provider should ask about CPR practice to enhance the level of knowledge as well as level of practice of nursing student during employment process.

CHAPTER NINE

9. REFERENCE

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Annex’s

Annex I: Information Sheet

Title of the Research Project

1. Influencing factors knowledge and practice towards cardiopulmonary resuscitation among nursing students at selected nursing schools in Addis Ababa, Ethiopia, 2022.

Name of principal Investigator: Meron KIfle

Name of the Organization: Different (Private and Government) Nursing schools in Addis Ababa Ethiopia.

Purpose of research project

3. The aim of this study is to assess the knowledge and practice towards Cardiopulmonary resuscitation among final year nursing students at selected nursing schools in Addis Ababa, Ethiopia, 2022. The results of this study will be used as a base, especially in the study area, to design appropriate intervention programs to address the constraints to assess the knowledge and practice towards Cardiopulmonary resuscitation among nursing students at selected nursing schools in Addis Ababa, Ethiopia, 2022.

Procedure

4. As this study involves currently final year nurse students from selected Nursing School to know the knowledge and practice towards cardiopulmonary resuscitation. For these questionnaires and cheek list-based study, studies subjects are who are final year student at the selected schools are. All the result obtained will be kept in a confidential manner by using coding system whereby no one will have access to your response.

Risk and /discomfort

There is no risk in this project

Benefits

Participants in this research project, there may not be direct benefit but is likely to help us in showing the Result of knowledge, Practice, and associated factors among final year nursing students and helps develop better improvement of the evidence-based decision-maker in process.

Incentives/payments for participating

There will not be provided any incentives or payment to takepart in this project.

Confidentiality

The information collected for this research project will kept confidential and information about that will be collected by this study will be stored in a file, without name of the participant, but a code number assigned to it. And It will not be revealed to anyone except the principal investigator and assistants will be kept locked with key.

Right To refusal

Who's not interested to be participated in this study allowed to refuse?

Person to contact

This research project will be review and approved by the ethical committee of the Addis Ababa University. If you want to know more information you can contact through the address below .If you have any question, you can contact any of the following individuals and you may ask at any time you want.

1. Sr. Meron Kifle
   Mobile: +251913070848 /e-mail: merongeber@gmail.com
2. Dr. Erdaw Tachbele: Addis Ababa University
   Mobile: +2519112880 /e-mail:erdawt@yahoo.com
3. Mr.-Ketema Bizuwerk----: Addis Ababa University
   Mobile: +251911884270/ e-mail: Ketema2005@yahoo.com

Annex: II

Dear participant,

Greetings

My name is ---------- currently working on as a data collector for research project entitled Influencing Factors Of Knowledge And Practice Of Cardiopulmonary Resuscitation And Associated Factors Among Final Year Nursing Students At Selected Nursing Schools In Addis Ababa, Ethiopia 2022. Conducted by Meron kifle who is a MSC student at AAU, college of health science, nursing department as partial fulfillment for graduate specialization training in Cardiovascular Nursing.

Here by, I ask you to be part of the research and to respond the questions accordingly. I will assure you that all your responses will be kept confidential and anonymous as well as any personal information will never be collected/ published and never be passed to any individuals or any institutions during the study period as well as during dissemination of the study result. Your participation is very crucial to complete this study successfully. Thank you for participation!

Signature _____

Date_____

1. Socio-Demographic Data and Associated factors

Item no	Question	Reponses
101	Sex	1. Male 2. Female
102	Age	
103	Marital status	1. single 2.married 3.divorced/widowed
104	Occupations	1 employed and student 2, student only
105	Residence	1. Addis Ababa 2. Outside Addis Ababa
106	From which nursing school are you from	1. Private owned school 2. Governmental owned school
107	Have you ever worked in MICU/PICU for at least 2 weeks?	1. yes 2. no
108	Have you ever had formal training on CPR?	1. yes 2.no
109	If answer for 109 is yes how many times?	1. once 2. twice 3. more than two
110	If yes, what type of formal training	1. Lectures 2. Demonstration 3. Role plays 4. Reading CPR guidelines

2. Knowledge: Questionnaire (encircle your choices)

201	What is a possible consequence of ventilation with high pressure and/or rate?	1. Hemothorax 2. Spasm of the vocal cords 3. Pneumothorax 4. Damage to the underlying tissues of the oropharynx
202	When you find someone unresponsive in the middle of the road, what will be your first response?	1. Open airway 2. Start chest compression 3. Look for safety 4. Give two breathings
203	If you confirm somebody is not responding to you even after shaking and shouting at him, what will be your immediate action?	1. Start CPR 2. Activate EMS 3. Put him in recovery position 4. Observe

204	What is the location for chest compression?	1. Left side of the chest 2. Right side of the chest 3. Centre of the chest on 4. lower half of breastbone
205	What is the location for chest compression in infants?	**1.** One finger breadth below the nipple line **2.** At the intermammary line **3.** One finger breadth above the nipple line **4.** At Xiphisternum
206	You and a friend are walking when you see an elderly man collapse in front of you. There are no hazards around. You assess the man and determine that he is unconscious and is not breathing. You should direct your friend t	1. Check the pulse 2. Begin CPR 3. Activate the emergency response system 4. Open the airway
207	Depth of compression in adults during CPR	1. At least 2 inches 2. 2½ – 3 inches 3. 1-1½ inches 4. 2½ inches
208	Depth of compression in Children during CPR	1. 2 inches 2. 2 - 2½ inches 3. 1-1½ inches 4. ½ – 1 inch
209	Depth of compression in neonates during CPR	1. 1½ – 2 inches 2. 2- 2½ 3. 1 inch 4. approximately 1½ inch
210	Rate of chest compression in adult & Children during CPR	1. at least 100 / min 2. approximately 100 / min 3. 80 / min 4. 120 / min
211	If the newborn's heart rate is still below 60 bpm despite ventilation and chest compressions, what is the most appropriate next step	1. Administer epinephrine 2. Provide CPAP. 3. Check the baby for signs of pneumothorax 4. Start dopamine
212	Hypotension in the post cardiac arrest phase can be treated with all of the following EXCEPT	1. IV or IO fluid bolus 2. Lidocaine infusion. 3. Treatment of the underlying cause of arrest

Checklist for assessing practice adopted from the American Heart Association

Procedure	No =0	Attempt=1	Satisfactory done=2
1. Assessment and activation Check for responsiveness			
Checks breathing			
Shout for help			
Check pulse			
2.Performs high-quality compressions •Hand placement on lower half of sternum			
•30 compressions in no less than 15 and no more			
Visible chest rise with each breath than 18 seconds			
• Compresses at least 2 inches (5 cm)			
• Complete recoil after each compression			
3.Gives 2 breaths with a barrier device			
• Each breath given over 1 second			
Resumes compressions in less than 10 seconds			
4.Cycle 2 of CPR (repeats steps in Cycle 1) Only check box if step is successfully performed ☐ Compressions			
☐ Breaths			
☐ Resumes compressions in less than 10 seconds			
Correctly attaches pads			
Clears for analysis			
Clears to safely deliver a sock			
Safely delivers a shock			
6.Resumes Compressions Ensures compressions are resumed immediately after shock delivery			