ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCE

SCHOOL OF MEDICINE DEPARTEMENT OF EMERGENCY MEDICENE

ASSESSMENT OF KNOWLEDGE, ATTITUDE AND PRACTICE AND ASSOCIATED FACTORS IN PERFORMING CPR AMONG MEDICAL INTERNS OF TIKUR ANBESSA SPECIALIZED HOSPITAL AND YEKETIT 12 HOSPITAL MEDICAL COLLEGE, ADDIS ABABA, ETHIOPIA, 2020

By:

MULUNEH SOLOMON (MD)

October, 2020

Addis Ababa, Ethiopia.

Assessment of Knowledge, Attitude and Practice and Associated Factors In Performing CPR among Medical Interns of Tikur Anbessa Specialized Hospital And Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia.

By:

MULUNEH SOLOMON (MD)

Advisors:

1. **SOFIA KEBEDE (MD, Assistant professor of Emergency medicine and critical care, AAU).**
2. **TIGIST W (MD, Assistant professor of Emergency medicine and critical care, AAU).**

A Research Thesis to Be Submitted to Addis Ababa University College of Health Sciences, Department of Emergency Medicine, For Partial Fulfillment of Specialty Certificate Training on Emergency Medicine and Critical Care.

October, 2020

Addis Ababa, Ethiopia.

ACKNOWLEDGEMENT

First of all, I would like to thank the Almighty God for all His glorious and merciful help that always keeps my life confident and peace.

Next I would like to express my deepest and sincere gratitude to my advisors Dr. Sofia Kebede and Dr Tigist Worku for their overall guidance and taking their time to correct the thesis.

My special respect goes to Federal Ministry of Health & Oromia Regional Health bureau which offered me such a rewarding educational opportunity and Addis Ababa University for enabling me to experience diverse intellectual setting from which I acquire many things for my career life.
I am also thankful to Yekatit 12 Hospital medical College for their cooperation during data collection.

I am very thankful to Dr Temesgen Kassa for giving me constructive comments on the content of questionnaire and support me during data analysis and Mr. Hailu Fikadu for his constructive comments.

My heartfelt thanks also go for all interns who participated in this research and my friends who supported me during the whole process.

Last but not least my special and heartfelt thanks go to my wife Ms. Selamawit Fikadu for her invaluable material and moral support in all aspects of my life.

Declaration

I, the undersigned, declare that this is my original work and that all sources of materials used for this thesis are duly acknowledged.

Name: Muluneh Solomon

Email: mldawit9@gmail.com

Signature: _____

Date of submission: _____

Place: Addis Ababa, Ethiopia

This thesis has been submitted for examination with my approval as University advisor.

Name of advisors: Dr. Sofia Kebede

Signature:_____

Date: _____

Name of advisors: Dr. Tigist Worku

Signature: _____

Date:._____

TABLE OF CONTENTS

Table Pages

LIST OF TABLES v

LIST OF FIGURES vi

LIST OF ABBREVIATIONS vii

LIST OF ANNEXES viii

ABSTRACT ix

CHAPTER ONE: INTRODUCTION 1

1.1. Back Ground 1

1.2 .Statement of the Problem 1

1.3 Significance of the Study 3

CHAPTER TWO: LITERATURE REVIEW 4

2.1. Knowledge of Medical Interns Towards CPR 4

2.2. Attitude of Medical Interns Towards CPR 4

2.3. Practice of Medical Interns towards CPR 5

CHAPTER THREE: OBJECTIVES 6

 3.1 General Objective 6

3.2 Specific Objectives 6

CHAPTER FOUR: METHODS 7

4.1 Study Area and Period 7

4.2 Study Design 7

4.3. Population 8

4.3.1. Source of Population 8

4.3.2. Study population 8

4.3.3 Inclusion Criteria 9

4.3.4. Exclusion criteria 9

4.4 Sample size Determination and Sampling Technique 9

4.4.1 Sample size Determination 9

4.4.2. Sampling Technique 9

4.4.3 Data collection methods and Data collection tool 9
4.4.4 Data Collection Procedure 10
4.5 Variables 10
4.5.1 Dependent variable 10
4.5.2 Independent variables 10
4.6. Operational Definitions 10
4.7 Data Quality Management 11
4.8 Data Processing and Analysis Plan 11
4.9 Ethical Consideration 12
4.10 Dissemination of the Result Plan 12
CHAPTER FIVE: RESULT 13
5.1 Response rate and socio-demography 13
5.2. Attachment to MICU/PICU/ER 14
5.3. Sources of CPR Knowledge 14
5.4 Assessment of Medical interns' knowledge regarding CPR 16
5.5 Assessment of Medical interns' Attitude regarding CPR 17
5.6. Assessment of Medical interns' Practices regarding CPR 18
5.7 The level of CPR knowledge and practice of the study participants 21
5.8 The level of knowledge by place of practicing internship 21
5.9. Practice level by place of practicing Internship 22
5.10. Factors associated with CPR knowledge among medical interns 23
5.11 Factors associated with CPR practice among medical interns 27
CHAPTER SIX: DISCUSSIONS 30
CHAPTER SEVEN: CONCLUSION AND RECOMMENDATION 32
7.1. Conclusion 32
7.2. Recommendation 32
7.3. Limitation of the study 32
CHAPTER EIGHT: REFERENCES 33
CHAPTER NINE: ANNEX 36

LIST OF TABLES

Table Page

Table 1: Criteria for rating the knowledge level of CPR, at TASH and YHMC.....8
Table 2:-Socio-demographic characteristics of medical interns at TASH and YHMC, 2020 13
Table 3: Knowledge regarding CPR among medical interns at TASH & YHMC, 2020 16
Table 4:- Attitude regarding CPR among medical interns at TASH &YHMC, 2020 18
Table 5: Practice regarding CPR among medical interns at TASH & YHMC, 2020.....19
Table 6: Distribution of subjects based on scores in knowledge and practice of CPR at TASH and YHMC, 2020 20
Table 7: Distributions of association between socio-demographic characteristics, associated factors and knowledge about CPR among medical interns at TASH and YHMC, 2020 24
Table 8: Factors associated with CPR practice among medical interns at TASH and YHMC, 2020. 27

LIST OF FIGURES

Figure Page

Figure 1: Distribution of source of knowledge of medical interns at TASH, 2020..... 14
Figure 2: Distribution of source of knowledge of medical interns at YHMC, 2020 15
Figure 3: Graphical representation of medical interns' level of CPR knowledge at TASH and YHMC 2020 22
Figure 4: Graphical representation of medical interns' CPR practice level at TASH and YHMC, 2020..... 23

LIST OF ABBREVIATIONS

AAHB	Addis Ababa Health Bureau
AAU	Addis Ababa University
ACLS	Advanced Cardiac Life Support
BLS	Basic Life support
CA	Cardiac Arrest
CPR	Cardiopulmonary Resuscitation
ER	Emergency Room
KAP	Knowledge Attitude and Practice
MBBS	Bachelor of Medicine and Bachelor of Surgery
MD	Medical Doctor
MICU	Medical Intensive Care Unit
No.	Number
PICU	Pediatric Intensive Care Unit
Q	Question
SCD	Sudden Cardiac Death
SD	Sudden Death
SPSS	Statistical Package for Social Science
TASH	Tikur Anbessa Specialized Hospital
VF	Ventricular Fibrillation
VT	Ventricular Tachycardia
X^2	Chi Square
YHMC	Yekatit 12 Hospital Medical College

LIST OF ANNEXES

Annex Page

Annex 1. Socio-demographic Data and Associated Factors 36
Annex 2. Knowledge regarding CPR among medical interns at TASH & YHMC, 2020 37
Annex 3. Attitude regarding CPR among medical interns at TASH &YHMC, 2020 41
Annex 4. Practice regarding CPR among medical interns at TASH & YHMC, 2020..... 43
Annex 5. Questionnaires 47

ABSTRACT

Background

Cardiopulmonary arrest is a major public health problem. Cardiopulmonary resuscitation (CPR) is an important life-saving technique, consisting of chest compression and rescue breathing and used to treat victims of cardiopulmonary arrest by helping to maintain oxygenated blood circulation in the body. The chance of survival after cardiopulmonary arrest may be increased with quality CPR that mainly depends on the sufficiency of the knowledge, attitude and skill/practice of health professionals who deliver the CPR. Therefore assessing the knowledge attitude and practice and associated factors among medical interns of Tikur Anbessa Specialized Hospital and Yekatit 12 Hospital Medical College in performing CPR is important as they manage many trauma and critically ill patients.

Methods: A cross sectional study conducted from March 2020 to July 2020, among 169 medical interns of TASH and 49 medical interns of YHMC. Structured questionnaires of 2020 American health association guidelines for CPR and basic life support (BLS) Practice Test of National Health Care Provider Solutions of 28 questions were used to assess the knowledge, attitude and practice and associated factors in performing CPR among study participants who fulfilled the inclusion criteria.

Results: The mean for knowledge score of TASH and YHMC medical interns were 6.36 $\pm$ 1.77 (49.00%) and 6.51 $\pm$ 1.72 (49.83%) respectively whereas the mean for the practice score of TASH medical interns was 5.49 $\pm$ 1.57 (55.10%) while that of YHMC medical interns was 4.86 $\pm$ 1.55 (47.91%).This is statistically not significant as P-value is greater than 0.05. Factors like institutions where they were training internship, having formal lectures, role plays, practices and learning from guidelines, MICU/PICU/ER attachments, age & sex of the study participants, had significant association with CPR practice among medical interns in the study area.

Conclusions: This study identified that the knowledge and practice score of CPR which is poor in both schools' medical interns and significantly associated with lectures, role plays, practices guidelines, MICU/PICU/ER attachments and age and sex, even though they have positive and good attitude towards it. Structured CPR training should be part of the curriculum to solve this issue.

Keywords: Cardiac arrest, BLS, CPR, Medical intern

CHAPTER ONE: INTRODUCTION

1.1. Back Ground

Most Non-violent, unexpected sudden deaths in the young population are from cardiac causes and their occurrence is unpredictable [1]. Cardiopulmonary resuscitation (CPR) may be a series of life saving actions that improve the prospect of survival following asystole. It is an emergency procedure which is sought in an effort to return life of a person from cardiac arrest. Cardiopulmonary arrest is a major public health problem [2]; [3]. It is more common in low socio-economic areas [4]; [5] and is one of the most common unfortunate incidents that may occur in and out of the health facilities [6]; [7]; [8]; [9]; [10]. Cardiopulmonary resuscitation (CPR) is an important life-saving technique [11] and consists of chest compression and rescue breathing [12]. It is an emergency procedure used to treat victims of cardiopulmonary arrest which can help to maintain oxygenated blood circulation in the body [12]. CPR will be continued until the heart can be restarted [12]. The quality of CPR mainly depends on the sufficiency of the knowledge, attitude and skill of health professionals who deliver the CPR [13]; [14]; [15]; [16].

1.2 .Statement of the Problem

The very frustrating and shocking experience for medical community and to the families left behind is Sudden Death (SD) in young person. Half of sudden cardiac death that has occurred is considered to be in good health status young individuals [1]. Cardiac arrest is leading cause of death all over the world. WHO estimated that more than 17.5 million people died from cardio vascular diseases such as heart attack and stroke in 2012 and more than three out of four occur in low income countries [17].

CPR can be life-saving when provided by well-trained person. Several researches have showed that prompt delivery of CPR has served as an important predictor of survival; and might almost double the chance of survival. The probability of survival from asystole falls by 10-15% per

minute without treatment. However, well performed CPR likely shifts this curve towards a higher probability of survival [18].

Many surveys done on knowledge, attitude and skill/practice of Interns towards CPR in India revealed that, their knowledge and practice status is low and they were not confident to do CPR [19]; [20].

Sudden cardiac death (SCD) may occur at any time, at any place to any person. So 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. In most cases CPR by itself is sufficient for survival [18]. Ideally, everyone should know BLS and CPR, but its awareness to medical personnel is invaluable as they face many such situations in their life especially for buddings doctors who will have tackled this kind of emergencies in their medical practice. So qualifying Medical Interns with knowledge, attitude and practice/skill of CPR are paramount to significantly save the life of cardiac arrest victims.

In general, cardiac arrest is a leading cause of death all over the world, which is possibly true in Ethiopia as well, though no nationwide researches have been done to conclude.

In Addis Ababa, insufficient data are present which addresses the knowledge, attitude and practice of medical students, doctors, and paramedical staff regarding this highly effective and easy maneuver. This study aims to investigate the knowledge, attitude and practice and associated factors in performing CPR among medical interns of Tikur Anbessa Specialized Hospital (TASH) and Yekatit 12 Hospital Medical College (YHMC) which will help in understanding the deficits and for further formulating medical education protocol/curriculum.

Additionally, it can serve as source of information for other researchers and health care professionals who will be interested on the related field.

.

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 Medical Interns with other health professionals in other universities, there are still no studies done on assessments of knowledge, attitude and practice (KAP) and associated factors towards CPR among Medical interns in Ethiopia particularly in Addis Ababa. This study will emphasize on assessments of knowledge, attitude and practice and associated factors in performing CPR among Medical Interns and will provides an update possibly new information regarding KAP and associated factors of medical interns towards CPR in Ethiopia specifically in Addis Ababa, It will help policy makers (curriculum designers) and different stake holders for improvement in teaching-learning processes and intervention strategies in clinical care. It will be also useful for researchers as a source of information for further investigation in the related area.

CHAPTER TWO: LITERATURE REVIEW

2.1. Knowledge of Medical Interns Towards CPR

Knowledge in this document refers to a familiarity, awareness, or understanding of medical interns, with regard to CPR facts. According to study done on medical student in Jimma University about (227) 93.3% of the respondents had excellent knowledge about CPR with which, fifth year 88(36.1%), fourth year 83(34 .2%) and interns 56(23%) respectively. 6.7% of them had poor knowledge [20]. Study from India also revealed that 36% of Medical interns had poor knowledge score [19]. Knowledge of BLS/CPR is poor in medical students. A significant portion of trainees don't acquire adequate knowledge during a single session of coaching CPR. An organized curriculum for BLS and its protocoled training is the need of the hour in medical education [18]. Studies conducted in Iran and New Zealand showed that the knowledge of interns and newly qualified doctors were substandard[17]; [21]; [22]. Another study done in India also indicated inadequate knowledge(45.25%) among medical interns [23].

Another Study conducted in India, regarding knowledge and practice/skills of BLS/CPR were poor in medical interns although they have shown an excellent attitude towards it. Significant knowledge gap was found which was depicted in proportions and knowledge score. Self-grading regarding BLS among 22.7% of participants was above average. Initiating BLS/CPR was low in 67% of the study participants with lack of professional training considered to be the main cause of that [24].

2.2. Attitude of Medical Interns Towards CPR

Almost all of respondents of Jimma University (98.3%) belief that CPR training before graduation is vital, which is higher in comparison to review wiped out Singapore, which

accounts 85.5. 93.8% of the respondents found to have positive attitude as compared to 7.4% of respondents noticed with negative attitude [20]. However, study conducted in University of Gondar Teaching Hospital showed that the overall attitude scores of health science graduates students including medical interns were poor (57.1%) and concluded that training on CPR for graduate health professionals needs to be given emphasis [25].

Study from India which was done on medical interns and nursing interns revealed that almost all of the participants (99%) viewed that BLS is important and suggested that it should be part of the teaching curriculum. According to this study, 51% of the study participants haven't performed CPR voluntarily while 47% participants that is (30% MBBS and 64% nursing interns) have performed CPR voluntarily [19].

2.3. Practice of Medical Interns towards CPR

According to study done in Malaysia, 82.9% said they had attended cases of CPR and 17.1% admitted that they had never attended any cardiac arrest before [19]. Another study conduct in Nigeria ,out of 53 respondents, 85% had been actively involved in the resuscitation of patients 41.54% were rarely involved in the resuscitation of patients while 4.62% had never been involved in the resuscitation of patients[26].

In Ethiopia, study that has been done Jimma University showed that from a total respondents, 19.7% of medical students were practicing CPR of which 2.5% fifth year; 16.8% were interns whereas the rest is fourth year. In all 196 (80.7%) students were not practicing CPR. According to study from University of Gonder, skill level of graduate health professionals with reference to CPR were insufficient [25].and another study from India revealed that 42% of MBBS interns had poor practice score [20].

CHAPTER THREE: OBJECTIVES

3.1 General Objective

- ✓ To assess the knowledge, attitude, practice and associated factors in performing CPR among medical interns in Tikur Anbessa Specialized Hospital and Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia, 2020.

3.2 Specific Objectives

- ✓ To explore knowledge level on CPR among medical interns in Tikur Anbessa Specialized Hospital (TASH) and Yekatit 12 College and Medical College (YHMC).
- ✓ To evaluate attitudes of medical interns in TASH and YHMC on performing CPR.
- ✓ To assess practice level regarding CPR among medical interns in TASH and YHMC.
- ✓ To compare knowledge, attitude and practice levels of CPR among interns of the two medical schools.
- ✓ To identify factors associated with knowledge, attitude and practice in performing CPR among medical interns in TASH and YHMC.

CHAPTER FOUR: METHODS

4.1 Study Area and Period

The study setting was Addis Ababa University TASH and YHMC. TASH is located in Addis Ababa, capital city of Ethiopia, which is the biggest specialized hospital in the country and receives many patients from the city of AA and all over the country. 11 years back TASH started emergency medicine specialty program which is first of its kind in the country. Currently the ED is giving service as independent department. The emergency department (ED) is staffed currently with 30 residents (from year one to three), 57 nurses (clinical, BSc and masters), 12 consultants and has collaboration with university of Toronto to send two Emergency consultants and one senior resident three times per year.

Yekatit 12 Hospital Medical College (YHMC) is also located in Addis Ababa, which is also one of the biggest hospitals in the country, receiving many referrals from all over the country and responsible to Addis Ababa Health bureau. It has begun teaching medical students since 2003 E.C.

This study was conducted on TASH and Yekatit 12 Hospital Medical College medical interns from March 1, 2020 – July 30, 2020.

4.2 Study Design

This is an institutional based descriptive cross-sectional study, which was conducted on TASH and YHMC medical interns using structured questionnaire based on American health association guidelines for CPR and basic life support (BLS).and theoretical practice Test of National Health Care Provider Solutions questions was used to assess the knowledge, attitude, and practice and associated factors among study participants in performing CPR.

The knowledge level of participants is graded as follows (Table 1).It is taken from grading system of AAU with the interns who scored less than 50% as very low,50-59.9% low,60-69.9 as fair,70-84.9%as good and 85and above as very good.

The attitude part is obtained from Bruce Campbell, Department of Surgery, Royal Devon and Exeter Hospital, Exeter, UK.

A Practice score of <45% was considered as poor, 45% to 55% were considered as average, 55% to 75% were considered as good and >75% were considered as excellent in this study [19].

Table 1: Criteria for rating the knowledge level of CPR, at TASH and YHMC

Very low	Interns who answered below 7 out of 13
Low	Interns who answered 7 out of 13
Fair	Interns who answered 8-9 out of13
Good	Interns who answered 10-11 out of 13
Very good	Interns who answered 12 and above

4.3. Population

4.3.1. Source of Population

All medical interns of Addis Ababa University College of health Science Tikur Anbesa Specialized Hospital and Addis Ababa health bureau Yekatit 12 Hospital Medical College those were practicing internship.

4.3.2. Study population

All medical interns of AAU, College of Health Science TASH and Addis Ababa Health Bureau YHMC those that practicing their internship.

4.3.3 Inclusion Criteria

All medical interns those were practicing their internship in the two institutions (TASH and YHMC) during the study period.

4.3.4. Exclusion criteria

1. Not giving consent or unable to participate in the study for different reasons
2. Interns absent from work or on leave during data collection period

4.4 Sample size Determination and Sampling Technique

4.4.1 Sample size Determination

Sample size determination was based on available number of all medical interns participating in the study from the two institutions (TASH & YHMC) during data collection period.

4.4.2. Sampling Technique

All medical interns who fulfill the inclusion criteria have been selected purposively.

4.4.3 Data collection methods and Data collection tool

Data has been collected by anonymous paper based standard questionnaire which consists of socio-demographic information and related factors, Knowledge (13), Attitude (5) and Practice (10) questions that obtained and modified from 2020 AHA guidelines for CPR and ECC and BLS practice test of National Health Care Provider Solutions. Knowledge and practice questionnaire were structured as multiple choice questions and attitude based questions were structured as yes/no/not sure pattern. Data was collected in the same questionnaire as marked response and was

used for data analysis. Equal marks were given for each question and scores were converted to percentage scale for each of the knowledge, attitude and practice questions of CPR.

4.4.4 Data Collection Procedure

Data have been collected by principal investigator after verbal consent has been taken. The questionnaire has been administered by PI and filled by Medical interns. Then the data was checked for completeness and validity.

4.5 Variables

Variables are determinant factors related.

4.5.1 Dependent variable

Knowledge, Attitude, Practice

4.5.2 Independent variables

Age, Sex, Institution of training, CPR teaching, MICU/PICU/ER attachment

4.6. Operational Definitions

- ✓ Attitude: - refers to manner, disposition, feeling, position, etc., with regard to a person or thing; tendency or orientation, especially of the mind response of interns regarding to CPR for selected emergencies to the structured attitude questionnaire used for this study.
- ✓ Advanced life support: - is cardiopulmonary resuscitation technique that is performed after Basic Life Support (BLS):- is maintained using electronic device and drugs.

- ✓ Basic life support: - is managing air way, breathing and circulation for patients with cardiac arrest without drug administration.
- ✓ Knowledge: is a familiarity, awareness, or understanding of medical interns, with regard to CPR facts. Accordingly, interns who scored less than 50% as very low,50-59.9% low,60-69.9 as fair,70 -84.9%as good and 85and above as very good.
- ✓ Practice: - refers to academic application of knowledge and skills on CPR.
- ✓ Medical interns: - are medical students who have passed qualification exam and are working under supervision by qualified medical doctors (physicians) and will become general practitioner after completing internship practices.

4.7 Data Quality Management

Data quality has been ensured during collection, coding, entry and analysis. Code has been given to the questionnaires during the data collection and identified errors have been corrected by tracing back using the codes. The filled questionnaires have been checked for completeness by PI on a daily basis. The data have been cleaned thoroughly before transferring to SPSS version 25 for analysis.

4.8 Data Processing and Analysis

The collected data has been checked for its completeness, consistency and accuracy before analysis. It has been processed and analyzed by using descriptive statistics like mean, standard deviation, frequency and percentage. The result has been presented by text, table, pie chart or bar chart as deemed necessary. Chi-square test has been conducted to identify factors likely affecting knowledge, attitude and practice of Medical interns towards CPR. Variables reaching $p<0.05$ at Chi-square test level have been considered as statistically significant and has been declared at $p\leq0.05$ with 95% confidence level.

4.9 Ethical Consideration

Ethical clearance was obtained from Addis Ababa University, College of Health Science, department of emergency medicine and critical care, Research Review Board Committee. Informed verbal consent was obtained from respondents prior to their enrollment into the study. In addition, all the responses has been kept confidential and anonymous by assuring that any personal information will never be passed to any individuals or institutions during the study period as well as during dissemination of the study result.

4.10 Dissemination of the Result Plan

The results of this study will be disseminated to Addis Ababa University, department of emergency medicine, Addis Ababa University College of health science library, Yekatit 12 Hospital Medical College, Ministry of health and Ministry of science and higher education. Further effort will be made to publish the findings on national or international journals.

CHAPTER FIVE: RESULT

5.1 Response rate and socio-demography

A total of 218 medical interns were interviewed, among them 169 from AAU, TASH and 49 from AAHB YHMC with response rate of 86.51 %. Of the respondents, 165 (75.69%) were males and the rest 53(24.31) were females.

Majority of the TASH medical intern 164(97%) belongs to 23-27 age group while that of the YHMC 46(93.88%) belonged to 28-32 age group with number of male predominance i.e. 126 (74.56%) and 39(79.6%) in TASH and YHMC respectively.(Table 2).
The mean of age TASH medical interns' was 24.34 (SD= $\pm$ 1.15) years while that of YHMC medical interns' mean age was 29.31(SD= $\pm$ 1.36) years.

Table 2:-Socio-demographic characteristics of medical interns at TASH and YHMC, 2020

Variables	**TASH**		**YHMC**	
	Frequency	**Percentage (%)**	**Frequency**	**Percentage (%)**
Age				
23-27	164	97	3	6.12
28-32	5	3	46	93.88
Total	169	100	49	100
Sex				
Male	126	74.56	39	79.60
Female	43	25.44	10	20.40
Total	169	100	49	100

5.2. Attachment to MICU/PICU/ER

Majority of the medical interns at both institutions (TASH 115(68.45%) and YHMC 39 (79.59%)) had no MICU/PICU/ ER attachment during data collection period (Annex 8.1).

5.3. Sources of CPR Knowledge

Majority (78%) of the medical interns had got CPR knowledge from multiple sources at both institutions while 1% had not got CPR knowledge from any formal teaching sources (Annex 1, figure 1 & 2).

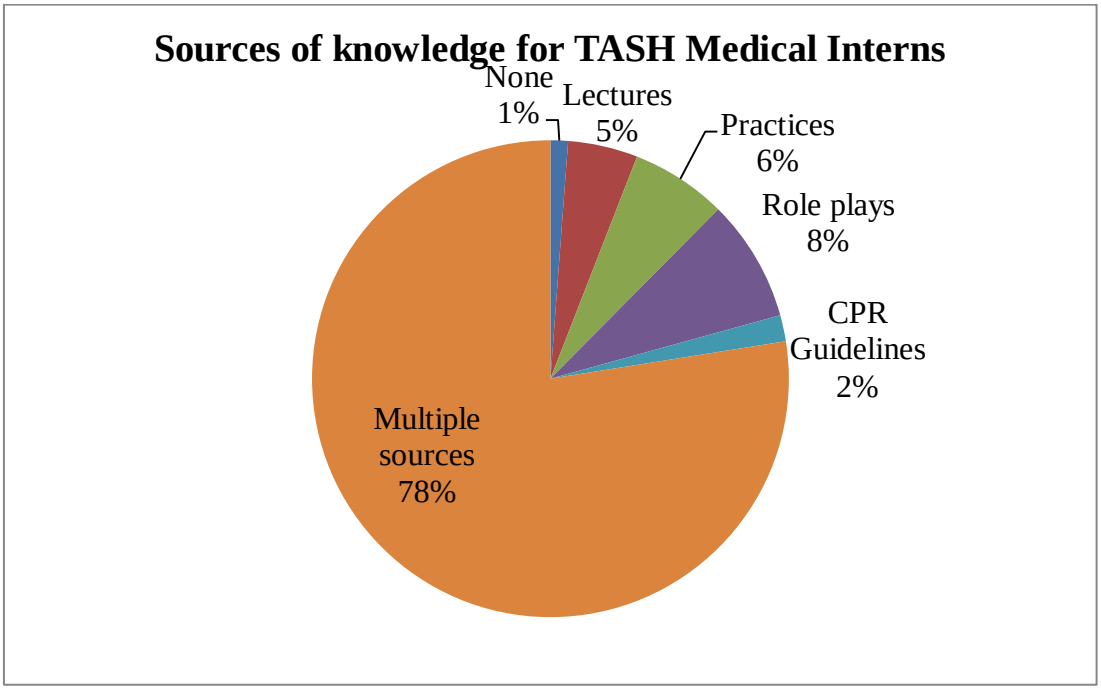

Figure 1: Distribution of source of knowledge of medical interns at TASH, 2020.

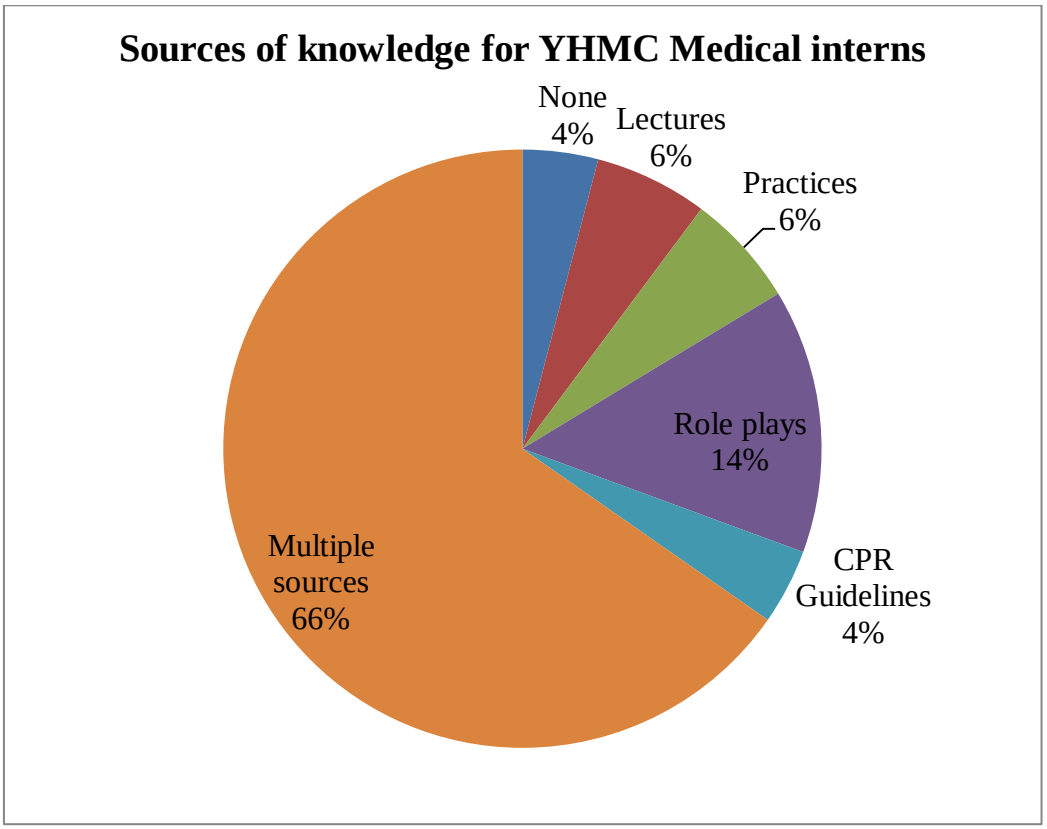

Figure 2: Distribution of source of knowledge of medical interns at YHMC, 2020

5.4 Assessment of Medical interns' knowledge regarding CPR

Out of 169 TASH medical interns 152(89.9%) responded correctly about a possible consequence of ventilation with high pressure and /or rate while 46(93.9%) medical interns of YHMC responded correctly. On the other hand only 24(14.2%) from TASH and 5(10.2%) from YHMC responded correctly to questions about first response to a friend having sudden chocking symptoms while eating but responsive. If they find someone unresponsive in the middle of the road, interns of TASH 99(58.6%) have responded that, they will open the airway 21(42.9%) while out of 49 YHMC interns responded that they will open airway. this is again statistically significant (X^2=7.8 = P-value = 0.019) (Table 3, Annex 2). The rest is described in annex 2.

Table 3: Knowledge regarding CPR among medical interns at TASH & YHMC, 2020

Questions	**TASH**				**YHMC**			
	Correct		**Incorrect**		**Correct**		**Incorrect**	
	No	**%**	**No**	**%**	**No**	**%**	**No**	**%**
A possible consequence of ventilation with high pressure/rate?	152	89.9	17	11.1	46	93.9	3	6.10
If you find someone unresponsive in the middle of the road, what should your first response be? (NB: You are alone)	99	58.6	70	41.4	21	42.9	28	57.1
If you confirm somebody is not responding even after shaking and shouting at him, what will be your immediate action?	79	46.7	90	53.3	19	38.8	30	61.2
Location for chest compression	116	68.6	53	31.4	35	71.4	14	28.6
Location for chest compression in infants	123	72.8	46	27.2	42	85.7	7	14.3

An elderly man collapse in front of you; no hazards around: he is unconscious & not breathing. You should direct your friend:	24	14.2	145	85.8	7	14.3	42	85.7
The correct depth of chest compression in adults during CPR	92	54.4	77	45.6	17	34.7	32	65.3
The correct depth of compression in Children during CPR	24	14.2	145	85.8	6	12.2	43	87.8
The correct depth of compression in neonates during CPR	30	17.8	139	82.2	13	26.5	36	73.5
The correct rate of chest compression for adults and children	102	60.4	67	39.6	31	63.3	18	36.7
The new-born's heart rate is still below 60 bpm despite ventilation & chest compressions, the most appropriate next step	149	88.2	20	11.8	43	87.8	6	12.2
Hypotension in the post cardiac arrest phase can be treated with all of the following EXCEPT.	97	57.4	72	42.6	27	55.1	22	44.9
Suddenly your friend starts expressing symptoms of choking but responsive while eating, what will be your first response	24	14.2	145	85.8	5	10.2	44	89.8

5.5 Assessment of Medical interns' Attitude regarding CPR

Most medical interns, 166(98.2%) from TASH and 48(98.0%) from HYMC responded that basic life-saving is necessary. On the other hand 113(66.9%) medical interns from TASH and 35(71.4%) from YHMC were voluntarily performed CPR (Table 4, Annex 3). But this finding is not statistically significant throughout the whole variables as described in annex 3.

Table 4:- Attitude regarding CPR among medical interns at TASH &YHMC, 2020

Answers	TASH					YHMC				
	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
Yes	166 (98.2%)	113 (66.9%)	150 (88.8%)	157 (92.9%)	167 (98.8%)	48 (98.0%)	35 (71.4%)	47 (95.9%)	43 (87.8%)	47 (95.9%)
No	2(1.2%)	42(24.9%)	3(1.8%)	5(3%)	2(1.2%)	0	11(22.4%)	1(2%)	4(8.2%)	2(4.1%)
Not sure	1(0.6%)	14(8.3%)	16(9.5%)	7(4.1%)	0	1(2%)	3(6.1%)	1(2%)	2(4.2%)	0

5.6. Assessment of Medical interns' Practices regarding CPR

Medical interns from TASH 109(64.5%) and 26(53.1%) from YHMC have responded that wheezing between Coughs is not signs of severe airway obstruction. On the other hand, 159(94.1% from TASH whereas 36(73.5%) have responded to check pulse on carotid artery in adult cardiac arrest (P-Value=0.000) which is statistically significant (Table5, Annex 4).

Table 5: Practice regarding CPR among medical interns at TASH & YHMC, 2020

Questions	TASH				YHMC			
	Correct		Incorrect		Correct		Incorrect	
	No.	%	No.	%	No.	%	No.	%
The 5 links in the adult Chain of Survival include all of the following EXCEPT:-	89	52.7	80	47.3	12	24.5	37	75.5
How often should rescuers switch roles when performing 2-rescuer CPR?	81	47.9	88	12	20	40.8	29	59.2
The initial Basic Life Support (BLS) steps for adults:	98	58.0	71	42	34	69.4	15	30.6
Where should you attempt to perform a pulse check in adult?	159	94.1	10	5.9	36	73.5	13	26.5
The compression to ventilation ratio for the lone rescuer giving CPR to victims of ANY age:	94	55.6	75	44.4	23	46.9	26	53.1
The proper steps for operating an AED:	81	47.9	88	52.1	22	44.9	27	55.1
The 2010 AHA Guidelines for CPR recommended BLS sequence of steps	28	16.6	141	83.4	10	20.4	39	79.6
Signs of severe airway obstruction include all of the following EXCEPT?	109	64.5	60	35.5	26	53.1	23	46.9
In an adult with an advanced airway in place during 2-rescuer CPR, breaths should be administered how often?	52	30.8	117	69.2	8	16.3	41	83.7
The critical characteristics of high-quality CPR include which of the following?	150	88.8	19	11.2	44	89.8	5	10.2

Mean knowledge scores of TASH medical interns' is 6.36 ± 1.77 with minimum score of 2 and maximum score of 11 while the mean knowledge score of YHMC interns' is 6.51 ± 1.72 with minimum score of 3 and maximum score of 11. Regarding scores of practices, TASH interns score minimum 1, maximum 10, with mean 5.49 ± 1.57 while that of YHMC interns score minimum 2, maximum 8, mean 4.86 ± 1.55.

Table 6: Distribution of subjects based on scores in knowledge and practice of CPR at TASH and YHMC, 2020

Score	**TASH Medical interns Mean (%)**	**YHMC Medical interns Mean (%)**	**P-value**
Score of knowledge (out of 13 score)	6.36(49.00)	6.51(49.83)	0.319
Score of practice (out of 10 score)	5.49(55.10)	4 86(47.91)	0.128

5.7 The level of CPR knowledge and practice of the study participants

According to Knowledge level grading system, used among the participants 7 (3.2%) have very good knowledge, 18 (8.3%) have good knowledge, 33(15.2%) have fair knowledge, 44(20.2%) have low knowledge, 116(53.2%) have very low knowledge about CPR.
From 53 females only 8(3.7%) have good and very good CPR knowledge. On the other hand from 126 male medical interns 17(7.8%) have good and very good knowledge about CPR (Table 7).

Concerning practice level of the study participants, 18(8.2%) have excellent practice, 85(39.0%) have good, 52(23.8%) have average, and 63(28.9%) have poor practice level about CPR.
From 53 females (4.1%) have excellent and 28(12.8%) have good CPR practice. On the other hand from 126 male medical interns 9(4.1%) have excellent and 57(26.1%) have good practice about CPR which is statistically significant (Table 8).

5.8 The level of knowledge by place of practicing internship

Among 169 participant interns of AAU TASH 19(8.7%) have good and very good knowledge while from YHMC 6(2.8%) out of 49 participant medical interns have good and very good knowledge about CPR (Figure 3).

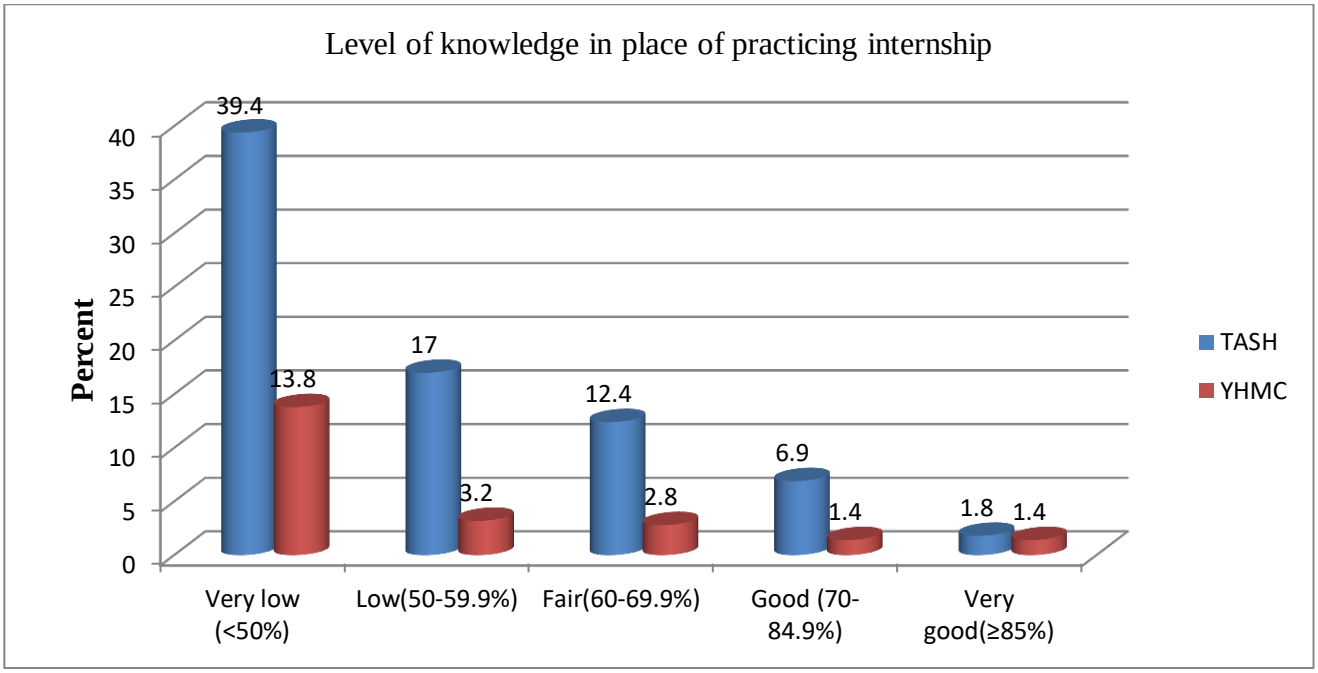

Figure 3: Graphical representation of medical interns' level of CPR knowledge at TASH and YHMC 2020

5.9. Practice level by place of practicing Internship

Regarding the CPR practice level of medical interns, 72 (33.0%) have good and 16(7.3%) have excellent practices from TASH while only 13(6.0%) have good and 2(0.9%) have excellent practice levels from YHMC which is statistically significant (X2-Value =11.021 & P-Values =0.012). From the participants, 28(12.8%) females and 57(26.1%) males have good practices (X^2-Value=17.605 & P-Value = 0.001) which is statistically significant.

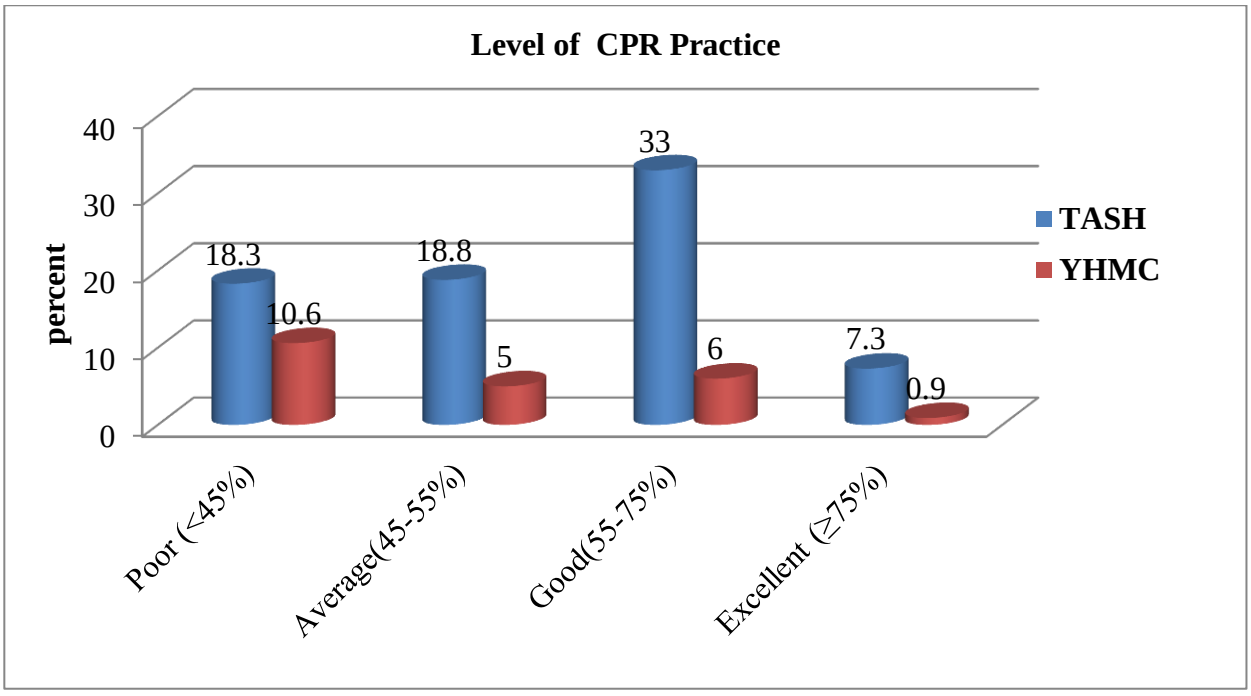

Figure 4: Graphical representation of medical interns' CPR practice level at TASH and YHMC, 2020

5.10. Factors associated with CPR knowledge among medical interns

Factors like formal Lectures, Role plays and Guidelines have significant association with knowledge of medical interns that have participated in the study(X^2-value=20.044) and (P-value=0.002. MICU/PICU/ER attachments have slight association with knowledge of medical interns P-Value=0.053) (Table7).

Table 7: Distributions of association between socio-demographic characteristics, associated factors and knowledge about CPR among medical interns at TASH and YHMC, 2020

Variables	**Knowledge level Assessment**						
	Very low (<50%)	Low(50-59.9%)	Fair(60-69.9%)	Good (70-84.9%)	Very good(≥85%)	X^2-Value	P-value
Medical school							
TASH	86(39.4)	37(17.0)	27(12.4)	15(6.9)	4(1.8)	4.219	0.377
YHMC	30(13.8)	7(3.2)	6(2.8)	3(1.4)	3(1.4)		
Sex							
Female	25 (11.5)	9 (4.1)	11(5.0)	5(2.3)	3(1.4)	3.721	0.445
Male	91 (41.7)	35(16.1)	22(10.1)	13(6.0)	4(1.8)		
Age							
23-27	30(13.8)	9(4.1)	6(2.8	3(1.4	3(1.4)	3.041	0.555
28-32	86(39.4)	35(16.1)	27(12.4)	15(6.9)	4(1.8)		
MICU/PICU/ER							
No	86(38.4	23 (10.6	24(11.0	15(6.9)	5(2.3	**9.207**	**0.053**
Yes	30(13.8)	21(9.6)	9(4.1	3(1.4)	2(0.9)		
Formal Teaching on CPR							
Didn’t have formal teaching							
No	113(50.8)	43(19.7)	33(15.1)	18(8.3)	7(3.2)	1.495	0.828

Yes	3(1.4)	1(0.5)	0	0	0		
Formal learning on CPR via lectures							
No	109(50.0)	43(19.7	30(13.8)	18(8.3)	7(3.2)	3.398	0.494
Yes	7(3.2)	1(.5)	3(1.4)	0	0		
Practical learning of CPR							
No	98(45.0)	41(18.8)	29(13.3)	18(8.3)	7(3.2)	8.052	0.428
Yes	18(8.2)	3(1.4)	4(1.9)	0	0		
Learning through Role plays							
No	103(47.2	42(19.3)	30(13.8)	15(6.9)	7(3.2)	3.419	0.490
Yes	13(6.0)	2(0.9)	3(1.4)	3(1.4)	0		
Learning from Guidelines							
No	116(53.2	7(3.2	43(19.7)	18(8.3)	33(15.1	3.973	0.410
Yes	0	0	1(0.5)	0	0		
Lecture and Practice							
No	100(45.9	40(18.3	30(13.8	12(5.5)	6(2.8)	7.227	0.124
Yes	16(7.3	4(1.8	3(1.4)	6(2.8)	1(0.5)		
Lecture, Practices and Role Play							
No	88(40.4)	35(16.1)	29(13.3)	16(7.3)	6(2.8)	3.530	0.473
Yes	28(12.8)	9(4.1)	4(1.8)	2(0.4)	1(0.5)		

Lectures, Practices, Role plays and Guidelines							
No	98(45.0	33(15.1	23(10.6	15(6.8	5(3.2	4.743	0.315
Yes	18(8.3	11(5.0)	10(4.6)	3(1.4)	2(0.9)		
Lecture, Role play and Guidelines							
No	110(50.5	43(19.7	29(13.3	18(8.3	4(1.8	**20.044**	**0.002**
Yes	6(2.8	1(0.5)	4(1.8	0	3(1.4)		
Lectures and Role plays							
No	108(49.5	36(16.5	31(14.2	17(7.8)	7(3.2)	6.625	0.157
Yes	8(3.7)	8(3.7)	2(.9)	1(0.5)	0		
Lecture and Guidelines							
No	113(51.8	44(20.2	32(14.7)	17(7.8)	7(3.2)	2.176	0.703
Yes	3(1.4)	0	1(0.5)	1(0.5)	0		
Practice ad Guidelines							
No	115(52.8	44(20.2)	33(15.1)	18(8.3)	7(3.2)	0.883	0.729
Yes	1(0.5)	0	0	0	0		
Role Plays and Guidelines							
No	156(53.2)	42(19.3	33(15.1	18(8.3)	7(3.2)	7.982	0.092
Yes	0	2(0.9)	0	0	0		

5.11 Factors associated with CPR practice among medical interns

Factors like institutions where they were training internship, sex and ages are significantly associated with CPR practice of medical interns in the study area. Similarly, lectures and Practical learning have significant association with practice level of medical interns in the study area. (X2-value=10.028 & P-Value=0.018). (Table 8).

Table 8: Factors associated with CPR practice among medical interns at TASH and YHMC, 2020.

Variables	**Practice Level Assessment**					
	Poor (<45%)	Average (45-55%)	Good (55-75%)	Excellent (≥75%)	X^2-Value	P-value
Medical school						
TASH	40(18.3)	41(18.8)	72(33.0	16(7.3)	**11.021**	**0.012**
YHMC	23(10.6)	11(5.0)	13(6.0)	2(0.9)		
Sex						
Female	11(5.0)	5(2.3	28(12.8)	9(4.1)	**17.605**	**0.001**
Male	52(23.9)	47(21.6)	57(26.1)	9(4.1)		
Age						
23-27	23(10.6)	12(5.5)	14(6.4)	2(0.9)	**9.837**	**0.020**
28-32	40(18.3)	40(18.3)	71(32.6)	16(7.3)		
MICU/PICU/ER						
No	45(20.6	35(16.1	60(27.5	13(6.0)	0.295	0.961

Yes	18(8.3)	17(7.8)	25(11.5)	5(2.3)		
Formal Teaching on CPR						
Didn’t have formal teaching						
No	61(28)	51(23.4)	84(38.5)	18(8.3)	1.171	0.760
Yes	2(0.9)	1(0.5)	1(0.5)	0		
Formal learning on CPR via lectures						
No	60(27.5)	48(22.0)	81(37.7)	18(8.3)	1.748	0.626
Yes	3(1.4)	4(1.8)	4(1.8)	0		
Practical learning of CPR						
No	56(25.7)	45(20.6)	75(34.4)	17(7.8)	1.865	0.932
Yes	7(3.2)	7(3.2)	10(5.6)	1(0.5)		
Learning through Role plays						
No	59(27.1)	45(20.6)	77(35.3)	16(3.7)	1.706	0.636
Yes	4(1.8)	7(3.2)	8(3.7)	2(0.9)		
Learning from Guidelines						
No	63(28.9)	52(23.9)	84(38.5)	18(8.3)	1.572	0.666
Yes	0	0	1(0.5)	0		
Lecture and Practice						
No	48(22.0)	44(20.2)	84(36.7)	16(7.3)	**10.028**	**0.018**
Yes	15(6.9)	8(3.7)	5(2.3)	2(0.9)		
Lecture, Practices and Role Play						
No	51(23.4)	45(20.6)	63(28.9)	15(6.9)	3.361	0.339

Yes	12(5.5)	7(3.2)	22(10.1)	3(1.4)		
Lectures, Practices, Role plays and Guidelines						
No	55(25.2)	40(18.3)	67(30.7)	12(5.5)	4.445	0.127
Yes	8(3.7)	12(5.5)	18(8.3)	6(2.8)		
Lecture, Role play and Guidelines						
No	61(28.0)	50(22.9)	75(34.4)	18(8.3)	6.952	0.073
Yes	2(0.9)	52(23.9)	10(4.6)	0		
Lectures and Role plays						
No	57(26.1)	47(21.6)	79(36.2)	16(3.0)	0.528	0.913
Yes	6(2.8)	5(2.3)	6(2.8)	2(0.9)		
Lecture and Guidelines						
No	62(28.4)	49(22.5)	85(39.0)	17(7.8)	5.793	0.122
Yes	1(0.5)	3(1.4)	0	1(0.5)		
Practice ad Guidelines						
No	62(28.1)	52(23.9)	85(39.0)	18(8.3)	2.472	0.480
Yes	1(0.5)	0	0	0		
Role Plays and Guidelines						
No	63(28.9)	52(23.9)	83(38.1)	18(8.3)	3.158	0.368
Yes	0	0	2(0.9)	0		

CHAPTER SIX: DISCUSSIONS

Even though Immediate response to a cardiac arrest challenging in resource limited and developing countries, having the basic knowledge, skill and attitude is an essential part of medical service providers [27].

Often medical interns are the first line health care personnel who encounter emergency situation in tertiary health care setting attached to medical universities. Therefore CPR skill and knowledge are essentials for medical interns. This study evaluated the knowledge, attitude & practice and associated factors of medical interns towards CPR in TASH and YHMC.

This study showed that the overall knowledge score were very low among medical interns. Only 19(8.7%) from TASH and 6(2.8%) from YHMC of medical interns have good and very good knowledge regarding CPR. This finding is concordant with study done in Jimma University specialized hospital in which only 23% of interns has good knowledge [20]. Another study done in northwest Ethiopia university hospital showed the same result [12]. This finding is in close similarity to a study done in Sri Lanka [28] and Singapore [29]. Studies conducted in Iran and New Zealand showed that the knowledge of interns and newly qualified doctors were substandard[17, 21, 22]. Another study from India also indicated (45.25%) inadequate knowledge among interns [23].

The newest development in the 2010 and 2015 AHA guideline for CPR is a change in the BLS sequence steps from ABC (Airway, Breathing, Chest compressions) to CAB (chest compression, airway, and breathing). The reason for this being in the vast majority cardiac arrest is due to VF or pulse less VT and the critical elements for these are chest compressions and early defibrillation. But only 62(36.7%) from TASH and 28(57.1%) from YHMC were right regarding the first response to unresponsive person and 92(54.4%) from TASH and 17(34.7%) from YHMC were correct regarding depth of chest compression in adult.

In this study, a total of 11.5% of medical students were practicing CPR of which 8.7% were from TASH and 2.8 were from YHMC medical interns. In all 193 (88.5%) students were not practicing CPR.

The theoretical knowledge and practical skills of BLS are the basic determining factors of a successful CPR technique and are of utmost important for survival of CA victims. Attitude plays a great role, especially for starting the CPR procedure. With the established advantages of CPR, developed countries have already recommended BLS training even for high school students nearly a decade ago [27;30]. However, to my knowledge Ethiopia still doesn't have any such guidelines in teaching curriculum even for medical and paramedical students in general. On the other hand, Medical interns are expected to deliver CPR from the very first day of their internship/employment. In this study, out of the 169 from TASH and 49 from YHNC medical interns, 2(1.2%) from TASH and 2(4.08) from YHMC were untrained; although almost all of them have performed CPR on patients.

Almost all of respondents from TASH 167(98.8%) and YHMC (47(95.9%) belief that CPR training before graduation is important. This finding is almost similar to study that has been done on medical students of Jimma University (98.3%). But it is higher when compared to study done in Singapore, which accounts for 85.5 [31].

Concerning the attitude, 93.8% of sampled medical students including medical interns of Jimma University found to have positive attitude with respect to CPR [20] which is in line with the current study finding. This result is also similar with the study finding done in India [29] which reported 86%. Generally, the study finding reflected that, the participants had positive attitude towards CPR.

The overall medical interns' performance/practice regarding CPR in the current study is good. This is higher when compared with other studies as only 19.7% of participants practiced CPR in a study done at Jimma university [20]. Similarly only 12.9% of medical interns practiced CPR in India study [29].

CHAPTER SEVEN: CONCLUSION AND RECOMMENDATION

7.1. Conclusion

The study revealed inadequate knowledge about CPR among medical interns. Majority of the participants had positive attitude and adequate practice regarding CPR. The two medical schools interns' knowledge and practice scores comparison was statistically not significant. Factors like institutions where they were training internship, having formal lectures, role plays, practices and learning from guidelines, MICU/PICU/ER attachments, age & sex of the study participants, had significant association with CPR practice while formal lectures, role plays and guidelines have significant association with CPR knowledge among medical interns in the study area. This showed that there are differences among medical interns who have got CPR knowledge and practice from single source and those who have got from combination of multiple sources.

7.2. Recommendation

According to the result of this study the following recommendations are proposed:

1. Structured CPR training program incorporating lectures, role plays, practices and guidelines should be prepared to train and educate medical interns.
2. Adequate length of MICU/PICU/ER attachments should be included in CPR training courses.
3. Further studies are needed to determine other factors that influence CPR knowledge and practice of medical interns.

7.3. Limitation of the study

There was no utilized simulation based assessment that make difficult to evaluate the practice of study participants in applying CPR technique correctly.

Data were collected nearly at the beginning of internship which may affect their knowledge and practice.

There were relatively moderate non responder rates.

CHAPTER EIGHT: REFERENCES

1. Winkel BG, Holst AG, Theilade J, Kristensen IB, Thomsen JL, Ottesen GL, et al. Nationwide study of sudden cardiac death in persons aged 1–35 years. Eur Heart J. 2011;32(8):983–90.

2. Chugh SS, Reinier K, Teodorescu C, Evanado A, Kehr E, Al Samara M, et al. Epidemiology of sudden cardiac death: clinical and research implications. Prog Cardiovasc Dis. 2008;51(3):213–28.

3. MEMBERS WG, Roger VL, Go AS, Lloyd-Jones DM, Benjamin EJ, Berry JD, et al. Heart disease and stroke statistics—2012 update: a report from the American Heart Association. Circulation. 2012;125(1):e2.

4. Peberdy MA, Kaye W, Ornato JP, Larkin GL, Nadkarni V, Mancini ME, et al. Cardiopulmonary resuscitation of adults in the hospital: a report of 14 720 cardiac arrests from the National Registry of Cardiopulmonary Resuscitation. Resuscitation. 2003;58(3):297–308.

5. Feero S, Hedges JR, Stevens P. Demographics of cardiac arrest: association with residence in a low-income area. Acad Emerg Med. 1995;2(1):11–6.

6. Soo L, Huff N, Gray D, Hampton JR. Geographical distribution of cardiac arrest in Nottinghamshire. Resuscitation. 2001;48(2):137–47.

7. Shultz JJ, Lurie KG. Variations in cardiopulmonary resuscitation techniques: past, present and future. Can J Cardiol. 1995;11(10):873–80.

8. Heller RF, Steele PL, Fisher JD, Alexander HM, Dobson AJ. Success of cardiopulmonary resuscitation after heart attack in hospital and outside hospital. BMJ. 1995;311(7016):1332–6.

9. Yap HY, Li TST, Tan KS, Cheung YS, Chui PT, Lam PKN, et al. Characteristics, management process, and outcome of patients suffering in-hospital cardiopulmonary arrests in a teaching hospital in Hong Kong. Hong Kong Med J. 2007;13(4):258.

10. Sodhi K, Singla MK, Shrivastava A. Impact of advanced cardiac life support training program on the outcome of cardiopulmonary resuscitation in a tertiary care hospital. Indian J Crit Care Med Peer-Rev Off Publ Indian Soc Crit Care Med. 2011;15(4):209.

11. Borimnejad L, Nasrabadi AN, Mohammadi H, Kheirati L. Improving the outcomes of CPR: A report of a reform in the organization of emergency response. Internet J Emer Med. 2008;4(2).

12. Gebremedhn EG, Gebregergs GB, Anderson BB. The knowledge level of fi nal year undergraduate health science students and medical interns about cardiopulmonary resuscitation at a university teaching hospital of Northwest Ethiopia. 2014;5(1):29–34.

13. Leong BSH, Chua GSW. Quality of resuscitation in hospitals. Singapore Med J. 2011;52(8):616–9.

14. Abella BS, Alvarado JP, Myklebust H, Edelson DP, Barry A, O'Hearn N, et al. Quality of cardiopulmonary resuscitation during in-hospital cardiac arrest. Jama. 2005;293(3):305–10.

15. Jacobs I, Nadkarni V, Outcomes ITF on CA and CR, PARTICIPANTS C, Bahr J, Berg RA, et al. Cardiac arrest and cardiopulmonary resuscitation outcome reports: update and simplification of the Utstein templates for resuscitation registries: a statement for healthcare professionals from a task force of the International Liaison Committee on Resuscitation (American Heart Association, European Resuscitation Council, Australian Resuscitation Council, New Zealand Resuscitation Council, Heart and Stroke Foundation of Canada, InterAmerican Heart Foundation, Resuscitation Councils of Southern Africa). Circulation. 2004;110(21):3385–97.

16. Jäntti H. Cardiopulmonary resuscitation quality and education. Publ Univ East Finl Diss Health Sci. 2010;

17. Ravari H, Abrishami M, Ghezel-Sofla M, Vahedian-Shahroodi M, Abrishami M. Knowledge of Iranian medical interns regarding cardio-pulmonary resuscitation. Trauma Mon. 2012;17(1):242.

18. Mishra A, Karim HMR, Raphael V, Ahmed G, Myrthong CE. Knowledge , attitude and practice of basic life support among junior doctors and students in a tertiary care medical institute. 2015;3(12):3644–50.

19. Mendhe HG, Burra L, Singh D, Narni H. Knowledge , attitude and practice study on cardiopulmonary resuscitation among medical and nursing interns. 2017;4(8):3026–30.

20. Tsegaye W, Tesfaye M. Knowledge, Attitude and Practice of Cardiopulmonary Resuscitation and Associated Factors in Ethiopian University Medical Students. J Gen Pract. 2015;03(04).

21. Isazadehfar KH, Sedaghat M, Entezariasl M. Cardiopulmonary resuscitation training for medical students in anesthesiology rotation in Ardabil medical University (Iran). 2008;

22. Price CSG, Bell SF, Janes SEJ, Ardagh M. Cardio-pulmonary resuscitation training, knowledge and attitudes of newly-qualified doctors in New Zealand in 2003. Resuscitation. 2006;68(2):295–9.

23. Avabratha KS, Bhagyalakshmi K, Puranik G, Shenoy K V, Rai BS. A study of the knowledge of resuscitation among interns. Al Ameen J Med Sci. 2012;5(2):152–6.

24. Khokhar A. a Cross Sectional Study To Assess the Knowledge , Attitude and Practice of Basic Life Support in Interns in a Tertiary Care Research Article a Cross Sectional Study To Assess the Knowledge , Attitude and Practice of Basic Life Support in Interns in a Tert. 2017;(April).

25. Bradley B. Attitude and skill levels of graduate health professionals in performing cardiopulmonary resuscitation. 2017;43–50.

26. Olajumoke TO, Afolayan JM, Raji SA, Adekunle MA. Cardiopulmonary Resuscitation - Knowledge, Attitude & Practices in Osun State, Nigeria. J West Afr Coll Surg. 2012;2(2):23–32.

27. Bakhsha F. Assessing the need and effect of updating the knowledge about cardio-pulmonary resuscitation in experts. J Clin Diagn Res. 2010;4(3):2512–4.

28. Ralapanawa DMPUK, Jayawickreme KP, Ekanayake EMM, Kumarasiri PVR. A study on the knowledge and attitudes on advanced life support among medical students and medical officers in a tertiary care hospital in Sri Lanka. BMC Res Notes. 2016;9(1):1–11.

29. Vausedvan B, Lucas A, M GD, Bhaskar A, Areekal B. Assessment of level of knowledge of basic life support algorithm among medical and nursing students in a tertiary care teaching hospital Assessment of level of knowledge of basic life support algorithm among medical and nursing students in a tertiary care teaching hospital. 2016;(January).

30. Chamberlain DA, Hazinski MF. Education in resuscitation. Resuscitation. 2003;59(1):11–43.

31. Thein MM, Lee BW, Bun PY. Knowledge, attitude and practices of childhood injuries and their prevention by primary caregivers in Singapore. Singapore Med J. 2005;46(3):122.

32. Mani G, Annadurai K, Danasekaran R, Jd R. A cross-sectional study to assess knowledge and attitudes related to Basic Life Support among undergraduate medical students in Tamil Nadu , India Department of Community Medicine , Shri Sathya Sai Medical College and Research. 2014;4(1):47–52.

33. Gebreegziabher Gebremedhn E, Berhe Gebregergs G, Anderson BB, Nagaratnam V. Attitude and skill levels of graduate health professionals in performing cardiopulmonary resuscitation. Adv Med Educ Pract. 2017 Jan;Volume 8:43–50.

CHAPTER NINE: ANNEX

Annex 1. Socio-demographic Data and Associated Factors

Variables	TASH		YHMC	
	Frequency	**Percentage (%)**	**Frequency**	**Percentage (%)**
Attached to MICU/PICU/ER for at least 2 weeks				
Yes	54	31.95	10	20.40
No	115	68.45	39	79.59
Total	169	100	49	100
Have Got Formal CPR Teaching from				
None	2	1.2	2	4.08
Lectures	8	4.73	3	6.12
Practices	11	6.51	3	6.12
Role plays	14	8.28	7	14.29
CPR Guidelines	3	1.78	2	4.08
Lecture and practices	23	13.61	7	14.29
Lectures, Practices and Role plays	36	21.30	8	16.33
Lectures, Practices, Role plays and CPR Guidelines	41	24.26	3	6.12
Lectures, Practices and CPR Guidelines	11	6.51	3	6.12
Lectures and Role plays	11	6.51	8	16.33
Lectures, Role plays and CPR Guidelines	2	1.18	2	4.08

Lectures and CPR Guidelines	4	2.37	1	2.04
Practices and Role plays	1	0.59	0	0
Role plays and CPR Guidelines	2	1.18	0	0
Total	169	100	49	100

Annex 2. Knowledge regarding CPR among medical interns at TASH & YHMC, 2020

Questions	**TASH**		**YHMC**		**X^2-Value**	**P-Value**
	Frequency	**Percentage(%)**	**Frequency**	**Percentage(%)**		
What is a possible consequence of ventilation with high pressure and/or rate?						
Hemothorax	3	1.8	0	0	1.239	0.744
Spasm of the Vocal cords	6	3.6	1	2		
Pneumothorax	152	89.9	46	93.9		
Damage to the underlying tissues of the oropharynx	8	4.7	2	4.1		
When you find someone unresponsive in the middle of the road, what will be your first response?						
Open airway	99	58.6	21	42.9	**7.876**	**0.019**
Start chest compression	8	4.7	0	0		

Look for safety	62	36.7	28	57.1		
Give two breathings	0	0	0	0		
If you confirm somebody is not responding to you even after shaking and shouting at him, what will be your immediate action?						
Start CPR	45	26.6	11	22.4	3.749	0.290
Activate EMS	79	46.7	19	38.8		
Put him in recovery position	43	25.4	19	38.8		
Observe	2	1.2	0	0		
What is the location for chest compression?						
Left side of the chest	27	16	10	20.4	2.027	0.567
Right side of the chest	1	0.6	0	0		
Centre of the chest on lower half of breast bone	116	68.6	35	71.4		
Xiphisternum	25	14.8	4	8.2		
What is the location for chest compression in infants?						
One finger breadth below the nipple line	123	72.8	42	85.7	5.519	0.138
At the intermammary line	11	6.5	3	6.1		
One finger breadth above the nipple line	12	7.1	3	6.1		
At Xiphisternum	23	13.6	1	2		
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 to:						
Check the pulse	70	41.4	11	22.4	6.724	0.081
Begin CPR	4	2.4	1	2		
Activate the emergency response system	24	14.2	7	14.3		
Open the airway	71	42	30	61.2		
Depth of compression in adults during CPR						
At least 2 inches	92	54.4	17	34.7	6.078	0.108
2½ – 3 inches	63	37.3	27	55.1		
1 – 1½ inches	9	5.3	3	6.1		
1½ inch	5	3	2	4.1		
Depth of compression in Children during CPR						
2 inches	24	14.2	6	12.2	0.169	0.982
2 - 2½ inches	28	16.6	8	16.3		
1 - 1½ inches	92	54.4	27	55.1		
½ – 1 inch	25	14.8	8	16.3		
Depth of compression in Children during CPR						
2 inches	33	19.5	12	24.5	4.102	0.251

2 - 2½ inches	12	7.1	1	2		
1 - 1½ inches	94	55.6	23	46.9		
½ – 1 inch	30	17.8	13	26.5		
Rate of chest compression in adult & Children during CPR						
at least 100 / min	102	60.4	31	63.3	0.244	0.970
approximately 100 / min	24	14.2	7	14.3		
80 / min	5	3.0	1	2.0		
120 / min	38	22.5	10	20.4		
If the newborn's heart rate is still below 60 bpm despite ventilation and chest compressions, what is the most appropriate next step						
Administer epinephrine	149	88.2	43	87.8	2.900	0.407
Provide CPAP	14	8.3	4	8.2		
Check the baby for signs of pneumothorax	4	2.4	0	0		
Start dopamine.	2	1.2	2	4.1		
Hypotension in the post cardiac arrest phase can be treated with all of the following EXCEPT.						
IV or IO fluid bolus	40	23.7	4	8.2	**10.618**	**0.014**
Lidocaine infusion	97	57.4	27	55.1		

Treatment of the underlying cause of arrest	9	5.3	7	14.3		
Vasopressor infusion	23	13.6	11	22.4		
If you and your friend are having food in a canteen and suddenly your friend starts expressing symptoms of choking but responsive, what will be your first response						
Give abdominal thrusts	103	60.9	17	34.7	**17.559**	**0.001**
Give chest compression	1	0.6	2	4.1		
Confirm foreign body aspiration by talking to him	24	14.2	5	10.2		
Give back blows	41	24.3	25	51.0		

Annex 3. Attitude regarding CPR among medical interns at TASH &YHMC, 2020

Questions	TASH		YHMC		X^2-Value	P-Value
	Frequency	Percentage (%)	Frequency	Percentage (%)		
Do you think BLS is necessary						
Yes	166	98.2	48	98.0	1.450	0.484
No	2	1.2	0	0		
can’t say or not sure	1	0.6	1	2.0		
Have you ever voluntarily performed CPR?						

Yes	113	66.9	35	71.4	0.434	0.805
no	42	24.9	11	22.4		
hesitant	14	8.3	3	6.1		
Do you think that CPR saves lives?						
1)Yes	150	88.8	47	95.9	2.917	0.233
2)no	3	1.8	1	2		
3)hesitant	16	9.5	1	2		
Would you like to undergo CPR training in a workshop/centre with hands on practice under supervision						
Yes	157	92.9	43	87.8	2.602	0.272
no	5	3	4	8.2		
not sure	7	4.1	2	4.2		
Do you think that CPR training should be a part of your curriculum?						
Yes	167	98.8	47	95.9	1.771	0.183
No	2	1.2	2	4.1		
Not sure	0	0	0	0		

Annex 4. Practice regarding CPR among medical interns at TASH & YHMC, 2020

Questions	**TASH**		**YHMC**			
	Frequency	Percentage (%)	Frequency	Percentage (%)	X^2-Value	P-Value
The 5 links in the adult Chain of Survival include all of the following EXCEPT:-						
Early CPR	7	4.1	5	10.2	**15.124**	**0.002**
Integrated post cardiac arrest care	22	13.0	14	28.6		
Advanced airway placement	89	52.7	12	24.5		
Rapid defibrillation	51	30.2	18	36.7		
How often should rescuers switch roles when performing 2-rescuer CPR?						
After each cycle	20	11.8	12	24.5	5.240	0.155
After 2 cycles	60	35.5	14	28.6		
After 5 cycles	81	47.9	20	40.8		
After 10 cycles	8	4.7	3	6.1		
The initial Basic Life Support (BLS) steps for adults are:						
Assess the victim, give 2 rescue breaths, defibrillate, start CPR	12	7.1	5	10.2	3.834	0.280
Assess the victim, activate EMS & get AED,	98	58.0	34	69.4		

check pulse, start CPR						
Check pulse, give rescue breaths, assess the victim, defibrillate	16	9.5	3	6.1		
Assess the victim, start CPR, give 2 rescue breaths, defibrillate	43	25.4	7	14.3		
Where should you attempt to perform a pulse check in adult?						
Carotid	159	94.1	36	73.5	**19.864**	**0.000**
Brachial	7	4.1	12	24.5		
Ulnar	3	1.8	1	2		
Temporal	0	0	0	0		
The compression to ventilation ratio for the lone rescuer giving CPR to victims of ANY age is:-						
15:1	21	12.4	6	12.2	4.393	0.222
15:2	33	19.5	8	16.3		
30:1	21	12.4	12	24.5		
30:2	94	55.6	23	46.9		
The proper steps for operating an AED are:						
On the AED, attach electrode pads, shock the patient, analyze the rhythm	8	4.7	7	14.3	5.477	0.140
On the AED, attach electrode pads, analyze the	81	47.9	22	44.9		

rhythm, clear the patient, deliver shock						
Attach electrode pads, check pulse, shock patient, analyze rhythm	17	10.1	4	8.2		
Check pulse, attach electrode pads, analyze rhythm, shock patient	63	37.3	16	32.7		
The 2010 AHA Guidelines for CPR recommended BLS sequence of steps are						
Chest compressions, Airway, Breathing	28	16.6	10	20.4	3.477	0.324
Airway, Breathing, Check Pulse	84	49.7	17	34.7		
Airway, Breathing, Chest Compressions	44	26.0	17	34.7		
Chest compression, Airway placement, Breathing	13	7.7	5	10.2		
Signs of severe airway obstruction include all of the following EXCEPT?						
Poor air exchange	20	11.8	5	10.2	**9.629**	**0.022**
High-pitched noise while inhaling	10	5.9	10	20.4		
Unable to cry	30	17.8	8	16.3		
May wheeze between coughs	109	64.5	26	53.1		
In an adult with an advanced airway in place during 2-rescuer CPR, breaths should be administered how often?						
Every 5 seconds	47	27.8	15	30.6	4.491	0.213

Every 5-6 seconds	34	20.1	11	22.4		
Every 6-8 seconds	52	30.8	8	16.3		
Every 10-12 seconds	36	21.3	15	30.6		
The critical characteristics of high-quality CPR include which of the following?						
Starting chest compressions within 10 seconds of recognition of cardiac arrest	2	1.2	4	8.2	**15.106**	**0.002**
Push hard, push fast	0	0	1	2		
Minimize interruptions	17	10.1	0	0		
All of the above	150	88.8	44	89.8		

Annex 5. Questionnaires

Dear participant, I, Dr. Muluneh Solomon (MD, EMCCR3) currently working on research project on **KNOWLEDGE, ATTITUDE AND PRACTICE OF CARDIOPULMONARY RESUSCITATION AND ASSOCIATED FACTORS AMONG INTERNS OF TIKUR ANBESSA SPECIALIZED HOSPITAL AND YEKATIT 12 HOSPITAL MEDICAL COLLEGE** as fulfillment for my post graduate specialization training in Emergency Medicine and Critical care. I believe that knowing this fundamental information is important in improving teaching learning process of CPR and contribute efforts on better quality of life care for emergency and critically ill patients.

Here by, I ask you to be part of the research and respond accordingly to the questions. 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!

A. Socio-Demographic Data and Associated factors

1. Sex……1.Male 2. Female

2. Age:____

3. From which medical school are you from? 1. TASH 2. YHMC

4. Have you ever worked in MICU/PICU for at least 2 weeks? 1. Yes 2. No

5. Have you ever had formal teaching on CPR? (Marking with, multiple responses are allowed)

1. None ____ 2. Lectures _____ 3. Practices_____ 4. Role plays ____ .5. CPR Guidelines _____

B. Knowledge: Questionnaire (encircle your choices)

1. 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

2. When you find someone unresponsive in the middle of the road, what will be your first response? (Note: You are alone there)

1) Open airway 2) Start chest compression 3) Look for safety 4) Give two breathings

3. 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

4. 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 lower half of breast bone 4) Xiphisternum

5. 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

6. 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 to: …1) Check the pulse … 2) Begin CPR… 3) Activate the emergency response system 4) Open the airway

7. Depth of compression in adults during CPR 1) At least 2 inches 2) 2½ – 3 inches 3) 1 – 1½ inches 4) 1½ inch

8. Depth of compression in Children during CPR 1) 2 inches 2) 2 - 2½ inches 3) 1 - 1½ inches 4) ½ – 1 inch

9. Depth of compression in neonates during CPR 1) 1½ – 2 inches 2) 2- 2½ 3) 1 inch 4) approximately 1½ inch

10. Rate of chest compression in adult & Children during CPR 1) at least 100 / min 2) approximately 100 / min 3) 80 / min

4) 120 / min

11. 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…) Provide CPAP. …3) Check the baby for signs of pneumothorax……4) Start dopamine.

12. 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…. 4) Vasopressor infusion.

13. If you and your friend are having food in a canteen and suddenly your friend starts expressing symptoms of choking but responsive, what will be your first response? 1) Give abdominal thrusts 2) Give chest compression

3) Confirm foreign body aspiration by talking to him 4) Give back blows

C. Attitude

14. Do you think BLS is necessary? 1.Yes 2 No 3 can't say or not sure

15. Have you ever voluntarily performed CPR? 1.Yes 2.no 3. performed but not voluntarily

16. Do you think that CPR saves lives? 1.Yes 2.no 3. hesitant

17. Would you like to undergo CPR training in a workshop / centre with hands on practice under supervision? 1.Yes 1.no 3 not sure

18. Do you think that CPR training should be a part of your curriculum? 1. Yes 2 No 3 Not sure

D. Practice

19. The 5 links in the adult Chain of Survival include all of the following EXCEPT: 1. Early CPR 2. Integrated post cardiac arrest care 3. Advanced airway placement 4. Rapid defibrillation

20. How often should rescuers switch roles when performing 2-rescuer CPR? 1. After each cycle 2. After 2 cycles

3. After 5 cycles 4. After 10 cycles

21. The initial Basic Life Support (BLS) steps for adults are: 1. Assess the victim, give 2 rescue breaths, defibrillate, start CPR

2. Assess the victim, activate EMS & get AED, check pulse, start CPR 3. Check pulse, give rescue breaths, assess the victim, defibrillate 4. Assess the victim, start CPR, give 2 rescue breaths, defibrillate

22. Where should you attempt to perform a pulse check in adult? 1. Carotid 2. Brachial 3. Ulnar 4. Temporal

23. The compression to ventilation ratio for the lone rescuer giving CPR to victims of ANY age is:

1. 15:1 2. 15:2 3. 30:1 4. 30:2

24. The proper steps for operating an AED are: 1. On the AED, attach electrode pads, shock the patient, analyze the rhythm

2. On the AED, attach electrode pads, analyze the rhythm, clear the patient, deliver shock 3. Attach electrode pads, check pulse, shock patient, analyze rhythm 4. Check pulse, attach electrode pads, analyze rhythm, shock patient

25. The 2010 AHA Guidelines for CPR recommended BLS sequences of steps are: - 1. Chest compressions, Airway, Breathing 2. Airway, Breathing, Check Pulse 3. Airway, Breathing, Chest Compressions 4. Chest compression, Airway placement, Breathing

26. Signs of severe airway obstruction include all of the following EXCEPT? 1. Poor air exchange 2. High-pitched noise while inhaling 3. Unable to cry 4. May wheeze between coughs

27. In an adult with an advanced airway in place during 2-rescuer CPR, breaths should be administered how often?

1. Every 5 seconds 2. Every 5-6 seconds 3. Every 6-8 seconds 4. Every 10-12 seconds

28. The critical characteristics of high-quality CPR include which of the following? 1. Starting chest compressions within 10 seconds of recognition of cardiac arrest 2. Push hard, push fast 3. Minimize interruptions 4. All of the above

(Adapted and prepared from: 2020 AHA guidelines for CPR and ECC and BLS practice test of National Health Care Provider Solutions available at https://www.nhcps.com/bls-certification-practice-test#question, 2020.)