# ADDIS ABABA UNIVERSITY

# COLLEGE OF HEALTH SCIENCES

# DEPARTMENT OF EMERGENCY MEDICINE


**COMPETENCY OF NURSES WORKING IN ADULT EMERGENCY ROOM AT ELECTROCARDIOGRAPHY INTERPRETATION: MULTICENTER STUDY IN ADDISS ABABA, ETHIOPIA, 2021**.

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**THIS THESIS TO BE SUBMITTED TO DEPARTMENT OF EMERGENCY MEDICINE & CRITICAL CARE, COLLEGE OF HEALTH SCIENCES, ADDIS ABABA UNIVERSITY, IN PARTIAL FULFILLMENT FOR THE REQUIREMENTS OF MASTERS DEGREE IN EMERGENCY MEDICINE & CRITICAL CARE NURSING (MSc)**

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**DEPARTMENT OF EMERGENCY MEDICINE**

# THESIS SUBIMITION FORM

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# Declaration

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# ABBREVIATIONS AND ACCRONYOMS

| | |
|---|---|
| AHA | American Heart Association |
| AMI | Acute Myocardial Infarction |
| CAD | Coronary Artery Disease |
| CCU | Coronary Care Unit |
| CDC | Central Disease Control |
| ECG | Electrocardiography |
| ED | Emergency Department |
| ETB | Ethiopian Birr |
| ICU | Intensive Care Unit |
| SPSS | Statistical Package for Social Science |
| STEMI | ST-segment Elevation Myocardial Infarction |
| TASH | Tikur Anbessa Specialized Hospital |
| VT | Ventricular Tachycardia |
| W H O | World Health Organization |

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# ABSTRACT

**Background**; Electrocardiogram (ECG) is a procedure of recording the electrical activity of the heart within a period of time using electrodes placed over the chest. Basic ECG rhythms, such as normal sinus rhythm, sinus tachycardia, sinus bradycardia, atrial fibrillation, atrial flutter, heart blocks, ventricular fibrillation, and asystole should be recognized by any nurse. Nurses are normally the first responders to an in-hospital cardiac arrest in health care facilities, and they must be proficient in basic resuscitation skills.

**Objective**: the objective of this study was to assess the Competency of nurses working in the adult emergency room at ECG interpretation: a multicenter study in Addis Ababa ethiopia2021.

**Method**: An institutional-based descriptive, cross-sectional study design using a quantitative research method with convenience sampling method was used to enroll 175 nurses in five hospitals at adult ER. Data was collected by using standard self-administered questionnaires which were adapted from ECG guidelines. The data was checked for its' completeness and entered into Epi data version 7.2.2 Then data was imported to SPSS version 26 software for analysis. The descriptive results were presented with frequency distribution tables, graphs and its association were analyzed by fishers extract test instead of X 2 due to occurrence of some observed number being less than 5with significant value of ($p<0.05$).

**RESULT:** out of 203respondents 175 were actively participated with a response rate of 86.2%.from those respondents 175nurses, 159(90.9%) were not competent (scored <65%) only 16(9.1%) were competent (scored>65%) the mean score was 6.82 from 20 questions and (SD=± 3.65).the minimum score was5% and the maximum score was 90%.

**Conclusio**n: the overall level of competency of nurses about ECG interpretation is low. This is difficult to monitor and manage arrhythmias. Level of education and training were a determinant factor to enhance their competency**.**



**Keywords**:-ECG interpretation, arrhythmias, competency

# CHAPTER ONE

# 1. INTRODUCTION

## 1.1 Background

Cardiovascular diseases (CVDs) remain the leading cause of morbidity, mortality and disability in the world with over 80% of CVD deaths occurring in low- and middle-income countries (1).

Arrhythmias are abnormal heart rhythms due to problems in heart automaticity and/or heart conduction which decrease cardiac output, a change in heart rate thus affecting tissue perfusion (2). Any impulse generating outside the sino-atrial node can cause an abnormal heart rhythm. A life threatening arrhythmia is a medical condition that requires urgent intervention, or it can causes death. Much of the literature considers ventricular tachycardia, ventricular fibrillation, pulse less electrical activity, complete heart block, and asystole to be the most common types of life threatening arrhythmias(3).

Electrocardiogram (ECG) is a procedure of recording the electrical activity of the heart within a period of time using electrodes placed over chest. Heart has four chambers two atria and two ventricles, the electrical activity generated from Sino atrial node (SA node) and go through atrial muscle fibres delay while the depolarization to a trio ventricular node (AV node) then it gone through out bundle of his to the right and left bundle branch among purkinje fibres, The contraction of atria associated with the ECG wave called P wave then when ventricular are depolarization it causes QRS complex finally when ventricular re polarization T wave occurs (4).

Electrocardiography is a frequently used, non-invasive procedure for recording electrical activities in the heart. Electrocardiogram (ECG) shows the series of waves that relate to the electrical impulses which occur during each beat of the heart. Nowadays ECG is used for patients presenting with cardiac diseases, and it's considered as the first diagnostic tool in chest pain and it provide objective information's about the structure and function of the heart (5). Also ECG makes a focal point of modern medicine because it gives whole background about diagnosing acute coronary syndromes and cardiac arrhythmias (6).

The standard 12-lead, ten electrodes are placed on the patient's limbs and on the surface of the chest which records the electrical activity of the heart from 12 different viewpoints or leads by attaching cables to the patient’s limbs and chest so the overall magnitude and direction of the heart's electrical depolarization is captured at each moment throughout the cardiac cycle(7). A12-lead must be ECG is recorded correctly because poor technique can lead to misinterpretation of the results, wrong diagnosis, mismanagement of the patient and inappropriate transfer to hospital(8).

ECG plays an important role in diagnosing of patients and providing whole information in many clinical scenarios for examples; Arrhythmias, Coronary artery disease (CAD), Electrolytes abnormalities, inherited cardiomyopathies and drug induced abnormalities (9)

## 1.2 Statement of the Problem

Globally ischemic heart disease and stroke take first place in the top 10 causes of death worldwide which it accounting for a combined 15 million deaths in 2015(10).

According to previous reports, the majority of patients who visit the emergency department have chest pain. One of these studies found that an ECG was performed on 88.4 percent of patients who visited the emergency room, and that atypical chest pain was the most common diagnosis for 59 percent of patients (11).

Nurses are normally the first responders to an in-hospital cardiac arrest in health care facilities, and they must be proficient in basic resuscitation skills (12). Basic ECG rhythms, such as normal sinus rhythm, sinus tachycardia, sinus bradycardia, atrial fibrillation, atrial flutter, heart blocks, ventricular fibrillation, and asystole, should be recognized by any nurse(3). The nurse is required to be in charge of monitoring and clinical decision-making based on data collected from the monitor(13).

According to a previous survey, only 38.1 percent of nurses were able to recognize ventricular fibrillation, 54.3% myocardial infarction, 33.3% third-degree atrioventricular block, and 40.5% ventricular tachycardia. However, 20.5% of the nurses stated that they could carry out defibrillation. 60,5% of the nurses expressed that they did not know the right electrocardiography monitoring and thus could not recognize the type of arrhythmia(14).

Research in Iraq was conducted to determine nurses' knowledge of early intervention for patients with ventricular tachycardia at Baghdad teaching hospitals, and the results showed that the overall knowledge of the studied sample was limited. (15). That led to a lot of responsibility on nurses to be qualified in continuous monitoring especially in critical care units, to ensure ongoing safe and effective ECG monitoring and to know the determine what courses needed and quality improvement program should be initiated(16). Inappropriate interpretation usage often raises healthcare costs and may cause delays in the admission process, which is an unpleasant burden that the hospital and its patients must bear (17).

There is a need to improve nurses' electrocardiogram awareness and experience to provide better health care outcomes for patients and prevent errors in ECG interpretation and interventions.

Determination of knowledge and practice of nurses on electrocardiogram may be useful in improving their level and enhance their initiation to become more professional in interpretation ECG. However, no previous studies found about this subject in Ethiopia**.**

## 1.3 .Significance of the study

There is a need to improve nurses' electrocardiogram awareness and experience to provide better health care outcomes for patients and prevent errors in ECG interpretation and interventions. Determination of knowledge and practice of nurses on electrocardiogram may be useful in improving their level and enhance their initiation to become more professional in interpretation ECG. However, no previous studies found about this subject in Ethiopia.

# CHAPTER TWO

# 2. LITERATURE

## 2.1. INTRODUCTION

ECG interpretation is an important knowledge and skill of nurses used to manage those who have cardiovascular diseases or arrhythmias. Nurses have a lower amount of knowledge about ECG interpretation but most of them do not consider ECG interpretation as a priority for the nursing profession and there is a gap between what had been thought in school and at the clinical setup in ECG interpretation. So nurses need continuous teaching, in-service training and the curriculum of nursing must contain educational material related to ECG interpretation (18).

### 2.2 Socio-demographic

According to a study done in Tanzania from 141 nurses participated in the study. The majority of participants (44.0%) were aged 31-40 years, with a mean age of 34.1± 7.3 years. The majority of participants were females (79.4%). The majority (70. 2%) had a diploma in nursing as their highest level of education. The majority (56.7%) had greater than five years of work experience(19).

A study conducted at the University of Kyrenia, Turkish Republic of Northern Cyprus shows that the mean age of the participants was 26.94 ± 4.26 years and the majority of them were females (66.2%). The majority of the nurses had B.Sc degree (93.8%) most of the participants had less than five years of work experience as a registered nurse (53.8%). Most of the participants had taken ECGs for patients (89.2%). Besides, 60% of respondents had taken ECG training courses (20).

According to a study conducted in Iraq, approximately two-thirds(64.0%) of the studied sample were males(48%) of participants were between the ages of 25 and28, a high percentage of the studied sample was married(62%) and a high percentage of them had a bachelor's degree (62.0%) The overwhelming majority(80.0%) and three quarters(76.0%) of the participants had prior experience in the field (1-4years)(15).

According to research conducted in Egypt, 80.0% of the studied nurses' age ranged between 20-30 Years old with a median of 26.5 years and 84.0% of them were females. Besides, 70.0% of the studied nurses were married. According to educational level, 44.0% of the participants were highly educated graduated with a bachelor of nursing. Moreover, 54.0% of the participants had total years of experience in the hospital less than 5 years with a Mean ±SD of 6.92±5.7 (21).

## 2.3. Knowledge of nurses on ECG interpretation

A study conducted at Manipal University shows that from the 40 participants 22(55%) had good knowledge. 8(25.8%) had average knowledge and. and 8(20%) had poor knowledge of ECG monitoring and interpretation(22).

A study conducted at the University of Kyrenia, Dr. Suat Günsel Hospital, and the Turkish Republic of Northern Cyprus shows that the most frequently known and correctly responded item (92.3%) was "ST depression in ECG indicates myocardial ischemia". However, the most frequently incorrectly answered item (55.4%) was "T long wave and QRS wide wave are seen in case of hypokalemia". The total frequency of correct answers is 69% and the total frequency of wrong answers is 31%(20).

Research conducted in Tanzania Dare slam found that 141 participants had a high level of awareness about life-threatening arrhythmias, with 85 (60 percent) scoring a high level of knowledge. Sixty-six (40 percent) of the 141 nurses had a poor degree of expertise, with a percentage of correct answers of less than 49.9%. Almost all (95%) showed a high degree of understanding of the nursing treatment of patients with this arrhythmia(19).

Research conducted by Stephen shows that from 75 nurses 14(19%)correctly identifies the presence or absence of ischemia in all 6 scenarios of the three ECG with mi 79 (59%) nurses identified all the three ECG strip as ischemia but, no one was able to determine the correct leads, location, or amplitude of ST-segment elevation. For the 3 non-ischemic ECGs, 37 (49%) of the nurses recognized a normal ECG as ischemic, 47 (63%) determined that an early repolarization pattern was ischemic, and 34 (45%) indicated that a left bundle branch block pattern was ischemic(23).

A study was done by Sanacy Mohan shown that there 14 questions were asked for 50 nurses to assess nurse's knowledge about life-threatening arrhythmias and its management maximum score

was 14. Total knowledge score was ranging between 8-14 with a mean of 12.53 and 88.8% of them have an above-average level of knowledge. AF rhythm analysis is 91 .11 VF rhythm analysis is 95.55%, VT rhythm analysis is 100%, Asystole rhythm analysis is 100%. (24).

A study conducted in Iraq shows that from 50 respondents 22(44%) knows correctly about the characteristic of ventricular tachycardia 17(34%) knows Causes of polymorphic VT 11(22%) detect v t on ECG 15(30%) Detect of monomorphic on ECG correctly generally the knowledge of respondents were low 33(66%) and medium 17(34%)(15).

Research conducted at Cairo University shows that nurses have a low total mean knowledge score (15.371±8.481) 6 respondents from 40 (15%) had satisfactory knowledge regarding life-threatening ventricular dys arrhythmias 35(40)85% had unsatisfactory knowledge (25).

According to research conducted in Egypt show that 74% of participants had unsatisfactory knowledge about life-threatening dys arrhythmias and 26% of respondents had satisfactory knowledge about life-threatening dys arrhythmias(2 1).

## 2.4 .practice of ECG interpretation

The study conducted at Manipal University shows that from 40 participants 23(57.5%) had poor skill in interpreting ECG and 14(35%) had average skill whereas only 3 participants were good skills in interpreting ECG (22).

The study conducted at the University of Kyrenia, Turkish Republic of Northern Cyprus shows that the most recurrently known items were interpretation ventricular tachycardia with (87.7%), Atrial flutter with (84.6%), Interpretation ECG with acute myocardial infarction (72.3%), Cases with ventricular fibrillation (67.7%), Atrial fibrillation with frequently of (63.1%), After that interpretation of a third-degree heart block with (60.0%), Then normal ECG with (53.8%) and atria tachycardia with (50.8%) respectively The total correct answer is 67% and the total wrong answer is 33%(20).

A study done in Tanzania Dare slam showed that the levels of skills of nurses about life-threatening arrhythmias were generally poor. Of the 141 nurses, 119 (84.4%) scored a low skill level, only 15.6% scored highly. The minimum score was 11.5% and the maximum score was

92.3%. Although generally, the participants had a poor skills score overall, the majority (97.9%) demonstrated competent skills in electrode placement on the patient's chest before connecting the patient to the cardiac monitor. Over three-quarters, (78.7%) of the nurses were competent in CPR skills. However, a low level of skill was observed in skin preparation before application of electrodes, as 94.3% were not competent 74% of respondents were competent in 12 lead placements(19).

According to research conducted in Egypt, 56% of respondents had unsatisfactory and 44% of respondents had satisfactory practice regarding the management of life-threatening dys arrhythmias(21).

A study done by Sanacy Mohan shows that Determining treatment for a trial flutter was 88.88%, treatment of choice for a patient with ventricular fibrillation is 86.66%, drug that blocks vagal stimulation and increases the heart rate was 100%, indications for the administration of the atropine sulfate was 82.22%, in ventricular fibrillation joules of the shock delivered in a monophonic defibrillator is 60%, the advantage of carotid sinus massage is 93.33%, the drug of choice for a patient with AF was 100%. The function of cardioversion was 91.11 %, all respondents identified asystole. All respondents identified ventricular tachycardia Mean knowledge score according to training attended participant scored 13.130 with a standard deviation of 0.69 and not attended scored 11.909 with a standard deviation of 1.23 (24).

Research conducted at Cairo University shows that 6(15%) had satisfactory practice in monitoring and management of life-threatening ventricular dys arrhythmias 35(85%) had unsatisfactory practice(25).

## 2.5. Factors associated with knowledge and practice on ECG interpretation

According to a study done in turkey shows that work experience and training is associated with nurses knowledge on ECG interpretation ($p < 0.005$) In the current study it was shown that nurses who less than one year of experience had the lowest average of correct answers and nurses who experience >=6 years had the highest average of correct answers. As shown up the comparison of years of working experience with knowledge of nurses on electrocardiogram wasn't statistically significant differences in terms of the majority of the items ($p > 0.05$). Results

showed statistically significant differences in 3 items of "T wave is one of the negative waves in ECG", "Atrial fibrillation could be regular rhythm", and "ECG can detect left ventricular hypertrophy (LVH)" were $p< 0.05$. ECG training course with the practice of nurses on ECG interpretations the percentage of nurses who had previous ECG training course scores more correct answers than who didn't have which also statistically significant differences in most of the items ($p< 0.05$) (20).

A study done in Tanzania shows that there was an association between nurses' level of knowledge on ECG interpretation and educational qualification and training ($p<0.001$) and also a significant association between skill and training ($p<0.001$) Another association has been found also in educational qualification and knowledge score by the P-Value $0.02=< 0.05$ (19).

The study conducted in Egypt shows that there was a significant association between nurse's qualifications and level of knowledge ($p<0.005$). And there was also a statistically significant relationship between the level of knowledge and years of experience with ($p<0.002$). There was a positive correlation between the total years of experience of participants and knowledge scores ($r=.385$). In addition, there was statistically significant positive correlation between total years of experience participants and practice scores ($r=0.274$ (21).

## 2.6. Conceptual framework

The factors associated with competency of nurses at ECG interpretation work experience, level of education, availability of ECG machine and training.

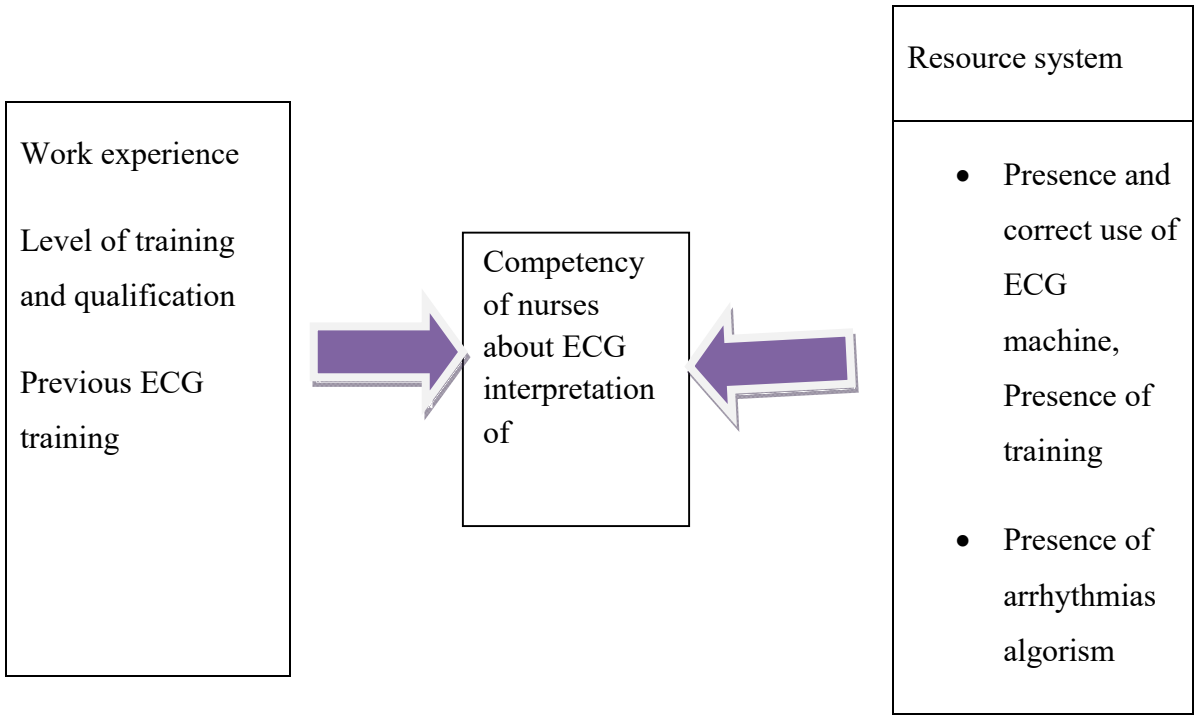


Figure 1 Conceptual frame work**(19)**.

# CHAPTER THREE:

# 3. OBJECTIVES

## 3.1 General objectives

- ✓ Competency of nurses working in the adult emergency room at ECG interpretation: multicenter study in Addis Ababa Ethiopia 2021.

## 3.2 Specific objectives

- ✓ To assess Competency of nurses working in the adult emergency room at ECG interpretation: multicenter study in Addis Ababa.
- ✓ To assess factors associated with Competency of nurses working in the adult emergency room at ECG interpretation: multicenter study in Addis Ababa Ethiopia.

# CHAPTER FOUR:
# 4. METHODS AND MATERIAL

## 4.1 Study area

This study was conducted in five hospitals administered by the federal republic of Ethiopia in Addis Ababa city at the Emergency department from March to April 2021.

There are five federal hospitals in Addis Ababa city which are Tikur Anbessa specialized hospital, St Paulo specialized hospital, Aabet, St Peter referral hospital, Alert referral hospital. Tikur Anbessa specialized hospital one of the largest specialized and teaching hospitals, located in Addis Ababa city. The adult emergency unit is staffed with 58 Nurses and different multidisciplinary residents and senior physicians. All African Leprosy, Tuberculosis, and rehabilitation center (Alert referral hospital) are located in the Akaki sub-city. Which has 390 nurses; 25nurses are currently working in the emergency departments. Paulo Millennium Medical College and Aabet hospital one of the largest public hospitals located in the Gulele sub-city. Currently, 65 nurses are working in the adult emergency department. Aebet hospital is one of the burn and trauma center and 35 nurses are currently working in ED. St Petro referral hospital is t is one of the main tuberculosis hospitals in Ethiopia. Currently, the hospital receives both trauma and medical patients. The hospital adult emergency is staffed by around 20 B Sc nurses. So the total number of nurses working in the emergency department at federal hospitals is 203.

## 4.2 Study design and period

An institutional-based descriptive cross-sectional study design using a quantitative research method with a convenience sampling method was used to determine the Competency of nurses working in the adult emergency room at ECG interpretation: a multi-center study in Addis Ababa ethiopia2021.

## 4.3 Population

### 4.3.1 Source of population

All nurses who are working in Tikur Anbessa Specialized Hospital, St. Paulo referral hospital Alert referral hospital, and St Petro referral hospital Addis Ababa, Ethiopia.

### 4.3.2 Sample population

All nurses who are working in Tikur Anbessa Specialized Hospital, St. Paulo referral hospital Alert referral hospital, and St Petro referral hospital Addis Ababa, Ethiopia**.**

### 4.3.3 Study unit

All Nurses working in Tikur Anbessa Specialized Hospital, St Paulo's referral hospital, Aebet hospital, Alert referral hospital, and St Petro referral hospital adult emergency at the time of data collection Addis Ababa, Ethiopia, 2021**.**

## 4.4 inclusion and exclusion criteria

### 4.4.1 Inclusion criteria

- ✓ All those registered nurses who are working and have experienced greater than six months.
- ✓ Nurses who are willing to consent and participate in the study.

### 4.4.2 Exclusion criteria

- ✓ Nurses on sick, annual, and maternal leave.
- ✓ Those not willing to participate.
- ✓ Nurses who have less than six months of working experience**.**

## 4.5 Variable of the study

### 4.5.1. Dependent variable

- ✓ Competency of nurses working in the adult emergency room at ECG interpretation: multicenter study in Addis Ababa ethiopia2021**.**

### 4.5.2 Independent variables

- ✓ Work experience
- ✓ Training
- ✓ Workplace
- ✓ Level of education
- ✓ Presence of arrhythmias algorism
- ✓ Availability of ECG machine

## 4.6. Sampling procedures and techniques

- ✓ A convenient sample technique was used by involving all 175 nurses who are working in the adult emergency department in TASH, St. Paulo referral hospital, Aebet hospital, Alert referral hospital, and St Petro referral hospital**.**

## 4.7. Operational definition

Competency

- ✓ will be considered competent if the percent score was equal to or above 65% and
- ✓ not competent if less than 65% based on a statistical analysis.(26).

## 4.8. Data collection tool and technique.

The data was collected using self-administered questionnaires. It has two parts part one has 6 questions to assesses associated factors. Part two has 20 questions to assess the competency of nurses' at ECG interpretation. All questionnaires are adopted from ECG the guideline(27).Data

were collected by five B Sc Nurses and supervised by one M Sc nurses. The training was given by the principal investigator for two days for data collectors and supervisors on the method of extracting the needed information, how to fill the information on a structured checklist, and the ethical aspect in approaching the hospital administers. Data was collected in Tikur Anbessa Specialized Hospital, St. Paulo referral hospitals, Aabet, Alert, and St Peter hospitals.

### 4.9. Data quality management

Data assurance was applied from the very beginning by review prior study and a pretest was done by taking 5% of the study sample in a similar hospital. The activities of data collectors and supervisors were closely monitored by the principal investigator. The collected data were checked for completeness, accuracy, and clarity. Codes were given to the questionnaire and participant during data collection so that any identified errors could get traced back using the codes. Each filled questionnaire was checked and reviewed for completeness by a supervisor and principal investigator the necessary feedback was given to the data collectors the next morning.

### 4.10. Data processing and analysis

Data clean-up and cross-checking were done before analysis. Data were checked, coded, completed questionnaires were given identification numbers and enter into epi info version 7.2.2 then it was exported to SPSS version 26 for analysis. Both descriptive and analytical statistical procedures were utilized. Descriptive statistics like percentage, mean, median and standard deviation were used for the presentation of socio-demographic data and competency of nurses about ECG interpretation. And its association was analyzed by Fisher exact test instead of X 2 due to the occurrence of some observed number being less than 5with a significant value of ($p<0.05$).

### 4.11. Ethical consideration

Ethical clearance was obtained from the Ethical Review Board of Addis Ababa University, and the college of medicine and health science, and the college wrote a cooperation letter for the study area and permission for the study was obtained from TAHS, ST. Paulo hospitals, Aebet hospital, Alert referral hospital, and St Petro referral hospitals. Informed consent was obtained from participants who signed or gave verbal consent to fill the questionnaires are allowed to do so. Nurses have the right to refuse participation in the survey. Each study subject was informed about the objective of the study and confidentiality of the information which they will give. Also,

they were told that they have the full right to withdraw from the study at any time if they feel that uncomfortable.

### 4.12. Dissemination of results.

The findings of this study will be presented and submitted to the Department of emergency medicine College of Health Sciences. Also, it will be used as a reference for other researchers interested in these topics. It will be presented in different seminars and attempts will also be made for presentation in National /International Science of the conference and the public in a peer-reviewed journal and will be published with scientific journals.

# CHAPTER FIVE

# 5. RESULT

## 5.1. Socio demographic characteristics

Out of 203 respondents, 175 have actively participated with a response rate of 86.2%. According to the level of education, the majority of respondents 134(76.6%) were B.Sc nurses whereas the lowest respondents 6(3.4%) were diploma nurses. The majority of respondents 115(65.7%) had to work experience 1-5 years and 4(2.3%) of respondents have work experience greater than 10 years.from175 respondents 127(72.6%) responds there is no ECG machine available in their institution whereas 48(27.4%) responds ECG machine is available in their institution. The majority of the participants 147(84%) didn't get in-service training about ECG. Only 28(16%) of participants have been trained about ECG. All participants 175(100%) responds there is no arrhythmia treatment algorism in their institution. From the participants 57(32.6%) were from S. Paulo s, 50(28.6%) were from Tikur Anbessa specialized hospital.

Table 1 Socio-demographic characteristics of nurses working in adult emergency in Addis Ababa multi sector hospitals 2021, (N =175)

| Variable | | Frequency | Percent (%) |
|---|---|---|---|
| Level of education | M sc | 15 | 8.6 |
| | B.Sc ECCN | 20 | 11.4 |
| | BSC | 134 | 76.6 |
| | Diploma | 6 | 3.4 |
| Work experience | <1 year | 2 | 1.1 |
| | 1-5 | 115 | 65.7 |
| | 6-10 | 54 | 30.9 |
| | >10 | 4 | 2.3 |
| Is there Ecg machine | Yes | 48 | 27.4 |
| | No | 127 | 72.6 |
| Have you got in service training | Yes | 147 | 84.0 |
| | No | 28 | 16.0 |
| Is there arrhythmia algorism | Yes | 0 | 0 |
| | No | 175 | 100.0 |
| Work place | Tikur Anbessa | 50 | 28.6 |
| | Alert | 16 | 9.1 |
| | Abet | 37 | 21.1 |
| | S. Paulo s | 57 | 32.6 |
| | S Petro s | 15 | 8.6 |

## 5.2 Competency of nurses about ECG interpretation

The competencies of ECG interpretation among study participants were generally poor. As of 175nurses, 159(90.9%) were not competent (scored <65%) only 16(9.1%) were competent (scored>65%) the mean score was 6.82 from 20 competency related questions and (SD=± 3.65). the minimum score was5% and the maximum score was 90%.detailed results show that almost all of the participants 173(98.9) correctly identify asystole from the ECG strip. Anterioseptal MI, inferior wall MI Wolf- Parkinson-white syndrome is less frequently identified ECG strips 4%,3.4%, and 2.7% respectively.

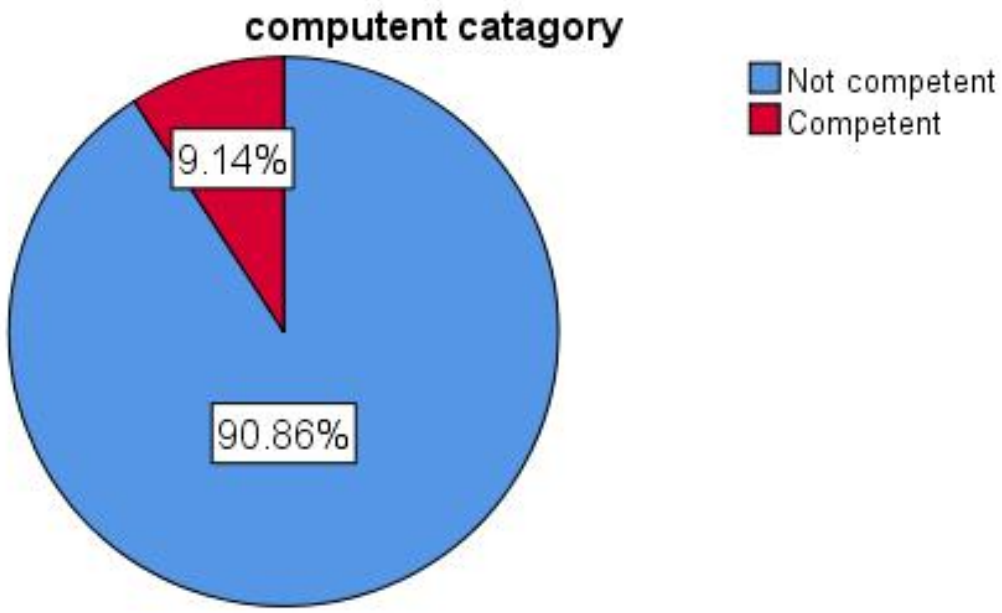


Figure 2 Pie chart showing general competency level of ECG interpretation of nurses working in adult emergency in Addis Ababa multi sector hospitals 2021, (N =175)

**Table 2 shows frequency and percentage about ECG reading among respondents**

| ECG finding | Frequency | | Percent (%) | |
|---|---|---|---|---|
| | No | Yes | No | Yes |
| Sinus tachycardia | 58 | 117 | 33.1 | 66.9 |
| Sinus bradycardia | 37 | 138 | 21.1 | 78.9 |
| Normal sinus rhythm | 61 | 114 | 34.9 | 65.1 |
| Asystole | 2 | 173 | 1.1 | 98.9 |
| Atrial Flutter | 95 | 80 | 54.3 | 45.7 |
| P v c | 158 | 17 | 90.3 | 9.7 |
| Torsado de Pointe | 134 | 41 | 76.6 | 23.4 |
| 1st degree a v block | 145 | 30 | 82.9 | 17.1 |
| 3rd degree a v block | 150 | 25 | 85.7 | 14.3 |
| left bundle branch block | 159 | 16 | 90.9 | 9.1 |
| right bundle branch block | 163 | 12 | 93.1 | 6.9 |
| Wolf- Parkinson-white syndrome | 172 | 3 | 98.3 | 2.7 |
| supra ventricular tachycardia | 103 | 72 | 58.9 | 41.1 |
| Anterioseptal MI | 168 | 7 | 96 | 4 |
| Inferior wall MI | 169 | 6 | 96.6 | 3.4 |
| Atrial fibrillation | 107 | 68 | 61.1 | 38.9 |
| Ventricular tachycardia | 63 | 112 | 36 | 64 |
| Ventricular fibrillation | 66 | 109 | 37.7 | 62.3 |
| Peaked t wave | 155 | 20 | 88.6 | 11.4 |
| second degree av block | 141 | 34 | 80.6 | 19.4 |

### 5.3Association between demographic characteristics and nurses' competency level ECG reading

Table 3: shows Fisher exact test was used to assessing Association between demographic characteristics and nurses competency level towards ECG reading. There is a statistical association between nurses' competency and level of education, ECG training, and workplace (p-value =0.000, 0.000, and 0.036) respectively but work experience and availability of ECG machines are not statistically associated with nurses' competency level (p-value 0.267 and 0.771) respectively**.**

Table 3 the association between demographic characteristics and nurses level of competency

| Demographic variable | Number of respondents(N=175) | | | | | |
|---|---|---|---|---|---|---|
| | Effect of demographic variables on respondents competency | | | | | |
| | Level of competency | | | | | |
| | Competent | | Not competent | | Test used | P- value |
| level of education | N | % | N | % | | |
| M sc | 6 | 40 | 9 | 60 | Fisher exact test | 0.000 |
| B.Sc Eccn | 5 | 25 | 15 | 75 | | |
| B.Sc | 2 | 1.5 | 132 | 98.5 | | |
| Diploma | 0 | 0.0 | 6 | 100 | | |
| Work experience | | | | | | |
| >1 year | 1 | 50 | 1 | 50 | Fisher exact test | 0.267 |
| 1-5 years | 14 | 9.6 | 104 | 90.4 | | |
| 6-10 years | 4 | 7.6 | 50 | 92.6 | | |
| Greater than 10 years | 0 | 0.0 | 4 | 100 | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Is there ECG machine | | | | | | |
| Yes | 11 | 8.7 | 116 | 91.3 | Fisher exact test | 0.771 |
| No | 5 | 10.4 | 43 | 89.6 | | |
| Have you got ECG training | | | | | | |
| Yes | 10 | 35.7 | 18 | 64.3 | Fisher exact test | 0.000 |
| No | 6 | 4.1 | 141 | 95.9 | | |
| Work place | | | | | | |
| Tikur Anbessa | 5 | 10 | 45 | 90 | Fisher exact test | 0.036 |
| Alert | 4 | 25 | 12 | 75 | | |
| Aebet | 1 | 2.7 | 36 | 97.3. | | |
| St. Paulo’s | 3 | 5.3 | 54 | 94.7 | | |
| St.petros | 3 | 20 | 12 | 80 | | |

# CHAPTER SIX

# 6. DISCUSSION

ECG interpretation is an important knowledge and skill of nurses used to manage those who have cardiovascular diseases or arrhythmias. Good ECG interpretation skill can save the life of the patient and increase the quality of care in the emergency department therefore this study was aimed at assessing the competency of nurses working in the adult emergency room at ECG interpretation: a multicenter study in Addis Ababa Ethiopia.

In this study, the majority of the respondents 90.9% were not competent and only 9.1 % of respondents were competent about Ecg interpretation .this finding is comparable with the study done at Cairo University shows that nurses had 15% satisfactory knowledge and 85% unsatisfactory knowledge (25).

But this study is contradicted with a study done by Egypt (44%), Sanacy Mohan (88.8%)&the University of Kyrenia (67%) of respondents had good knowledge about Ecg interpretation respectively (21,24,28).This might be due to cardiac unit and Icu experience .

Particularly in this study, almost all 98.9% of the respondents identified Asystole from the ECG strip. This finding is nearly similar to a study done by Sanacy Mohan showed that 100% of respondents identified asystole from the ECG strip(24).

In this study, more than half 62.3% of respondents were identified ventricular fibrillation from the ECG strip. This finding is nearly similar to a study done by Tahboub showed that67.7% of respondents identified ventricular fibrillation(28).

In this study, 45.7%, 14.35 %,and 64% of respondents have identified atrial flutter, third-degree av block ,and ventricular tachycardia respectively .This finding is contradicted with a study done by Tahboub showed that 84.6%,60% and87% of respondents identified atrial flutter, third-degree v block ,and ventricular tachycardia respectively(28).This might be due to the majority of respondents had learned the ECG course from university and most of them had an interest to learn Ecg.

In this study,78.9%, 65.5%, 9.7%,and14.3% of the respondents have identified sinus bradycardia, normal sinus rhythm p v c, and 1$^{st}$ degree a v block respectively. This finding is different from a study done by Mainago showed that 88.4, 83.6%,62.3%,and34.2% of respondents identified sinus bradycardia, normal sinus rhythm ,p v c ,and 1st degree a v block respectively(18).This might be due to majority of respondents were doing ECG's in their clinical practice and most of them considered the ECG interpretation as a priority for nursing profession.

Among different variables, the level of education, ECG training, and workplace of nurses were statically associated with the competency of ECG interpretation.

This study showed that level of education was statistically associated with nurses' competency in ECG interpretation (p-value=0.000). This finding is similar to the study done by Ruhwanya showed that there was an association between educational qualification and knowledge score p-value=0.02(19). This study also similar to a study done in Egypt showed that there was an association between nurses' qualifications and level of knowledge about Ecg interpretation($p<0.005$)(21).

This study showed that in-service training about ECG had statistically associated with nurses' competency about ECG interpretation (p=0.000). This finding is similar to the study done in Tanzania and Turkey showed that there was a statistical association between training and level of knowledge about Ecg interpretation ($p<0.001$) and ($p<0.05$) respectively(19,20).

This study showed that work experience was not statistically associated with nurses' competency about ECG interpretation (p=0.267), This finding is similar to a study done in Turkey showed that there was no association between work experience and knowledge about Ecg interpretation(20). But this study is contradicted with a study done in Egypt showed that there was statistically association between work experience and knowledge about ECG interpretation($p<0.002$)(21).this might be due to majority of respondents had more than two years Icu experience which, have critical patients who needs frequent monitoring may increases nurses exposure.

# CHAPTER SEVEN

# 7. Strength and limitation

## 7.1 Strength

- ✓ primary data usage
- ✓ survey based study
- ✓ This study is the first in Ethiopia and can be used as a baseline for future studies

## 7.2 Limitations

- ✓ Use of cross tab
- ✓ Respondents were bored due work load at emergency department
- ✓ Surge of covid 19 existence

# CHAPTER EIGHT

# 8. CONCLUSION AND RECOMMENDATION

## 8.1 Conclusion

Generally in this study nurses level of competency about ECG interpretation is lower than the rest studies had been done in different country. Having training and educational qualification were determinant factor to improve the level of competency about ECG interpretation**.**

## 8.2 Recommendation

- Minister of higher education
  - ✓ To include ECG course in the curriculum
- To FMOH
  - ✓ To prepare in-service Training
  - ✓ Give supportive supervision for professionals.
  - ✓ To Increase professionals level of education
- For hospitals
  - ✓ To fulfill the equipment
  - ✓ To facilitate experience sharing
  - ✓ Give supportive supervision for professionals**.**

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# ANNEXES

## Annex I: Participants Information and Consent Form

Hello! Good morning/afternoon? My name is ---------- I am here today to collect data on the assessment knowledge and practice about ECG interpretation on common arrhythmia among nurses in Tikur Anbessa Specialized Hospital, s t Paulo's referral hospitals, Alert referral hospital, and St Petro's referral hospital in the emergency department. The objective of this questionnaire is to assess knowledge and practice about ECG interpretation of common arrhythmia among nurses in Tikur Anbessa Specialized Hospital, St Paulo's referral hospitals, Alert referral hospital, and St Petro's referral hospital. Your correct and genuine response or answer to the questions can make the study achieve its goal. Therefore, you are kindly requested to respond very voluntarily with patience. The questionnaire may take 10 to 15 minutes. We assure you that this study is surely confidential, thus writing your name is not needed. Are you willing to participate in answering the questionnaire? Yes! Go to the next page. No! Thank them and interrupt to take responsibility.

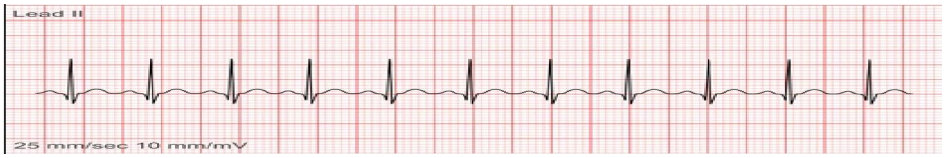
Sign of the consenting interview ……

Supervisor's name ……. Sign ……

**Annex II: Questionnaire part I. Socio-demographic characteristics**

| No | Question | Choices |
|---|---|---|
| 1 | Level of education | 1 M sc<br>2 B sc ECCN<br>3 Bs c<br>4 Diploma |
| 2 | experience in year | |
| 3 | Is there ECG machine | 1.yes<br>2. no |
| 4 | Have you got in-service training about ECG | 1 yes<br>2 no |
| 5 | Is there arrhythmias algorism | 1. yes<br>2. no |
| 6 | | 1.Tikur Anbessa |
| | | 2.Alert |
| | | 3. Abet |
| | | 4 .S. Paulo s. |
| | | 5 S Petro s. |

## PART II Identify the following rhythms

1. 

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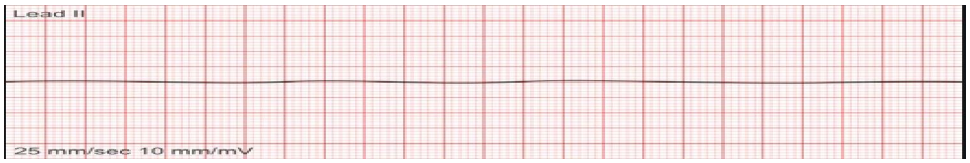
4. 

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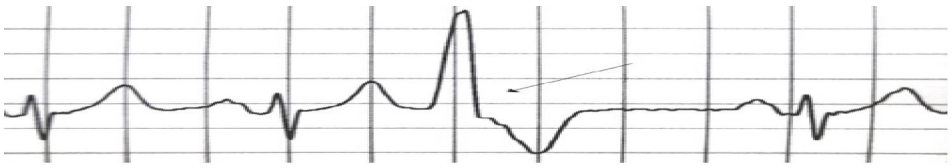
6. 
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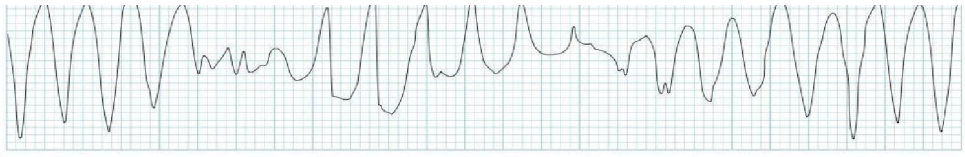
7 
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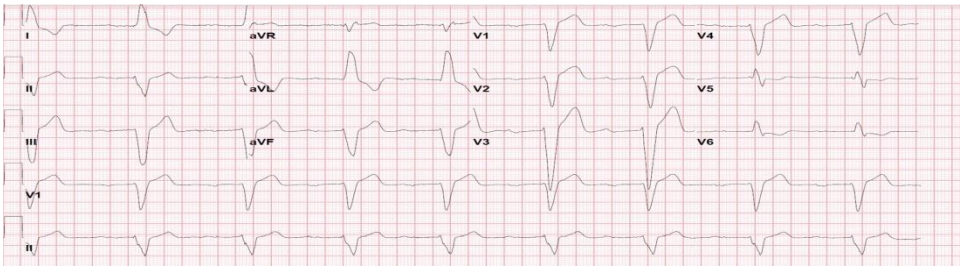
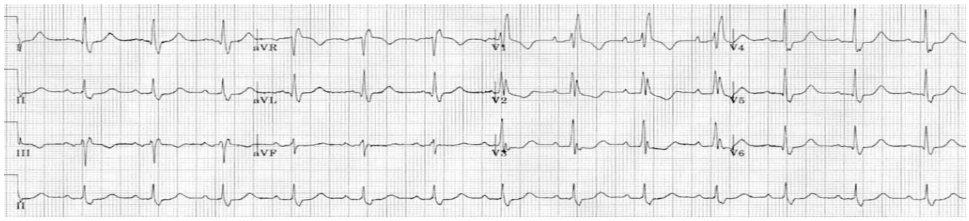
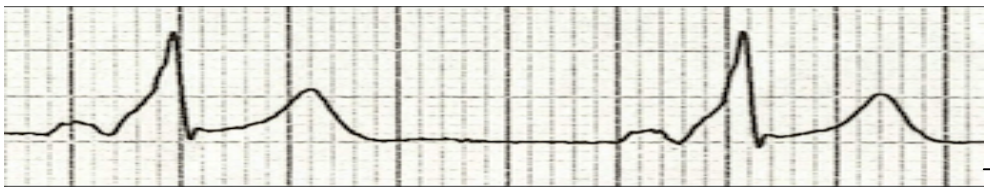
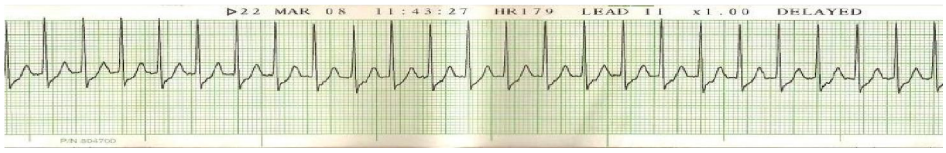
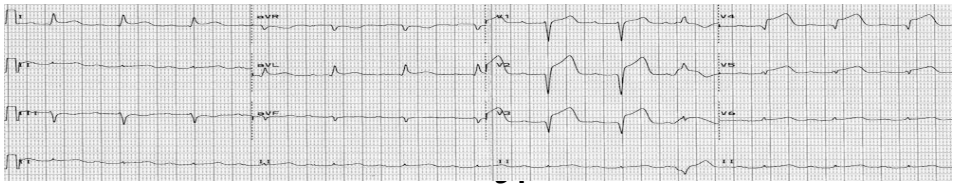
**9.** 

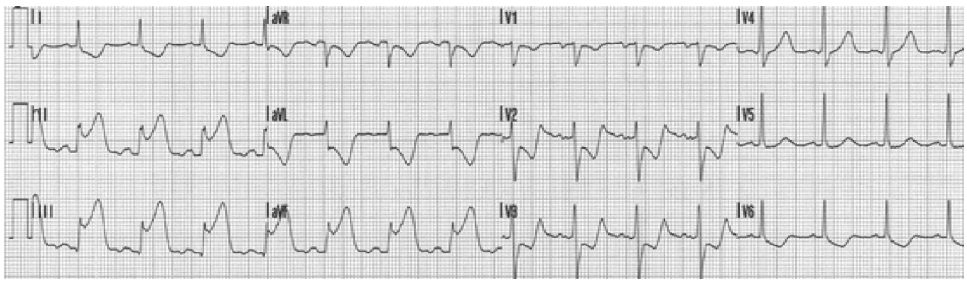

**10.** 


**11.** 

**12.** 

**13.** 


**14.** 

**15.** 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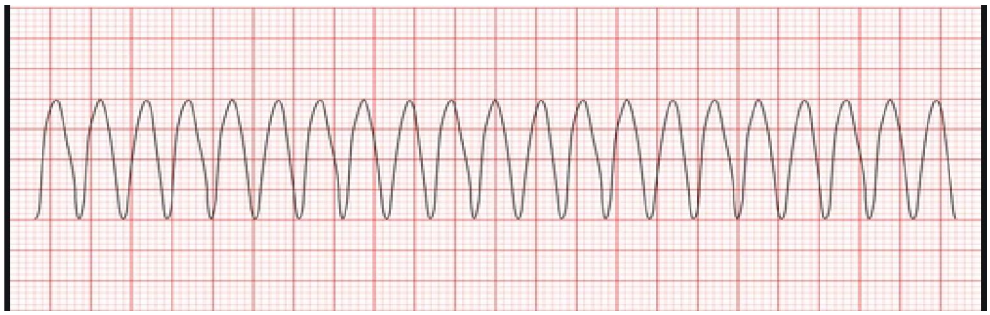
**17.** 

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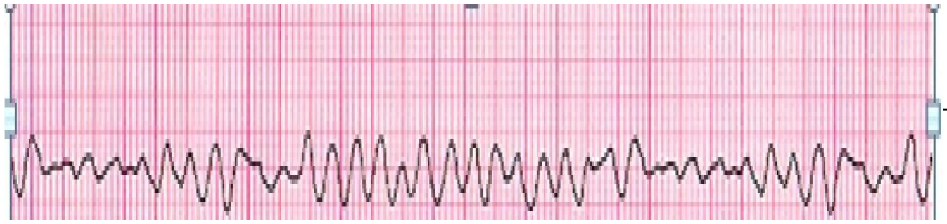
**18.** 

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**19.** 


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**20.**