KNOWLEDGE ABOUT RHUEMATIC HEART DISEASE AND ITS ASSOCIATED FACTORS AMONG NURSES WORKING IN CARDIAC CENTERS AT PUBLIC AND PRIVATE HOSPITALS OF ADDIS ABABA, ETHIOPIA, 2021

BY: BETHELHEM LEGESSE (BSC)

A THESISI SUBMITTED TO ADDIS ABABA UNIVERSITY, COLLEGE OF HEALTH SCIENCES,

SCHOOL OF NURSING AND MIDWIFERY POST GRADUATE STUDIES IN PARTIAL FULFILMENT OF

THE REQUERMENTSFOR THE DEGREE OF MASTER OF SCIENCE IN CLINICAL CARDIOLOGY NURSING

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ADDIS ABABA, ETHIOPIA

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APPROVAL SHEET

ADDS ABABA UNIVERSITY, COLLEGE HEALTH SCIENCES, SCHOOL OF NURSING AND MIDWIFERY, DEPARTMENT OF NURSING

I, the undersigned MSc student, declare that I have submitted my original work on a title: Knowledge about Rheumatic Heart Disease and its Associated Factors among Nurses Working in Cardiac Centers at Public and Private Hospitals of Addis Ababa Ethiopia 2020 /2021for the examination.

Submitted by:

BETELEHEM LEGESSE _____ _____

Name of student Signature Date

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

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YOHANNES AYALEW _____ _____

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APPROVAL BY THE BOARD OF EXAMINATION

This thesis by the title Knowledge about Rheumatic Heart Disease and its Associated Factors among Nurses Working in Cardiac Center at Public and Private Hospitals, Addis Ababa, Ethiopia, 2021 is accepted in its present form by the board of examiners as satisfying thesis requirement for the degree of Masters inCardiovascular Nursing.

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STATEMENT OF DECLARATION

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

This thesis is submitted in partial fulfillment of the requirement for a graduate degree from the Addis Ababa University at College of Health Sciences, School of Allied Health Sciencesdepartment of Nursing and Midwifery. The thesis is deposited in the Addis AbabaUniversity Digital Library and is made available to local, national and international scientific community. I solemnly declare that this thesis has not been submitted to any other institution anywhere for the award of any academic degree, diploma or certificate.

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ACRONYMS AND ABBREVIATIONS

ACH	Addis Cardiac Hospital
AF	Atrial Fibrillation
ARF	Acute Rheumatic Fever
CC	Cardiac Center
CCE	Cardiac Center Ethiopia
CI	Confidence Interval
GH	Gesund Hospital
GICH	Gaafar Ibnauf Children Hospital
HF	Heart Failure
KAP	Knowledge, Attitude and Practice
LMH	Land Mark Hospital
RHD	Rheumatic heart disease

SPHMMC St. Paul's Hospital Millennium Medical College

TASH Tikur Anbessa Specialized Hospital

USA United States of America

ABSTRACT

It is proposed that the biggest gap in control of rheumatic heart disease is in implementing of ineffective primary and secondary preventive measures. These measures are supposed to be well addressed by health care providers specially nurses. For anticipation and appropriatecontrolling of rheumatic heart disease, nurses are ordinary to have completethoughtful of the environment of the disease process and worthy information.The objective of this study is toassess rheumatic heart disease knowledge and its associated factors among nurses working in cardiac centers of public hospitals at Addis Ababa, Ethiopia, 2021.Institution based cross sectional study was employed on nurses working in cardiac centers of public and private hospitals at Addis Ababa from October, 2020 to June 2021. The sample size was163designated by purposive sampling method. Data was entered in to Epi-data version 4.45 and transferred to SPSS Version 25. Data testedand cleaned for misplaced values. Descriptive figures such as frequency percentages and mean were calculated, described and displayed in tables, graphs and charts. Binary logistic regression wasemployed to see the rudimentarysubstantial relation of individually independent variable with outcome variables. Significant factors were recognized based on multi variat logistics regression 95% confidence level at P-value less than 0.05.In the present study about 154participants were participated. The mean correct answer response of the nurses for knowledge of RHD questions is 12.2 $\pm$ 5.2. Only 48.7% of the nurses have good knowledge towards RHD and Being male in gender, having history of sore throat any time in life, taking formal education in university or collage about RHD, taking in-service training on RHD, having higher wok experience, have found significantly associated with higher odds of nurses' good knowledge towards RHD.In service training regarding RHD managementshould be given to

nurses who are working in cardiac centers. RHD early treatment and preventionshould be incorporated and reinforced in to nursing curriculum and Guidelines and protocols must be premeditated to advance the nurse's knowledge about RHD early diagnosis, treatment and preventionfor good outcomes and wellbeing of RHD patients.

Key words: Knowledge, Rheumatic Heart Diseases,

CHAPTER ONE

1. INTRODUCTION

1.1. Background

Rheumatic heart disease (RHD) is a graveailment of the heart includinginjury to one or extra of the four small heart valves (1). Rheumatic heart disease is an outcome of rheumatic fever that tracks an managed group A streptococcal contagion of vulnerablepersons(2). The disease is mediated by inflammatory and autoimmune responses(3). Abundantinheritable factorsaccompanying to the human immune system responses are tangled (4).

The heart valves injury remains after an illness called acute rheumatic fever, during which the heart valve tissue, also seldom the heart inside layer or muscle can become engorged, which sequentiallycauses carditis (5). The heart valves becomesinjured and scarred (6). A scared heart valves leads to an interruption to normal blood flow through, some blood may flow backward through a leaky valve that does not close properly or blood may be blocked because a tight, scarred valve does not open properly. Theinjuredheart will not be able to workeffectively(7).

The damage can result in narrowing of the valve which leads to decreased blood flow, leak in the valvewhichcauses blood to flow in the wrong direction(8), damage to heart muscle which weakens the heart muscle, affecting its ability to pump(9).Damage to the mitral valve or other heart valves and tissues can cause problems with the heart(10), later in life resulting an irregular and chaotic heartbeat called Atrial Fibrillation (AF)(11) and finally Heart Failure (HF) (12).

Rheumatic heart disease is caused by scarlet fever which in turn is caused by an infection with streptococcus bacteria (13). Rheumatic fever most often affects children who are between 5 and 15 years old, though it can develop in younger children and adults. Rheumatic fever causes everlasting harm to the heart which is called (Rheumatic Heart Disease) (14). It generally occurs 10 to 20 years after the first illness, but severe cases of rheumatic fever can cause damage to the heart valves despite having actual symptoms (15). Problems are most common with the valve between the two left chambers of the heart called mitral valve, but the other valves can be affected (16).

There are various potential factors that can increase the risk of rheumatic fever(17). Family history and type of streptococcus bacteria are the most frequently mentioned factors (18,19). Some people carry a gene that might make them more likely to develop rheumatic fever,certain strains of streptococcus bacteria are more likely to contribute to rheumatic fever than are other strains. However, the greater risk of rheumatic fever is associated with overcrowding, poor sanitation and other conditions that can easily result in the rapid transmission or multiple exposures to streptococcus bacteria(20,21).

1.2. Statement of the problem

Rheumatic heart disease has been an avoidable but stern public healthinessdelinquent in low- and middle-income nations and in consignedsocieties in high-income nations, as well asinstinctivepeoples(22).

More than 30 million individuals are beingpretentious by RHDcurrentlyglobally (23). Conferring to WHO 2015 report RHDconsidered to have been responsible for 305 000 mortalities and 11.5 million morbidities(24). From these mortalities 60% occurredimpetuouslyearlierto the age of 70 years(25).

The African, South-East Asia and the Western Pacific counties are the most horribly affected, responsible for 84% of all rampantdiseases and 80% of all predictablemortalitiesowed by RHD in 2015(26).India, in the South-East Asia Region, has the maximumworldwidedominance, with around 27% of all cases worldwide (27). In the Western Pacific countries, the encumbrance of RHD is particularlyintense in China and nativeinhabitantsincarnate in Australia, New Zealand and the Pacific island nations(28). In the Eastern Mediterranean Region, RHDperseveres in definitenationslike Egypt, Sudan and Yemen(29).

The prevalence of RHD is very high in our country Ethiopia where an average of 40% cases per 1000 population is affected by RHD(30). Although the prevalence did not differ by sex, around 62% of males in Ethiopia have RHD and around 53% of females' population experienced RHD in Ethiopia(31).

The potentialobstacles to prevention, control and eradication of RHD are the mistreatment of Rheumatic Fever (RF) (32) and RHD in nationwide health plans and financial resources (33), deficiency of information to permitdirectingdeterrencedeterminations, deprived primary and secondary prevention and access to primary health care(34), small numbers, inadequate training

or limited knowledge of nurses(35), inadequatethoughtful of RF and or RHD in pretentioussocieties and delay on the publicfactors of the disease and biases in health (36).

It is anticipated that the maindifficulty in eradication or control of RHD is in-instigatingactual primary and secondary preventive measures. These measures are supposed to be well addressed by health care providers specially nurses (37). For prevention and proper management of RHD health care providers are expected to have full understanding of the nature of the disease condition and good assessment knowledge (38). Thus, for effective prevention and management of RHD health care providers must be well-educated and knowledgeable about the diseases (39).

Although RHD can be preventable and effectively managed, the prevalence of the disease is still increasing. Knowledgeable nurses are very crucial in reducing the prevalence of RHD by providing health education and quality care. In Ethiopia little is known for the level of knowledge of nurses to wards RHD. And therefore, the main objective of the study is to assess knowledge about rheumatic heart disease among nurses in Addis Ababa public and private hospitals with cardiac center.

CHAPTER TWO

2. LITERATURE REVIEW

Literatures are quite limited and unavailable on nurse's knowledge regarding rheumatic heart disease. But the investigator obligated to include some literatures that explore on health care provider's knowledge irrespective of their educational discipline. Such as physicians, graduating health students and other medical fields.

2.1. Knowledge about rheumatic heart disease among nurses working at cardiac centers

Assessment of KAP on RHD among senior health care providers in Cameroon cross-sectional study conductedin 4health schools in Cameroon in 2019 among 509 medical students showed that the whole knowledge level of the study subjects on RHD was medium 296 (58.2%), while 159 (31.2%) had a good knowledge level. The mean knowledge score was 11.97 out of 22.
Concerning knowledge on prevention of RHD up to 30.1% of study participantsbelieved amoxicillin was the primemedicine for secondary prophylaxis acute RF or RHD. The leastlength of secondary prophylaxis was acknowledged by 14.5% of study subjects, and 84.7% replied that Benzathine penicillin is the drug of choice for the management of sore throat to avert acute RF(37).

A prospective hospital based cross sectional study conducted among 87 health care providers in Sudan Khartoum State Gaafar Ibnauf Children's Hospital(GICH) on knowledge about prevention of rheumatic fever and rheumatic heart disease revealed that before and after a teaching session, the doctors' awareness about the diagnosis of RHD and rheumatic fever according to the new control program was about 38%, this was increased to 93% after lectures. In addition, general doctors' knowledge about the different aspects of management had shown significant improvement after the teaching sessions. The average knowledge of these health care providers level of knowledge was average before lecture provision(36)

Another study conducted in Gezira State, Al Managil district from in 2018 on handheld echocardiography for screening and control of rheumatic heart disease study in Gezira state, Sudan: a pairedmethod to assess knowledge attitude and practice of health care providers regarding RHD showed that health workers knowledge attitudes and practice towards ARF/RHD were found to be poor and that was apparently due to the lack of training as had been documented in the health facility evaluation. Regarding concern of this study knowledge level of both the nurses and physicians was poor (40).

According to a prospective follow-up study conducted in Suva, Fiji, in the South Pacific on health workers on teaching focused echocardiography for rheumatic heart disease screening, explored that mean knowledge scores increased from 8.1 prior to training (range 5-15) to 14.9 (range 14-15) after training(41).

2.2. Factorsassociated with nurse'sknowledge about rheumatic heart diseases

A prospective hospital based cross sectional study conducted among 87 health care providers in Sudan Khartoum State Gaafar Ibnauf Children's Hospital(GICH) on knowledge about prevention of rheumatic fever and rheumatic heart disease revealed that administration of protocols and guide lines and provision of lecture to health care providers has shown to increase their knowledge from average. In addition, general doctors' knowledge about the different aspects of management had shown significant improvement after the teaching sessions. There was some improvement after lectures, regarding the doctor's awareness towards recurrence of rheumatic fever but not statistically significant(36).

Assessment of Knowledge, Attitudes and Practices (KAP) on rheumatic heart disease among senior medical students in Cameroon cross-sectional study carried out in 6_{th} and 7_{th}-year medical students in four medical schools in Cameroon from February to April 2019 among 509 medical students showed that good knowledge was significantly associated with place of work, being exposed to at least two formal lectures on RHD, having a formal lecture on RHD and history of sore throat (37).

A cross-sectional and interventional study conducted in Gezira State, Al Managil Locality from Nov 2016 to February 2018 on handheld echocardiography for screening and control of

rheumatic heart disease study in Gezira state, Sudan: a double approach modelto assess knowledge attitude and practice of health care providers regarding RHD showed that health workers knowledge towards ARF/RHD were significantly associated with taking training on RHD, public education about RHD. There was nothing mentioned if age, sex occupation salary and other socio demographic variables could associate with higher knowledge of RHD knowledge or not(40).

According to a prospective follow-up study conducted in Suva, Fiji, in the South Pacific on health workers on teaching focused echocardiography for rheumatic heart disease screening, explored that training health workers without prior experience to perform basic echocardiography can facilitate RHD screening in settings with limited resources. In addition on the job training of health workers may contribute for higher levels of knowledge scores after training which further can help in better screening of RHD performance (41).

According to the world heart federation an Rheach second edition report, health worker training has a central role in RHD control programs that needs to be instituted to all levels of health care personnel including physicians and non-physicians. The study also concludes that provision of training whether in the job or scheduled to health care providers on rheumatic heart diseases have shown to increase the knowledge level of the professionals on rheumatic heart disease(42).

2.3. Conceptual frame work

Socio-demographic characteristic

- Age
- Sex
- Monthly income
- Religion

Knowledge

Of RHD

Education

- In-service training
- Level of Education

Experience

- Years of experience in health care
- Experience in managing RHD
- History RHD before

Clinical factors

- Diagnosing with RHD
- History of sore throat

Figure 1: Relationship of variables on knowledge about rheumatic heart disease and its associated factors among Nurses working in public and privatecardiac hospitals of Addis Ababa, Ethiopia, 2021 developed by reviewing different literatures (36, 37,40,41).

2.4. Justification of the study

The research involved nurses from AddisAbaba hospitals with cardiac units and it assessednurses' knowledge about Rheumatic heart diseases (variables) such as Socio demographic characteristic)Age, Sex, Monthly income,Experience, religion (Clinical factors), Years of experience in health care, Experience in managing RHD, History RHD before, Diagnosing with RHD, History of sore throat Education, In-service training, Level of Education). Due to the small size of the nurses working in cardiac hospitals of Ethiopia, time constraints, budget limitations, and the researcher's ability to manage large amounts of data, it was not exhaustive. New nurses who have less than six-month service have not include in the study. The study was conduct in Addis Ababa hospitals with cardiac center both private and public hospitals. The research used true false and don't know response knowledge measurements.

2.5. Significance of the study

Little is known about nurse's knowledge on rheumatic heart disease. Therefore, findings from this study may givesignificance for health institutions and the nation in illustrating the courtesy of policy makers, health care mangers and health care professional's particularly nurses so as to motivate them to proceed taking applicableactions and directinghealth investigators to sight it as one of the extents of study. Further, the result of the study can be used as a baseline data for further related studies.

This study benefit to the policy makers by identifying the gaps of nurses for rheumatic heart disease prevention and management protocols that helps to influence the higher education to revise nursing curriculum in order to incorporate RHD preventive measures content in nursing course. This will help for nurse's educators to give great prominence.

It can also benefit the community as nurses can address for patients for pre and post occurrence of RHD acceptable preventive mechanisms and treatment. In conclusion, this study will help the nurses to see themselves and respond consequently, so that they can put their exertion on apprising their knowledge through interpretation or taking short term training.

CHAPTER THREE

3. OBJECTIVES

3.1. General objective

The main objective of this study was to assess knowledge aboutrheumatic heart disease and its associated factors among nurses working in cardiac centers of public and private hospitals at Addis Ababa, Ethiopia 2021.

3.2. Specific objective

- To assess knowledge about rheumatic heart diseases among nurses working in cardiac centers of public and private hospitals at Addis Ababa, Ethiopia 2021.
- To identify factors associated with knowledge about rheumatic heart disease of nurses working at cardiac centers of public and private hospitals ofAddis Ababa, Ethiopia 2021.

CHAPTER FOUR

4. METHODS AND MATERIALS

4.1. Study area

This study was conducted in Addis Ababa hospitals with cardiac units. Addis Ababa is the capital city of Ethiopia. The city has full-bodied annual growth rate, and population counts as of 2017 near to five million. Addis Ababa is a commissioned city and as such, is well-thought-out both a city and a state. It is the largest city in the world located without sea boarders. Public and private hospitals which have cardiac center in Addis Ababa were selected as study area. These are Tikur Anbessa Specialized Hospital (TASH) cardiac center, Saint Peter hospital (SPH), Cardiac Center Ethiopia (CCE), Land Mark Hospital (GH) and Addis Cardiac Hospital (ACH).

Study design

Institution based cross sectional study with quantitative research method was employed to address the specific objectives of the study

Study period

The data collection was conducted from March to April 2021.

Source populations

- **Study population**

All nurses working in Addis Ababa public and private hospitals with cardiac units.

- **Study subjects**

Sampled nurses who are working in cardiac unit in Addis Ababa publicand private hospitals and were meeting the eligibility criteria.

Inclusion and exclusion criteria

- **Inclusion criteria**

Nurses who are working in public and private hospitals with cardiac units in Addis Ababa and willing to participate in the study were included.

- **Exclusion criteria**

  - Nurses who wereextremely sick and absent during the study period.
  - Nurses who are apportioned to work in the cardiacunits butnever monitored or attained RHD patient.

Sample size determination

The sample size was determined by using formula for estimating a single population proportion. The sample size for this cross-sectional study was calculated by assuming knowledge prevalence to be50% because there are no studies done before in the study area. Based on the assumption 5% marginal error, 95% confidence interval (CI) and a none response rate of 10%, the actual sample size for the study is as follows.

Where n=Sample size

Z=value corresponding to a 95% level of significance=1.96

p= prevalence in previous study for knowledge (0.5)

q= (1-p) = (1- 0.5) = 0.5

d= Margin of error, assumed to be 5%

Therefore, using the above single population proportion formula the sample size Calculated as; 384.

Since the study population is less than 10,000,we used population correction formula in order to get the necessary minimum sample size.

Where;

$x = \frac{xc}{1+(n/N)}$

x=desired sample size

xc= the calculated sample size

N= total population (nurses inAddis Ababa hospitals with cardiac units)

$x = \frac{384}{1+(384/240)}$

$X_c = 148$

And then adding 10 % for non-response rate to provide a total sample size of 163nurses.

Sampling technique and Sampling procedure

Private and public cardiac hospitals in Addis Ababa were included. To select the study subjects, the whole sample size wasapportioned proportionally based on the number of nurses in governmental or private cardiac hospitals. Proportional allocation was done for each hospital nurses. Finally, nurses were selected using purposive sampling method.

Based on proportional allocation the whole sample size (163**)**distributed to each cardiac unit hospitals as public or privet cardiac centers.And then proportional allocation was also done in each hospital nurses. Then by using purposive sampling method study subjects were carefully chosen until finding the entire study participants. As shown in the diagram below.

Figure 2: Schematic presentation of sampling technique in the selected hospitals 2021

Key; -CCE: Cardiac Center Ethiopia, TASH: Tikur Anbessa Specialized Hospital, SPH: St. Peter Hospital, GH: Gesund Hospital, LMH: Land Mark Hospital, ACH: Addis Cardiac Hospital

Variables

- **Dependent Variables**
  - Knowledge aboutrheumatic heart disease
- **Independent Variables**
  - Age
  - Sex
  - Monthly income
  - In-service training
  - Level of education (diploma, degree, MSc)
  - Year of experience(service) in nursing
  - Experience in care of rheumaticheart disease patient
  - History of sore throat
  - Place of work (CCE, TASH, ST PETER, GH, ACH, LMH)

Operational definition

Good knowledge: if participants respond above the mean score to RHD knowledge questions
Poor knowledge: if the participants respond below the mean score to RHD knowledge questions

Methods of data collection

- **Data collection tool**

Data was collected using self-administered questionnaire for nurse's knowledge for RhematicHeart Disease (RHD), and the tool is adopted from different literatures(37, 38, 40) and adapted for this study. The tool has two parts.

- Sociodemographic variables include (Age, Sex, Religion, Work experience, Educational level, Salary, etc.…
- RHD knowledge questions of nurses (developed by (37)according to literature content of the questionnaire was approved by the nurse experts, used to assess knowledge of nursesabout RHD ; items had “true”, “false” or “do not know” choices; scoring was done giving “1” point for each correct answer with maximum score of 22).

Pilot testing was done by primary investigator with nurses in another hospital. Necessary revisions were made after pilot testing.The content of the tool was derived from current standards of CDC and World Health Organization guidelines.

Data analysis

Institution based cross sectional study was employed on nurses working in cardiac centers of public and private hospitals at Addis Ababa from October, 2020 to June 2021. The sample size was **163**designated by purposive sampling method. Data was entered in to Epi-data version 4.45 and transferred to SPSS 25, Version. Data tested and cleaned for misplaced values. Descriptive figures such as frequency percentages and mean were calculated, described and displayed in tables, graphs and charts. Binary logistic regression was employed to see the rudimentary substantial relation of individually independent variable with outcome variables. Significant factors were recognized based on multi variat logistics regression 95% confidence level at P-value less than 0.05

Ethical consideration

Ethical clearance was obtained from institutional review board of Addis Ababa University, college of health sciences, department of nursing and midwifery research committee. Support letter from department of nursing and midwifery was written toTikurAnbessa Specialized referral hospital, SPHMMC, Gesund hospital, Land Mark hospital, Cardiac Center Ethiopia and Addis Cardiac hospital. Informed written consent was obtained from all study participants. Participants were informed about the objective of the study.

After information is provided about purpose of the study, non- invasiveness of the data collection procedure, confidentiality of the information and respondents will be reassured that they would

be anonymous (unnamed). Then respondents were given a chance to ask anything about the study and be free to refuse or stop at any moment they want if their choice.

Dissemination and utilization of result

Since the primary objective of this thesis is for partial fulfillment in the requirements to degree of masters of sciences in clinical cardiology nursing; it will be presented and submitted to college of health sciences, school of nursing and midwifery, Addis Ababa University. In addition, copies of the result will be given to Addis Ababa city administration health bureau; Addis Ababa hospitals with cardiac unit to utilize the information for further development of strategic and educational plan promotion of nurse's knowledge about RHD. Presentations at professional, local, national and international meetings and publication in peer reviewed national or international journals will be attempted.

CHAPTER FIVE

5. RESULT

5.1.Socio-demographic characteristics of the participants

In the present study about 154participants were included. Out of these, the great majority ,128 (83.1%) of the participants were females. The mean age of the participants was 28.8, while the minimum and maximum ages of patient were 21 and 44 years respectively. Majority 92 (59.7%) of participants were in the age group of 21 – 28 years old category(Table 1)**.**

Majority 90 (58.4%) of the respondents were orthodox Christians and catholic followers were the least group 3(1.9%). One hundred five (68.2%) of the study participants were BSc degree holders whereas only 17 (11%) had Master's degree in the nursing field.
Regarding marital status, 80(51.9%) were single and 66 (42.9%) of them were married as few as 8(5.2%) of the study participants were widows and divorced. Majority of the participants were from Land Mark Hospital 8(24.7%) and St. Peter hospital participants 15(9.7%) cover the smallest number (Table 1).

The nurses working in the selected study area's mean income was 6248.07± 2391.5 Ethiopian Birr and majority of the study participants 105(68.2%) earn less the mean income (6248.07 ETH Birr). Most 72(46.8%) of them had work experience from two to five years and 52(33.8%) had a sore throat at least once in their life. Twenty-eight (18.2%) of the nurses had been diagnosed with rheumatic heart disease 92(59.2%) have experience in managing RHD patients. Nearly 80% (123) and 35(22.7%) of the nurses working in the current study area had learned formal education in university about RHD and took in service trainings on RHD after start working respectively(Table 1).

Table:1 Socio demographic and clinical factors of nurses working in public and private cardiac center hospitals at Addis Ababa, Ethiopia 2021.

Variables	Category	Frequency(n)	Percentage (%)
Sex	Male	26	16.9
	Female	128	83.1
Age	21- 28 years	92	59.7
	29-36years	44	28.6
	>37 years	18	11.7
Level of educational	Diploma	32	20.8
	BSc nurse	105	68.2
	MSc nurse	17	11
Religion	Orthodox Christian	90	58.4
	Muslim	34	22.1
	Protestant	27	17.5
	Catholic	3	1.9
Marital status	Single	80	51.9
	Married	66	42.9
	Divorced	4	2.6
	Widowed	4	2.6
Current working place (hospital)	TASH	28	18.2
	St. Peter Hospital	15	9.7
	CardiacCenter Ethiopia	33	21.4
	Gezund Hospital	20	13
	Land Mark Hospital	38	24.7
	AddisCardiac hospital	20	13
Year of experience in care provision (years)	≤ 1years	31	20.1
	• years	72	46.8
	≥6 years	38	24.7
Have you ever had a sore throat?	Yes	52	33.8
	No	102	66.2
Have you been diagnosed with rheumatic heart disease?	Yes	28	18.2
	No	126	81.8
Do you have experience in managing RHD patients?	Yes	92	59.2
	No	62	40.3
Have you learned formal education in your university about RHD?	Yes	123	79.9
	No	31	20.1
Have you taken in service trainings on RHD after you start working?	Yes	35	22.7
	No	119	77.3

Monthly income	<4500 Eth Birr	37	24
	4501-7500 Eth Birr	76	49.4
	>7501 Eth Birr	41	26.6

5.2. Nurses' knowledge about Rheumatic heart disease (RHD)

As shown in table 2majority of the nurses respond question items "What causes rheumatic heart disease?84(54.5%), Can a sore throat cause heart disease? 114(74%), Which treatment is appropriate for a bacterial sore throat for prevention of acute rheumatic fever and rheumatic heart disease? 131 (85.1%), Carditis in acute rheumatic fever most often persists with the resolution of other symptoms 107(69.5%), Rheumatic heart disease can occur without prior evidence of acute rheumatic fever 80(51.9%), Patients with acute rheumatic fever or rheumatic heart disease should be put on secondary prophylactic antibiotics 105 (68.2%), What is the drug of choice for secondary prophylaxis 87(56.5%)?What is the frequency of prophylaxis with Benzathine Penicillin 96(62.3%), Which valve is most commonly involved in rheumatic heart disease113(73.4%) Should some patients with rheumatic heart disease be placed on anticoagulants100 (64.9%)Early treatment of bacterial pharyngitis with antibiotics 123 (79.9%), What the problems with benzathine penicillin injections107(69.6%), and Early treatment of bacterial pharyngitis with antibiotics 86(53.8%)?" correctly.

Only 32(20.8%) responded correctly to the question item "What is the minimum duration of prophylaxis?".

Based on this the mean correct answer response of the nurses for knowledge of RHD questions is 12.2 $\pm$ 5.2, with minimum 0 and maximum score 23 out of 24 question items.

And therefore, based on the current study 75(48.7%) of the nurses have scored above mean to knowledge of RHD questions and 79(51.3%) have scored below mean to nurse's knowledge questions. Only 48.7% of the nurses have good knowledge towards RHD among the nurses who are working in public and private hospitals with cardiac center in Addis Ababa, Ethiopia.

Table 2Knowledge about Rheumatic heart disease (RHD) among nurses working in public and private cardiac center hospitals Addis Ababa, Ethiopia, 2021.

S. No	Knowledge of RHD items	Correct answers		Wrong answers	
		Frequency (n)	Percent (%)	Frequency (n)	Percent (%)
1	What causes rheumatic heart disease?	**84**	**54.5**	70	45.5
2	What is the clinical manifestation of acute rheumatic fever?	70	45.5	84	54.5
3	Can a sore throat cause heart disease?	**114**	**74**	40	26
4	Which strain of the germ is implicated?	56	36.4	98	63.3
5	What is the duration from a sore throat to the onset of acute rheumatic fever?	46	29.9	108	**70.1**
6	Within which time range does the treatment of sore throat have to be initiated to reduce the risk of acute rheumatic fever?	36	23.4	118	**76.6**
7	Which treatment is appropriate for a bacterial sore throat for preventionof acute rheumatic fever and rheumatic heart disease?	**131**	**85.1**	23	14.9
8	Carditis in acute rheumatic fever most often persists with the resolution of other symptoms.	**107**	**69.5**	47	30.5
9	Rheumatic heart disease can occur without prior evidence of acute rheumatic fever.	**80**	**51.9**	74	48.1
10	Which lesion is commonly associated with carditis in acute rheumatic fever?	40	26	114	**74**
11	Can indolent carditis alone fit the criteria for the diagnosis of acute rheumatic fever?	50	32.5	104	67.5
12	Patients with acute rheumatic fever or rheumatic heart disease should be put on secondary prophylactic antibiotics.	**105**	**68.2**	49	31.8
13	What is the drug of choice for secondary prophylaxis?	**87**	**56.5**	67	43.5
14	What is the frequency of prophylaxis with Benzathine Penicillin?	**96**	**62.3**	58	37.7
15	What is the minimum duration of prophylaxis?	32	20.8	122	**79.2**
16	What are the complications of rheumatic heart disease?	73	47.4	81	52.6
17	Carditis in acute rheumatic fever is treated with?	41	26.6	113	73.4
18	Which valve is most commonly involved in rheumatic heart disease?	**113**	**73.4**	41	26.6
19	Which pone is the earliest valve lesion?	57	37	97	63
20	Should some patients with rheumatic heart disease be placed on anticoagulants?	**100**	**64.9**	54	35.1
21	Early treatment of bacterial pharyngitis with antibiotics	**123**	**79.9**	31	20.1
22	What the problems with benzathine penicillin injections	**107**	**69.6**	47	30.5
23	Which of the following is characteristics of bacterial tonsillitis	44	28.6	110	71.4

24	Early treatment of bacterial pharyngitis with antibiotics	**86**	**55.8**	68	44.2

Figure 3A pie chart showing nurses knowledge towards RHD at public and private hospitals cardiac center in Addis Ababa Ethiopia 2021.

5.3. Factors associated withNurses' knowledge towards RHD

As shown in table 3 below, in the bivariate logistics regression analysis, being male in gender has found association with higher odds of good knowledge towards RHD in the current study. The same is true for having history of sore throat any time before, taking formal education in university or college about RHD, taking in-service training on RHD, being diagnosed for RHD, having experience of managing RHD patients are also shown association.

On the contrary having lessor wok experience, being in younger age group, and having lesser monthly income are found to be less likely to be associated with nurse's knowledge towards RHD at p values less than 0.2.

But in the multivariate logistics regression, being male in gender, having history of sore throat any time in life, taking formal education in university or collage about RHD, taking in-service

training on RHD, having higher wok experience, have found significantly associated with higher odds of nurses' good knowledge towards RHD at p values less or equal to 0.05.

As shown in table 3 below, male nurses working in the cardiac unit of the current study area were having 4.6 times higher odds of good knowledge towards RHD compared to female nurses ([AOR= 4.6, 95% CI (1.33-16.045)) P= 0.017)].

Nurses who had formal education towards RHD in college or university have 4.3 times more likely higher odds of better knowledge towards RHD ([AOR=4.3, 95% CI (1.07,17.5)) P= 0.039)]. In relation to the nurse previous history of sore throat, the participants who had history of sore throat had also scored more than 5 hands higher knowledge level compared to those who have never feel sore throat previously [AOR= 5.8: 95% CI (2.04-16.53) P= 0.001)].

Participants with in service training towards RHD related courses had nearly 11 times more likely to have higher odds of better knowledge on RHD ([AOR=10.9: 95% CI (2.93,40.6)) P=0.001]). The study also indicated that participants with shorter work experience have less likely to be associated with level of nurses' knowledge of RHDcompared to those who had longerduration of work experience [AOR= 0.57: 95% CI (.011,0.3)) P= 0.001)].

Table 3: knowledge towards RHD and its associated factors among nurses working in public and private cardiac centers in Addis Ababa, Ethiopia 2021.

Characteristics	Category	Knowledge towards RHD		P-value	COR (Lower and upper limit)	P-value	AOR (Lower and upper limit)
		Poor n (%)	Good n (%)				
Sex	Male	7(4.5%)	19(12.3%)	**0.009***	3.5(1.37,8.89)	**0.017****	4.6(1.33,16.04)
	Female	72(46.8%)	56(36.4) %		1		1
Sore throat	Yes	15(9.7%)	37(24%)	**0.00***	4.1(2.01,8.55)	**0.001****	5.8(2.04,16.53)
	No	64(41.6%)	38(24.7%)		1		1
Diagnosed with rheumatic heart disease	Yes	8(5.2%)	20(13%)	**0.01***	3.2(1.3,7.87)	0.49	1.6(0.42,6.24)
	No	71(46.1%)	55(35.7%)		1		1
Experience in managing RHD patients	Yes	39(25.3%)	53(34.4%)	**0.008***	2.47(1.27,4.8)	0.22	1.8(0.69,4.82)
	No	40(26%)	22(14.3%)		1		1
Learned formal education in your university about RHD?	Yes	57(37%)	66(42.9%)	**0.017***	2.8(1.27,6.64)	**0.039****	4.3(1.07,17.5)
	No	37(14.3%)	9(5.6%)		1		1
Training on RHD	Yes	7(4.5%)	28(18.2%)	**0.000***	6.1(2.47,15.1)	**000****	10.9(2.93,40.6)
	No	72(46.8%)	47(30.8%)		1		1
Age	21-28 years	55(35.7%)	37(24%)	**0.045***	.34(.116,.976)	0.995	1(0.16,6.23)
	29-36 years	18(11.7%)	26(16.9%)	0.579	.72(.23,2.28)	0.861	1.16(.21,6.39)
	>37years	6(3.9%)	12(7.8%)		1		1
Work experience	≤ 1years	26(18.4%)	5(3.5%)	**0.000***	.089(.027,.28)	**0.001****	.057(.011,0.3)
	• years	31(22%)	41(29.1%)	0.23	.61(.26,1.397)	0.306	0.54(0.17,1.75)
	≥6 years	12(8.5%)	26(18.4%)		1		1
Monthly income	<4500 ETB	25(16.2%)	12(7.8%)	**0.001***	.2(.076,0.52)	0.552	0.63(.137,2.89)
	4501-7500	42(27.3%)	34(22.1%)	**0.008***	.34(.15,.753)	0.251	.46(.125,1.722)
	>7501 ETB	12(7.8%)	29(18.8%)		1		1

***Significant at p-value of <0.2** ****Significant at p-value of <0.05**

CHAPTER SIX

6. DISCUSSION

The present study assesses the knowledge level of nurses towards Rheumatic Heart Disease (RHD) and associated factors in Addis Ababa public hospitals with cardiac units. Consequently, the mean correct answer response of the nurses for knowledge of RHD questions is 12.2 $\pm$ 5.2, with minimum 0 and maximum score 23 out of 24 question items.

This is consistent compared to a study conducted in four medical schools in Cameroon from February to April 2019 among 509 medical students which showed that the overall knowledge level of the study participants on Rheumatic heartdisease was moderate 296 (58.2%), with 159 (31.2%) having a good knowledge level. The mean knowledge score was 11.97 out of 22 (37).

Better knowledge of study subjects was scored on RHD in the current study compared to a prospective hospital based cross sectional study conducted among 87 health care providers in Sudan Khartoum State Gaafar Ibnauf Children's Hospital(GICH) which assessed knowledge about prevention of rheumatic fever and rheumatic heart disease before a teaching session was 38% (36). This discrepancy may be due to better work experience in Cardiac clinics in the current study or exposure to rheumatic disease inflicts a memory towards RHD care knowledge.

According to a prospective follow-up study conducted in Suva, Fiji, in the South Pacific on health workers on teaching focused echocardiography for rheumatic heart disease screening, explored that mean knowledge scores increased from 8.1 prior to training (range 5-15) to 14.9 (range 14-15) after training(41). This is congruent compared to our study as the level of mean knowledge. Although the studies had difference in study design and incomparable.

The current study finds out that 75(48.7%) nurses have scored above mean to knowledge of RHD questions and 79(51.3%) have scored below mean to nurse's knowledge questions. This is consistent compared to a cross-sectional and interventional study conducted in Gezira State, Al Managil locality from Nov 2016 to February 2018 on handheld echocardiography for screening

and control of rheumatic heart disease study in Gezira state, Sudan: the study assessed knowledge attitude and practice of health care providers regarding RHD and found that majority of the health worker's knowledge towards RHD were found to be poor (40).

However, the current study contradicts A prospective hospital based cross sectional study conducted among 87 health care providers in Sudan Khartoum State Gaafar Ibnauf Children's Hospital(GICH) on knowledge about rheumatic heart disease revealed that before and after a teaching session, the nurses' knowledge about RHD and rheumatic fever was increased to 93% after lectures. Knowledge about the different aspects of management had shown significant improvement after the teaching sessions. The average knowledge of these health care providers level of knowledge was average before lecture provision (36). This discrepancy may be due to difference in research methodology as the later study is prospective interventional study.

According to a study conducted in Sudan the minimum duration of secondary prophylaxis was known by 14.5% of students, and 84.7% responded that Benzathine penicillin is the drug of choice for the treatment of sore throat to prevent acute rheumatoid fever (37). This is congruent compared to our study in which What the drug of choice for secondary prophylaxis 87(56.5%), and the frequency of prophylaxis with Benzathine Penicillin 96(62.3%).

Regarding knowledge on prevention of RHD up to 30.1% of students thought that amoxicillin was the drug ofchoice for secondary prophylaxis for acute rheumatic fever or rheumatic heart disease in the Sudan's study. However, 114(74%), in the current study thought amoxicillin is appropriate for a bacterial sore throat for prevention of acute rheumatic fever and rheumatic heart disease. This discrepancy may be due to difference in socioeconomic status, lack of in-service training and RHD education in their university in the Sudan's study.

According to the world heart federation an Rheach second edition report, health worker training has a central role in RHD control programs that needs to be instituted to all levels of health care personnel including physicians and non-physicians. The study also concludes that provision of training whether in the job or scheduled to health care providers on rheumatic heart diseases have shown to increase the knowledge level of the professionals on rheumatic heart disease (42). This agrees with the current study as taking formal education in university or collage about RHD, taking in-service training on RHD, having higher wok experience, have found

significantly associated with higher odds of nurses' good knowledge towards RHD at p values less or equal to 0.05.

In this study male nurses working in the cardiac unit of the current study area were having 4.6 times higher odds of good knowledge towards RHD compared to female nurses ([AOR= 4.6, 95% CI (1.33-16.045)) P= 0.017)]. Most literatures (37-41) didn't support this idea. This may be due to the fact that difference in socio cultural background of the nurses in the studies.

In this study Nurses who had formal education towards RHD in college or university have 4.3 times more likely higher odds of better knowledge towards RHD ([AOR=4.3, 95% CI (1.07,17.5)) P= 0.039)].This finding agrees with studies conducted in Sudan Khartoum State Gaafar Ibnauf Children's Hospital(36). And cross-sectional study conducted in Cameroon having a formal lecture on RHD (37).

A cross-sectional and interventional study conducted in Gezira State, to assess knowledge attitude and practice of health care providers regarding RHD showed that health workers knowledge towards ARF/RHD were significantly associated with taking training on RHD, public education about RHD. There was nothing mentioned if age, sex occupation salary and other socio demographic variables could associate with higher knowledge of RHD knowledge or not (40). This is consistent compared to the current study except being male nurse have associated with better knowledge to RHD in the current study.

Nurse participants who had history of sore throat had scored more than 5 hands higher knowledge level compared to those who have never feel sore throat previously [AOR= 5.8: 95% CI (2.04-16.53) P= 0.001)]. This is not consistent compared to studies conducted in Fuji, Sudan or Cameron. This inconsistency may be due to the fact that all nurses in the later studies may have been taking the prophylactic treatment before exposed to RHD.

According to a prospective follow-up study conducted in Suva, Fiji, in the South Pacific on health workers on teaching focused echocardiography for rheumatic heart disease screening, explored that training health workers without prior experience to perform basic echocardiography can facilitate RHD screening in settings with limited resources. In addition on the job training of health workers may contribute for higher levels of knowledge scores after

training which further can help in better screening of RHD performance (41).This is congruent compared to the recent study as expressed by participants with in service training towards RHD related courses had nearly 11 times more likely to have higher odds of better knowledge on RHD ([AOR=10.9: 95% CI (2.93,40.6)) P=0.001]).

Study participants with short work experience period/ time/ have associations with low level of good nurses' knowledge of RHD. Participants with less work experience had 0.57 times less probability of having better knowledge towards RHD compared to those who had higher long period of work experience [AOR= 0.57: 95% CI (0.57(.011,0.3)) P= 0.001)]. This may be due to work experience may expose nurse to multi professional experience exchange, knowing the disease more extensively and knowing more about the disease.

CHAPTER SEVEN

7. STRENGTHS AND LIMITATIONS OF THE STUDY

7.1. Strength

- Many different variables were considered if they can associate with nurse's knowledge towards RHD knowledge and factors analyzed to illustrate their relative influence.
- Standard and valid questionnaire used in other studies was adopted and adapted for this study.
- Pretest was done before actual administration of the prepared tool at actual subjects.

7.2. Limitation

- The respondents might not provide accurate information.
- Cross sectional study makes determining causality impossible.
- The study is limited to the study area and study subjects only because of sample non probability and small sample size.

CHAPTER EIGHT

8. CONCLUSION AND RECOMMENDATION

8.1. Conclusion

The mean correct answer response of the nurses for knowledge of RHD questions is 12.2 $\pm$ 5.2, with minimum 0 and maximum score 23.In this study 75(48.7%) of the nurses have scored above mean to knowledge of RHD questions and 79(51.3%) have scored below mean to nurse's knowledge questions. Only 48.7% of the nurses have good knowledge towards RHD among the nurses who are working in public hospitals with cardiac center in Addis Ababa, Ethiopia.

Being male in gender, having history of sore throat any time in life, taking formal education in university or collage about RHD, taking in-service training on RHD, having higher wok experience, have found significantly associated with higher odds of nurses' good knowledge towards RHD.

8.2. Recommendation

Based on the findings of the study the following recommendations are forwarded to concerned bodies

- Quality improvement projects about RHD knowledge of nurses need to be accompanied, regulation and observing of regularaccomplishments of nurses should be conducted.
- In service training regarding RHD managementmust beprovided to nurses who are working in cardiac centers.
- RHD early treatment and preventionmust beintegrated and strengthened in to nursing curriculums.
- Guidelines and protocols should be considered to improve the nurse's knowledge about RHD.
- Unit managers and matrons in collaboration with training, research center and director of nursing must inspire and consolidate continues professional development, provide in service training about RHD management.

CHAPTER NINE

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CHAPTER TEN

ANNEXES

ANNEX I. Information sheet and consent form

Information sheet

Hello dear?

Dear respondent my name is _____ I am here to collect data for a study entitled, "Nurses knowledge and associated factors about rheumatic heart disease in Addis Ababa public hospitals with cardiac centers, Addis Ababa, Ethiopia." The study is being conducted by Bethlehem Legesse who is MSC clinical cardiology nursing student at Addis Ababa University College of health sciences, school of nursing and midwifery. For this study you are selected as a participant and before getting your consent or permission of your participation, you need to know all necessary information related to the study.

Thus, this information will be detailed as the objective of this study is to assess nurse's knowledge about rheumatic heart disease in Addis Ababa hospitals with cardiac centers, Addis Ababa, Ethiopia in 2020.You are being asked to take part in this study and to respond sincerely. You are selected to be involved by chance. This questionnaire focuses on assessing your knowledge about RHD. Your cooperation and willingnessaregreatly helpful in identifying problems in the mentioned area. This questionnaire may take 15 to 20 minutes to complete.

There is no possible risk with participating in this study. Your name will not be written in this form and for all the information you give us will be kept confidentially. Your participation is voluntary and if you feel discomfort with any of the questions it is your right to drop or stop filling the questionnaire. If you have questions regarding this study or if you wish to know the result after its completion, its pleasure to give you our phone number. Please contact the principal investigator.

Sister Bethlehem Legesse

Tel. no – 0911374959 Email:betelehemlegesse8071@gmail.com

Are you willing to participate in this study?

If yes, please proceed to consent form. Thank you

Consent form

In signing this document, I am giving my consent to participate in the study entitled, “Nurse’s knowledge and associated factors about rheumatic heart diseases in Addis Ababa public hospitals with cardiac center Addis Ababa, Ethiopia, 2021.’’ I have been informed that the objective of this study is to assess nurse’s knowledge and associated factorsabout rheumatic heart diseases in Addis Ababa hospitals with cardiac center Addis Ababa, Ethiopia.

I have understood that participation in this study is completely voluntarily. I have been told that my answers to the questions will not be given to anyone else and no reports of this study ever identify me in any by any means. I understood that participation in this study doesn’t involve risks except the time spent for completing the questionnaire.

I understand that Sister Bethlehem is the contact person and if I have questions about the study or about my rights as a study participant the following is the contact address.

Address of principal investigator: Bethlehem Legesse

Mobile no:0911374959

Email: betelehemlegese8071@gmail.com

Participants’ signature: _____ date: _____

Thank you for your willingness to participate!!

Annex II: QUESTIONAIRE

Code _____

R.	I. Socio- demographic questions	
101	Age	In_____ years
102	Gender	A. Male B. Female
103	Religion	A.Orthodox Christian B.Muslim C.Protestant D. Other
104	What is your level of education?	A.Diploma B.BSc nurse C. MSc nurse D.Other
105	Marital status:	A. Single B. Married C. Divorced D. Widowed • Other
106	Current working place (hospital)	• TASH • St. peter hospital • Cardiac center Ethiopia • Addis cardiac hospital • Gezund hospital • Landmark hospital
107	Year of experience in cardiac center care provision (years)	In _____years
108	Have you ever had a sore throat?	A.Yes

109	Have you ever been diagnosed with acute rheumatic fever?	B.No • Yes • No
110	Have you been diagnosed with rheumatic heart disease?	A. Yes B. No
111	Do you have experience in managing RHD patients?	• Yes • No
112	Have you learned formal education in your university about RHD?	• Yes • No
113	Have you taken in service trainings on RHD after you start working?	A. Yes B. No
114	Nationality	• Ethiopian • Foreigner
115	Monthly income	_____Ethiopian birr

Nurses' knowledge for Rheumatic heart disease questions

200	What causes rheumatic heart disease?	• Virus • Streptococcal pneumonia • Staphylococcal aureus • Streptococcus virdins
201	What is the clinical manifestation of acute rheumatic fever?	• Arthritis • Carditis • Chorea • All • All except 3
202	Can a sore throat cause heart disease?	• Yes

		• No • Don’t know
203	Which strain of the germ is implicated?	• L protein • N protein • M protein • P protein • Don’t know
204	What is the duration from a sore throat to the onset of acute rheumatic fever?	• 5 days • 1 to 2 weeks • 1 month • 2 months • Don’t know
205	Within which time range does the treatment of sore throat have to beinitiated to reduce the risk of acute rheumatic fever?	• 14 days • 21 days • 9 days • 30 days • don’t know
206	Which treatment is appropriate for a bacterial sore throat for preventionof acute rheumatic fever and rheumatic heart disease?	• Benzathine penicillin G • Vancomycin • Azithromycin • Acyclovir • Don’t know
207	Carditis in acute rheumatic fever most often persists with the resolution of other symptoms.	• True • False • Don’t know
208	Rheumatic heart disease can occur without prior evidence of acute rheumatic fever.	• True • False • Don’t know

209	Which lesion is commonly associated with carditis in acute rheumatic fever?	• Erythema marginatum • Subcutaneous nodules • Conjunctivitis • Don't know
210	Can indolent carditis alone fit the criteria for the diagnosis of acute rheumatic fever?	• Yes • No • Don't know
211	Patients with acute rheumatic fever or rheumatic heart disease should be put on secondary prophylactic antibiotics.	• Yes • No • Don't know If no or don't know, move to question 216
212	What is the drug of choice for secondary prophylaxis?	• Amoxicillin • penicillin • benzathine penicillin • ceftriaxone • Don't know
213	What is the frequency of prophylaxis with Benzathine Pencillin?	• 2 weekly • 4 weekly • 3 monthly • 6 monthly • Don't know
214	What is the minimum duration of prophylaxis?	• 5 years • 10 years • 20 years • 30 years • Don't know
215	What are the complications of rheumatic heart disease?	• Stroke, atrial fibrillation, heart failure • Deep venous thrombosis, infective, endocarditis, renal failure

		• Pulmonaryhypertension, pneumonia, heart failure, • Don't know
216	Carditis in acute rheumatic fever is treated with?	• NSAID • Paracetamol • Corticosteroid • Don't know
217	Which valve is most commonly involved in rheumatic heart disease?	• Tricuspid • Aortic • Mitral • Pulmonic • Don't know
218	which pone is the earliest valve lesion?	• Regurgitation • Stenosis • Don't know
219	Should some patients with rheumatic heart disease be placed on anticoagulants?	• Yes • No • Don't know
220	One of the managements of rheumatic heart disease involves surgery.	• Yes • No • Don't know
221	Early treatment of bacterial pharyngitis with antibiotics	A. Is primary prophylaxis B. Is Secondary Prophylaxis C. Is Primordial Prevention
222	What are the problems with benzathine penicillin injections	A. Anaphylaxis B. Vasovagal syncope C. Skin Rash D. It is painful E. All

223	Which of the following is characteristics of bacterial tonsillitis?	A. High grade fever B. Exudates C. Rhinorrhea D. All E. All except C