ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

DEPARTMENT OF INTERNAL MEDICINE

Research Title:

Utilization and Barriers to Secondary prophylaxis for Rheumatic Heart disease at Tikur Anbessa Specialized Hospital adults outpatient clinic, Addis Ababa, Ethiopia.

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Acknowledgment

I would like to thank the department of internal medicine, the college of health sciences, Addis Ababa University for giving me this golden opportunity to do this research. In particular, I am grateful to my advisor Dr. Dasalew Mekonnen for his unreserved assistance in giving me timely comments and relevant guidance throughout this research.

Table of abbreviations

Abbreviation	
ARF	Acute Rheumatic Fever
BPG	Benzathine Penicillin G
CHF	Congestive heart failure
GAS	Group A streptococcus
RHD	Rheumatic Heart Disease
SAP	Secondary Antibiotics Prophylaxis
TASH	Tikur Anbessa Specialized Hospital
WHO	World Health Organization

Lists of tables and figures

ABSTRACT

Background: Rheumatic heart disease (RHD) is one of the major causes of cardiovascular disease in developing countries, affecting most of the young population. Secondary prophylaxis in the form of benzathine penicillin is effective for preventing recurrent acute rheumatic fever (ARF) and the progression of RHD. However, the low adherence rate reduced the effectiveness. Therefore, a systematic generalizable tool is necessary to tackle the barriers.

Objective: The purpose of the study was to assess adherence and barriers to use secondary prophylaxis for RHD, at Tikur Anbessa specialized hospital (TASH).

Methods: Cross-sectional study was conducted from June 5, 2020, to September 4, 2020, at Tikur Anbessa Specialized Hospital, Ethiopia. A structured questioner was used for the data collection on awareness, adherence, and barriers for benzathine penicillin prophylaxis in adults with RHD. Data were analyzed using SPSS version 26.

Results: A total of 385 patients participated in this study, 305(79.6%) patients were aware, sore throat associated with heart disease, and about 288 (75.6%) patients; know that benzathine penicillin prevents tonsillitis. The adherence rate was 77.9% for benzathine penicillin prophylaxis (BPG) while the left 85 patients (22.1%) were non-adhered to the prophylaxis. The main barriers for none adherence in this study were the nonavailability of medication, forgetting, and health professionals refuse to inject benzathine penicillin**.** Increased age was found to have a significant association with adherence to BPG. For each one-year increase in the age of patients with RHD, the percent odds of adherence decreases by 3% (P value 0.006)

Conclusion: Adherence level was low, which is below WHO recommendation. This study insight important major barriers that affect secondary prophylaxis for RHD that can be used to develop an intervention to improve adherence**.**

Key words: Rheumatic heart disease, adherence, barriers, secondary prophylaxis, Tikur Anbessa specialized Hospital

1. Introduction

1.1. Background

Rheumatic heart disease (RHD) accounts for most cardiovascular morbidity and mortality among young adults in developing countries. Secondary prophylaxis (SP) with benzathine penicillin G is effective strategy for the prevention of Acute rheumatic fever (ARF) recurrence and progression of RHD, however, adherence is variable. Therefore, this study aims to determine the level of adherence and possible barriers to SP among RHD patients.

1.2. Statement of the problem

Rheumatic fever (RF) and RHD remain significant causes of cardiovascular disease in the world today. They are a major public health problem for many developing countries(November 1988).

The prevalence of RHD across WHO regions remains high. Although RF and RHD have progressively declined in developed countries over the past 50 years; they continue to increase at a striking rate in developing countries. Linked to poverty and poor access to health care facilities, estimates suggest that roughly 50% of cardiac patients in less developed countries have RF and or RHD (Noubiap et al., 2019).

Africa, south-East Asia, and the western pacific regions are the worst affected, accounting for 84% of all prevalent cases and 80%of all estimated deaths due to RHF in 2015. Socioeconomic and environmental factors such as poor housing, undernutrition, overcrowding, and poverty are well known contributors to the incidence, magnitude, and severity of rheumatic fever and rheumatic heart disease.(Do & Stand, 2018)

Secondary prophylaxis through the administration every 3-4 weeks of injection of benzathine penicillin to patients with a previous history of RF/ and or RHD is effective at preventing streptococcal pharyngitis and recurrence of rheumatic fever

Some of the long-term follow-up studies have proved that the early initiation of SP is very effective to stop or slow down the further progress of RHD.

To limit the progression of the disease, WHO recommends that patients take monthly treatment of penicillin. Sentinel studies conducted under the auspices of the WHO during the last four decades clearly documented that the control of the preceding infections and their sequel is both cost effective and inexpensive.

Without doubt, appropriate public health control programs and optimal medical care reduce the burden of disease. Also, the disease is preventable and has been successfully controlled through

the implementation of register-based control program. Effective early intervention can prevent premature mortality from rheumatic heart disease. However, adherence to monthly treatment is not easy for poor populations.

In, Ethiopia, RHD is the major, cause of cardiac pathology. Rates continue to increase as a result of minimal diagnostic assessments and low adherence to monthly follow-up treatment.

1.3. Significance of study

This study will identify the current adherence rate and barriers for benzathine penicillin in patient with RHD. There are data on adherence and barriers done outside Addis Ababa in Ethiopia. But these are done on either adherence or barriers at different times and also done outside Addis Ababa, so it may not representative of most of the patients. So the rationale to conduct this study is to better understanding of current adherence rate and barriers for secondary prophylaxis in patients with RHD coming from the different country side to TASH. This study will have a significant impact to tackle these barriers.

2. Literature Review

A key evidence-based public health focus for people living with ARF or RHD is the provision of secondary prophylaxis: injections of benzathine penicillin G (BPG) every 28 days to prevent ARF recurrences and development or progression of RHD. A key performance indicator is the proportion of individuals receiving ≥80% of scheduled injections(Do & Stand, 2018).

World Health Organization has recommended secondary prophylaxis, most effectively delivered within a coordinated program using a registry of patients, as the first priority for the control of rheumatic heart disease. Yet most developing countries still do not have effective secondary-prophylaxis programs.

Primary prevention of RHD focuses on the prompt recognition and treatment of GAS pharyngitis to decrease the risk of RF in high-risk populations. Secondary prevention involves continuous antibiotic chemoprophylaxis to prevent recurrent RF and reduce progression to RHD. Four weekly intramuscular BPG remains the standard of care in most settings, and contemporary studies have found low rates of RF recurrence (0.07 per 100 patient-years) with this regimen. (Karthikeyan et al., 2018)

Secondary antibiotic prophylaxis has been shown to reduce the risk of ARF recurrences and the development or worsening of RHD with intramuscular benzathine penicillin G (BPG) having the most evidence for effectiveness (Lennon D, 2009)

For countries where rheumatic heart disease is endemic the main strategies for prevention, control, and elimination include, improving standards of living; expanding access to appropriate care; ensuring a consistent supply of quality-assured antibiotics for primary and secondary prevention. (Ordunez et al., 2017)

Planning, developing and implementing a feasible program for prevention and control of rheumatic heart disease, supported by adequate monitoring and surveillance, as an integrated component of national health systems responses. It is proposed that the biggest gap in control of rheumatic heart disease is in implementing effective primary and secondary preventive measures.

The study conducted, on the spectrum of cardiovascular disease at Tikur Anbessa Hospital, Ethiopia revealed that valvular heart disease was the commonest primary diagnosis. (Abdissa et al., 2014)

2.1. Adherence

Out of 256 participants interviewed, in Cameroon, more than two-thirds (71.1%) reported having had sore throat at least once. The disease was treated with antibiotics in only 45.4%, health professionals prescribed treatment in 35.8% of cases. About 73% of respondents, did not know the cause of sore throat.

Most of the patients (71%) were unaware of complications of sore throat and 70% did not know sore throat can have associated with heart disease. RHD was unknown by 82% of the participant

and 95% of participants did not know the cause of RHD. Age <35 years, post-secondary level of education, and having heard of RHD were significantly associated with adequate knowledge. This study showed that the level of awareness of RHD is low. (Id et al., 2018).

In Jimma university study, out of 241 patients, 224 (93%,) took benzathine penicillin prophylaxis during last one year of follow up. From 224 RHD patients who took secondary prophylaxis, 86 (35.6%) missed injection more than three times and 5(2.1%) never missed injection. The adherence rate was 133(55.2%), who received more than nine annual prophylaxis.(Mohammed, 2019)

A study conducted in India, the overall adherence rate for benzathine penicillin was 93.6%. 151 patients (90.5%) had good adherence (>80%). On 16 patients (9.5%) adherence rate was <80%, 7 of these had extremely poor adherence of 50%.

The most common reason for poor adherence was lack of awareness. The other reasons for poor adherence were, pain and fear of injection, nonavailability of BPG, and BPG stopped by local physicians after valve replacement. There was no correlation of adherence rate to educational status, socio-economic scale, transportation cost, and total cost of BPG prophylaxis(Saxena et al., 2015)

In the Pakistan study total of 102 patients were included in study, out of total patients 75 (73.5%) were adherent to secondary prophylaxis. Adherence was lower for age more than 30 years 32 (65.3%) Vs 43 (81.1%). Adherence was strongly associated with valvular lesion (p=0.009) with less adherence among aortic stenosis (16,7%) and aortic regurgitation (62.5%) as compared to mitral stenosis (78.1%) and mitral regurgitation (78.1%). Lesser adherence was observed among patients presenting to the emergency department 19 (59.4%) vs. 56(80%) in OPD. (Sial et al., 2018)

Aswan Egypt study of 29 eligible patients, 65.5% adherent and 34.5% non-adherent for BPG prophylaxis, knowledge of nature of disease and knowledge of consequences of missing prophylaxis doses were higher in adherent groups.(Balbaa et al., 2015).

Factors associated with higher adherence were positive patient; staff and health system interaction were identified in three small studies in Australia and New Zealand. Adherence was closely linked with positive patient-staff interactions.

Patient confidence in health service and receipt of holistic care, as well as family support for and belief in treatment, were important to adherence. Appropriately trained, socially and culturally competent staff was associated with higher adherence. The presence of community health workers and a rheumatic fever resource nurse impacted positively on adherence. In patients and parents who had poor knowledge about the disease, non-adherence was also common. (Kevat et al., 2017)

In Fiji, study, overall, 203 patients, 37 (7%) had adequate adherence. Increasing age and time since diagnosis >1.5 years was inversely associated with adherence. The urban residency was associated with adequate adherence, (Engelman et al., 2016).

Recurrent episodes of RF occurred in 88 of 536 patients (16.5%). Patients with a recurrent episode of RF were younger, more frequently males, and less adherent to secondary prophylaxis than patients without RF recurrence.

Nonadherence to secondary prophylaxis had a significant association with recurrences of RF ($p < 0.0001$). On this study, recurrence was associated with nonadherence to secondary prophylaxis in 54.5% of cases. Non-adherence to secondary prophylaxis was 35% in the total sample of patients (536)(Pelajo et al., 2010).

In Italian study of 117 pediatric patients with rheumatic fever carditis, the data show that carditis at follow up was associated with the presence of carditis at diagnosis ($p<0.000$) and not with the level of compliance to antibiotic prophylaxis (p=NS).

Also there was no statistically significant association between recurrences of infections and good level of compliance to therapy and between number of recurrences and presence of carditis at follow up(Taddio et al., 2015)

The Northern Territory Rheumatic Heart Disease Register underestimates adherence, although the key performance indicator of > 80% adherence was not significantly affected. 2780 penicillin doses were validated; 426 inconsistencies were identified, including 102 incorrect dose dates. After cleaning, mean adherence increased (63.5% to 67.3%, $p<0.001$) and proportion of patients receiving80% of doses increased (34.2% to 42.1%, $p = 0.06$).(Dassel et al., 2017)

South India Tertiary Care Center study among 500 patients, two hundred and sixty-one patients were considered compliant and 239 were noncompliant as per the adherence rates. Noncompliance with secondary prophylaxis was more prevalent among male ($P = 0.003$), low socioeconomic class ($P = 0.0009$), uneducated ($P = 0.000018$), and the rural population ($P = 0.025$) (Nemani et al., 2018).

Those with a history of RF were more compliant with secondary prophylaxis ($P = 0.04$). Recurrences of RF were more common in those not on regular prophylaxis ($P = 0.011$).

Among the 239 noncompliant patients, 54 (10.8%) had adherence rate of 50%–80% and 185 (37%) had adherent rates <50%. Nearly 59% said that they were never advised regarding the secondary prophylaxis. The reasons for noncompliance were a sense of well-being, pain at the site of injection, financial constraints, distance to travel, unavailability of medicine and health-care professional, and allergy. Noncompliance significantly contributed to recurrences of RF (Nemani et al., 2018)

In Brazilian children study 536 patients with RF. Recurrent episodes of RF occurred in 88 of 536 patients (16.5%). Patients with a recurrent episode of RF were younger ($p < 0.0001$), more frequently males ($p = 0.003$), and less adherent ($p < 0.0001$) to secondary prophylaxis than patients without RF recurrence(Pelajo et al., 2010)

In Uganda, of 449 subjects with RHD heart failure was associated with poor penicillin adherence (p=0.001), and left ventricular end diastolic diameter greater than 55 mm (p=0.001). Patients whose average adherence to benzathine penicillin was <80% had significantly greater mortality (31% vs. 9%, p<0.001). the risk of death among those with poor penicillin adherence was 3.81 times higher than those with better adherence (HR=8.36, p=0.001)(Okello et al., 2017).

Cross sectional study of 39 patients with RF in Jamaica Only 48.7% had a high level of adherence. The majority (72%) had low knowledge levels regarding their illness. Most clients (70%) strongly agreed that nurses and doctors encouraged them to take their prophylaxis(Thompson et al., 2014).

2.2. Barriers for benzathine penicillin prophylaxis for RHD

A study was done in Jimma southwest Ethiopia the main barriers identified were patient's knowledge of the disease and the issue of medication availability. The other influencing factors for the prophylaxis were medications side effects, treatment schedule, clinical distance, rapport with health staff, cost of care, both financial burden and cost of traveling.(Petricca & Haileamlak, 2009).

Another study, here in Jimma, also showed, the main reason to miss and do not to initiate their prophylaxis among RHD patients were lack of money, followed by far distance from the hospital, fear of medication side effects and painful injection, and lack of knowledge about the disease and prevention. (Mohammed, 2019)

Out of 101 participants were interviewed. Adherence was very low (adequate in 6%). Barriers were taking alternative treatments and the perception that symptoms were benign and self-limiting. Medications missed due to lack of awareness, feeling well, and cost and medication unavailability(Engelman et al., 2017).

Study done in Australia also indicated that poor registration and recall system and pain of injection were identified barriers. The enablers of secondary prophylaxis uptake include positive patient-health provider relationships, supporting patient autonomy, education of patients, caregivers and healthcare providers, and community based service delivery(Chamberlain-salaun et al., 2017).

Lost to follow up and inadequate appointment frequency was the main barrier in patients with recurrent RF IN Brazilian study (Pelajo et al., 2010)

In the Uganda Kampala study, decreased compliance to penicillin was associated with increasing age (71% of those <15 years compared to 22% of those >50 years, p<0.001). Additional factors associated with poor compliance included no formal education (p=0.001), and the presence of stroke (0.04) or atrial fibrillation (p<0.001)(Okello et al., 2017)

A systematic review of 20 studies showed that demographic, clinical, socio-cultural, and health care service delivery factors were associated with adherence to secondary prophylaxis. Ensuring

an effective active recall system, providing holistic care, involving community health workers and health education can increase adherence as indicated in these reviews (Kevat et al., 2017).

3. Objective

3.1. General objective:

- ✓ To assess utilization/adherence and barriers to use secondary prophylaxis for RHD.

3.2. Specific objectives:

- ✓ To determine adherence rate to secondary prophylaxis for rheumatic heart disease
- ✓ To identify barriers that influencing the use of secondary prophylaxis for rheumatic heart disease.
- ✓ To assess awareness regarding rheumatic heart disease and the significance of secondary prophylaxis for rheumatic heart disease.

4. Methodology

4.1. Study settig

Tikur Anbessa specialized hospital is located in the capital city Addis Ababa, Ethiopia. It is the largest specialized referral teaching hospital for both undergraduate and postgraduate students in the country. In addition to teaching the hospital also gives both inpatient and outpatient service to patients referred from different parts of the country. Currently, it is the only governmental hospital where cardiac surgery is practiced in the country with a follow-up clinic for congenital and acquired heart disease in children and adults.

4.2. Data collection period

The study period was from June 5, 2020, to September 4, 2020 GC.

4.3. Study method

Cross sectional study using structured questioners on adherence for the BPG prophylaxis for the last 1-year and barriers to use BPG prophylaxis.

4.4. Source and study population

4.4.1. Source population

Patients with RHD attending adults' cardiac follow-up clinic.

4.4.2. Study population

Patients with history of RHD on BPG prophylaxis at least for the past 1 year.

4.5. Inclusion and exclusion criteria

4.5.1. Inclusion criteria

- ✓ Adults age >14 years with RHD who are willing to participate in the study.
- ✓ Patients with RHD who are available during the data collection period.
- ✓ Patients with RHD who are on secondary prophylaxis for at least 1 year.

4.5.2. Exclusion criteria

- ✓ Patients who are not on secondary prophylaxis for RHD
- ✓ Patients who came for the first time to the clinic as a follow up of the disease
- ✓ Patients/guardians who are not willing to participate in the study.

4.6. Study Variables

4.6.1. Dependent variables:

- Adherence

4.6.2. Independent variables:

- Age
- Sex
- Educational status
- Income
- Place of residency
- Comorbidities
- Number of hospitalization
- Time since RHD diagnosed
- Time since BPG started
- Barriers

4.7. Sample size and sampling method

Sample size will be determined based on single population proportion formula.

$$n = \frac{z^2 pq}{e^2}$$

Where

n= sample size

z= the standard normal deviate usually set at 1.96 (which corresponds to the 95% of confidence interval)

p= the proportion in the target population

q= 1-p

e= acceptable sample error

Since there is similar study done at Jimma which shows adherence rate of 55.2%. so using this proportion with 95% confident interval and 5% marginal error, calculated sample size will be

Where n- sample size, p= 0.55 z= 1.96 e=0.05

The calculated sample size = 381

Sampling method: Convenience sampling method was used, for all patients with RHD full filling inclusion criteria.

4.8. Data collection procedures:

4.8.1. Data collection instruments

The structured questionnaire was used. The questionnaire was developed and adapted from other related research in a way that addresses the objective of the study.

4.8.2. Data quality measurements

The questionnaire prepared in English and Amharic language was adopted and modified from different kinds of literature. The training was given to data collectors. The data collectors were a 4th-year medical student and medical intern. Continuous follow-up and supervision were done by the principal investigator. The questionnaire pre-tested in 5% of samples to check the questionnaire is clear and addressing the objective of the study. The collected data checked for completeness before the data entry process.

4.8.3. Data analysis and presentation.

Data were entered into SPSS version 26 manually. Data analyzed and results summarized by descriptive statics. Association was done by chi-square test for categorical tests and considered to be statistically significant when the p-value is below 0.05. Confidence interval set at 95%.

4.9. Operational Definition

- **Rheumatic Heart Disease (RHD):** Refers to the major long-term sequel of acute rheumatic fever, which involves the cardiac valves leading to stenosis or regurgitation with resultant hemodynamic disturbance.
- **Acute rheumatic fever (ARF)** is delayed, nonsuppurative sequel following group A streptococcus pharyngitis and may consist of arthritis, carditis, chorea, erythema marginatum, and subcutaneous nodules
- **Good adherence or adhered to prophylaxis**: if the rate of adherence is covering >= 80% of prophylaxis. i.e. patient has not missed any injection or only missed three or less than three times injection in the last 1 year or received prophylaxis nine or more than nine times).
- **Poor adherence or not adhered to prophylaxis:** if the rate adherence is <80%, i.e. patient had missed their regular injection more 3 times in the last 1 year or received less than nine injection.

5. Ethical consideration

Ethical clearance was obtained from the department of internal medicine research ethical committee. A written Informed consent obtained from the patients before data collection and patents have the full right not to participate in the study. The patients' response was fully confidential. The patients were not harmed if they would refuse to participate in the study.

6. Dissemination of the results:

This research after defense will be submitted to internal medicine department, college of health science, Addis Ababa, university. The research will also be submitted to reviewers for possible publications.

7. Results

7.1. Socio-demographic characteristics of the respondents

A total of 385 patients with rheumatic heart disease (RHD) attending adults cardiac clinic participated in the study. Among the participants, 276 (71.7%) of them were females and 345 (89.6%) were urban residents. The mean age was 31 years. Most of the participants were from Addis Ababa 259 (67.3%) (Table 1).

7.2. Awareness regarding rheumatic heart disease among the respondents

Among 383 participants, 219 (57.2%) had a history of sore throat, for only 148 (67.9%) patients medical doctors or other health professionals prescribed medication for sore throat. Antibiotics were the most prescribed medication 152(69.2%). Three hundred five respondents (79.6%) aware, 55(14.4) not aware association of sore throat with RHD, and 23(6%) have no idea, sore throat associated with heart disease. Three hundred two (79.5%) heard about rheumatic heart disease before. Regarding the purpose of benzathine penicillin, 288(75.6%) responded BPG prevent tonsillitis, 123 (32.2%) patients responded BPG cure RHD, and 30(7.9%) patients responded, it prevents worsening of RHD (Table 2)

7.3. Adherence to benzathine penicillin prophylaxis for RHD

Among 384 participants in the past 1 year, 211(54.9%) did not miss a monthly injection, 37(9.6%) patients missed one injection, 51(13.3%) missed two to three injections and 85(22.1%) missed more than three injections. Yielding adherence rate of 77.9 % while the left 85 patients (22.1%) were non-adhered to the prophylaxis. Two hundred and thirty-three (61.8%) wait until the next appointment when they missed the injection. Seven (1.9%) took alternative medication (herbal) when they missed monthly injections. Most of patients 287 (75.3%) never experienced a bad reaction to benzathine penicillin. Most of the patients 230 (59.9%) in this study were RHD diagnosed less than 10 years and 113(29.4%) patients were diagnosed to have RHD between the past 11-20 years. About 240 (62.3%) started on benzathine penicillin prophylaxis within the past 10 years (Table 3).

7.4. Barriers to monthly benzathine penicillin injection

In this study, the main reason for missing injection for most of the patients 216 (56.1%) were due to no medication supply followed by forgetting 167(43.4%) and health professional refuse to inject benzathine penicillin 149(38.7%). For the majority of patients 376(97.9%) the usual waiting time at the clinic during injection was less than 1 hour.

Importance of benzathine injection prophylaxis that had been explained by a doctor for majority 346(90.1%) patients. Regarding the effectiveness of medication 362(94%) patients agreed the drug is effective. The majority of patients 302(79.1%) disagreed painful nature of the injection prevent them from taking their injection. For 267 (69.7%) participants cost associated with coming to the clinic (like days off work, transportation, etc.) prevent coming to the injection clinic. About 346(90%) patients agreed secondary prophylaxis card or booklet that lists dates of injections is very useful. The majority 294(76.5%) agreed on analgesic mix or taking divided dose injection can increase adherence. From this study, finding a long waiting time at the clinic was not an obstacle to monthly injection 266(69.4%) (Table 4).

7.5. Factors associated with adherence to benzathine penicillin

In multivariable analysis, only increased age was found to have a significant association with adherence to BPG. As a result, for each one year increase in the age of patients with RHD attending adults cardiac clinic at TASH, the percent odds of adherence to b. penicillin decreases by 3% [AOR= 0.97; 95% CI 0.95, 0.99] (Table 5).

Table 1. Socio-demographic characteristics of patients with RHD attending adults cardiac clinic at TASH, Addis Ababa, Ethiopia, 2020

Variables		No.	Percent (%)
Age category (n=385)			
	<20 years	54	14.0
	20-29 years	140	36.4
	30-39 years	114	29.6
	40-49 years	49	12.7
	50-59 years	21	5.5
	>=60 years	7	1.8
Sex(n=385)	Female	276	71.7
	Males	109	28.3
Residence (n=385)			
	Rural	40	10.4
	Urban	345	89.6
Region (n=385)			
	Addis Ababa	259	67.3
	Oromia	82	21.3
	Amhara	21	5.5
	SNNPR	20	5.2
	Others	3	.8
Marital status (n=383)			
	Single	147	38.4
	Married	205	53.5
	Divorced	23	6.0
	Widowed	8	2.1
Occupation (n=383)			
	Government employee	76	19.8
	Non-government employee	71	18.5
	Student	59	15.4
	House wife	63	16.4
	Farmer	17	4.4
	Merchant	16	4.2
	No occupation	81	21.1

Family Income (n= 378)			
	> 1000 Ethiopian birr	269	71.2
	< 1000 Ethiopian birr	82	21.7
	No income	27	7.1
Level of Education (n= 372)			
	No formal education	40	10.8
	Primary school	124	33.3
	Secondary school	133	35.8
	Teriary	75	20.1

Table 2.Awareness regarding rheumatic heart disease among patients with RHD attending adults cardiac clinic at TASH, Addis Ababa, Ethiopia, 2020.

Variables	**No.**	**Percent (%)**
History of sore throat (n=383)		
Yes	219	57.2
No	164	42.8
Treatment for sore throat (n=218)		
Antibiotics	152	69.7
Salt	16	7.3
Traditional herbs	44	20.2
Other	6	2.8
A person prescribed the medication for sore throat (n=218)		
Myself	22	10.1
Friend/Relative	44	20.2
Medical doctor/another health professional	148	67.9
Others	4	1.8
Awareness of complications of sore throat (n=379)		
Yes	294	77.6
No	85	22.4
Sore throat associated with heart disease (n=383)		

	Yes	305	79.6
	No	55	14.4
	No idea	23	6.0
Adequate treatment of acute sore throat prevent heart disease (n=377)			
	True	350	92.8
	False	27	7.2
Ever heard about rheumatic heart disease (n=380)			
	Yes	302	79.5
	No	78	20.5
Benzathine penicillin prophylaxis for RHD, alleviate the symptoms (n=382)			
	Yes	70	18.3
	No	312	81.7
Benzathine penicillin prophylaxis for RHD, prevent worsening(n=382)			
	Yes	30	7.9
	No	352	92.1
Benzathine penicillin prophylaxis for RHD, cure the disease(n=382)			
	Yes	123	32.2
	No	259	67.8
Benzathine penicillin prophylaxis for RHD, prevent tonsillitis (n=381)			
	Yes	288	75.6
	No	93	24.4
What can happen if you do not take these injections (n=375)			
My heart condition will get worse/ symptoms will start to appear		369	98.4
It is okay to miss a few doses, nothing will happen		6	1.6
Aware side effects of benzathine penicillin (n=381)			
	Yes	47	12.3
	No	334	87.7

Figure 1. Time since RHD diagnosed among patients with RHD attending adults cardiac clinic at TASH, Addis Ababa, Ethiopia, 2020. **(n=384)**

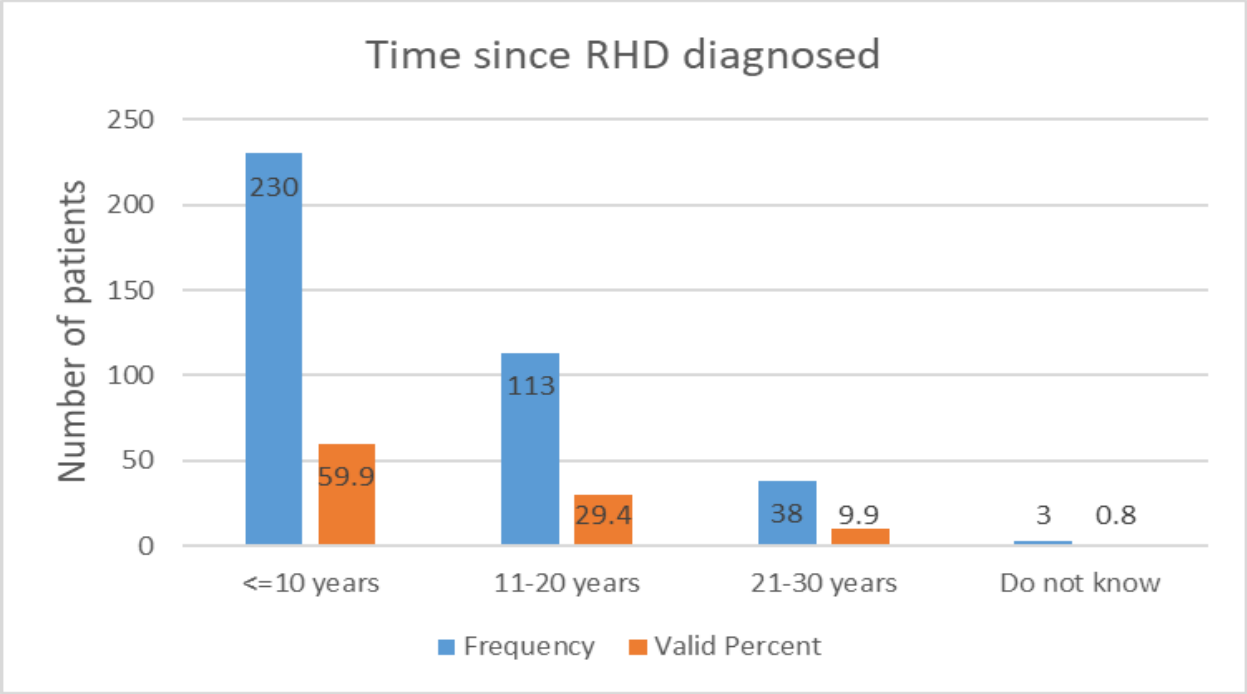

Figure 2. Time since benzathine penicillin prophylaxis for RHD among patients with RHD attending adults cardiac clinic at TASH, Addis Ababa, Ethiopia, 2020. **(n=385)**

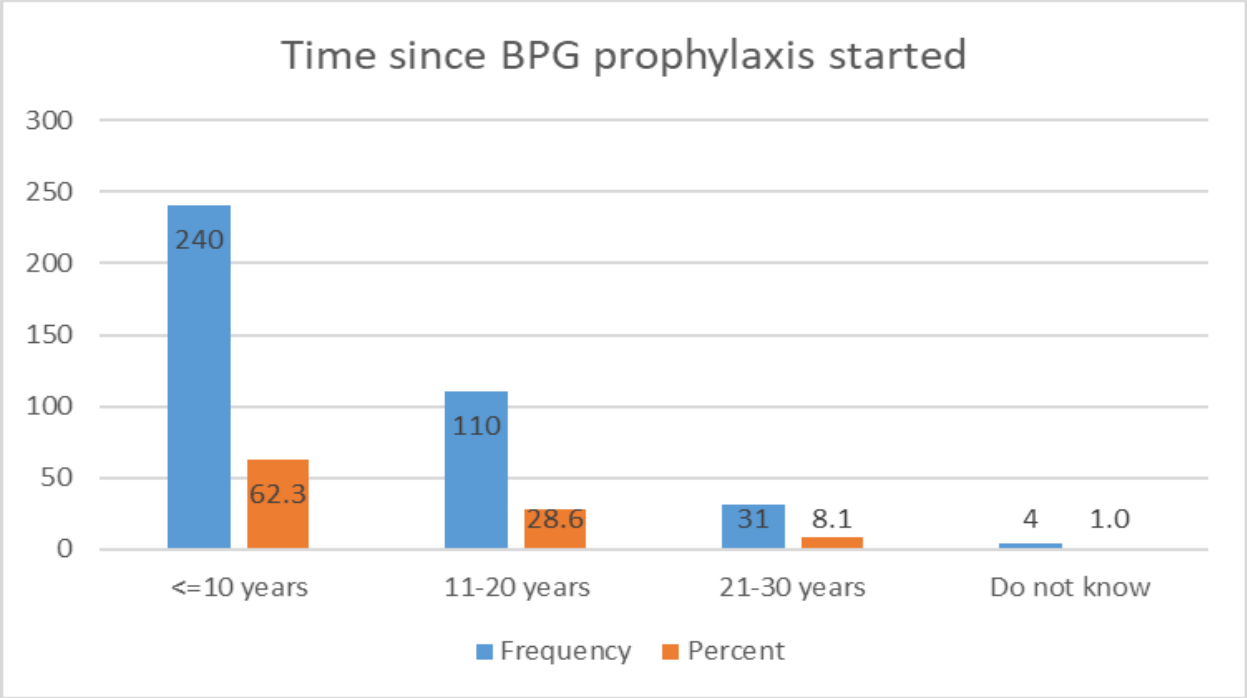

Table 3. Adherence to b. penicillin prophylaxis for RHD among patients with RHD attending adults cardiac clinic at TASH, Addis Ababa, Ethiopia, 2020

Variables		No.	Percent (%)
Serious reaction (more than local swelling and pain) following a previous b. penicillin injection (n=381)			
	Yes	94	24.7
	No	287	75.3
Attend appointment for BPG penicillin prophylaxis (n=382)			
	Alone	216	56.5
	With a family member	163	42.7
	With others	3	.8
Benzathine penicillin prophylaxis card is useful (n=380)			
	Yes	341	89.7
	No	39	10.2

Injections missed in the past 1 year (n=384)		
None	211	54.9
One	37	9.6
Two to three	51	13.3
More than three	85	22.1
What do you do if you miss monthly benzathine penicillin (n=377)		
Wait until my next appointment	233	61.8
Go a few days later	137	36.3
Take alternative medication (herbal)	7	1.9
Hospital admissions in the last 1 year (n=385)		
No admission	279	72.5
Once	45	11.7
Twice	13	3.4
Three times	20	5.2
Four and more	28	7.3
Co-morbidities (n=385)		
No	339	88.1
Hypertension	13	3.4
Diabetes mellitus	5	1.3
Ashma	3	.8
Other	25	6.5

Figure 3. Barriers to monthly b. penicillin injection among patients with RHD attending adults cardiac clinic at TASH, Addis Ababa, Ethiopia, 2020.

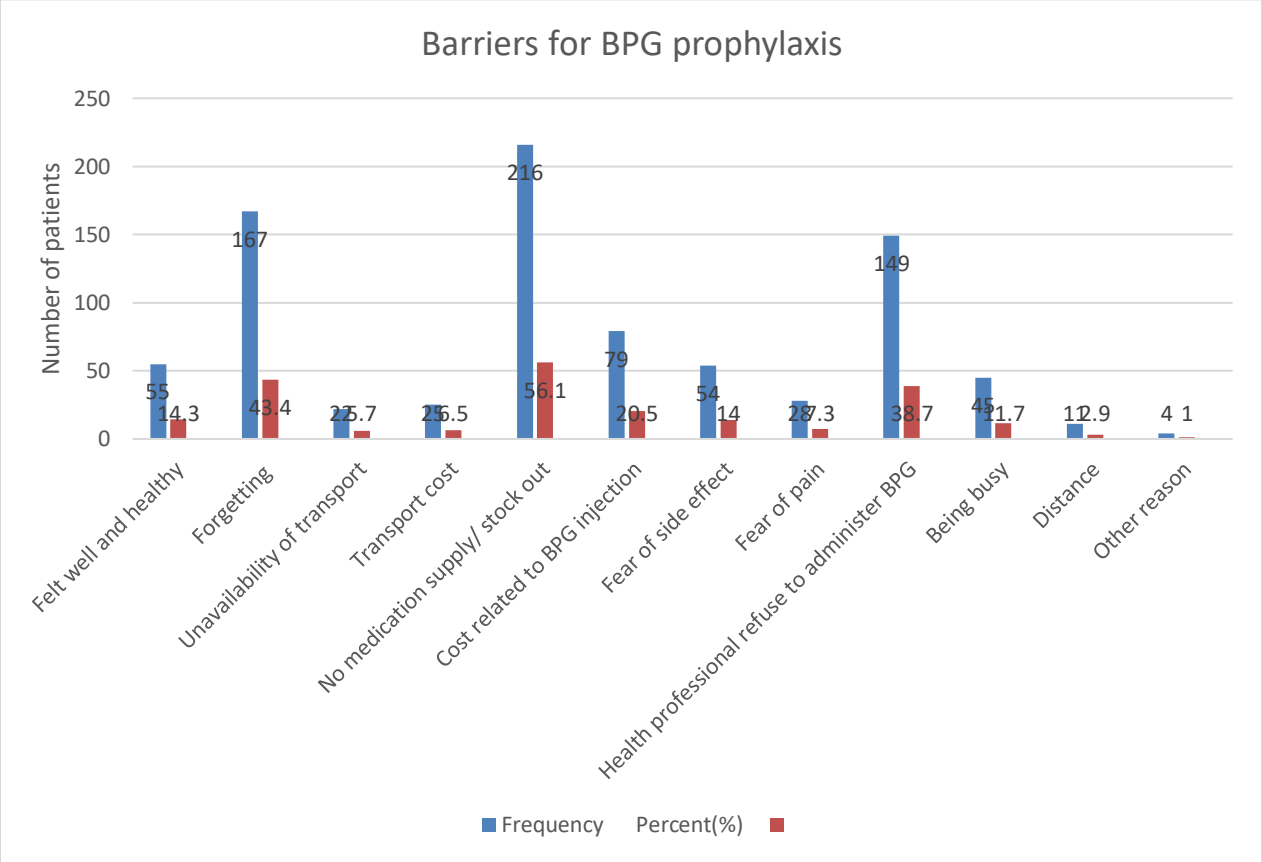

Table 4. Barriers to monthly b. penicillin injection among patients with RHD attending adults cardiac clinic at TASH, Addis Ababa, Ethiopia, 2020.

Variables	No.	Percent (%)
Why health professionals refuse to give BPG injection (n=379)		
Fear of side effects	254	67.0
Lack of training on how to inject	60	15.8
Because they feel that it is not their responsibility	21	5.5
Inadequate number of health professional in remote areas	26	6.9
Other	18	4.7
Time taken to get to the clinic (n=384)		
Less than 1 hour	348	90.6
1 to 2 hour	19	4.9
More than 2 hours	17	4.4
Transportation usually used to get to the clinic (n=383)		
Bus/ Taxi	70	18.3
Car	13	3.4
Walking	296	77.3
Other	4	1.0
Usual waiting time at the clinic where you receiving prophylaxis (n=384)		
< 1 hour	376	97.9
1 hour and more	8	2.1

Table 4. Health care barriers to monthly b. penicillin injection among patients with RHD attending adults cardiac clinic at TASH, Addis Ababa, Ethiopia, 2020

Variables	No.	Percent (%)
The doctor has explained what rheumatic heart disease is		
Agree	347	90.4
Neutral	8	2.1
Disagree	29	7.6
The doctor clarified to me why the injections are important		
Agree	346	90.1

	Neutral	8	2.1
	Disagree	30	7.8
I believe that this medication is effective			
	Agree	362	94.5
	Neutral	14	3.7
	Disagree	7	1.8
Taking the injections will make me better			
	Agree	365	95.1
	Neutral	14	3.6
	Disagree	5	1.3
Taking the injections is painful			
	Agree	51	13.3
	Neutral	58	15.1
	Disagree	275	71.6
The painful nature of the injection deter me from taking the injection			
	Agree	34	8.9
	Neutral	46	12.0
	Disagree	302	79.1
Cost associated to coming to the clinic (days off work, transportation, etc), prevent me from coming			
	Agree	267	69.7
	Neutral	26	6.8
	Disagree	90	23.5
Long wait times at the injection clinic are deterrent to come to my appointment			
	Agree	63	16.4
	Neutral	54	14.1
	Disagree	266	69.5
Secondary prophylaxis cards or booklets that list dates of injections are very useful (Reminder)			
	Agree	346	90.1
	Neutral	30	7.8
	Disagree	8	2.1
Taking analgesic mix or divided dose injection can increase adherence			
	Agree	294	76.6
	Neutral	70	18.2
	Disagree	20	5.2

Table 5. Bivariable and Multivariable Logistic Regression analysis results of factors associated with adherence to b. penicillin patients with RHD attending adults' cardiac clinic at TASH, Addis Ababa, Ethiopia, 2020

Explanatory Variables	Adherence to b. penicillin		COR(95% CI)	AOR(95% CI)	P-value
	Adhered	Not adhered			
Age in year	30.03 ± 10.4¥	34.0 ± 11.2¥	0.97(0.95, 0.99)*	0.97(0.95, 0. 99)	0.006
Time since benzathine penicillin prophylaxis started					
≤ 10 years	194 (80.8%)	46 (19.2%)	1		
11 - 20 years	83 (76.1%)	26 (23.9%)	0.76 (0.44, 1.31)		0.317
21 – 30 years	19 (61.3%)	12 (38.7%)	0.38 (0.17, 0.83)*		0.015

¥ mean ± SD * statistically

significant at p value of ≤ 0.05

8. Discussion:

Out of 385 study participants, females were 276(71.7%), most of them were from urban area 354(89.6%). The mean age of participants was 31 years. Of the study participants, 219(57.2%) reported having had a history of sore throat which lower than the study done on Cameroon (71.1%) which is probably due to different sociodemographic backgrounds. Antibiotics were the most prescribed medication 152(69.7%) and health professionals prescribed treatment for the majority of the patients (67.9%) which is higher than the Cameroon study (45%), (35.8%) respectively (Id et al., 2018).

In this study, 305(70.6%) patients were aware of the consequence of sore throat association with heart disease this better than the Cameroon study in which 70% of participants did not know the association between sore throat and rheumatic heart disease(Id et al., 2018). About 302(79.6%) heard about rheumatic heart disease. Knowledge of BPG prophylaxis among patients, 288(75.6%) patients responded as it prevents tonsillitis, and 30(7.9%) patients were aware that it is useful to prevent worsening rheumatic heart disease.

Out of 384 participants, 211(54.9%) did not miss a monthly injection, 37(9.6%) missed one injection, 51(13.3%) missed two to three injections and 85(22.1%) missed more than three injections past 1 year. The overall adherence rate for this study was 77.9%, which is better than a similar study done in Jimma, Ethiopia (adherence rate was 55.2%)(Mohammed, 2019). The better adherence rate in this study can be explained by, most of the participants were from an urban area and they have a better understanding of the benefit of BPG prophylaxis. However, the adherence rate in this study is lower than in Indian patients (93.6%) (Saxena et al., 2015). Probably different socioeconomic backgrounds as compared to our patients. Our study finding adherence rate is comparable to Pakistan study finding (73.5%) (Sial et al., 2018).

Major barriers for prophylaxis in this study was nonavailability of drug 216(56.1%), forgetting 167(43.4%), health professionals refuse to give injection 149(38.7%), cost related to BPG injection 79(20.5%), and fear of side effects 54(14%). This finding is consistent with a study done on barriers to BPG prophylaxis in Jimma, Ethiopia the main barriers were unavailability of medication, drug side effects(Petricca & Haileamlak, 2009). This study finding barriers also consistent with the Indian study, the main barriers were nonavailability of drug, pain, and fear of injection(Saxena et al., 2015). Other influencing factors for prophylaxis in different studies were treatment schedule, clinical distance, perception that the symptoms are benign and self-limited, and lack of awareness, which were not in this study finding. Poor recall system was a barrier in another study, which is identical to this study finding. For the majority of participants 376 (97.9%) the usual waiting time at the clinic was less than 1 hour, which is much less than the Egypt study, for whom 66% of patients waiting for 1 to 3 hours average 2 hours.(Balbaa et al., 2015).

Only increased age was found to have a significant association with adherence to B. penicillin (P-value 0.006). For each one-year increase in the age of patients with RHD, the percent odds of adherence decreases by 3%. This is consistent with Uganda Kampala study, decreased compliance to penicillin was associated with increasing age (71% of those <15 years compared to 22% of those >50 years, $p<0.001$).

9. Conclusion.

The overall adherence to BPG prophylaxis for RHD was low (77.9%) in patients attending the cardiac clinic at TASH. The major barriers were benzathine penicillin unavailability, forgetting, and health professional related issues. Increasing age was associated with nonadherence.

10. Limitation of the study

The limitation of this study as it was being done in a single center and will not be representative of the general population of the whole country partially. The other limitation of the study, as it was done within a short period of time and the data might not be complete. During the data collection period, patients from outside Addis Ababa city were not fully included, due to the current COVID-19 pandemic.

11. Recommendations.

To improve adherence, creating awareness regarding the benefit of BPG prophylaxis is essential. This study finding barriers might be used as input to find solutions to increase adherence. RHD control program, based registry of patients is essential for the delivery of secondary prophylaxis. Registries improve the ability to follow patients and identify those who default from prophylaxis and to institute strategies to improve adherence.

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13. Annexes

A. English Version consent

Dear study participants, first I would like to thank you for your participation in this study.

I understood the purpose of the study entitled “utilization and barriers to secondary prophylaxis for rheumatic heart disease in adult patients at Tikur Anbessa specialized hospital Ethiopia”. I informed fully in the language I understand about the aim of the above-mentioned research. I have been informed that my medical chart will be reviewed and there will be an interview. Also, I have been told all the information collected throughout the research process will be kept confidential. I understood my current and future medical services will not be affected if I refused to participate in the study.

Agree_____ Not agree_____

Therefore, I give my consent freely for my participation in this study.

Signature: _____ Date:

ለታካሚዎች የፈቃድ መስጫ ቅጽ

የተከበሩ የጥናት ተሳታፊ በዚህ ጥናት ላይ ለመሳተፍ ፍቃደኛ ስለሆኑ በቅድሚያ አመሰግናለሁ

ይህ መጠይቅ በጥቁር አንበሳል ሆስፒታል በአዲስ አበባ ኢትዮጵያ ውስጥ ለአዋቂዎች የልብ ህመምተኞች ቤንዛንቲን ፔኒሲሊን መርፌ መከላከያ አጠቃቀምን እና መሰናክሎችን አስመልክቶ አጠቃላይ ጥናት ለማካሄድ ዝግጁ የሆነ መጠይቅ ነው። ይህን ለማወቅ በታሰበው ምርምር ላይ በሚገባኝ ቋንቋ በቂ መረጃ አግኝቻለሁ። የህክምና መረጃ ምንም አይነት ጉዳት በማያደርስ መልኩ እንደሚወሰድ ተረድቻለሁ። በተጨማሪም የሚወሰዱ ማናቸውም መረጃዎች በሚስጢር እንደሚያዙ ተነግሮኛል። እንድሁም የሚጠየቀውን መረጃ ያለመስጠትና በጥናቱ ያለመሳተፍ መብት እንዳለኝ እንድሁም ከጥናቱ በማናቸውም ወቅት ራሴን ማግለል እንደምችል የተገለፀልኝ ሲሆን ይህንንም በማድረጌ ወደፊትም ሆነ አሁን የማገኛቸው የህክምና ግልጋሎቶች እንደማይጓደሉብኝ ተነግሮኛል።

እስማማለሁ _____አልስማማም _____

ስለዚህ በዚህ ጥናት ላይ ለመሳተፍ በራሴ ፈቃደኝነቴን እገልፃለሁ።

ፊርማ ---------- ቀን ----------

Questionnaire

A. English version

This is a questionnaire, which is prepared to undergo cross sectional study on utilization and barriers to secondary prophylaxis for RHD patients seen at TASH adults' cardiac clinic Addis Ababa Ethiopia. The data will be collected from patient and medical recording system.

Date _____ MRN/ICARE Number _____

General instruction

i. For all questions that have a pre- coded response,

- ✓ Circle the responses that best match with your response

ii. For open ended questions write your responses in your own words, phrases or statement

SN	Variables	Category/response
	Part I. Socio-demographic data	
1	Age in year	_____
2	Sex	1. Female 2. Male
3	Address	1.Rular 2.Urban
4	Region	1. Addis Ababa 2. Tigray 3. Oromia 4. Amhara 5. SNNPR 6. Others (specify)
5	Marital status	1. Single 2. Married 3. Divorced 4. Widow
6	Occupation	1. Farmer 2. Merchant 3. Government employee 4. Non-government employee Student 5. House wife 6. Others specify
7	Family income	1. >1000 Ethiopian birr 2. <1000 Ethiopian birr 3. No income

8	Level of education	_____
	Part II. Awareness regarding rheumatic heart disease	
1	Have you ever had a sore throat? _____	1. Yes 2. No
2	If yes in question 1, what did you do to treat the sore throat?	1. Antibiotics 2. Salt 3. Traditional herbs 4. Others
3	Who prescribed medication when you had a sore throat?	1. Myself 2. Friend/Relative 3. Medical doctor/ healthcare professional 4. Other.
4	Are you aware of any complications that could occur in case sore throat is poorly treated?	1. Yes 2. No
5	Can sore throat be associated with heart disease?	1. Yes 2. No 3. No idea
6	Adequate treatment of acute sore throat is an important tool in the prevention of heart Disease	1. True 2. False
7	Have you ever heard about rheumatic heart disease?	1. Yes 2. No
8	What is the purpose /benefit of b. penicillin prophylaxis for RHD? (more than one answer is possible)	1. Alleviate the symptoms. 2. Prevent worsening 3. Cure the disease 4. Prevent tonsillitis
9	If you do not take these injections what can happen?	1. My heart condition will get worse/symptoms will start to appear 2. It's ok to miss a few doses, nothing will happen
10	Are you aware of the side effects of b. penicillin?	1. Yes 2. No
11	If yes, for Q 11what are the side effects?	_____
12	Have you ever had a bad reaction (more than local swelling and pain) following a previous penicillin injection?	1. No 2. Yes
	Part III Adherence to b. penicillin prophylaxis for RHD	
1	When was RHD diagnosed?	1. ≤10 years 2. 11–20 years

		3. 21–33 years 4. Do not know
2	When did you start benzathine penicillin prophylaxis?	1. ≤10 years 2. 11–20 years 3. 21–33 years 4. Do not know
3	With whom you usually attend appointments for benzathine penicillin prophylaxis injection?	1. Alone 2. With a family member 3. With others(Specify)
4	Do you think benzathine penicillin prophylaxis card is useful?	1. Yes 2. No
5	How many injections you have missed in the past 1 year?	1. One 2. Two to three 3. More than three 4. None
6	If you miss monthly B. penicillin what do, you do.	1. Wait until my next appointment 2. Go a few days later 3. Take alternative medication (herbal)
7	How many admissions do you have in the last 1 year?	1. No admission 2. Once 3. Twice 4. Three times 5. Four and more
8	Does the patient have Co-morbidities?	1. Hypertension 2. Diabetes mellitus 3. Asthma 4. Others…
	Part IV. Barriers to monthly b. penicillin injection	
1	What is Reason/s for missing injections?	1. Felt well and healthy 2. You forget 3. Transport unavailable 4. Transport costs 5. No medication supply /Stockout 6. Cost related to BPG injection 7. Fear of Pain 8. Fear of side effects

		9. Health professional refuse to administer BPG 10. Being busy 11. Distance 12. Others…
2	Why some health professionals refuse to give injection?	1. Fear of side effects 2. Lack of training how to inject. 3. Because they feel that it is not their responsibility 4. Inadequate number of health professional in remote areas 5. Other…
3	How long does it take you to get to the clinic?	1. Less than 1 hour 2. 1 to 2 hour 3. More than one 2 hours.
4	What mode of transportation do you usually use to get to the clinic?	1. Bus/Taxi 2. Car 3. Walking 4. Others.
5	How long do you usually wait at clinic you receiving prophylaxis?	1. < 1 hour 2. 1 to 3 hours 3. 3 to 5 hours 4. More than 5 hours

Part V Health care barriers

Answer the following questions choosing strongly agree, Agree, Undecided, Disagree or Strongly Disagree

	Strongly agree	Agree	Undecided	Disagree	Strongly Disagree
1. My doctor has explained what Rheumatic heart disease is.	1	2	3	4	5
2. My doctor clarified why the injections are important.	1	2	3	4	5
3. I believe that this medication is effective.	1	2	3	4	5
4. I need to take this medication even if I do not feel any symptoms.	1	2	3	4	5
5. Taking the injections will make me better.	1	2	3	4	5
6. I trust the information the doctors provide.	1	2	3	4	5
7. Taking the injections is painful.	1	2	3	4	5
8. The painful nature of the injection	1	2	3	4	5

deter me from taking the injections.						
9. Costs associated to coming to the clinic (days off work, transportation, etc.) Prevent me from coming.		1	2	3	4	5
10. Long wait times at the injection clinic are a deterrent to come to my appointment		1	2	3	4	5
11. Secondary prophylaxis cards or booklets that list dates of injections is very useful		1	2	3	4	5
12. Taking analgesic mix, divided dose injection can increase adherence.		1	2	3	4	5

1. What do you think the most important the barriers for monthly b. penicillin injection?

መጠይቅ

ቀን: _____ የሕክምና ካርድ/ICARE ቁጥር _____

አጠቃላይ መመሪያ

i. ለሁሉም ጥያቄዎች የሚዛመዱ ምላሽ ክብቡ
ii. ክፍት ለሆኑ ጥያቄዎች በእራስዎ ቃላት፣ ሐረግ ወይም ዐረፍተነገር ይፃፉ

መ.ቁ	ተለዋዋጮች	ምድብ / ምላሽ
	ክፍል አንድ: ማህበራዊና አከባብያዊ ኑሮ ባህሪያት	
1	ዕድሜ በአመት	_____
2	ጾታ	1. ሴት 2. ወንድ
3	የመኖሪያ አካባቢ	1. ገጠር 2. ከተማ
4	ክልል	1. አዲስአበባ 2. ትግራይ 3. ኦሮምያ 4. አማራ 5. ደቡብ 6. ሌሎች (ይግለጹ)

5	የጋብቻ (ትዳር) ሁኔታ	1.አላገባሁም 2. ባለትዳር ነኝ 3. ፈትቻለሁ 4.ባሌሞቷል/ሚስቴ ሞታለች
6	ሥራ	1. ገበሬ 2. ነጋዴ 3. የመንግስት ሰራተኛ 4. የመንግስት ያልሆነ ሠራተኛ 5. ተማሪ 6.የቤት እመቤት 7. ሌሎች (ይገልፃሉ)
7	ወርሃዊ የቤተሰብ ገቢ	1. > 1000 የኢትዮጵያ ብር 2. <1000 የኢትዮጵያ ብር 3. ገቢ የለም
8	የትምህርት ደረጃ	————
	ክፍል ሁለት: የሩማቲክ የልብ በሽታን ግንዛቤ በተመለከተ መጠይቅ	
1	የቶንሲል በሽታ/ የጉሮሮ መቁሰል አጋጥሞዎት ያውቃሉ? ————	1. አዎ 2. የለም
2	አዎ ከሆነ በጥያቄ 1 ላይ፣ለማከምምን አደረጉ?	1. አንቲባዮቲኮች መድሃኒት 2. ጨው 3. ባህላዊ እፅዋት መድሃኒት 4. ሌሎች …
3	አዎ ከሆነ በጥያቄ 1 የጉሮሮ መቁሰል ችግር ቶንሲል በሽታ ሲያጋጥምዎ መድሃኒት ያዘዘውማ ነው?	1. ራሴ 2. ጓደኛ ወይም ዘመድ 3.የሕክምና ዶክተር/ የጤና ባለሙያ 4. ሌላ ሰው
4	የጉሮሮ መቁሰል በተገቢ ውሁኔታ ካልታከመ ሊከሰት የሚችል ማናቸውም ውስብስብ ችግሮች ያውቃሉ?	1. አዎ 2. የለም
5	የጉሮሮ መቁሰል ቶንሲል በሽተ ከልብ ህመም ጋር ሊዛመድ ይችላል?	1. አዎ 2. የለም 3. ምንም ሀሳብ የለም
6	ቶንሲል በሽተ ህክምና በተገቢ ሁኔታ ማድረግ የልብ በሽታን ለመከላከል ጠቃሚ መሣሪያ ነው	1. እውነት 2. ሐሰት
7	ከዚህ በፊት ስለ የልብ ህመም ሪመቲክ (RHD) ሰምተው	1. አዎ 2. የለም

	ያውቃሉ?	
8	የፔኒሲሊን mRØ ጥቅሙ ምንድ ነው? (ከአንድ በላይ መልስ መስጠት ይቻላል)	1. ምልክቶቹን ያሻሽሉ። 2. የልብ ህመም እንዲባባስ 3. በሽታውን ይፈውሳል 4.የቶንሲል በሽታ መከላከል
9	እነዚህን መርፌዎች ካልወሰድክ ምን ሊሆን ሊከሰት ይችላል?	1. የልብ ሁኔታ ይበባሳል 2. ምንም ነገር አይከሰትም
10	የቤንዛታይን ፔኒሲሊን የጎንዮሽ ጉዳቶች ያውቃሉ?	1. አዎ 2. የለም
11	አዎ ከሆነ፣ ለጥያቄ 11 የጎንዮሽ ጉዳቶች ምንድናቸው?	_____
12	ከዚህ በፊት የፔኒሲሊን መርፌን በመከተል መጥፎ ጎንዮሽ ጉዳት እብጠት እና ህመም በላይ አጋጥሞዎት ያውቃሉ?	1. የለም 2. አዎ
	ክፍል ሶስት ቤንዛንቲን ፔንሲሊን በአጠቃላይ በተመለከተ መጠይቅ	
1	መቼ ነበር የልብ በሽታ ሪመቲክ (RHD) ምርመራየ ተደረገው የታወቀው	1. ≤10 ዓመት 2. ከ 11 እስከ 20 ዓመት 3. 21 - 33 ዓመታት 4. አታውቅም
2	ቤንዛታይን ፔኒሲሊን መከላከያ መርፌ መቼ ነበር የጀመሩት?	1. ≤10 ዓመታት 2. ከ 11 እስከ 20 ዓመታት 3. 21 - 33 ዓመታት 4. አታውቅም
3	ለቤንዛታይን የፔኒሲሊን መከላከያ መርፌ ለመውሰድ የሚመጡት ከማን ጋር ነው?	1. ብቻዬን 2. ከቤተሰብ አባል ጋር 3. ከሌሎች ጋር (ይግለጹ)
4	የቤንዛታይን ፔኒስሊን መከላከያ መርፌ ካርድ ጠቃሚ ነው?	1. አዎ 2. የለም
5	ባለፈው 1 ዓመት ውስጥ ስንት መርፌ አመለጠዎት ?	1. አንድ 2. ከሁለት እስከ ሶስት 3. ከሶስት በላይ 4. አላመለጠኝም
6	ወርሃዊ ቤንዛታይን ፔኒሲሊን ቢያጡ ምን ያደርጋሉ?	1.የሚቀጥለው ቀጠሮ እስከ ሚይድረስ እጠብቃለው 2.ከጥቂት ቀናት በኋላ እሄዳው 3.አማራጭ መድሃኒት ወስዳለው
7	ባለፈው 1 አመት ውስጥ ስንቴ ሆስፒታል ተገኝተዋል	1. ምንም አልተኛውም 2. አንዴ 3. ሁለት ጊዜ

		4. ሦስት ጊዜ 5. አራት እና ከዚያ በላይ
8	ህመምተኛው ተጨማሪ በሽታ አለው?	1.የደምግፊት 2.የስኪርበሽታ 3. አስም 4. ሌሎች …. 5. የለም
	ክፍል 4: የወርሃዊ የቤዚዚን ፔኒሲሊን መርፌ አወሳሰድ መሰናክሎች የሚመለከት መጠይቅ	
1	መርፌ አለመውሰድ ምክንያት ምን ሊሆን ይችላል (ከአንድ በላይ መልስ መስጠት ይቻላል)	13. ጤነኝነት ስለሚሰማኝ 14. ረስቼ 15. ትራንስፖርት አይገኝም 16. የትራንስፖርት ወጪዎች /ችግር 17. የመድኃኒት አቅርቦት የለም 18. የመርፌ ውጭ 19. ህመም ፍርሃት 20. የጎንዮሽ ጉዳቶች ፍርሃት 21. የጤና ባለሙያ መርፌ ለመውጋት ፈቃደኛ አይሆን 22. በሥራ መጠመድ 23. ርቀት 24. ሌሎች (ይገልፃሉ)…
2	አንዳንድ የጤና ባለሙያዎች መርፌ መስጠት ለምን እንቢ ይላሉ	6. የጎንዮሽ ጉዳቶች ፍርሃት 7. መርፌ የመስጠት ስልጠና ስላልወሰዱ። 8. የእነሱ ኃላፊነት እንዳልሆነ ስለማይሰማቸው 9. በቂ የጤና ባለሙያ አለመኖር 10. ሌላ (ይገልፃሉ)…
3	ወደ ክሊኒኩ ለመሄድ ምንያህል ጊዜ ይወስዳል?	4. ከ 1 ሰዓት በታች 5. ከ 1 እስከ 2 ሰዓት 6. ከ 2 ሰዓታት በላይ።
4	ወደ ክሊኒኩ ለመድረስ ብዙውን ጊዜ የትኛውን የትራንስፖርት አይነት ይጠቀማሉ?	5. አውቶቡስ / ታክሲ 6. መኪና 7. መራመድ 8. ሌሎች።
5	ክሊኒኩ መርፌ ሊወሰዱ ሲመጡ ምን ያህል ጊዜ ይጠብዋሉ?	5. ከ1 ሰዓት በታች 6. ከ 1 እስከ 3 ሰዓታት

		7. ከ 3 እስከ 5 ሰዓታት 8. ከ 5 ሰዓታት በላይ

ክፍል አምስት የሚከተሉትን ጥያቄዎች በጣም እስማማለው ፣ እስማማው ፣ ገለልተኛ (Natural)፣ አልስማም፣ በጣም አልስማማም በማለት ይመልሱ

	በጥብቅ እስማማለሁ	እስማማለሁ	ገለልተኛ (Natural)	አልስማም	በጣም አልስማ
1. ሐኪሜ የልቤ በሽታ ህመም ምን እንደሆነ አብራርተውልኛል	1	2	3	4	5
2. ሐኪሜ መርፌዎቹ ለምን አስፈላጊ እንደሆኑ አብራርተውልኛል።	1	2	3	4	5
3. ይህ መድሃኒት ውጤታማ ነው ብዬ አምናለሁ።	1	2	3	4	5
4. ምንም ዓይነት ህመም ባይሰማኝም እንኳ ይህንን መድሃኒት መውሰድ አለብኝ።	1	2	3	4	5
5. መርፌዎችን መውሰድ የተሻለኝ ያደርገኛል።	1	2	3	4	5
6. ሐኪሞቹ የሚሰጡትን መረጃ አምናለሁ።	1	2	3	4	5
7. መርፌዎችን መውሰድ ህመም ያስከትላል።	1	2	3	4	
8. መርፌው የሚያስከትለው ህመም ከመውሰድ ይከለክለኛል።	1	2	3	4	5
9. ወደ ክሊኒኩ ከመምጣት ጋር የተያያዙ ወጪዎች (ከስራ ውጭ ቀናት፣ትራንስፖርት፣ወዘተ) ከመምጣት ይከላከላሉ።	1	2	3	4	5
10. በመርፌ ክሊኒክ ውስጥ ረጅም ጊዜ የሚቆዩበት ጊዜ ወደ ቀጠሮዬ ከመምጣት ይከላከላሉ	1	2	3	4	5
11. መርፌዎችን አወሳሰድ የሚዘረዝሩ ካርዶች ወይም በራሪ ወረቀቶች በጣም ጠቃሚ ናቸው	1	2	3	4	5

12. ሀመም ማስታገሻ ድብልቅ መውሰድ፣/ የተከፋፈለ መጠን መርፌን መውሰድ አጠቃቀምን ይጨምራል።	**1**		**2**	**3**	**4**	**5**

1. **ለወርሀዊ ቤዛንቲን ፔንስሊን አወሳሰድ ዋና መሰናክሎች ምን ያመስሎታል?**

14. Declaration

I, undersigned, declare that this postgraduate research is my original work, and materials used for the thesis have been acknowledged.

Postgraduate candidate: Lemma Zewde, MD

Signature: ----------

Date of submission January 8, 2020

This thesis has been submitted with my approval as an advisor:

Advisor: Desalew Mokennen, MD, Internist and consultant Cardiologist

Signature: ----------

Date: ----------

Place: Addis Ababa, Ethiopia