

# Adherence of Rheumatic Heart Disease Patients to Secondary Prophylaxis and Main Reasons for Poor Adherence at Jimma Medical Center

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## Abstract

**Objectives:** Rheumatic heart disease (RHD) is the major long-term sequel of acute rheumatic fever (ARF), which involves the cardiac valves leading to stenosis or regurgitation with resultant hemodynamic disturbance. The incidence of ARF and prevalence RHD in the sub-Saharan Africa including Ethiopia are amongst the highest in the world. The main priority of long-term management of ARF or RHD is to ensure that patients are adherent to the secondary prophylaxis which is monthly benzathine penicillin injection to prevent recurrent attacks of ARF.

**Materials and Methods:** A cross-sectional study was conducted among sampled 241 RHD patients having at least one year follow-up at cardiac clinic of Jimma Medical Center (JMC) who appointed every month to receive

injections of antibiotic prophylaxis. The data was collected for 4 months (from June 1-September 30, 2018) by asking their follow-up status of last one year retrospectively and assessing related variables by using face to face interview. After the data was collected using structured questionnaires, it was coded, entered into Epi data and exported to SPSS for further analysis. The adherence rate of RHD patients was determined by frequency of annual injections of prophylaxis.

**Results:** A total of 241 patients with RHD were interviewed, among those 224 (93.0%) were received the secondary prophylaxis at least once within last one year, despite frequency differs while 17 (7.0%) of them didn't initiate the prophylaxis yet. The adherence rate



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## Abstract

of the assessed RHD patients to secondary prophylaxis was 55.2% while the left 108 RHD patients (44.8%) were generalized as non-adhered to the prophylaxis [can be who either don't start the prophylaxis 17 (7.0%) or who missed the prophylaxis more than three times annually 86 (35.6%)]. The main reasons for poor adherence were lack of money 41 (38%), far distance from hospital 28 (26%), fear of medication side effects and painful injection 25 (23%), and lack of knowledge about the disease and

prevention 14 (13%).

**Conclusion:** RHD patients attending cardiac clinic of JMC had low adherence rate (55.2%) to the secondary prophylaxis due to lack of money, far distance from the setup, painful injection especially among children and lack of awareness about the disease.

**Keywords:** Rheumatic heart disease patients, adherence, main reasons of poor adherence

## Introduction

Acute rheumatic fever (ARF) and rheumatic heart disease (RHD) represent the first cause of cardiac mortality among children and young people in developing countries<sup>(1)</sup>. The worldwide prevalence of RHD is estimated to 15.6 million people, with an annual incidence of ARF of 470,000. The burden of mortality still concerns 230,000 people per annum, caused by infective endocarditis and heart failures<sup>(2,3)</sup>.

The prevalence of heart diseases in children and young adults, including congenital heart disease and RHD are highest but underestimated due to many reasons<sup>(4)</sup>.

The prevalence of RHD was also highest in Ethiopia as revealed by many studies that conducted in different parts of the country among school children and other groups which needs due emphasis on management protocols<sup>(5-10)</sup>.

Since 1980s, the recommendations of World Health Organization is to promote secondary prevention as the cornerstone of control programs by continuous administration of specific antibiotics to patients with a previous attack of rheumatic fever, or well-documented RHD<sup>(11)</sup>. Secondary prevention of rheumatic fever has multipurpose, applicable and cost effective strategy to prevent colonization or infection of the upper respiratory tract with group A  $\beta$ -hemolytic streptococcal pharyngotonsillitis and the development of recurrent attacks of rheumatic fever, to reduce mortality and morbidity due to disease<sup>(12-16)</sup>.

The recommended secondary prophylaxis is intramuscular injections of benzathine benzyl penicillin G (BPG), every three to four weeks which is determined by a number of factors, including age, time since the last episode of ARF, ongoing risk of streptococcal infections and potential harm from recurrent ARF and its dosage being adapted to patient's weight<sup>(12,17)</sup>.

The implementation of monthly administration of secondary prophylaxis to all RHD patients should need due emphasis and its effectiveness in reducing rates of streptococcal pharyngitis, recurrences of ARF and the progression of RHD should clearly evaluated periodically; otherwise it might even lead to mild to moderate valvular lesions within a decade<sup>(18-20)</sup>. Thus simultaneously promoting adherence of patients to secondary prophylaxis should be addressed and assessed timely as the management modality<sup>(21)</sup>. Patient adherence is defined as the concordance between the patient's behavior and the care provider's recommendations<sup>(18,22)</sup>. Global adherence to treatment of chronic diseases in developed countries averages only 50%, particularly affecting the poor population<sup>(23)</sup>. As many factors interact and interfere with adherence, it is considered as a multidimensional phenomenon<sup>(24)</sup>.

Even though the level of adherence required to prevent further episodes of ARF is not known, the objective is to reach 100% of the annual expected BPG injections, with a recommended benchmark of 80%<sup>(25)</sup>. Patients receiving

less than 80% of prescribed doses are considered as none adhered with high risk of recurrence of ARF<sup>(15,25)</sup>.

The objective of the present study was to evaluate rates of adherence of RHD patients attending cardiac clinic of Jimma Medical Center (JMC) to BPG injection prophylaxis and to assess the reasons for poor adherence.

## Materials and Methods

### Study Design and Setting

The cross sectional study was conducted among RHD patients attending Cardiac Clinic of JMC for at least one year who appointed every month to receive secondary prophylaxis. JMC is located in Jimma zone, Southwest Ethiopia which is the largest and pioneer referral specialized teaching hospital of the country, serving millions of patients dwelling in the catchment area. The study was conducted for 4 months (from June 1-September 30, 2018 among RHD patients). Information of pediatrics was received from their corresponding parents or caregivers.

### Data Collection Technique Processing and Analysis

Standardized and structured questionnaire was used for data collection. The collected data was cleaned, coded, entered in to Epi data version 3.1 and finally exported to SPSS version 22 for further analysis. Adherence of RHD patients was determined based on frequency of annual prophylaxis they received and considered as adhered, not adhered and not started the prophylaxis yet. For pediatric RHD patients, their family's adherence (bringing child to the institution for receiving prophylaxis was evaluated).

### Ethical Considerations

Approval of the proposal was obtained from Institutional Review Board of Jimma University, Institute of Health (IRB/989/2018). An informed written consent was obtained from patients or/and parents of pediatric patients less than 16 years after explaining the purpose of the study. The respondents were also informed that the obtained information would not be disclosed to a third party.

### Operational Definition

Good adherence or adhered to prophylaxis: if the rate of adherence was covering  $\geq 80\%$  of prophylaxis (patient was 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 of adherence is  $< 80\%$  (patient had missed their regular injection more three times in the last 1 year).

## Results

### Socio-demographic Characteristics

During the period of June 1-September 30, 2018, a sample of 241 RHD patients who came to Cardiac Clinic of JMC for follow-up were interviewed, of these 135 (56%) were pediatric age group (age 5-16 years) and 106 (44%) were adult age group as the overall age ranges from 5-68 years. The male to female ratio was 1:1.2 computed from 135 (56.0%) females and 106 (44.0%) males. Majority of the patients were dwelling in rural part 172 (71.4%) while urban dwellers account 69 (28.6%). Majority of RHD patients were illiterate [90 (37.3%)] while 36 (14.9%) and 62 (25.7%) attended grade 5-8 and grade 9-12 respectively. Majority of the patients or their care givers were farmers 151 (62.7%) who were considered as low income with monthly income below 1000 Ethiopian birr (53.9%). Majority of the patients [195 (80.9%)] were living at the distance of more than 3 kilometers away from JMC where they seek service. The detail is well seen in Table 1.

### Adherence Status of RHD Patients to Secondary Prophylaxis

Out of a total of 241 patients, majority of them 224 (93.0%) took secondary prophylaxis (intra muscular injection of BPG) during follow-up of last one year despite frequency varies. From a total of 224 RHD patients who took secondary prophylaxis, 86 (35.6%) of them missed their regular injection for more than three times and 5 (2.1%) never missed any annual prophylaxis (100% coverage) last year who have to be appreciated. In

general the adherence rate of RHD patients to secondary prophylaxis was 133 (55.2%) who received more than nine annual prophylaxis or missing less than three months while the left 108 (44.8%) considered non adhered [can be either who don't start prophylaxis yet (7.0%) or who missed more than three times of last year prophylaxis (35.6%)] as detailed in Table 2.

**Table 1.** Socio-demographic characteristics of rheumatic heart disease patients at Jimma Medical Center Cardiac Clinic, Jimma, Ethiopia, 2018

Socio-demographic		Number/ frequency	Percentage (%)
Sex	Male	106	44
	Female	135	56
Age	<16 years	135	56
	>16 years	106	44
Religion	Muslim	163	67.6
	Orthodox	52	21.6
	Protestant	19	7.9
	Others	7	2.9
Ethnicity	Oromo	165	68.5
	Amahara	44	18.3
	Dawaro	16	6.6
	Tigre	4	1.7
	Gurage	5	2.1
	Others	7	2.9
Family income	<1000 Ethiopian birr	230	53.9
	>1000 Ethiopian birr	111	46.1
Educational status of (patient/care taker)	Illiterate	90	37.3
	Read and write only	24	10
	Grade 1-4	14	5.8
	Grade 5-8	36	14.9
	Grade 9-12	62	25.7
	Higher	15	6.2
Occupation	Farmer	151	62.7
	Government employee	27	11.2
	Merchant	35	14.5
	Daily labor	23	9.5
	Others	5	2.1
	Address	Urban	69
Rural	172	71.4	

## Reasons for Poor Adherence

The main reasons to miss and don't initiate their prophylaxis among the 108 RHD patients with poor adherence were lack of money 41 (38%), followed by far distance from hospital 28 (26%), fear of medication side effects and painful injection 25 (23%), and lack of knowledge about the disease and prevention 14 (13%).

## Discussion

Among the total 241 RHD patients assessed, majority of them (56%) were pediatric age group (age 5-16 years) and female (56%) dwelling in rural part (71.4%) which is also in line with global epidemiology of the disease being highest among school children, females and rural part<sup>(3,5)</sup>.

The level of adherence of RHD patients to secondary prophylaxis was 55.2% as computed from the annual frequency of intramuscular injection (more than 9 times per last year is considered as adhered) which was very low and needs due emphasis. This low adherence rate is also in harmony with the study of Musoke et al. who reported the adherence rate of 54%, also in nearly similar range with the finding of systematic analysis done by Kevat et al. and Amarilyo et al.<sup>(26-28)</sup>.

But the present finding was against the studies of de Dassel et al. with their finding of high adherence rate of 63.5-67.5% probably due to study design difference as they approach by register data analysis, the finding of Nicola Culliford-Semmens et al. who revealed maximum adherence rate of RHD patients to secondary prophylaxis

**Table 2.** Adherence status of rheumatic heart disease patients to secondary prophylaxis, Jimma, Ethiopia, 2018

Status of adherence	Number/ frequency	Percentage (%)
Not initiated yet	17	7.0
Received prophylaxis	224	93.0
12 times annually (not missed any)	5	2.1
>9 times annually (missed <3 times)	133	55.2
<9 times annually (missed >3 times)	86	35.6
Adherence status: adhered to prophylaxis (missed <3 times)	133	55.2
Not adhered to prophylaxis (not start yet + missed >3 times)	108	44.8

(92%) due to the socio-demographic difference of our patients and New Zealand and design difference<sup>(29,30)</sup>. Opposing the finding of the present study, highest adherence of RHD patients to secondary prophylaxis was also reported by studies of Sial et al. (73.5%), Saxena et al. (93.6%) may be due to study design and socio-demographic difference<sup>(31,32)</sup>.

The finding of present study was also inconsistent with the study of Gasse et al. and Pelajo et al. who reported even lower adherence rate (46%) and (32-42%)<sup>(33,34)</sup>. The probable justification for this difference is a significant variation in study design and socio-demographic characteristics.

The main reasons/barriers affecting low adherence rate of RHD patients to secondary prophylaxis was lack of money, far distance to the setting, painful injection and lack of awareness about the disease. This objective was also in line with the study of Petricca et al. who conducted at the setting to explore those barriers (disease perception, quality of service and cost)<sup>(35)</sup>. The present finding for reasons of low adherence was also supported with study of Musoke et al. that conducted in Uganda and Nemani who explored the absence of proper counseling followed by a sense of well-being, injection site pain and financial constraints as the main reasons for low adherence<sup>(26,36)</sup>.

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### Ethics

**Ethics Committee Approval:** Institutional Review Board (IRB/989/2018 of Jimma University, Institute of Health).

**Informed Consent:** An informed written consent was obtained from patients or/and parents of pediatric patients less than 16 years after explaining the purpose of the study. The respondents were also informed that the obtained information would not be disclosed to a third party.

**Peer-review:** Externally peer-reviewed.

### Authorship Contributions

Surgical and Medical Practices: K.M., W.R.D., M.B.G., Concept: K.M., W.R.D., M.B.G., Design: K.M., W.R.D., Data Collection or Processing: K.M., Analysis or Interpretation: K.M., W.R.D., Literature Search: K.M., W.R.D., Writing: K.M., W.R.D.

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