

A Questionnaire Survey on the Prevalence and Awareness of Rheumatic Fever in Bangladesh

By

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A thesis submitted to the School of Pharmacy in partial fulfillment of the requirements for
the degree of Bachelor of Pharmacy (B.Pharm)

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Declaration

It is hereby declared that

1. The thesis submitted is my own original work while completing a degree at BRAC University.
2. The thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The thesis does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. I have acknowledged all main sources of help.

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Approval

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Ethics Statement

This project does not involve any kind of animal or human trial.

Abstract

Rheumatic Fever (RF) persists as a major public health issue in the world including Bangladesh. It causes significant illness and even death especially among children and young adults. Despite its preventability, there is a lack of expansive data regarding its prevalence due to lack of advanced treatment and public awareness of the disease. This study aims to assess the prevalence of RF and public awareness of this disease. A questionnaire survey was conducted across the different specialized hospitals in Bangladesh targeting populations of varying age and socioeconomic backgrounds. The outcomes showed a moderate level of public awareness which was 47% of people were aware of this disease. RF was found in 50% patients from the urban area and 46.7% from rural areas with poor household conditions like – the presence of mold or dampness in the house (76.7%), overcrowding around 82.8%, having a high chance of getting exposure to streptococcus group A bacteria. Also, 34.5% people are affected by Rheumatic Heart Disease who had been diagnosed with RF previously. This study reflects the importance of improving public awareness and preventive healthcare strategies to decrease the burden of Rheumatic fever in Bangladesh.

Keywords: Rheumatic Fever; Rheumatic Heart Disease; Streptococcus Group A bacteria; Bangladesh

Dedication:

Dedicated to my parents and my elder sister.

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Table of Contents

Declaration	ii
Approval	iii
Ethics Statement	iv
Abstract/ Executive Summary	v
Dedication (Optional)	vi
Acknowledgement	vii
Table of Contents	viii
List of Tables	ix
List of Figures	x
List of Acronyms	xi
Glossary	xii
Chapter 1 Introduction	1
1.1 Rheumatic Fever	1
1.2 Prevalence of Rheumatic Fever	1
1.3 Scenario of Rheumatic Fever in Bangladesh	2
1.4 Pathophysiology of Rheumatic Fever	3
1.5 Risk Factors of Rheumatic Fever	3
1.5.1 Genetic Factors	4
1.5.2 Age	4
1.5.3 Gender	4

1.5.4 Socioeconomic Factors	4
1.6 Symptoms of Rheumatic Fever	6
1.7 Diagnosis of Rheumatic Fever	7
1.7.1 Tests for Diagnosis of Rheumatic Fever	7
1.7.2 Jones Criteria for Diagnosis of Rheumatic Fever	7
1.8 Prevention of Rheumatic Fever	8
1.8.1 Primary Prevention	8
1.8.2 Secondary Prevention	9
1.9 Significance of the Study	9
1.10 Objectives of the Study	11
Chapter 2	12
Methodology	12
Chapter 3	13
3.1 Result and Discussion	13
3.2 Findings of the Study	23
3.3 Limitations of the Study	23
Chapter 4 Conclusion and Future Work	25
References	26
Appendix A.	29

List of Tables

Table 3.1.1.1 Demographic information of the patient (Age)	13
Table: 3.1.2.1 Understanding the Diagnosis of RF	20
Table: 3.1.2.2 Understanding the Medications of RF	20

List of Figures

Figure 1.1 Risk factors of Rheumatic Fever or Pathway of GAS Exposure	5
Figure 1.2 Symptoms of Rheumatic Fever (WHO, 2025)	7
Figure: 3.1.1 Understanding the Gender of the patient (30 Patients)	14
Figure 3.1.2 Demonstrating the Educational Qualification of the Patient	15
Figure 3.1.3 Understanding the household monthly income level of the patient	15
Figure 3.1.4 Analyzing the Living Place of the Patient	16
Figure 3.1.5 Understanding the dampness/mold in the house	17
Figure 3.1.6 Understanding the number of family members of the patient living in the same house	17
Figure 3.1.7 Analyzing the number of members sharing room or bed with patient	18
Figure 3.1.8 Analyzing the number of family members sharing a washroom with patient	18
Figure 3.1.9 Analyzing the Symptoms of Rheumatic Fever	19
Figure 3.1.10 Number RF Patients who Developed Heart Disease	21
Figure 3.1.11 Analyzing the symptoms of Rheumatic Heart Disease (30 Patients)	22
Figure 3.1.12 Evaluating the awareness about RF	22

List of Acronyms

RF	Rheumatic Fever
RHD	Rheumatic Heart Disease
GAS	Group A Streptococcus
WHO	World Health Organization
CDC	Centers for Disease Control and Prevention

Chapter 1

Introduction

1.1 Rheumatic Fever

Rheumatic Fever is an autoimmune inflammatory disease that is the response to pharyngitis caused by Group A beta-hemolytic infection. It mostly occurs as a result of untreated streptococcal pharyngitis and scarlet fever. Additionally, various types of symptoms are seen in this disease like joint pain, fever, chest pain, jerky movements of hand, feet and face *etc.* Acute rheumatic fever is often considered as the precursor of rheumatic heart disease because it can affect the valves of the heart (Carapetis et al. 2016). Rheumatic Heart Disease which is the result of RF is the most common acquired heart disease in young people aged less than 25 years worldwide. It causes an impact on brain, joints, subcutaneous tissues and heart. It mostly affects the valves of the heart. RF is considered as the cardiovascular morbidity and mortality mainly in developing countries in the world (Islam & Majumder, 2016).

1.2 Prevalence of Rheumatic Fever

A study found that approximately 47,000 cases of acute rheumatic fever have been reported annually and also there is a serious disease burden in developing countries with an increasing rate of untreated or insufficiently treated strep throat infection. However, the mortality rate of Rheumatic Heart Disease which is the consequence of Rheumatic Fever is significant (1.4 million per year) (Talwar, 2016). About 2,75,000 deaths are caused by rheumatic heart disease (Chowdhury et al. 2023). According to WHO, the majority of rheumatic heart disease are found in low or middle-income countries and this disease snatches over 288,348 lives each year and it mostly affects people under age 25 (Rheumatic heart disease, 2020).

In South Asia, the prevalence rate is much higher. However in Bangladesh, the prevalence of rheumatic heart disease that is caused by rheumatic fever is 0.32 per 1000 people. Also, the prevalence rate of rheumatic fever in Bangladesh is 0.6 per 1000 and in total RF and RHD prevalence rate is 0.9 per 1000(Majumder et al.,2014). It is also observed that RF is most commonly developed in females (OR=2.2, 95%CI 1.2-8.4) (Riaz BK et al., 2013).

1.3 Scenario of Rheumatic Fever in Bangladesh

Rheumatic Fever and Rheumatic Heart Disease are the most significant contributors of cardiovascular morbidity and mortality rates in Bangladesh. Rheumatic Fever can be caused by some factors including poor environmental and social factors, poor household quality and overcrowding that are the major issues of exposure to Streptococcus A bacteria.(Watkins et al. 2021). Though the rate of rheumatic fever is under control, a study using new technology of echocardiographic screening is needed to detect the RF or RHD in every hospital in Bangladesh (Zaman et al.,2015).It has been many years that work has been done regarding the prevalence of rheumatic fever in Bangladesh as it is disappearing in our country but not fully disappeared. After doing a literature review, we found that most of the research had been done mostly around before 2000 to 2016.Also by contacting with physicians, we have come to know that patients of rheumatic fever are now decreasing and they claim that if proper diagnosis and awareness are ensured the number of rheumatic fever will increase more in Bangladesh.

1.4 Pathophysiology of Rheumatic Fever

Rheumatic Fever is a late inflammatory nonsuppurative autoimmune disease caused by Group A Streptococcal pharyngitis. The pathophysiology mainly characterized by GAS infection results from humoral and cellular mediated immune responses 1-3 weeks after the onset action of streptococcal pharyngitis. It is triggered by molecular mimicry between GAS antigens and self-antigens (Burke, 2015). Streptococcal antigens show autoimmune response especially by GAS M proteins and human cardiac antigens like myosin, valvular endothelium. Streptococcal M proteins demonstrate structural similarity with myosin results in cardiac myositis and valvulitis. Antibody antigen complication also affects the joints and causes migratory polyarthrititis (Halbreich et al., 1976a). It can also affect the brain membranes or cortex through autoimmune mechanisms resulting in diffused, unstable and transient neurological and psychiatric problems. The pathogenic mechanism of antibodies and T cell responses in Sydenham chorea induce movement and behavioral disturbances. Here autoimmune antibodies deposit in the brain and target the basal ganglia and dopaminergic neurons. Whereas in carditis, autoantibodies and T cell target valve proteins (Halbreich et al., 1976b).

1.5 Risk Factors of Rheumatic Fever

Rheumatic Fever is commonly observed in developing countries rather than developed countries like - the United States and Western Europe. It is mostly seen in Middle Eastern countries, Asia and among indigenous populations of Australia (Weinberg, 2024). So, RF often occurs in countries with limited resources where socioeconomic deprivation and narrow access to healthcare facilities. Also age, genetic factors, exposure to mold, dampness and cold to house, structural and functional household crowding *etc.* are the risk factors of Rheumatic Fever (Coffey et al., 2018). The risk factors of Rheumatic Fever are described below:

- 1.5.1 Genetic Factors:** The individual will be at a higher risk of RF with a family history of Rheumatic Heart Disease than the individual with no family history of RHD. This disease is considered as heritable. Because the probable susceptibility locus have been examined on chromosome 6 in the HLA region and other regions in the human genome (Muhammed et al., 2019)
- 1.5.2 Age:** People between the ages of 5 - <23 years old are at the highest risk of RF. They mostly suffer from strep throat infection and get exposed to streptococcus Group A bacteria due to poor immunity system in the body.
- 1.5.3 Gender:** Though RF is equally observed in both males and females, RHD is more common in women. This difference is followed in adolescents and adults than children because the intrinsic factors like- significant autoimmune susceptibility and extrinsic factors like – greater exposure to GAS infection in females than in males (Carapetis et al., 2016). Also in female there is less tendency to access RF prophylaxis. In pregnancy, RHD is also observed increasingly because haemodynamic changes that happen during pregnancy increase the pre-existing disease. (Sawhney et al., 2003)
- 1.5.4 Socioeconomic Factors:** Environmental factor is one of the major factors that cause the rheumatic fever in developing countries. The socioeconomic factors include-
- **Overcrowding:** A study in Bangladesh found that 70% of the households in Bangladesh have 4-5 members (Bangladesh Bureau of Statistics, 2011). The number of rooms sharing for sleeping is crowding in Bangladesh that facilitates the risks of spreading the Streptococcus group A bacteria. The low income of the family can also be another risk factor of RF.
 - **Household Condition:** Poor housing conditions can be the risk factor for RF. One case-control study in Bangladesh found a significant correlation between building materials like- brick walls and urban residences for ARF (Riaz et al., 2019). Damp

walls and ceilings, mold and cold conditions can increase the risk of exposure to Streptococcus group A bacteria that causes RF. Houses made of mud also facilitate RF. (Coffey et al., 2018).

- **Poor Washing Facilities:** Lack of resources and facilities for washing like – laundry, teeth cleaning , exposure to biting insects and exposure to environmental tobacco smoke (ETS) may increase the amount of bacteria on inanimate items or household members' skin, increasing the risk of transmission and the pharyngeal and skin illness that follow the streptococcal group A infection (Baker et al., 2019).
- **Healthcare and nutrition facilities:** Limited access to healthcare facilities, limited health literacy, lack of nutrition *etc.* can be the cause of RF.

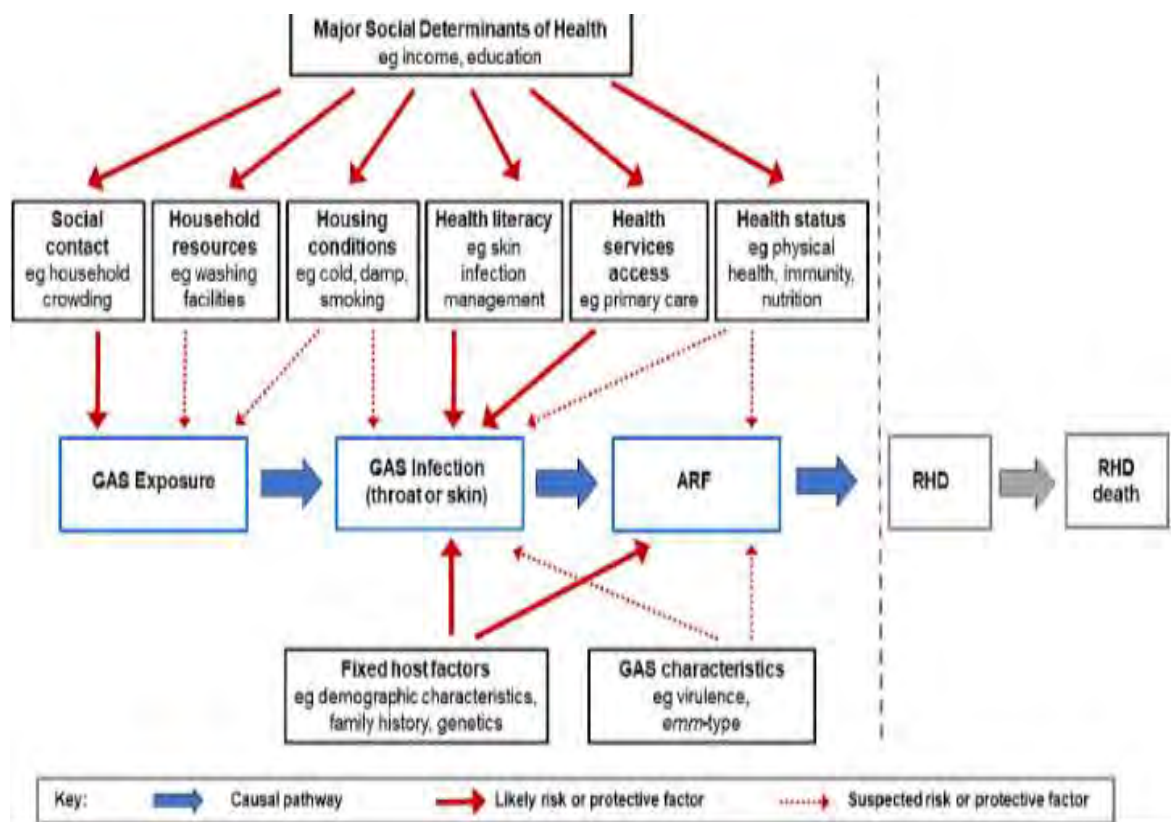


Figure 1.1: Risk factors of Rheumatic Fever (Baker et al., 2019).

1.6 Symptoms of Rheumatic Fever

Rheumatic Fever is an autoimmune response that causes an inflammatory condition in the body resulting in heart valve damage. The symptoms of RF include:

- Fever
- Joint pain significantly elbows, wrists and knees ankles *etc.*
- Swollen or tender and red joints
- Muscle ache
- Chorea (Jerky body movements that are uncontrollable)
- Fatigue
- Skin rash
- Shortness of breath
- Throat pain or infection

1.7 Diagnosis of Rheumatic Fever

RF can be diagnosed by undergoing several types of tests, reviewing medical history and by diagnosis criteria.

1.7.1 Tests for Diagnosis of Rheumatic Fever: RF can be diagnosed by following tests, such as-ASO titer, ESR, CRP, ECG, Chest X-rays *etc.*

Blood Test: ASO titer confirms the presence of a GAS infection:

ASO Titer: An increasing trend of anti-streptolysin O titer (ASO) data instead of a single titer consequence; or a positive throat culture for GAS, a test for streptococcal carbohydrate antigen in a child with a high pretest probability of streptococcal pharyngitis based on clinical indications. This test detects the antibodies of recent group A infection. This test is carried out by taking a blood sample from a vein in the hand or usually inside the elbow. One of the major requirements for this test is it requires several hours of fasting before performing the test. . (Gewitz et al., 2015).

Echocardiography: It is used for observing the functions of heart muscle.

Throat Swab: It is to detect a group A infection.

1.7.2 Jones Criteria for Diagnosis of Rheumatic Fever: Diagnosis of Acute Rheumatic Fever was first introduced in 1944 in the USA by T. Duckett Jones. These criteria are known as Jones criteria that were last revised in 2015. Jones criteria for diagnosis of RF consist of major and minor manifestations (Noonan, 2021). The major manifestations for the diagnosis of RF include:

- Carditis
- Arthritis

- Erythema marginatum
- Subcutaneous nodules

The minor manifestations include:

- Fever($\geq 38.5^{\circ}\text{F}$)
- Increased ESR (≥ 30 mm) or CRP (≥ 3 mg/dl) that direct the generalized inflammation
- Arthralgia
- Enhanced PR interval (If carditis is not a major criteria)

In this way, Rheumatic Fever is diagnosed with revised Jones criteria (David, 2015).

1.8 Prevention of Rheumatic Fever

Prevention of RF can be mainly done by detecting and treating group A streptococcal bacterial infections such as pharyngitis and strep throat infection. Here prevention indicates decreasing the spread of group A streptococcal bacteria with standard infection control practices like maintaining proper hand hygiene and respiratory etiquette, antibiotic prophylaxis *etc.* Prevention of Rheumatic Fever can be divided into two stages of prevention. (Gerber et al., 2009)

1.8.1 Primary Prevention: Primary prevention indicates preventing initial illness as well as recurrent attacks of RF. Primary prevention includes proper identification and sufficient antibiotic treatment of tonsillopharyngitis or strep throat infection and skin infection caused by GAS. Also maintaining good hygiene, respiratory etiquette, assuring access to clean housing, sanitization and clean water. Ensuring access to high-quality health services is also fallen under the primary prevention of RF. (About Rheumatic Fever, 2024)

1.8.2 Secondary Prevention: Secondary prevention of RF includes prevention of recurrent RF and RHD. This includes using long-term antibiotic prophylaxis and screening to detect early RHD. As RF is the precursor of RHD and other rheumatic diseases, hence it is essential to prevent additional streptococcal infections that cause RF to treat the patient with long-term antibiotic prophylaxis. Penicillin G benzathine injection, a narrow-spectrum antibiotic is the most effective antibiotic for RF. It is an intramuscular injection that is given every 3-4 weeks intervals. Oral penicillin V is given twice daily in minor cases (WHO, 2024). For individuals who are allergic to penicillin alternatives like- narrow spectrum oral cephalosporin, oral clindamycin or oral macrolides *etc* are used for administration to treat Rheumatic Fever. The duration antibiotic prophylaxis depends on some factors like- the number of previous attacks, time of last attack, age of the individual and exposure to GAS infection risks, involvement of carditis *etc*. (Gerber et al., 2009)

1.9 Significance of the study

Rheumatic fever and Rheumatic Heart Disease are one of the most significant contributors to cardiovascular morbidity and mortality rates in Bangladesh. For example, according to WHO (2025), approximately 55 million people are affected by RHD and around 3,60,000 lives are lost for RHD. Nowadays rheumatic fever is getting under control due to progress in socio-economic indicators, advancement in healthcare sector as well as public awareness, antibiotic prophylaxis *etc*. (Lillis, 2024). More epidemiological and clinical research is needed to make evidence-based national policy to deal with this important public health issue in future (Islam & Majumder, 2016).

Though the rate of rheumatic fever is under control, the study using the new technology of echocardiographic screening is needed to detect the RF or RHD in every hospital in Bangladesh (Zaman et al., 2015). It has been many years that work has been done regarding the prevalence of rheumatic fever in Bangladesh as it is disappearing in our country but not fully disappeared. If we work on it, we will be able to find the current situation of rheumatic fever in Bangladesh to tackle public health issues regarding rheumatoid disease in future. By considering these major issues we are working on finding the current prevalence and awareness of Rheumatic Fever in Bangladesh.

1.10 Objectives of the study

The objectives of the study are as follows:-

- To identify the prevalence and the risk factors associated with the incidence of Rheumatic Fever.
- To identify the causes of Rheumatic Fever
- To Investigate the correlation between the incidence of RHD with RF

Chapter 2

Methodology

In this project work, two-month-long questionnaire-based survey was conducted to investigate the prevalence, current situation and awareness of RF. In this study the target population were the people of all age ranges and male/female who have RF or RHD and suffered from RF previously. This survey was done both online and offline. This survey was conducted in multiple specialized hospitals located in Dhaka and Pabna. The patients who came for the treatment of RF in the outdoor patient care unit, were approached for the survey. This survey was also conducted through online platform from December, 2024 to January, 2025. For this Purpose, a google form was posted on Facebook platform. The patients with RF participated in this survey willingly. In this survey, data were collected from 30 patients who were diagnosed with RF. A total of 12 patients participated in this survey online and 18 participants filled up the form in-person.

Before conducting this survey, the purpose of the survey was described to the patients and consents were taken. In case of minors, their parents gave the consent. For the convenience of all the patients, the survey was conducted in Bangla. Additionally, the physicians, nurses of the hospitals were enquired for the information related to this work. The questionnaire of this survey were prepared after reviewing the relevant literature. Total 29 questions were developed to investigate the correlation between RHD with RF, to observe the risk factors consisting of age, gender, socioeconomic conditions (occupation, monthly income), household conditions *etc.* and to assess the awareness of RF among patients like- having a knowledge about Streptococcus bacteria that is the main cause of RF. These data were analyzed both quantitatively and qualitatively to observe the prevalence, risk factors and current conditions of RF in Bangladesh. A copy of the questions are provided in the Appendix-A.

Chapter 3

3.1 Result and Discussion

In this survey, a total of 30 patients or their parents responded willingly to the questionnaire that was conducted both online and in person. Now all the data collected from the patients are briefly analyzed and the following results are discussed here to find the risk factors, causes and reasons behind the decreasing rate of RF and the correlation between RF and RHD.

3.1.1 Understanding the Risk Factors of Rheumatic Fever

3.1.1.1 Demographic factors

Age: After analyzing the age range of the patients, we can see that 40% of the patients are in the age range of 10 – 20 years among 30 patients, which is the highest percentage here. Then, we got 6% for each age range of <10 years, 21-25 years and >25 years which are shown in the table below. Similar studies show the incidence of RF is most common in the age range of 5-15 years and it may repeat in adulthood sometimes (Lahiri and Sayanhumbi, 2021).

Table 3.1.1.1: Analyzing the Demographic Information Like-Age of the 30 Patients

Age of The Patient	Number of the Patient	Percentage (%)
<10 years	6	20%
10-20 years	12	40%
21 – 25 years	6	20%
>25 years	6	20%

Gender: According to the responses of this survey, 66.7% are female and 33.3% are male of the total participants. Similar studies show that females are in more than two-fold higher risk of RHD which is the result of RF than male (71.4% vs. 29.6%, $p < 0.0001$). The reason behind this fact can be significant autoimmune susceptibility of female, greater exposure to GAS infection and less access to antibiotic prophylaxis (Negi et al., 2020b).

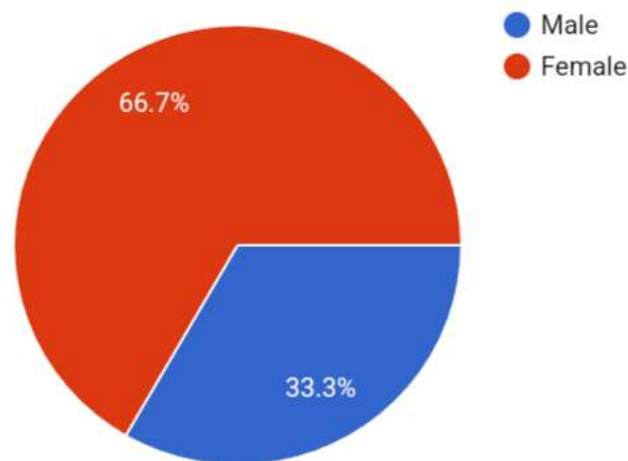


Figure: 3.1.1: Understanding the Gender of the RF patient (Number of the Patient: 30)

3.1.1.2 Socioeconomic Factors:

Educational Qualifications: Educational qualifications of the patients found in this survey are elaborated in the given pie chart. Here 43.3% of the patients are only educated with primary education, which is the highest percentage among the 30 patients. 30% patients got secondary education. 16.7% patients have higher secondary level and a few percentage of patients are having higher education (3.6% undergraduate, 6% are graduate). According to previous works, lower educational attainment is one of the socioeconomic risk factors for exposure to GAS infection or getting RF (Okello et al., n.d.). Though among 13 patients who are in primary education level, 12 patients are children here.

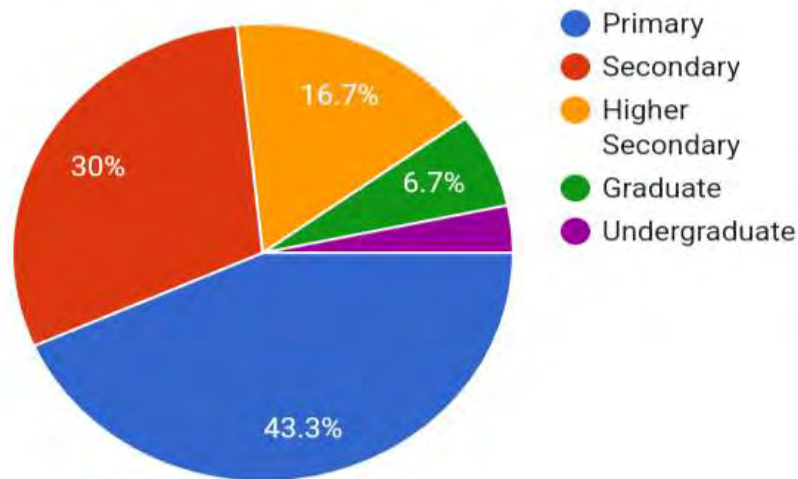


Figure 3.1.2: Demonstrating the Educational Qualification of the Patient (30 Patients)

Income Level: During the study patient's household income level has been recorded. Poor income level can be another socioeconomic risk factor for RF. About 44.4% patient's monthly household income are within 16000-25000. Whereas, 33.3% patient's income are 10000 – 15000 and 11% having 51000 or above income level. Other percentage is very low. Though some participants were not willing to share their income level, we were not able to record all of the responses.

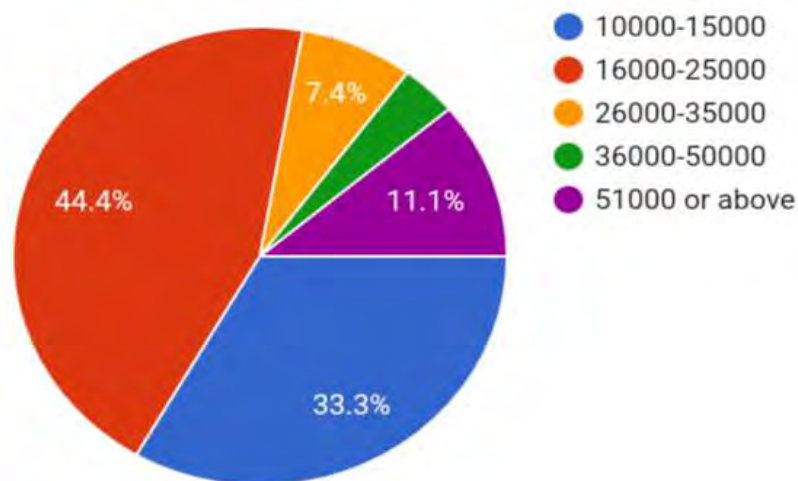


Figure 3.1.3: Understanding the household monthly income level of the patient

Living Place: In socioeconomic factor of RF living area can be the major risk factor. It can affect access to healthcare services, educational attainment *etc.* Though in this era our country is developing and in rural areas many facilities are accessible for people, there is still lacking in many areas like- limited access to primary healthcare *etc.* In urban area overcrowding can be the major cause of RF. According to data collected during the study, 50% of participants are from urban areas and 46.7% are from rural area. A small amount of participants are from the hostel.

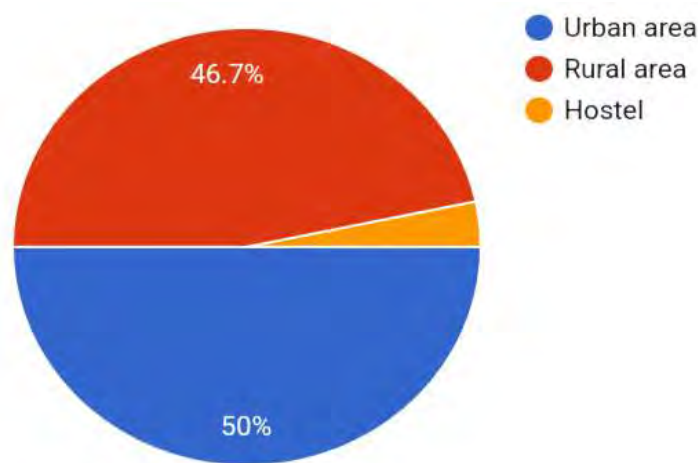


Figure 3.1.4: Analyzing the Living Place of the Patient (Number of the Patient: 30)

Household Condition: Poor household conditions such as-mold or dampness in the house, overcrowding in the house, bed-sharing and washroom sharing with many members in the house are the major risk factors for RF.

In this study, 76.7% of participants among 30 patients responded that in their house there is a presence of mold/dampness in the wall or ceiling.

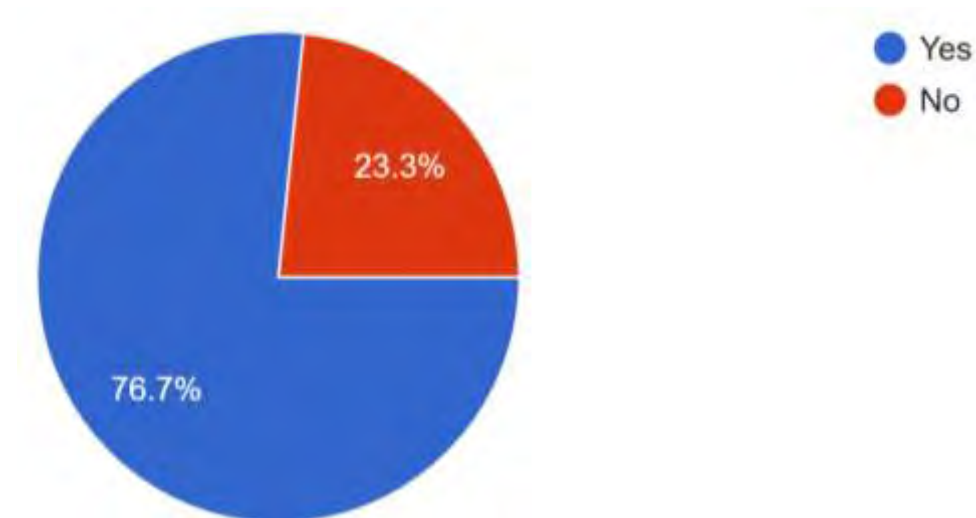


Figure 3.1.5: Understanding the dampness/mold in the house of the patients

In this survey, about 56.7% patients live with four–six members in the house that indicate overcrowding and 40% patients having two–three members in the house.

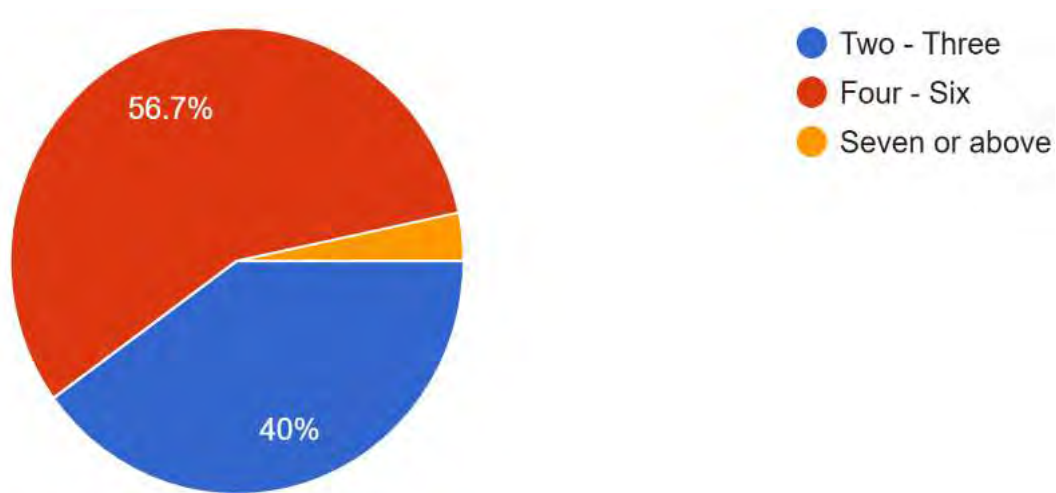


Figure 3.1.6: Number of family members of the patient living in the same house

About 82.8% patient share room with two–four members and 80.8% patients share washroom with two-four members that indicates overcrowding and high chance of getting exposure to streptococcus A bacteria.

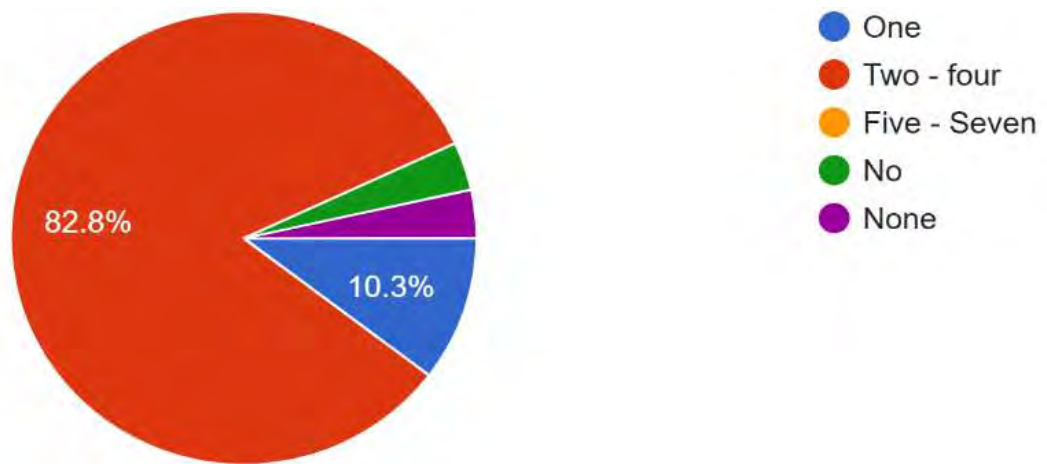


Figure 3.1.7: Analyzing the number of members sharing a room or bed with the patient

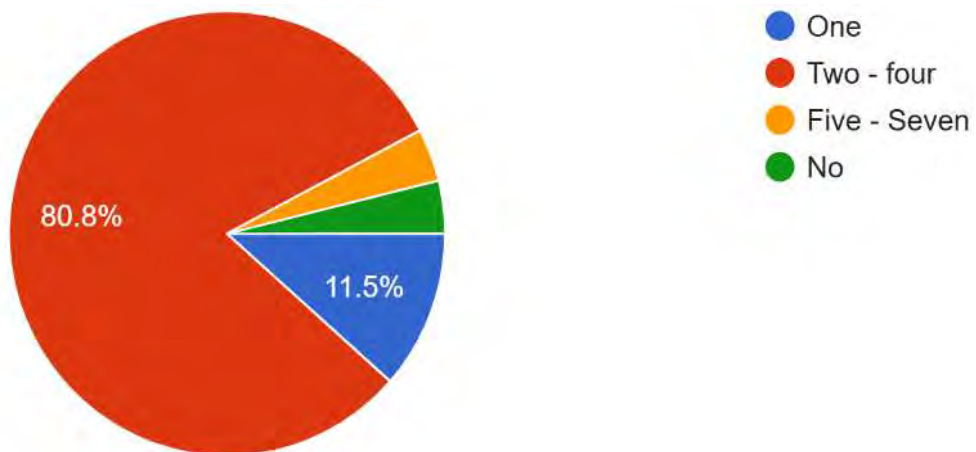


Figure 3.1.8: Analyzing the number of family members sharing a washroom with the patient

3.1.2. Understanding the Symptoms, Diagnosis and Medications of Rheumatic Fever: In this survey, different types of patient's symptoms, diagnosis process and medications are recorded and analyzed here.

3.1.2.1. Symptoms of Rheumatic Fever: Patients suffering from RF often face symptoms like, high temperature, multiple joint pain, shortness of breath *etc.* and other minor symptoms (NHS, n.d.). From the recorded data of the patients, 83.8% of patients have fever, 86.7% of patients have multiple joint pain. 56.7% of patients suffer from throat infection. 46.7% have a problem of shortness of breath and 33% have chest pain. A minor percentage of patients have other symptoms like – skin rash, coughing, shaking body parts *etc.*

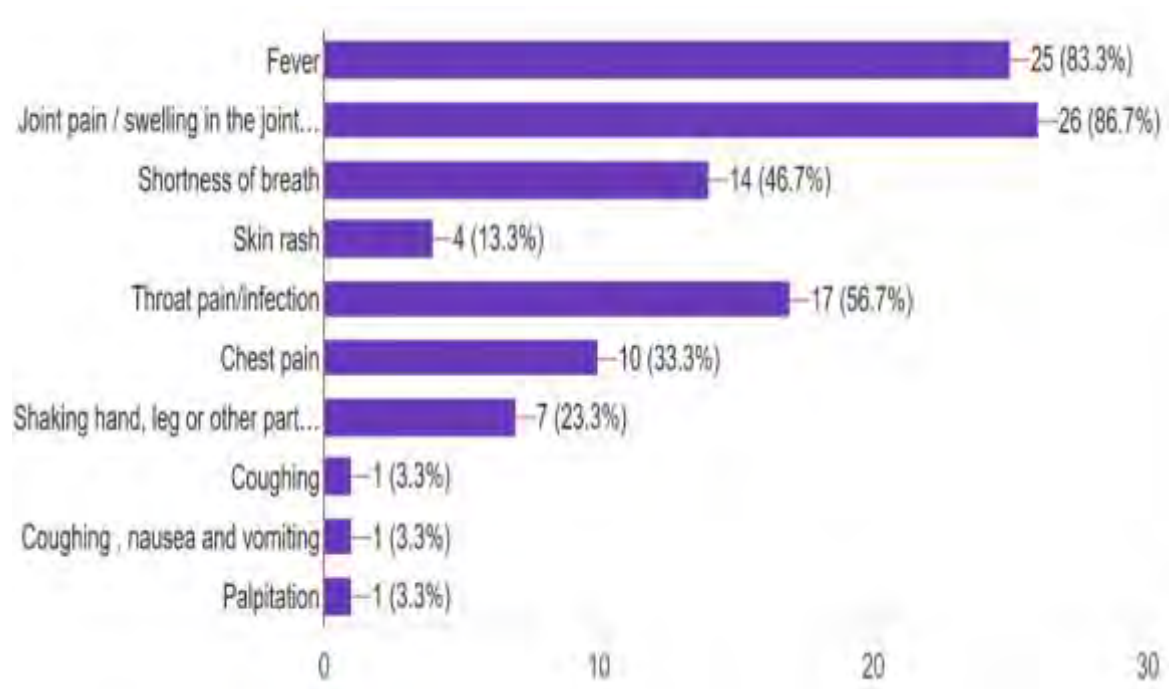


Figure 3.1.9: Analyzing the Symptoms of Rheumatic Fever (Number of the Patient: 30)

3.1.2.2. Diagnosis of Rheumatic Fever: Diagnosis of Rheumatic fever is done by seeing the medical history of the patient, physical exam and tests that evaluate the inflammation and also heart involvement (About Rheumatic Fever, 2024). Here 26 patients have done ASO titer and 21 patients have done CRP test. That means, similar patients have done both ASO titer and CRP among the 30 patients and 5 patients have done only ASO titer to diagnose the RF. Finally, all the patients are confirmed by the physician that they have RF.

Table: 3.1.2.1 Understanding the Diagnostic process of RF

Type of Diagnosis	Percentage of the Patient
ASO titer test	86.6%
CRP test	70%
Confirmed by Physician	100%

3.1.2.3 Medications of the patient: From the previous study, it is observed that the most effective treatment of RF is antibiotics and anti-inflammatory drugs. However, patients who have allergic reactions with penicillin can be treated with other types of antibiotics (Thomas, 2024). In this study, it was observed that 30% of the patients take penicillin-like- Penvik DS and Pen V syrup in case of minors and 30% of patients take other types of antibiotics like – Azithromycin, Clindamycin and Cephalexin. Among them, patients who are in serious stage of RF (40%) are prescribed Benzathine penicillin G injection. The table demonstrates the medications of the patients from whom the data were collected.

Table: 3.1.2.2 Understanding the Medications Taken by the Patients of RF

Types of Medication	Number of the Patient	Percentage of the Patient
Taking Penicillin	9	30%
Taking other antibiotics	9	30%
Taking Penicillin G injection	18	40%

3.1.3. Understanding the Consequence of Rheumatic Fever:

RF can develop serious complications like – damage to the valves of the heart or narrowing the valves. These can lead to heart failure, where the heart does not pump the blood actively. It is recognized as Rheumatic Heart Disease (About Rheumatic Fever, 2024). From this survey, 36.5% of patients responded that they are suffering from heart disease. That means, among 30 patients 11 patients had developed RHD who had RF previously. After interrogation it was found that their RHD was evaluated by doing an echocardiogram, echo-doppler and confirmed by the physician.

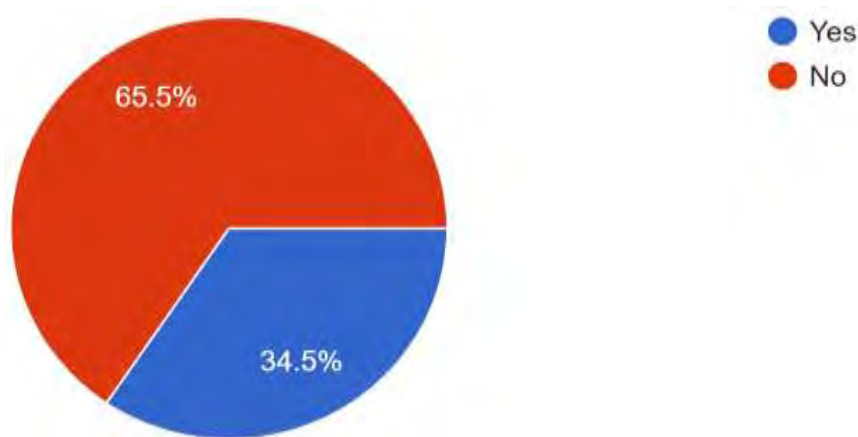


Figure 3.1.10: Number of RF Patients who Developed Heart Disease

It is found that among 34.5% patients who are suffering from RHD, 66.7% patient have chest pain, 50% patient have high blood pressure and 33.3% have low blood pressure. Lower number of patients have weakness, palpitation *etc.* problems.

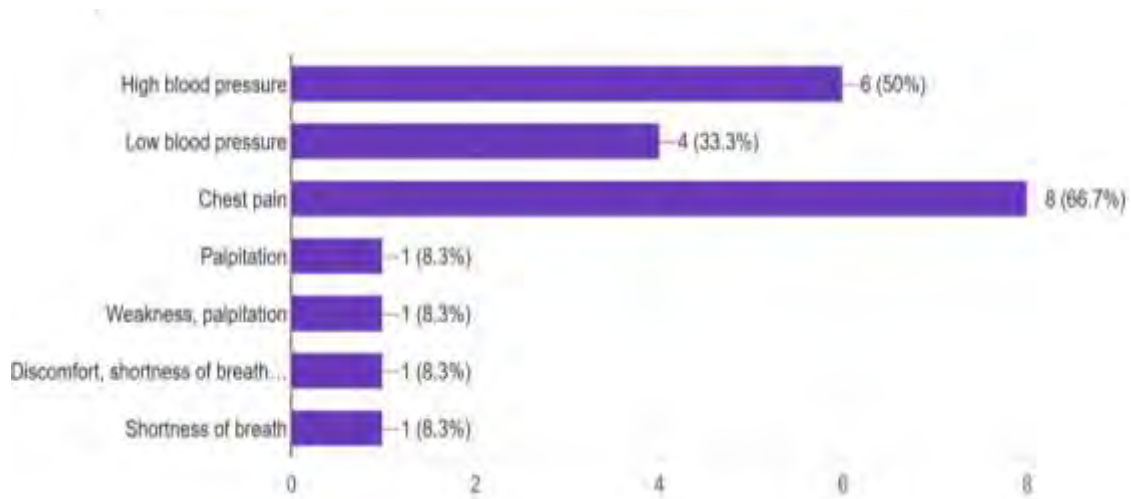


Figure 3.1.11: Analyzing the symptoms of Rheumatic Heart Disease (30 Patients in total)

3.1.4. Analyzing the Literacy Rate of RF among the Patients:

During the survey, the patients were interrogated about the consequences of RF to observe their awareness of RF. About 53.3% of patients are not aware that RF can cause damage to the valves of the heart and 50% people do not know that RF can be caused by Streptococcus A bacteria.

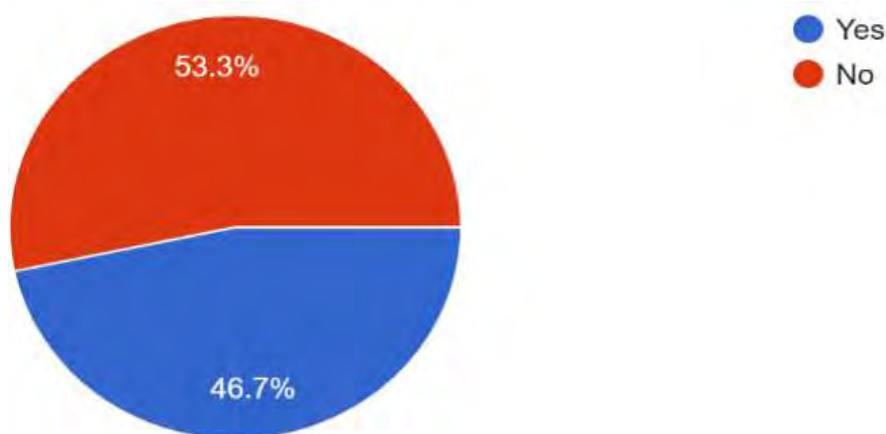


Figure 3.1.12: Evaluating the awareness about RF (Number of the Patient: 30)

3.2: Findings of the Study

This study accomplishes the objectives that were designed to achieve are to identify the prevalence and risk factors associated with the incidence of RF, to identify the causes of Rheumatic Fever and to investigate the correlation between the incidence of RHD with RF. According to the result of the study, we observed that in most cases, patients suffer from RF due to socioeconomic factors like – overcrowding, poor household conditions *etc.*

Also, it is observed that among this small population of the study, 36.6% of people have developed RHD. Furthermore, we discovered that many people are not aware of this disease and its consequences, so they are not conscious about taking long-term medications and regular checks properly. Patients living in the rural areas are not getting proper medical access to evaluate and treatment of RF and RHD. Due to lack of screening tests like- ASO titer, ECG, Echo-doppler *etc.* as well as for want of new advanced technology in the rural area and lack of awareness among the people, it may show that the rate of RF is decreasing. Another reason can be the development of our socioeconomic environment which helps to decrease the rate of RF. From this study, it has been found that awareness about RF and its proper treatment should be spread among the people of Bangladesh. For this, campaign can be started and vaccination can be discovered to cure RF and RF related diseases.

3.3 Limitations of the Study

Though this study has many major findings, one of the drawbacks is that this study was conducted in a very small population due to limited time of the study. To get the precise scenario, the study must be led in a large population from different socioeconomic backgrounds and different places. We were not able to cover the remote areas of the country where there is very limited access to healthcare services for this study. If the study is conducted in remote areas, the actual rate of RF will be found. Another limitation is we were not able to find the

correlation between RF and RHD for want of sufficient data. Moreover, this study employed the non-probability-based purposive sampling approach, in which participants were selected based on non-random standards, ensuring that no individual had a similar chance of being included. This method was chosen as the population is small and specific only those who have or suffered from this particular disease. Also, this study must collect accurate information about the particular disease rather than making generalizations.

Chapter 4

Conclusion and Future Work

In this survey, work has been done to know about the prevalence and current scenario of RF in Bangladesh based on the risk factors, causes and reasons behind the decreasing rate of RF. RF and RHD are significant contributors to the morbidity and mortality rates worldwide. In the last century, RF was the most common disease in Bangladesh due to poverty, overcrowding, ignorance and less access to healthcare, but now, due to socioeconomic development and advancement in healthcare access, antibiotic prophylaxis RF has been decreased. But the chronic RHD is prevalent in Bangladesh and its rate may be very significant. Due to a lack of awareness, ignorance of long-term antibiotic administration and delayed diagnosis for want of advanced screening in rural healthcare services, it may occur.

From our study, we found that due to ignorance of people about the long-term treatment and lack of new advanced technology and undiagnosed conditions the rate of RF and its complications like – RHD is decreasing in Bangladesh, which can be much higher.

Lastly, large scale epidemiological and clinical researches among large population is highly needed to implement the evidence – based national policy to get rid of this public health issue in future. Also, discovering the vaccination for this disease can help to tackle this public health issue in future.

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Appendix A.

A Questionnaire Survey on “Prevalence and awareness of Rheumatic Fever in Bangladesh”

Rheumatic fever is an autoimmune inflammatory disease that affects the heart, joints, skin and brain *etc.* One type of bacteria named Streptococcus A can cause this disease. However there are some risk factors of rheumatic fever like, environmental factors (overcrowding, poor sanitation and other socio economic conditions), exposure to Streptococcus A bacteria, untreated throat infections, socio-economic conditions *etc.* In this survey, we plan to study the prevalence, awareness and current situation of rheumatic fever in Bangladesh.

Note: All the information that will be collected during this survey will be kept anonymous, confidential and will not be shared with any third parties.

Consent of the volunteer (patient / their parent in case of minor):

- **I am aware that all the information taken during this survey will be kept anonymous and confidential. I also consent that I am willingly volunteering to participate in this survey.**

Questions (Please tick the correct answer of the following questions)

1. Did you fill this type of form previously?
 - Yes
 - No

2. Are you filling up this form for yourself?
 - Yes
 - No

3. If you are filling up this form on behalf of your family member with rheumatic fever, what is the relationship between you and the patient?
 - Son / Daughter
 - Sister
 - Brother
 - Other

4. Has the person/you ever been diagnosed with rheumatic fever?
 - Yes
 - No

5. What is the gender of the patient/you?
 - Male

- Female

6. What is the age of the patient/you?

.....

7. What is the place where the patient/you spend most of the time of life?

- Urban area
- Rural area
- Other

8. What is the educational qualification of the patient/ you?

- Primary
- Secondary
- Higher secondary
- Other.....

9. What is the occupation of the patient/ you ?

.....

10. What is the household monthly income level of the patient / you?

- 10000-15000
- 16000-25000
- 26000-35000
- 36000-50000
- 50000-100000 or above

11. Which year has the patient been diagnosed with rheumatic fever?

.....

12. How was the patient diagnosed with rheumatic fever?

- By doing the blood test
- Confirmed by the physician
- Other

13. ASO titer is one of the tests to confirm rheumatic fever. Did the patient/you ever do this test?

- Yes
- No

14. Did the patient / you take any treatment for rheumatic fever?

- Yes
- No

15. What type of treatment did the patient / you get for rheumatic fever?

- Taking penicillin
- Taking other types of antibiotics
- Taking other medications

16. What are the other types of medication the patient / you take?
(If the patient/you don't take any other medication, please write N/A)

.....

17. What are the symptoms the patient / you often experience?

- Fever
- Joint pain / swelling in the joint like knee, ankles, wrist and elbow
- Skin rash
- Shortness of breath
- Chest pain
- Throat pain/ infection
- Shaking hand, leg or other part of the body
- Other

18. Does the patient/you have any type of throat infections?

- Yes
- No

19. Does the patient/ you still have rheumatic fever?

- Yes
- No

20. Does the patient/ you still take medication to control rheumatic fever? If yes, what type of medication are you / the patient taking?

(If the patient/you don't take any medication, please write N/A)

.....

21. Does the patient / you have any heart disease?

- Yes
- No

22. If the patient/ you have a heart problem, what type of symptoms do you/ the patient often face?

- High blood pressure
- Low blood pressure
- Chest pain
- Palpitation
- Other.....

23. Does the patient/ you take any medication for heart disease? If yes, what is the medication?

(If the patient/you don't take any medication, please write N/A)

.....

24. How many family members of the patient / you are living in the same house?

- Two - Three
- Four- Six
- Seven or above
- Other.....

25. Does the patient / you share any room with other members of the family in a house? If yes, with how many people does he/she share a room?

- One
- Two - Four
- Five - Seven
- Other.....

26. Does the patient/ you share any washroom with other members of the family in a house? If yes, with how many people does he /she share a washroom?

- One

- Two - Four
- Five - Seven

- Other.....

27. Is there any damp walls or ceilings in the bedrooms or living areas of the patient's or your home?

- Yes
- No

28. Have you ever heard that rheumatic fever can cause rheumatic heart disease and it may damage the valve of the heart?

- Yes
- No

29. Have you ever heard that Streptococcus A bacteria can cause rheumatic fever?

- Yes
- No

"বাংলাদেশে বাতজ্বর প্রাদুর্ভাব এবং সচেতনতা" বিষয়ক একটি প্রশ্নপত্র সমীক্ষা

বাতজ্বর হল একটি প্রদাহজনিত রোগ যা হার্ট, জয়েন্ট, ত্বক এবং মস্তিষ্ক ইত্যাদিকে প্রভাবিত করে। "স্ট্রেপ্টোকক্কাস এ" নামক এক ধরনের ব্যাকটেরিয়া এই রোগের কারণ হতে পারে। তবে বাতজ্বরের কিছু ঝুঁকির কারণ রয়েছে যেমন, পরিবেশগত কারণ (অতিরিক্ত জনসমাগম, দুর্বল স্যানিটেশন এবং অন্যান্য আর্থ-সামাজিক অবস্থা), স্ট্রেপ্টোকক্কাস এ ব্যাকটেরিয়ার সংস্পর্শ, চিকিৎসা না করা গলায় সংক্রমণ, আর্থ-সামাজিক অবস্থা ইত্যাদি। এই সমীক্ষায়, আমরা অধ্যয়ন করার পরিকল্পনা করেছি। বাংলাদেশে বাতজ্বরের ব্যাপকতা, সচেতনতা এবং বর্তমান পরিস্থিতি

দ্রষ্টব্য: এই সমীক্ষার সময় যে সমস্ত তথ্য সংগ্রহ করা হবে সেগুলি বেনামী, গোপনীয় রাখা হবে এবং কোন তৃতীয় পক্ষের সাথে শেয়ার করা হবে না।

স্বেচ্ছাসেবকের সম্মতি (রোগী/নাবালকের ক্ষেত্রে তাদের পিতামাতা):

☐ আমি সচেতন যে এই সমীক্ষার সময় গৃহীত সমস্ত তথ্য বেনামী এবং গোপনীয় রাখা হবে। আমি সম্মতি দিচ্ছি যে আমি স্বেচ্ছায় এই সমীক্ষায় অংশগ্রহণ করতে চাই।

প্রশ্ন (অনুগ্রহ করে নিচের প্রশ্নের সঠিক উত্তরে টিক দিন)

1. আপনি কি আগে এই ধরনের ফর্ম পূরণ করেছেন?

- হ্যাঁ
- না

2. আপনি কি নিজের জন্য এই ফর্মটি পূরণ করছেন?

- হ্যাঁ
- না

3. আপনি যদি বাতজ্বরে আক্রান্ত আপনার পরিবারের সদস্যের হয়ে এই ফর্মটি পূরণ করেন তবে আপনার এবং রোগীর মধ্যে সম্পর্ক কী?

- ছেলে/মেয়ে
- বোন
- ভাই
- অন্যান্য

4. ব্যক্তি/আপনার কি কখনও বাতজ্বর ধরা পড়েছে?

- হ্যাঁ
- না

5. রোগীর/আপনার লিঙ্গ কি?

- পুরুষ
- মহিলা

6. রোগীর/আপনার বয়স কত?

.....

7. রোগী/আপনি জীবনের বেশিরভাগ সময় কাটান এমন জায়গা কী?

- শহুরে এলাকা
- গ্রামীণ এলাকা
- অন্যান্য

8. রোগী/আপনার শিক্ষাগত যোগ্যতা কি?

- প্রাথমিক
- মাধ্যমিক
- উচ্চ মাধ্যমিক
- অন্যান্য

9. রোগীর/আপনার পেশা কি?

.....

10. রোগী/আপনার পরিবারের মাসিক আয়ের স্তর কত?

- 16000-25000
- 26000-35000
- 36000-50000
- 50000-100000 বা তার বেশি।

11. কোন বছর রোগীর বাতজ্বর ধরা পড়েছে?

.....

12. কিভাবে রোগীর বাতজ্বর নির্ণয় করা হয়েছিল?

- রক্ত পরীক্ষা করে
- চিকিত্সক দ্বারা নিশ্চিত
- অন্যান্য.....

13. ASO টাইটার হল বাতজ্বর নিশ্চিত করার জন্য একটি পরীক্ষা। রোগী/আপনি কি কখনো এই পরীক্ষা করেছেন?

- হ্যাঁ
- না

14. রোগী/আপনি কি বাতজ্বরের কোনো চিকিৎসা নিয়েছেন?

- হ্যাঁ
- না

15. বাতজ্বর জন্য রোগী/আপনি কি ধরনের চিকিৎসা পেয়েছেন?

- পেনিসিলিন গ্রহণ
- অন্যান্য ধরনের অ্যান্টিবায়োটিক গ্রহণ

- অন্যান্য ওষুধ গ্রহণ

16. রোগী/আপনি অন্য কোন ধরনের ওষুধ খান? (যদি রোগী/আপনি অন্য কোনো ওষুধ না খান, অনুগ্রহ করে N/A লিখুন)

.....

17. রোগী/আপনি প্রায়শই যে উপসর্গগুলি অনুভব করেন?

- জ্বর
- জয়েন্ট ব্যথা/হাঁটু, গোড়ালি, কজি এবং কনুইয়ের মতো জয়েন্ট ফোলা
- ত্বকে ফুসকুড়ি
- শ্বাসকষ্ট
- বুকে ব্যথা
- গলা ব্যথা / সংক্রমণ
- হাত, পা বা শরীরের অন্য অংশ কাঁপানো
- অন্যান্য

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18. রোগী/আপনার কি কোনো ধরনের গলার সংক্রমণ আছে?

- হ্যাঁ
- না

19. রোগী/আপনার কি এখনও বাতজ্বর আছে?

- হ্যাঁ
- না

20. রোগী/আপনি কি এখনও বাতজ্বর নিয়ন্ত্রণের জন্য ওষুধ খান? যদি হ্যাঁ, আপনি/রোগী কি ধরনের ওষুধ খাচ্ছেন (ঔষধের নাম উল্লেখ করুন)?

(যদি রোগী আপনি কোনো ওষুধ না খান, অনুগ্রহ করে N/A লিখুন)

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21. রোগী/আপনার কি কোনো হৃদরোগ আছে?

- হ্যাঁ
- না

22. যদি রোগী/আপনার হার্টের সমস্যা থাকে, তাহলে আপনি প্রায়ই রোগীর কী ধরনের উপসর্গের মুখোমুখি হন?

- উচ্চ রক্তচাপ

- নিম্ন রক্তচাপ
- বুকে ব্যথা/ ধড়ফড়
- অন্যান্য

23. রোগী/আপনি কি হৃদরোগের জন্য কোন ওষুধ খান? যদি হ্যাঁ, ঔষধের নাম উল্লেখ করুন.
(যদি রোগী/আপনি কোনো ওষুধ না খান, অনুগ্রহ করে N/A লিখুন)

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24. রোগীর পরিবারের কতজন সদস্য/আপনি একই বাড়িতে থাকেন?

- দুই-তিন
- চার-ছয়
- সাত বা তার উপরে
- অন্যান্য।

25. রোগী/আপনি কি পরিবারের অন্য সদস্যদের সাথে একটি বাড়িতে কোনো রুম শেয়ার করেন?
যদি হ্যাঁ, তিনি কতজনের সাথে একটি রুম শেয়ার করেন?

- এক
- দুই-চার
- পাঁচ-সাত
- অন্যান্য

26. রোগী/আপনি কি বাড়ির অন্য সদস্যদের সাথে কোন শৌচাগার শেয়ার করেন? যদি হ্যাঁ, তাহলে
তিনি কতজনের সাথে একটি ওয়াশরুম শেয়ার করেন?

- এক
- দুই-চার
- পাঁচ-সাত
- অন্যান্য

27. রোগীর বা আপনার বাড়ির বেডরুম বা থাকার জায়গাগুলিতে কি কোন স্যাঁতসেঁতে দেয়াল বা ছাদ
আছে?

- হ্যাঁ
- না

27. আপনি কি কখনও শুনেছেন যে বাতজ্বর বাতজনিত হৃদরোগের কারণ হতে পারে এবং এটি
হার্টের ভাবকে ক্ষতিগ্রস্ত করতে পারে?

- হ্যাঁ

- না

28. আপনি কি কখনও শুনেছেন যে “স্ট্রেপ্টোকক্কাস এ” একটি ব্যাকটেরিয়া বাতজ্বর সৃষ্টি করতে পারে

- হ্যাঁ
- না