

## Original Article

### Community Awareness of Sore Throat And Rheumatic Heart Disease in Northern Ethiopia

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#### Abstract

##### Introduction:

Early treatment of bacterial sore throat is important in primary prevention of acute rheumatic fever (ARF). In Ethiopian population, knowledge about Rheumatic Heart Disease (RHD) and its prevention strategies is expected to be limited, but few studies have been done.

**Methods:** To determine awareness of RHD prevention in the community in Northern Ethiopia, a descriptive, cross-sectional study was conducted. Using structured questionnaire, adults more than 18 years of age were interviewed.

##### Results:

A total of 1298 participants were included, 1004 (77.4%) were from rural areas, 978 (75.3%) were female. Only 34 (2.6%) of the participants responded that the cause of sore throat is due to bacteria/virus and 6.2 % knew the relation between sore throat and heart disease. Of the respondents, 43.3% would take children with sore throat to traditional healers, 71.6% had history of uvulectomy in their children or themselves. Only 7.8% answered that penicillin injection is useful for primary prophylaxis and 8.1% answered that regular penicillin injection is useful as secondary prevention in RHD.

##### Conclusion:

We conclude that the community awareness on the cause and the link between bacterial pharyngitis and ARF/RHD is almost non-existent and hence concerted efforts to change this should be made at different levels.

**Keywords:** Rheumatic Heart Disease, Awareness, Prevention, Pharyngitis, Ethiopia

### **Introduction:**

Acute Rheumatic Fever (ARF) is a consequence of bacterial sore throat with Group A  $\beta$  haemolytic Streptococcus (GAS). The progression from ARF to Rheumatic Heart Disease (RHD) is thought to be driven by recurrent infections resulting in a prolonged inflammatory response in the cardiac valvular tissue (1).

ARF and its sequel, RHD, cause significant morbidity and mortality in developing countries, yet they are under-recognized as major health problems in developing countries (1, 2). The most recent estimates of the global burden of RHD include nine million disability-adjusted life years lost, 33 million prevalent cases and 275,000 deaths each year, with deaths occurring predominantly in low- and middle-income countries including Ethiopia (1-4). In 2016, multisite echocardiography screening in school children in Ethiopia has shown the prevalence of RHD to be 19 per 1000 (5). Other multisite tertiary hospital based studies have also shown that RHD is the leading cause of cardiovascular morbidity and mortality in Ethiopia (6). In 2017, an echocardiography based community

screening of RHD has shown even a higher prevalence in a rural community of southwest Ethiopia with an overall prevalence of 37.5 cases per 1000 population of definite RHD (95% CI 26.9 – 51.8) (7).

Despite the high burden of RHD, the attention given to this disease by health authorities and the subsequent resource allocation is low, leading to repeated calls from different organizations to act to stop RHD (8, 9). Recently, the Ministry of Health of Ethiopia has developed an RHD prevention and control program and the Guideline based prevention of Rheumatic Heart Disease Program in Eastern Zone of Tigray, Northern Ethiopia (PrevRHD) which is a pilot program implemented in the Wukro area, as part of this national effort.

It has been concerning to note from several reports that the level of awareness of ARF/RHD is low in the communities most affected by it. People most at risk of ARF/RHD tend to be from parts of the community with the lowest income and/or education. Reports from Tanzania and South Africa show that patients with RHD had poor knowledge of the connection between GAS and RHD,

most patients and their guardians had not yet heard of RHD until they were diagnosed with the condition, demonstrating a low level of awareness in the general community (10).

There are several contributors to the low levels of awareness of ARF/RHD in communities often most affected by the disease. Inadequate resources and the lack of prioritization of ARF/RHD educational programs have effectively maintained a public that is largely ignorant of the causes, symptoms and risks associated with ARF/RHD(9).

Comprehensive awareness campaigns about pharyngitis and ARF have been associated with reductions in ARF (11). Therefore, it is wise and economical to work on prevention by raising awareness of the disease particularly under resource-limited conditions.

In order to implement the prevention modalities into the community appropriately in a culturally acceptable manner, we planned to identify the level of baseline knowledge and practice on sore throat and its link with heart disease. Therefore, this study was carried out to identify some barriers to improved care of RHD in the community and then use

these findings in future preventive activities in communities with a similar cultural background.

### **Methods:**

#### Study area

This study was done in Northern Ethiopia; Eastern zone of Tigray regional state, located about 880 kilometres north of the capital Addis Ababa. According to the Ethiopian Population and Housing Census of 2007, Tigray region has an estimated total population of 5.24 million of which 50.8% are female, 80% rural and about 85% of the population are farmers.

This community based cross-sectional, descriptive study was carried out in January 2018 involving households residing in the three districts at Wukro town, Kilege-Awlaelo and Atsbi-Wenberta rural districts with an estimated population of 50,208, 112,788 and 110,546 inhabitants respectively. There are two primary hospitals, 11 health centres and 36 health posts in the three districts.

#### Sample size and sampling technique

Sample size was estimated using a single population proportion formula. The prevalence of awareness on RHD among the community was not found in

other studies. Therefore, the researchers decided to take the estimated prevalence as 50%. With the assumption of  $P = 50\%$ ,  $Z = 1.96$ , design effect = 2, and marginal error = 4%, the sample was estimated as 1200. Then taking 10% non-response rate, a total of 1320 sample size was calculated.

The three districts of the study area were purposively selected due to their proximity to the Demographic Health Surveillance Site (DHS) of Mekelle University. Six Kebeles (small administration units) from rural and two from urban areas were randomly selected. The number of households from each village was taken through population proportion sampling distribution at household level. Then the systematic random sampling technique was used to select the 1320 households, using the sampling frame, which was obtained from the office of the DHS. The selected households were marked by DHS, in each household one family member (aged >18 years) was interviewed.

#### Data collection

A structured questionnaire was developed from the previous literature review and it was customized to the local

context. The questionnaire was imported to an open data kit (ODK) (opendatakit.org), which is user friendly by using a tablet (Samsung company) for easy facilitation of data capturing and to avoid errors. Eight trained nurses did data collection, using ODK on November 6 – 11, 2017 after the questionnaire was pretested. Senior physicians and public health specialist were assigned as supervisors and a total of 1298 household members were interviewed.

#### Data analysis

Data was compiled from the ODK, revised and coded before the data entry. The Data Epi program was used for data entry, then it was analyzed using SPSS version 21. Frequencies, proportions, mean and standard deviation were calculated. Cross tabulation was done on selected variables with the outcome variable. The participants' level of knowledge on sore throat and its link with RHD were calculated.

#### Ethical consideration

Ethical approval for this study was obtained from Mekelle University Ethical Review Committee of the College of Health Sciences, Northern Ethiopia. A letter of permission was issued from the

Tigray Regional Health Bureau and the district health authorities. Verbal informed consent from the household heads was obtained.

## Results

### Socio-demographic characteristics

With a response rate of 98%, a total of 1298 participants were included in this study with a mean age of 44.68 (Standard Deviation =15.1) and 75.3% were female. 1004 participants (77.4%) were from rural areas, of whom 68.2% were in the age group of 38 years and above.

Characteristics	Residence		Total (%)
	Rural (%)	Urban (%)	
Male	270 (26.9)	50 (17.0)	320 (24.7)
Female	734 (73.1)	244 (83.0)	978 (75.3)
Family size (1-3 persons)	286 (28.5)	119 (40.5)	405 (31.2)
Family size (>= 4 persons)	718 (71.5)	175 (59.5)	893 (68.8)
Religion			
Muslim	10 (1.0)	20 (6.8)	30 (2.3)
Orthodox	993 (98.9)	272 (92.5)	1,265 (97.5)
Others	1 (0.1)	2 (0.7)	3 (0.2)
Monthly Income (Ethiopian Birr) 1000 Birr ≈ 35 USD			
< 2000	945 (94.1)	200 (68.0)	1,145 (88.2)
>2000	59 (5.9)	94 (32.0)	153 (11.8)
Do you know what sore throat is?			
Yes	968 (98.4)	287 (97.6)	1,255 (96.7)
No	36 (3.6)	7 (2.4)	43 (3.3)
What do you do when children get sore throat?			
Go to traditional healer	483 (48.1)	79 (25.9)	562 (43.3)
Go to health institution	370 (36.9)	192 (65.3)	562 (43.3)
Others (herbal remedy, holy water, smelling kerosene, don't know)	151 (15.0)	23 (7.8)	174 (13.4)
Treatment			
Tablets	249 (67.3)	110 (57.3)	359 (63.9)
Injection	32 (8.7)	47 (24.5)	79 (14.1)
Advice only	89 (24.1)	35 (18.2)	124 (32.19)
History of uvulectomy in your children			
Yes	730 (72.7)	200 (68.0)	930 (71.7)
No	274 (27.3)	94 (32.0)	368 (28.4)
Why uvulectomy was done?			
Traditional healer's recommendation	725 (99.32)	200 (100)	925 (99.5)
Physicians recommendation	5 (0.7)	0 (0.0)	50 (0.5)
Is penicillin injection useful for primary prevention of ARF/RHD?			
Yes	77 (7.7)	24 (8.2)	101 (7.8)
No	927 (92.3)	270 (22.7)	1,197 (92.2)
Is penicillin injection useful for secondary prevention of ARF/RHD?			
Yes	83 (8.3)	22 (7.5)	105 (8.1)
No	921 (91.7)	272 (92.5)	1193 (91.9)
Do you know the relation between sore throat and heart disease?			
Yes	53 (5.3)	27 (9.2)	80 (6.2)
No	951 (94.7)	267 (90.8)	1,218 (93.8)

**Table 1: Participants' Socio-demographic characteristics and awareness on prevention and treatment of sore throat and RHD in three districts of eastern zone of Tigray, Northern Ethiopia, January 2018**

The majority were Orthodox Christian religion followers and married (97.5% and 70.6% respectively). More than two thirds (68.8%) of respondents had a family size of more than four and 405 (31.2%) of the respondents had a family size of one to three persons. The majority had a monthly income of less than 2000 Ethiopian Birr equivalent to approximately 70 USD (Table 1). 832 (60.3%) respondents had no formal education (illiterate) and of these 703 (85.4) were from rural communities. Only 49 (3.8%) of the participants had attended college or university.

#### Level of Awareness

Only 80 (6.2%) of the participants were aware about the relation between heart disease and sore throat (Table 1). Thirty-four (2.6%) of the participants said that sore throat is caused by bacteria or virus, 207 (15.9%) by large tonsils/uvula during early neonatal and childhood period, 92 (7.1%) by spitting into toilet, 69 (5.3%) by drinking cold water and 97 (7.5%) due to dust/smoke (Figure 1). When asked about symptoms of sore throat, 1235 (95.1%) said difficulty in swallowing, 1217 (93.8%) said fever, while 339 (26.1%) said rhinorrhea.

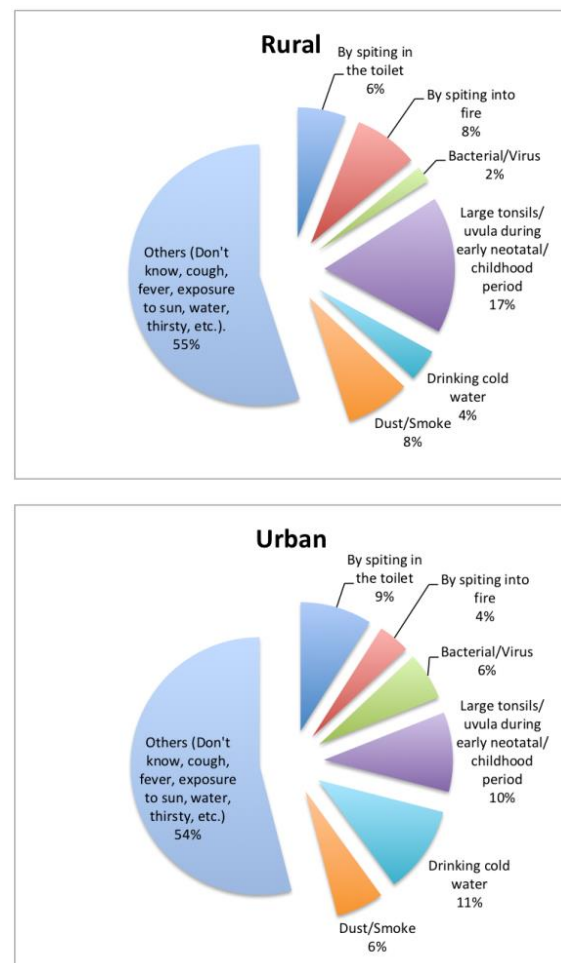


Figure 1: Participants response for causes of sore throat in three districts of Eastern zone Tigray, Northern Ethiopia, November 2017

When their children get sore throat, 562 (43.3%) of the participants said they take them to a traditional healer and the same number (43.3%) take them to a health institution. Most people in rural area tended to take their children to traditional healers while most in urban area tend to take their children to a health institution. Of those who seek medical treatment in health institutions, 359 (63.9%) reported that they get oral medications as a

treatment for sore throat, 79 (14.1%) injections and 124 (22.1%) advice only.

The majority (73.9%) of the participants have one or more children, of these 311 (32.4%) reported that their children get sore throat frequently. Of the participants, 930 (71.6%) reported that their children had uvulectomy done and 925 (99.5%) of these reported that the uvulectomy done is as per traditional healer's recommendation whereas 5 (0.5%) reported to be physician's recommendation.

One hundred of the participants (7.8%) answered, that penicillin injection is useful for primary prevention of ARF/RHD and only 105 (8.1%) participants answered that regular penicillin injection is important for secondary prevention of ARF/RHD (Table 1).

### **Discussion**

The aim of this study was to assess the level of awareness of the study population on ARF and RHD prevention. The results show that the level of awareness on RHD is generally very low.

To identify GAS sore throat early and hence prevent its deadly consequences requires adequate knowledge of the

causes, symptoms and its link with RHD by the general public and health professionals. Knowing the level of community awareness and practice on sore throat is an important step in community education, which is one of the important components of prevention.

The majority (96.7%) of the participants think that they know the reason for sore throat, but only a minority (2.6%) know that the causative agent is a bacterial or viral infection. This fact corresponds with another study about awareness on sore throat, ARF and RHD in a rural community in 1992 in India, described by Arya RK (12).

RHD is considered a preventable disease but is still the leading cause of acquired heart disease and heart failure in children and young adults in developing regions of the world including Ethiopia (6, 13). There are different recommendations to prevent the disease including primordial prevention: reducing overcrowding, poverty, malnutrition and improving access to health care; primary prevention: treating GAS pharyngitis with antibiotics; secondary prevention: ARF/RHD register and giving regular antibiotics for those at risk of recurrence ; and tertiary prevention: medical and

surgical management of symptomatic RHD (14, 15).

There are several barriers that contribute to the low levels of awareness of ARF/RHD in communities often most affected by the disease as is found in developing nations including Ethiopia. One of these barriers arises from the reality that communities at highest risk for ARF/RHD are also frequently burdened with high rates of other major diseases such as malaria, HIV/AIDS and tuberculosis. These diseases inevitably receive higher priority from those in charge of distributing scarce resources for disease control programs (15).

Our study shows the community's level of awareness on the relationship between heart disease and sore throat to be very low with only 6.2% of the participants knowing that there is a relation between sore throat and heart disease. The majority, 97.4%, of the participants believed that sore throat is caused by either exposure to the sun, spitting in the fire or toilet, drinking cold water, dust or smoke exposure among others while only 2.6% mentioned that sore throat is caused by bacteria or viruses. We also found that those in the rural community as compared to urban

tended to go to traditional healers rather than to health institutions for sore throat. A study from South Africa, reported that individuals most affected by ARF and RHD know little about the disease, including methods for prevention and the potential long term consequences (16). The low level of knowledge or wrong beliefs of the causes of sore throat would lead to wrong ways of addressing the problem, and children will be denied of the appropriate therapy.

A study from Tanzania demonstrated that patients do not present to major clinics for GAS pharyngitis and have limited understanding of its serious sequelae. Even RHD patients and their parents had poor knowledge of the signs or symptoms of GAS pharyngitis and stated that they would normally not take a child with a sore throat with or without fever to a professional health care provider. The majority of clinicians (87%) disagreed or strongly disagreed that patients and their families are knowledgeable about the consequences of untreated GAS infection (10).

Our study found that most of the respondents mentioned difficulty of swallowing and fever as the symptoms of



sore throat. The majority (56.7%) of ill children do not get appropriate diagnosis or treatment (43.3% got to a natural healer, 13.4% do not go anywhere). Of those who go to health institutions, 63.9% reported that they get tablets treatment for sore throat, 14.1% get injections and 22.1% get advice only. This proportion is similar to a study done in Cameroon and Zambia where less than half of those who had a previous sore throat received antibiotics (17, 18). Most of our study participants (92.2%) didn't know treatment with antibiotics is useful in primary prevention of RHD and only 8.1% knew that penicillin injection is useful for secondary prevention. Similarly, to our findings, a study done in Cameroon showed that most (73%) of the respondents did not know what causes sore throat, and most (71.1%) were unaware of any complications that could arise from poorly treated sore throat. More than 70% of the participants did not know that sore throat could be associated with heart disease. RHD was unknown to 82% of the participants and 95% of them did not know what causes RHD (17). A study done in the Ethiopian rural town of Butajirra found that even patients who already have RHD have

poor knowledge of their disease condition. Only two of the 15 patients were aware of their disease and neither of them were on regular secondary prophylaxis (19). This was also the scenario in a survey done in the capital city of Ethiopia, Addis Ababa. Out 9388 school children, 60 were found to have RHD and the study concluded that among the interviewed parents of children with RHD there was lack of awareness of the disease and extremely low rate of regular prophylaxis (20). This is similar to studies done in other African countries proving the fact that those affected most have little knowledge about the disease condition.

The other important finding in this study was that, in addition to the misconceptions on the cause of sore throat, there is a high rate of traditional malpractices like uvulectomy in the community we surveyed. It was found that 71.6% of the participants reported either themselves or their children had undergone uvulectomy and most of the procedures (99.5%) were done by traditional healers. The uvulectomy is traditionally performed in early childhood due to the belief that the uvula is responsible for myriads of potential

maladies. Studies on harmful traditional practices done in Northern Ethiopia showed that uvulectomy was practiced on 72.8% of children, which was higher than in our study (21). A study from Tanzania reported that traditional uvulectomy was associated with significant morbidity and there was mortality. They recommended that given that the procedure confers no clinical benefit, emergency care providers should advocate for legal and public health interventions to eliminate this dangerous practice (22). Similarly, in a Nigerian study, 86.1% of patients had uvulectomy at childhood and the commonest complication was hemorrhage (n = 29, 17.6%) (23). Therefore, addressing this issue during the process of awareness creation will also be important not only to reduce ARF/RHD prevalence but also to reduce morbidity and mortality due to this malpractice.

In addition, 68.8% of participants have family size more than four and the monthly income is less than 2000 Ethiopian Birr ( $\approx$  70 USD) in 88.2% of the participants. The contribution of the economic status of patients and caregivers of ARF/RHD has been reported by

K. Petricca et al from Jimma, Ethiopia, where they found that costs associated with care play a role in decision making process to seek care. The study also found that knowledge and education of the disease causality and severity influenced patients' understanding of the importance to seek follow-up treatment (24). Overcrowding, poor hygienic conditions, low socio-economic status, illiteracy are known major risk factors for ARF/RHD. Hence improving the socio-economic status of a community is one of the pillar strategies for the prevention of RHD. The risk of RHD is 1.6 – 2.0 times greater in women likely due to several factors including worsening of existing disease during pregnancy, GAS exposure during child rearing, limited access to services and intrinsic hormonal factors(1). Our study population includes mostly female, rural, illiterate, living in overcrowded homes, having low income and hence is at a very high risk for GAS pharyngitis, ARF and RHD. This finding supports the need to emphasize this segment of the community during awareness campaigns and education to reduce the burden of ARF/RHD.

Public awareness activities are important for successful RHD control

programs as recommended by the World Health Organization and as practiced in Cuba in 1986 – 2001 and in Nepal (11,25,26). The Nepalese experience is a good example where a comprehensive prevention program improved awareness of RHD by 40%. It is critical that public awareness of the role of GAS and its potential consequences are addressed, as this will result in increased health-seeking behaviour. Therefore, the improvement of public awareness on sore throat RHD by the committed involvement of governmental health institutions, community leaders, community health educators, non-governmental organizations and all available public media outlets in the process of awareness creation will be crucial.

#### Limitations of the study

Overcrowding and poor socioeconomic status are known risk factors for acquiring GAS sore throat, ARF/RHD. We have found that most have family size more than four members but obtaining a crowding index would have been more helpful which was not done in this study. We took the salary cut off point community are important areas which need to be addressed as they would

to estimate the economic status of participants, but this is far from the reality especially as those in the rural area were simply asked to estimate their monthly income and no other standard modality was used to assess their economic status. The sites selected had been surveillance sites for long years and they perhaps had a better knowledge of health-related issues as compared to other sites in the country. Hence the level of awareness on many of the issues mentioned here could potentially be worse than reported here.

#### **Conclusion**

This study concludes that the community awareness on the cause and the link between sore throat and ARF/RHD in Northern Ethiopia is almost non-existent. These results can help understand the beliefs and practices about sore throat, ARF/RHD in the Ethiopian community and can be used to design culturally acceptable and targeted interventions of awareness creation programs. These results show that the combination of high illiteracy rate, low health-seeking behaviour and poor socio-economic status and widespread superstition of the remain the Achilles heel to the control of RHD.

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### Conflict of Interest

None

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