

WORLD CONGRESS ON RHEUMATIC HEART DISEASE

2-4 November 2023 • Abu Dhabi



Submission Id: 34

Title: A snowball approach for screening of asymptomatic Rheumatic Heart Disease among school age children in Ethiopia: A comparative cross-sectional study

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Background & Aims: Acute rheumatic fever (ARF) is a delayed, non-suppurative sequelae of a pharyngeal infection with Group A B-hemolytic streptococcus (GAS). ARF and rheumatic heart disease (RHD) affects millions of people and are the leading causes of cardiovascular morbidity and mortality during the first 5 decades of life in the developing world. Early detection of RHD and structured prevention programs can halt the devastating effect.

Objective: The study was conducted to demonstrate the effectiveness of screening using hand-held device for asymptomatic RHD by comparing their exposure status with a known Chronic RHD case or not.

Methods: A community based comparative cross-sectional study, following the STROBE guidelines for analytical cross-sectional studies, was conducted at five elementary schools, in Addis Ababa, Ethiopia from January to June, 2022. Two categories of study population were identified as to their close contact exposure or not to a known patient with RHD (Positive and negative contacts). Lumify handheld device was used to do echocardiography and confirmation was made using standard echo machine GE-vivid e-9. Data was summarized using frequencies with percentages and median as needed. A chi-square and Fisher's exact test were used to determine statistical significance. For both tests, a statistically significant difference was detected when the P-value is ≤ 0.05 .

Results: A total of 265 children (positive-108 and negative-157 contact) were screened using structured questionnaire and echocardiography. Almost all of the students had reported symptoms of sorethroat in the past three months and more than 70% were treated with unspecified antibiotic in two weeks of the onset of the symptom.

The stratified prevalence of asymptomatic RHD among children with negative contact history was 3/157 (1.9%, 95%CI= 0 -4.0%) of which 2 were borderline cases. Whereas among children with positive contact history with a known CRHD case was 10/108 (9.3%, 95% CI= 4.6 -14.8%) of which 9 were definitive cases. Out of which 8 students were having mild mitral regurgitation and the remaining two were with mild to moderate degree of regurgitation.

After adjusting for age and sex, the odds of developing asymptomatic RHD among participants with positive contact history was 5.67 times than participants with negative contact history (AOR= 5.67, 95% CI= 1.40, 22.98, p-value=0.015).

Conclusions: Sore throat is highly prevalent and the treatment is not standardized in the study population. The prevalence of asymptomatic RHD was significantly higher among children with positive contact history with a known case of CRHD. The majority of these children were diagnosed with definitive RHD as compared to those with negative contact history. Therefore, screening using a snow ball technique will give us a superior yield when compared to routine school screening approach.