

WORLD CONGRESS ON RHEUMATIC HEART DISEASE

2-4 November 2023 • Abu Dhabi



Submission Id: 260

Title: LATENT RHD IN WEST AFRICA (LATTE study)

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Background & Aims: Rheumatic Heart Disease (RHD) is the first cause of acquired cardiovascular diseases in children and young adults, killing over 300,000 persons/year, mainly in poor countries. Despite being preventable- using penicillin to treat StrepA infections of the throat, RHD is usually diagnosed at late stage heart failure when valve lesions need surgery. The latent phase of RHD represents a window of opportunity for early treatment and prevention of disease progression. We conducted a multi-country pilot study to generate baseline data on the epidemiology of latent RHD in West Africa (WA) and the feasibility of mass screening with handheld echocardiography (HHEC).

Methods: The study was conducted in The Gambia, Senegal and Nigeria between October 2019 and March 2022 and consisted in two phases, i) training of non-expert users in HHEC; ii) mass-screening of RHD in children (5-18y) and adults (18-40y). Sample size calculation anticipated 3,000 children and 3,000 adults per site. Upon validation of the HHEC training, screening was done by the trainees, either in schools or in health facilities. All suspected RHD cases were reviewed by an expert cardiologist for diagnostic confirmation and management as required. Each confirmed RHD case by standard echocardiography (EC) was matched (sex & age) with four controls. Direct data capture was done using tablets and the RedCap database. Data were cleaned and analyzed in Stata 17 software. Main outcomes included: i) performance of HHEC (versus standard EC) to detect RHD; ii) feasibility of mass-screening, iii) prevalence and risk factors of latent RHD in three WA countries.

Results: Two non-expert users per country followed a two-week training on HHEC at the Uganda Heart Institute (UHI) in January 2020. This was followed by a 6-8 weeks hands-on training in each site under the supervision of the local expert cardiologist (PI) following the World Heart Federation guidelines. Each RHD patient/healthy volunteer involved in the study was scanned both by a trainee (HHEC) and an expert cardiologist (standard EC) and all measurements saved independently for later comparison. Sensitivity and specificity of HHEC versus standard EC were computed for each trainee and validated by external quality control at the UHI. In The Gambia, both the sensibility and specificity of HHEC were >90% at the end of the training for both nurses. Over 3,000 Gambian school children were screened and RHD was confirmed in 41 (1.6%) of them with a majority (71%) identified with borderline lesions. Only 10/41 (24%) RHD cases had an audible heart murmur and only 5/41 (12%) had clinical symptoms. A total of 1,942 Gambian adults (including 993 pregnant women) were screened among whom 14 (0.7%) had confirmed definitive RHD lesions. However, 22 additional adults displayed echocardiography features compatible with borderline lesions despite being over 20 years old. Taking into account both borderline and definitive lesions, the overall RHD prevalence among adults was 1.8% (2.8% among pregnant women). Although the clinical significance of borderline RHD lesions in adults has yet to be established, they should be monitored. Study results from Senegal and Nigeria will also be reported during the meeting.

Conclusions: Our study showed that latent RHD is common among school-aged children and young adults in WA and should be systematically detected through mass screening for early case management and prevention of disease progression. We demonstrated that non expert users (nurses, midwives) can be readily trained to reliably screen for latent RHD in schools, antenatal clinics and other primary health care facilities. Information campaigns on RHD prevention and treatment in the general population and among health care workers should be urgently deployed. National RHD registries should be established for improved diagnosis, case-management, and the control of RHD in West Africa.