ORIGINAL RESEARCH

Primary Healthcare Workers' Awareness of Acute Rheumatic Fever & Rheumatic Heart Disease: A Study in Public Health Facilities in South Western Uganda

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Introduction: Timely identification and treatment of a streptococcal throat infection prevents acute rheumatic fever (ARF) and its progression to Rheumatic Heart Disease (RHD). However, children in developing countries still present with established RHD, due to either missed, untreated or sub-optimally treated sore throats and ARF. We aimed to determine the level of knowledge, skills, and practices of primary health workers in South Western Uganda in providing care such children.

Methods: We conducted a comparative quantitative cross-sectional study to assess knowledge, practices, and skills regarding the care of a child with a sore throat, ARF, and RHD. The responses were scored against a structured guide. The Fisher's exact test and the chi-squared test with level of significance set at 0.05 were utilized to compare differences in knowledge, skills, and practices among health workers in private and public health facilities about ARF and RHD.

Results: Eighty health workers from health facilities were interviewed in Mbarara district with a median age of 29.5 years (IQR 27.34) and median duration in practice of 5 years (IQR: 2, 10). On average, there were at least 3 children with sore throats weekly. At least 95% (CI: 87.25%–98.80%) of the health worker had awareness about ARF and RHD. Only 43.75% (95% CI: 33.18%–54.91%) had good knowledge about ARF and RHD. Majority, 61.25% (95% CI: 50.03%−71.39%) did not know the proper prophylaxis and investigations for a child with ARF. There were no statistically significant differences but a clinically meaningful differentials in the level of knowledge among health workers in public and private facilities.

Conclusion: The knowledge and skill level of health workers in primary healthcare facilities about ARF and RHD in South Western Uganda remains low, with no difference between practitioners in public and private facilities.

Keywords: acute rheumatic fever, rheumatic heart disease, awareness, knowledge, healthcare provider

Introduction

Rheumatic heart disease, an irreversible disease of the heart valves, affects nearly 32 million people and kills 345,000 every year globally.[1–3] Acute rheumatic fever (ARF) is an inflammatory disease that can develop after an infection with Group A Streptococcus bacteria. This infection typically presents as strep throat and is most common in children ages 5 to 15 years. Children in living crowded homesteads, school communities, and camps are more at risk. ARF is an immune-mediated condition. In an attempt to combat streptococcal infection, antibodies are produced that attack the heart tissues because of a similar structure to the bacteria – this is referred to as molecular mimicry. Repeated streptococcal infections and resultant inflammatory response eventually lead to rheumatic heart disease (RHD). The mitral and aortic valves are most frequently affected, leading to valvular insufficiency or stenosis, which may result in heart failure over time. The process from ARF to RHD can be insidious, with progressive valve damage leading to

chronic heart disease.[2,3] Timely identification and treatment of a streptococcal infection avert this progression.[1] Despite this, many children still present to tertiary care facilities with already established RHD meaning that early symptoms were either due to missed, untreated, or sub-optimally treated sore throats and ARF.[4] This leads to complications that are expensive and difficult to treat in resource-limited settings.[5]

Poor communities are disproportionately affected, with approximately 70% of the cases occurring in sub-Saharan Africa.[5,6] In Uganda, RHD remains the most commonly acquired heart condition contributing to 45.5% of all acquired heart diseases treated at the Uganda Heart Institute.[7] In South Western Uganda, it contributes about 74% of all acquired heart diseases in children.[8] These acquired heart diseases are very costly to treat with the cost of treatment for RHD, for example, being catastrophically high at 78 dollars per person-year;[9,10] yet, the poorest communities are most affected. In such communities, primary healthcare workers, if equipped with the right skills, knowledge, and practices, could be fundamental in curbing the epidemic of RHD in impoverished communities.

Little is known about the knowledge, practice, and skills of primary health workers in health facilities in Mbarara district in preventing, identifying, and managing acute rheumatic fever and rheumatic heart disease. Moreover, Mbarara district has a high population with numerous congested urban slums and is known to have a high prevalence of RHD.[8] There are also numerous health facilities in this town, both public and private, with personnel at different levels of training and experience. Understanding the level of knowledge of primary healthcare workers about ARF and RHD will provide a benchmark for interventional health education strategies, interventions, and empowerment to correctly diagnose sore throats and identify symptoms of acute rheumatic fever early and optimally treat them. This will eventually prevent the progression of ARF to RHD.

We thus aimed to;

1) Determine the level of knowledge of primary healthcare workers about acute rheumatic fever and rheumatic heart disease in primary healthcare facilities in Mbarara district.
2) Determine the skills and practices of primary healthcare workers regarding acute rheumatic fever and rheumatic heart disease in primary healthcare facilities in Mbarara district.
3) Compare the level of knowledge of health workers about acute rheumatic fever and rheumatic heart disease between public and private health facilities in Mbarara district.

Methods

This was a comparative cross-sectional study using quantitative methods. We compared the knowledge level of 80 health workers in purposively selected public and private health facilities in Mbarara district. Mbarara district has a high population of over 500,000 people with numerous congested urban slums and is known to have a high prevalence of RHD.[8] There are also numerous health facilities in this town, both public and private, with personnel at different level of training and experience. Mbarara district has 253 health workers. It has 4 hospitals (3 privately owned), 4 health centers IV, 13 health centers III, 29 health centers II and Village Health Teams. The Village Health Teams (VHTS) are the lowest levels of the health system in Uganda. VHTs provide health education and may participate in surveillance and preventive care services. They are thus a Level 1 health service. Following the VHTs is the Health Center II, which is an outpatient service run by a nurse and meant to serve 5000 people. Next in level is Health Center III (HCIII), run by a clinical officer. A clinical officer holds a diploma in clinical medicine and community health. A HCIII is intended to serve 10,000 people and provides in addition to HC II services, in-patient, simple diagnostic, and maternal health services. Above HC III is the Health Center IV, run by a medical officer, and provides surgical services in addition to all the services provided at HC III. A medical officer holds a bachelor's degree in medicine and surgery (MBChB). HC IV is also intended to provide blood transfusion services and comprehensive emergency obstetric care.

We included health facilities (hospitals, Health Centers III and IV) that see at least ten children in a month using a two-stage sampling procedure. Health workers who routinely see children were included while health facility administrators without medical training were not included in the study.

Using the formula; Size of strata = Size of entire sample ∗ layer size/population size, we enrolled 8, 50, and 22 health workers from Hospitals, HCIV, and HCIII, respectively.

A pretested structured questionnaire was administered to assess health workers' knowledge and practices in identifying and managing sore throats, acute rheumatic fever, and rheumatic heart disease. The responses were scored against a structured guide, and differences in knowledge and practice were detected amongst health workers.

Using a structured checklist, we assessed healthcare provider skills in examining a child with a sore throat. Scores from this checklist were graded, and differences in skills were noted.

We created a dedicated database to store the collected data and analyzed it, using the statistical software STATA 15. We assessed the Gaussian assumption was assessed using the Shapiro–Wilk test and histograms. A descriptive analysis was carried out, where the median and interquartile range (IQR) were calculated for continuous variables and the frequency distributions were calculated for categorical variables. We assessed the knowledge level with 12 questions (alpha = 0.72). Each correct answer to the twelve questions was considered as one point, and a wrong answer was no point. The knowledge-level score was divided into 3 categories: poor (0–4 points), moderate (5–8 points), and good (8–12 points). The practices of healthcare workers were rated as good if the total score in the 6 questions was ≥9, and poor if the response was <9. Each question had a score of 1.5 points. For the skill section, the responses from the observation were graded into not done, fairly done, and done well, with scores of 0–4, 5–7, and 8 and above, respectively. The domains assessed included calming the patient and asking for permission (2 points), using the appropriate PPE and equipment (tongue depressor and pen torch) (3 points), assessing and commenting on oral hygiene, palate, tonsils, and nasopharynx (5 points). The Cronbach's alpha of the scale was 0.79. The Fisher's exact test and the Chi-squared test were used to compare the level of knowledge, skills, and practices of primary healthcare workers in private and public health facilities about ARF and RHD. A p-value of 0.05 will be considered statistically significant.

We got ethical approval from MUST REC (Approval reference MUST-2022-611) and permission from the District Health Officer of Mbarara District. Written informed consent was sought from the health workers, and they were interviewed at their time of convenience. All interviews were conducted in a confidential place, and the participants were compensated for their time.

Results

Characteristics of Participants

We reached out to 80 health workers with the majority (55, 68.75%) working in private facilities. The median age of the health workers was 29.5 (IQR 27,34) years. There were 46 (57.50%) male health workers. The median duration in practice for participants was 5 years (IQR: 2,10). The health workers reported seeing at least 3 children presenting with sore throats per week. More than two-thirds of the health workers had at least heard about ARF and RHD. Almost half of the health workers interviewed were nurses. This is shown in Table 1.

Knowledge About Causes and Risk Factors of ARF and RHD

In our study, only 35 (43.75%) of the participating health workers had good knowledge about ARF and RHD. Almost half of the health workers did not think that bacteria were the major cause of ARF and only 36 (45%) thought that children in crowded places were at higher risk of getting RHD. Only 41 (51.25%) identified children aged 5–15 years as the commonly affected age group. However, the majority, 63 (78.48%), of the health workers thought Pen V was the treatment of choice for prophylaxis against RHD.

Practice Towards the Treatment of ARF and RHD

According to this study, less than half, 37 (46.15%), of health workers were very likely to prescribe an antibiotic for a child presenting with a sore throat. Only 40 (47.44%) were likely to consider a differential diagnosis of ARF for a child presenting with a sore throat and less than half, 37 (46.15%) were likely to consider an ECHO as part of the radiological investigations for a child with symptoms suggestive of ARF. Only 40 (50%) of health workers considered health education about ARF and RHD as part of the package for a child with a sore throat.

Table 1 Characteristics of Participants

Variables	N	%
Age (median, IQR)	29.5	(27,34)
Sex Male Female	 46 34	 57.50% 41.77%
Cadre Medical officer Clinical officer Nursing officer	 22 20 38	 27.50% 25.00% 47.50%
How long in practice (median, IQR)	5	(2, 10)
Type of medical facility Public/government Private	 25 55	 31.25% 68.75%
Level of the facility HC3 HC4 Hospital	 22 50 8	 27.50% 62.50% 10.00%
Number of children with sore throats per week	3	(2,5)
Ever heard about ARF No Yes	 4 76	 5% 95%
Ever heard about RHD No Yes	 4 76	 5.00% 95.00%
Ever seen a child with ARF No Yes Don't know	 18 57 5	 20.50% 71.25% 6.25%
Ever seen a child with RHD No Yes Don't know	 13 62 5	 16.25% 77.50% 6.25%

Skills of Health Workers in Examining a Child with a Suspected Sore Throat

When participating health workers were requested to examine the throat of one of the research assistants, 78 (97.5%) calmed down the "patient" and hence set the stage for a proper exam. However, only 32 (40.35%) used a tongue depressor and hence majority did not view the oral cavity well despite 64 (80%) of them making comments about oral hygiene. Only 27 (33.93%) made remarks about the pharynx, palate, and tonsils. This is shown in Table 2.

Comparison of Public and Private Health Facilities in Mbarara City

No statistically significant difference was noted in the knowledge, practices, and skills between public and private health workers.

Table 2 Knowledge, Skills, and Practices Between Public and Private Facilities

Knowledge	Total	95% CI	Public	Private	p-value
	n (%)		n (%)	n (%)	
Poor	19 (23.75%)	(15.58–34.44)	6 (31.58%)	13 (68.42%)	0.951
Moderate	26 (32.50%)	(23.04–43.64)	9 (34.62%)	17 (65.38%)	
Good	35 (43.75%)	(33.18–54.91)	10 (28.57%)	25 (71.43%)	
Skills					
Not done	22 (27.50%)	(18.73–38.44)	5 (22.73%)	17 (77.27%)	0.356
Fairly done	2 (2.50%)	(0.61–09.64)	0 (0%)	2 (100%)	
Done well	56 (70.00%)	(58.94–79.13)	20 (35.71%)	36 (64.29%)	
Practices					
Poor	7 (8.75%)	(0.42–17.41)	3 (42.86%)	4 (57.14%)	0.671
Good	73 (91.25%)	(82.59–95.82)	22 (30.14%)	51 (69.86%)	

Discussion

We conducted one of the few studies on the knowledge, skills, and practice among primary healthcare workers towards RHD in LMIC.[11] Half of the health workers had inadequate knowledge about ARF and RHD with many thinking ARF had other causes rather than bacteria. Less than half were also likely to investigate ARF in a child with a sore throat. This finding is concerning, representing a potentially missed opportunity for appropriate management and prevention of ARF and RHD by health workers for a significant number of children.

Our findings are comparable to a study done in Uganda that found that most health workers had very limited knowledge of RHD and ARF despite their facilities having readiness to manage RHD.[12] They are also similar to studies done in Nigeria, and Ethiopia.[13–15] These also noted that more than half of the health workers studied neither knew the causative agent for RHD nor appropriate preventive methods. This similarity of results could be attributed to the infrequent refresher training on updated information, improper training, and little or no mentorship from other experienced health workers, hence fewer learning opportunities.

Health education about ARF and RHD as part of the discharge plan for a child with a sore throat was practiced by only 50% of the health workers. These programs should be tailored to the local context and should be accessible to all healthcare workers, regardless of their location or facility type. This is, however, different from a study done in Cameroon among medical students where the majority discussed the importance of health education.[16] This contrast could be due to differences in the cadres of health workers studied in Cameroon compared to those in our study. Medical students and nurses have different curricula in training where the latter may have had different training exposure about RHD.

The majority of the health workers demonstrated substandard throat examination techniques. They neither used a tongue depressor nor made a detailed comment on the oral cavity and the throat. These primary healthcare workers were also unable to identify classical signs of a streptococcal throat. Several studies have reported a decay in the skills of health workers after training when they do not routinely practice such skills.[17,18]

There was no statistically significant difference in the level of knowledge among health workers in public and private facilities. This could be attributable to the fact that we sampled a few facilities in the city. The individual differences in the level of knowledge and skills between these two groups are minimal as they seem to have similar exposures to knowledge access and mentorship.

Strengths and Limitations

Our study was a cross-sectional observable quantitative study and despite the being done in only a small geographical location, the results from it can be used to improve practice. We were also able to observe skills in examining a sore throat which has not been demonstrated in previous studies.

Conclusion

Primary health workers have inadequate knowledge about ARF, RHD, its prevention, and treatment. There is no difference in knowledge, skills and practice about ARF /RHD among primary healthcare providers in public and private facilities in Mbarara district.

Recommendations

We recommend targeted health education about ARF and RHD to health workers in primary health facilities. This could be done in a manner contextualized to the training level of the health workers and made more frequent. We also recommend a larger study in other geographical areas to study more deeply the factors that could cause low knowledge and inadequate skills regarding ARF and RHD.

Abbreviations

ARF, acute rheumatic fever; RHD, rheumatic heart disease; LMIC, low- and middle-income countries.

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Author Contributions

All the authors significantly contributed to this work. This is in the conception, study design, execution, data acquisition, analysis, and interpretation. They all participated in drafting, revising, and critically reviewing the article. All the authors gave final approval of the version to be published, agreed on the journal to which the article has been submitted and agreed to be accountable for all aspects of the work.

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Disclosure

The authors declare no conflict of interest.

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