Journal of Advances in Medicine and Medical Research

30(11): 1-12, 2019; Article no.JAMMR.52225
ISSN: 2456-8899
(Past name: British Journal of Medicine and Medical Research, Past ISSN: 2231-0614, NLM ID: 101570965)

Rheumatic Fever and Rheumatic Heart Disease: A Physicians Perspective

Nsirimobu Ichendu Paul[1] and Chika O. Duru[2*]

[1]Department of Paediatrics, University of Port Harcourt Teaching Hospital, Port Harcourt, Rivers State, Nigeria.
[2]Department of Paediatrics and Child Health, Niger Delta University Teaching Hospital, Okolobiri Bayelsa State, Nigeria.

Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI:10.9734/JAMMR/2019/v30i1130247
Editor(s):
(1) Dr. Murali P. Vettath, Department of Cardiovascular & Thoracic Surgery, Minimally invasive & Transplant surgeon, Director-International Center of Excellence in OPCAB Surgery, MEITRA Hospital, India.
Reviewers:
(1) Francesca Gorini, National Research Council, Italy.
(2)Mra Aye, Melaka Manipal Medical College, India.
(3)E. Siva Rami Reddy, Tantia University, India.
Complete Peer review History: http://www.sdiarticle4.com/review-history/52225

Original Research Article

Received 12 August 2019
Accepted 22 October 2019
Published 04 November 2019

ABSTRACT

Background: Acute rheumatic fever (ARF) and rheumatic heart disease (RHD) are non-suppurative cardiovascular sequlae of group A Streptococcus pharyngitis affecting children and young adults. Despite concerted efforts aimed at prevention, they still remain diseases of public health concern globally.
Objectives: The aim of this study was to assess the knowledge and practice of acute rheumatic fever and rheumatic heart disease among physicians practicing in public and private hospitals in two states of the Niger delta region of Nigeria.
Materials and Methods: Using a structured self administered questionnaire with 9 questions, 123 physicians from all the medical and surgical specialties were interviewed. Data was analyzed using SPSS 20.
Results: Majority (95.93%) of the doctors were working in Government hospitals and nearly half (49.59%) of them were Paediatricians. Over half (50.41%) had more than 5 years' experience in medical practice. Among the cadre of the doctors, house officers represented 44.72% while

**Corresponding author: E-mail: duru_chika@yahoo.com;*

Consultants constituted 17.07% of the study participants. The study showed that 70 (56.91%) of the study participants selected at least seven correct answers out of the nine questions that assessed their knowledge and practice and so showed a good knowledge and practice of ARF and RHD.

Conclusion: Though a good level of knowledge and practice was gotten from our study, there are still some gaps in the knowledge and practice that can be improved by health education through training and retraining our healthcare professionals. We therefore recommend the inclusion of ARF and RHD in CME and other training programs.

Keywords: Rheumatic fever; Rheumatic heart disease; Physicians perspective.

1. INTRODUCTION

Acute rheumatic fever (ARF) and rheumatic heart disease (RHD) remain diseases of public health importance despite concerted efforts globally to eradicate them [1]. Acute rheumatic fever is a delayed autoimmune reaction to group A beta hemolytic streptococcal pharyngitis in genetically susceptible individuals. Rheumatic heart disease is a long term complication of ARF following repeated valvular damage resulting in severe morbidity and mortality of affected children and young adults[1,2].

Globally,33 million people are affected by RHD, which accounts for about 300,000 deaths, with over 80% of cases of ARF occurring in low and middle income countries[2,3].These countries have a proliferation of underlying risk factors such as poverty, overcrowding and low socioeconomic status which increase the burden of these largely preventable diseases [3].

In Nigeria, ARF and RHD remain one of the major acquired heart diseases in Nigerian children [4]. Though mainly hospital based studies have reported the burden of RHD in Nigeria to be low [5] Ekure et al. [6] in a recent population based screening of Nigerian school children for RHD reported a prevalence rates of 2.7 per 1000.

As acquired cardiac diseases, the main goal of management is prevention. This can be achieved through the four major levels of prevention [2]. Primordial prevention deals with tackling socioeconomic risk factors such as reduction of poverty, improving housing conditions and increased access to health care [2]. Primary prevention of ARF is a major factor in the fight against the occurrence of RHD. This begins with adequate recognition and effective treatment of strep throats in school aged children [2].Secondary levels of prevention of RHD involves the administration of benzathine penicillin injection every 3-4 weeks to patients with previous history of ARF or RHD to prevent recurrent episodes of Streptococcal pharyngitis [2].Tertiary prevention involves the management of chronic RHD and its complications of heart failure, atrial fibrillation and stroke [7].

In a bid to reduce the incidence of these diseases, one of the recommendations by the World Health Assembly [2] was to improve access to primary health care by investing in a community and primary health care workforce trained in prevention, diagnosis and evidence-based management of group A beta haemolytic streptococcal pharyngitis, ARF and RHD [7].This aims to tackle other determinants of the disease burden which have been linked to health-system related factors such as shortage of resources for health care, inadequate expertise of health care workers and low level of awareness of the disease in the community [1].The inadequate expertise of the health care workers can be related to their low level of knowledge on causes and management of ARF and RHD[8].

The aim of this study was to assess the knowledge and practices of rheumatic fever and rheumatic heart diseases of health care workers in public and private hospitals in the Niger Delta region of Nigeria. It is hoped that the data from this study will assist in policy making and strategic planning on preventive strategies to prevent acute rheumatic fever and rheumatic heart disease.

2. METHODOLOGY

This was a descriptive cross-sectional study conducted in public and private hospitals located in the Niger Delta region of Nigeria. Using pretested questionnaires, 123 doctors practicing at two Government Hospitals; the Niger Delta University Teaching Hospital Okolobiri Bayelsa State and the University of Port-Harcourt Teaching Hospital, Port Harcourt Rivers State, a

Private hospital and an Oil Company Hospital in Port Harcourt Rivers State were given self administered questionnaires. Verbal consent was gotten from each participating doctor who was randomly selected and invited to participate in the study. The doctors were selected from all the medical and surgical subspecialties. All cadre of doctors were approached, from the Interns to the resident doctors to the Consultants. The interns are the newly inducted doctors, also referred to as the House officers and had recently graduated from Medical school. The resident doctors had commenced their 4-6 year residency training in the different subspecialties while the Consultants were the most qualified of the group having obtained a Fellowship degree and hence considered specialists in their chosen area of specialization.

The questionnaire consisted of 9 items which allowed for multiple responses, however there was only one most appropriate answer for each question except for question 9. A total of seven correct answers out of the nine questions were adjudged as good knowledge and practice while scores of 6 and below was categorized as poor knowledge and practice. The data was entered into an excel sheet and analyzed by calculation of means, percentages and ratios. A test of significance between proportions was assessed using the Chi-square and t-test and a p value of <0.05 was considered significant at a 95% confidence interval.

3. RESULTS AND DISCUSSION

3.1 Demographic Characteristics of the Study Population

A total of one hundred and forty questionnaires were distributed and 125 were returned, two of the returned questionnaires were poorly completed and 123 were analyzed giving a response rate of 87.9%. Out of these, 58 (47.15%) were aged between 20 and 30 years. Fifty seven (46.34%) were males while 66 (53.66%) were females giving a male: Female ration of 0.9: 1. Over half (50.41%) had more than 5 years' experience in medical practice. Majority (95.93%) of the medical professional were working in Government hospitals and nearly half (49.59%) of them were Paediatricians. Among the cadre of the doctors, house officers represented 44.72% while registrars constituted 26.83% of the study participants Table 1.

Table 1. Demographic characteristics

Characteristics	Frequency n=123	Percentage (%)
Age		
20-<30years	58	47.15
30-<40years	43	34.96
40-<50years	16	13.01
50-<60years	5	4.07
>60years	1	0.81
Sex		
Male	57	46.34
Female	66	53.66
Years of practice		
0-<5years	61	49.59
5-<10years	22	17.89
10-<20years	32	26.02
>20years	8	6.50
Place of work		
Government Hospital/ Health centre	118	95.93
Private Hospital	4	3.25
NGO/Oil company	1	0.81
Department/Specialty		
Paediatrics	61	49.59
Obs and Gynae	20	16.26
Surgery	11	8.94
Internal Medicine	15	12.20
Family Medicine	8	6.50
Dentistry	3	2.44
Accident & Emergency	3	2.44
Laboratory Medicine	1	0.81
Ophthalmology	1	0.81
Cadre in medical profession		
Consultant	21	17.07
Senior Registrar	14	11.38
Registrars	33	26.83
House officers	55	44.72

3.2 Responses to ARF Related Questions

Question 1: What can be done to prevent acute rheumatic fever?

More of the participants (52.06%) answered this question with the most appropriate response 'Go to the hospital for treatment of skin sores and sore throats', however 19.07% also selected 'keep house and body clean/good sanitation /hygiene 'option and 15.98% selected 'reduce household overcrowding' Table 2.

Further analysis as shown in Fig. 1 shows the categories of the doctors that selected the wrong

answers. Only house officers and registrars selected the option 'eat healthy food/maintain healthy weight' as measures that can prevent ARF. There was a mix of the cadres of doctors who selected the wrong answers. This shows that all cadre of doctors show some deficiency in ARF preventive measures. The consultants showed a statistically significant higher correct response to this question with a proportion of 26.73%, followed by the registrars (25.74%) (X2=49; p=0.001).

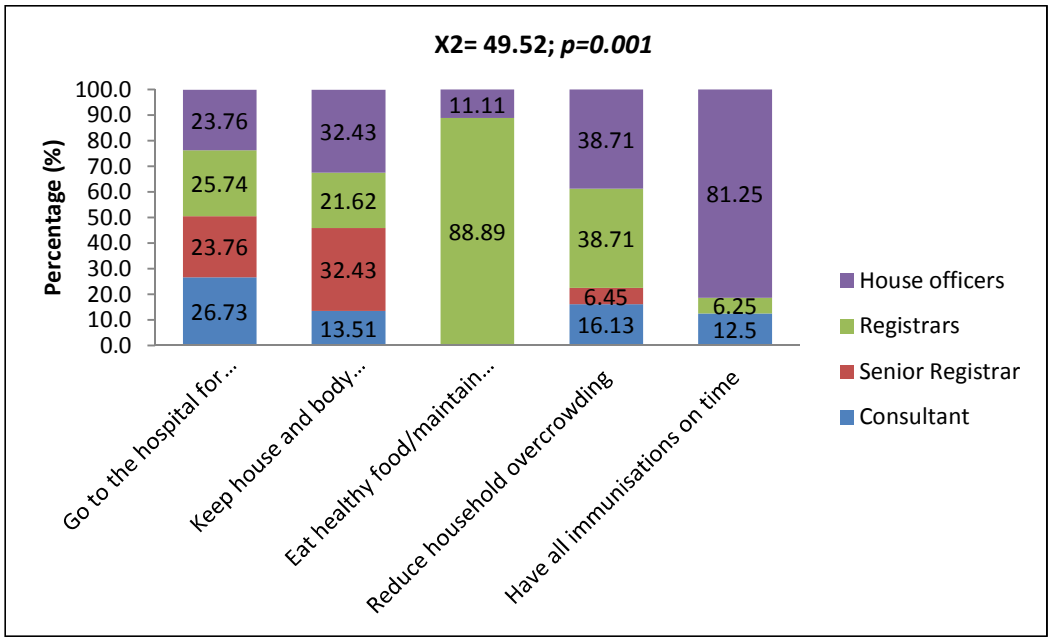

Fig. 1. What can be done to prevent acute rheumatic fever?

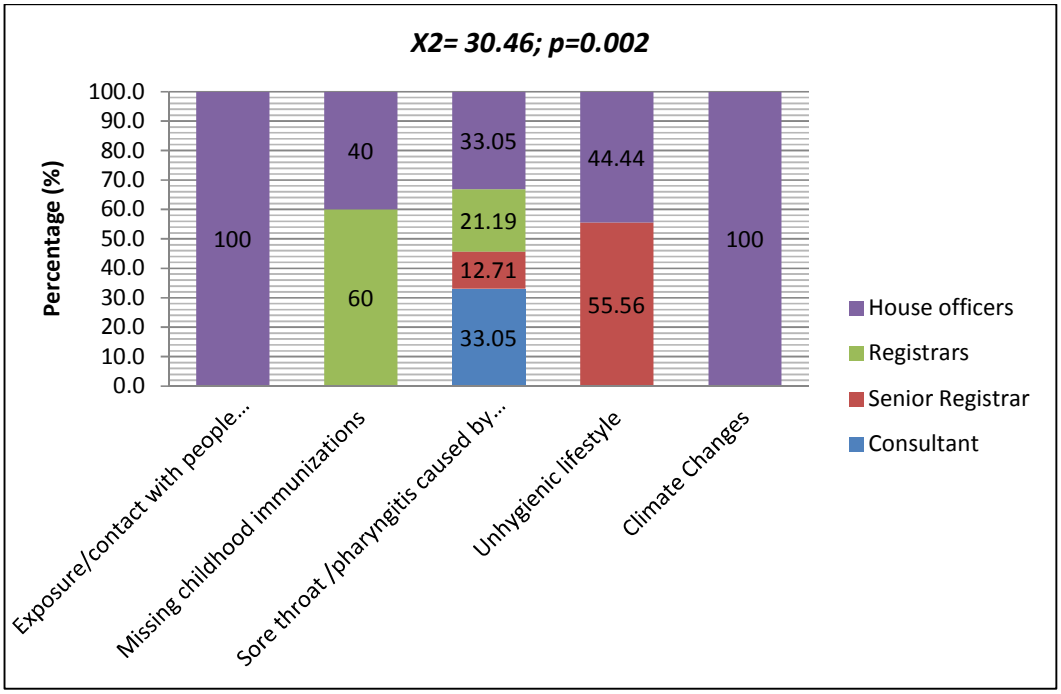

Fig. 2. What causes acute rheumatic fever

Question 2: What causes acute rheumatic fever?

The most correct answer to this question was 'sore throat /pharyngitis caused by Group A B-hemolytic Streptococcus (GABHS)'. This answer was selected by 86.76% of the doctors. This is similar to the findings among Fiji health workers where 82.2% selected the correct response. [9]

However, other answers were selected by these and other doctors as shown in Table 2. Fig. 2, shows that all the options (correct and incorrect) were selected by some house officers and only them selected the incorrect options 'exposure/contact with people that have RHD' and climatic changes. Other incorrect responses are shown in Fig. 2. The consultants and the house officers showed a statistically significant higher correct response to the question 'what causes ARF', with a proportion of 33.05% in each case (X2=30.46; p=0.02). Since ARF and RHD are part of the medical curriculum during undergraduate training, one would have expected that the newer medical graduates would have performed better in this question, however, the contrary was observed, thus strengthening the need for regular update of ARF and RHD among medical practitioners.

Question 3: Who is most at risk of getting ARF?

A total of 69.29% of all participants surveyed provided the correct response to this question i.e. identifying that children aged 5-15 years were most at risk for ARF. However, 19.45% and 8.66% of the doctors selected the incorrect options of 'everyone equally at risk 'and '0-4 years' respectively as the correct answers; Table 2. Further analysis in Fig. 3 shows that consultants selected all but one of the available options, they were also the only group that selected the elderly as being at risk of ARF and RHD. This depicts a high degree of uncertainty in their choice of the correct answer. The registrars and the house officers also had varying answers which were incorrect as shown in Fig. 3 below. The Senior Registrars showed a statistically significant higher correct response to the question, 'Who is most at risk of getting ARF', with a proportion of 29.55%, followed by the Consultants (28.41%) (X2=41.62; p=0.001).

Question 4: What are signs and symptoms of ARF?

The doctors 'responses to the question 'What are the signs and symptoms of ARF?' showed a range of correct and incorrect answers: 101(58.05%) identified 'sore and swollen joints' as the correct answer. However, 14.94% and 13.79% also chose 'Shortness of breathe' and 'coughing and Shortness of breath' respectively as shown in Table 2. Fig. 4 shows that incorrect answers were selected from all cadre of doctors especially the registrars (who selected all the options), house officers, and consultants in response to this question. The senior registrars showed a statistically significant higher correct response to this question with a proportion of 28.71% (p=0.001) Fig. 4.

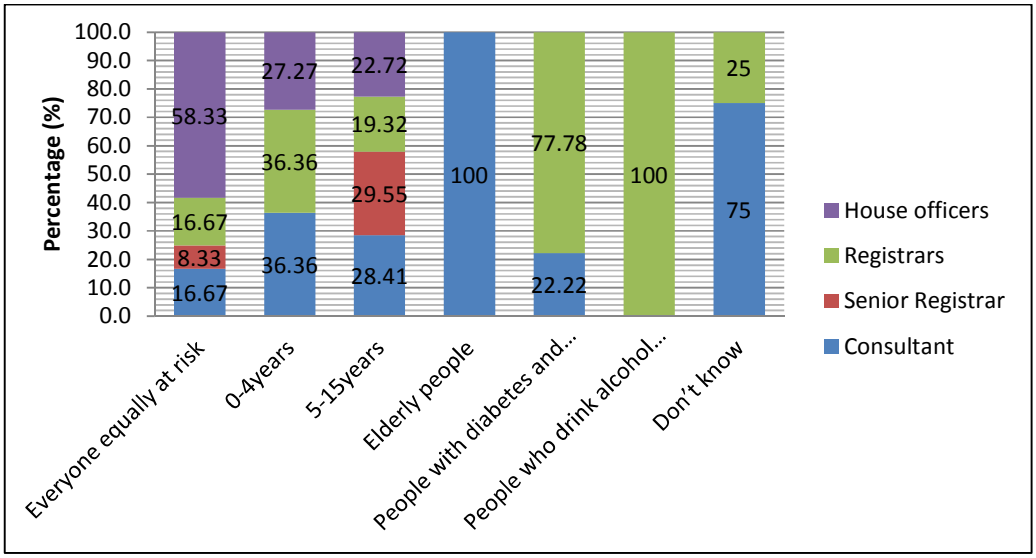

Fig. 3. Who is most at risk of getting ARF

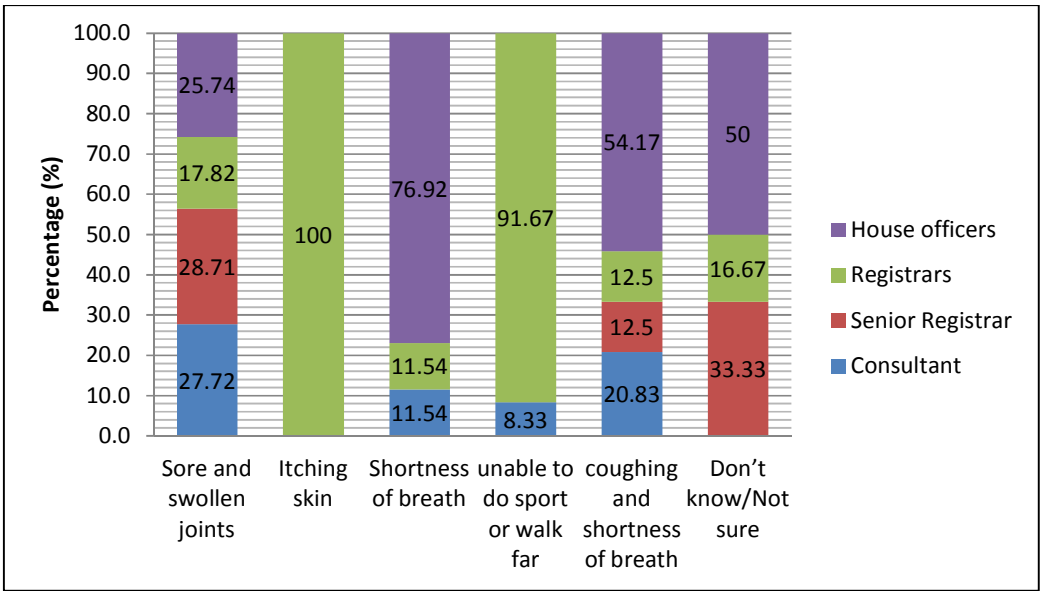

Fig. 4. What are signs and symptoms of ARF

Question 5: How is a Group A B-hemolytic Streptococcus pharyngitis /sore throat diagnosed?

Of all participants, 62.79% correctly indicated that GABHS sore throat could be diagnosed by laboratory test such as throat culture and ASOT, 46 (26.74%) of all participants indicated that GABHS sore throat could be diagnosed by a combination of clinical symptoms and signs. A surprising finding was the selection of echocardiography as a diagnostic method for GABHS sore throat (Table 2). Fig. 5 shows that the option of echocardiography was selected by registrars and houseofficers. The consultants showed a statistically significant higher correct response to this question with a proportion of 45.37% (X2=87.76 p=0.001).

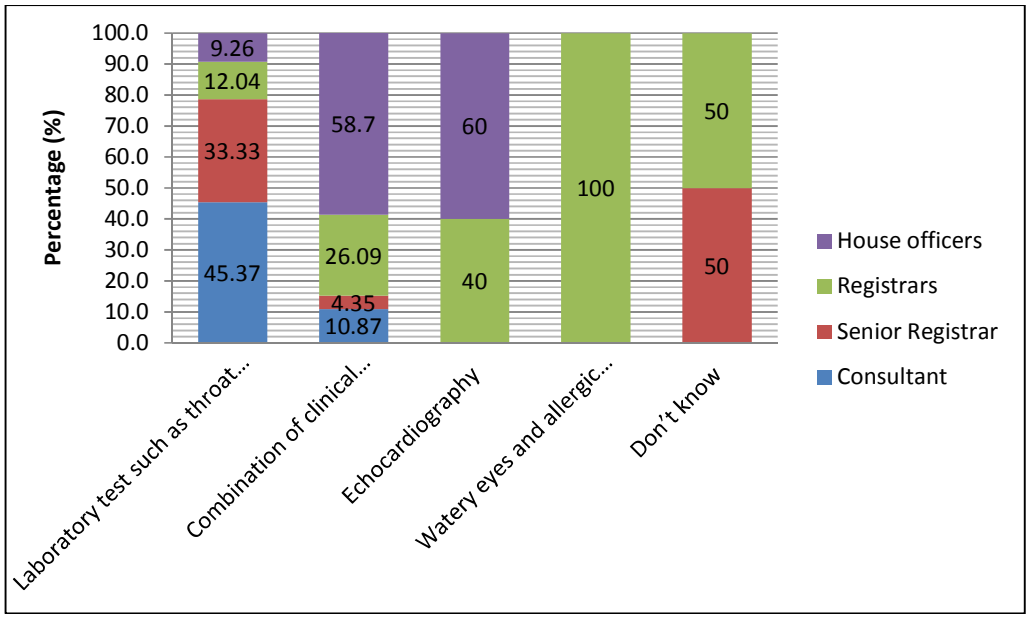

Fig. 5. How is a group A B-hemolytic streptococcus pharyngitis/sore throat diagnosed

Table 2.1. Knowledge and Practice of ARF

Characteristics	Frequency n=123	Percentage (%)
What can be done to prevent acute rheumatic fever? (n=194) (*Multiple Responses*)		
Go to the hospital for treatment of skin sores and sore throats	101	52.06
Keep house and body clean/good sanitation/hygiene	37	19.07
Reduce household overcrowding	31	15.98
Have all immunizations on time	16	8.25
Eat healthy food/maintain healthy weight	9	4.64
What causes acute rheumatic fever? (n=136) (*Multiple Responses*)		
Sore throat /pharyngitis caused by Group A Streptococcus (GAS).	118	86.76
Unhygienic lifestyle	9	6.62
Missing childhood immunizations	5	3.68
Exposure/contact with people that have RHD	3	2.21
Climate changes	1	0.74
Who is most at risk of getting ARF? (n=127) (*Multiple Responses*)		
5-15years	88	69.29
Everyone equally at risk	12	9.45
0-4years	11	8.66
People with diabetes and other serious illnesses	9	7.09
Don't know	4	3.15
Elderly people	2	1.57
People who drink alcohol and smoke	1	0.79
What are signs and symptoms of ARF? (n=174) (*Multiple Responses*)		
Sore and swollen joints	101	58.05
Shortness of breath	26	14.94
coughing and shortness of breath	24	13.79
unable to do sport or walk far	12	6.90
Don't know/Not sure	6	3.45
Itching skin	5	2.87
How is a Group A Beta-hemolytic Streptococcus pharyngitis/sore throat diagnosed? (n=172) (*Multiple Responses*)		
laboratory test such as throat culture and ASO Titre	108	62.79
Combination of clinical symptoms and signs	46	26.74
Echocardiography	15	8.72
Don't know	2	1.16
Watery eyes and allergic symptoms	1	0.58

Question 6: How should confirmed Group A B-hemolytic Streptococcal pharyngitis/sore throat be treated

Nearly 70% of the participants selected the correct answers to this question: either 'single BPG injection' (38.46%) or 'oral penicillin V for 7 days' (31. 41%). Twenty-three (14.74%) said the treatment was by the use of prednisolone and paracetamol (Table 3). Incorrect answers like 'bed rest and liberal fluids' and 'prednisolone and paracetamol' were selected by all other cadre of doctors as shown in Fig.6. In the Fuji study however, about 92% and 95% of the junior and senior medical officers respectively selected the correct answers[9]. The findings of this study depict some knowledge gap that needs to be filled. There was a statistically significant higher correct response to this question by the consultants (p=0.001) as shown in Fig. 6.

Question 7. Why are regular Benzathine penicillin G injections important for people who have had ARF and RHD?

Various responses to the question on why regular BPG injections are important for people with ARF and RHD were given. Of the 143 responses from 123 participants, 62.94% (90/143) chose the correct answer 'prevention against recurrence of ARF'. Twenty six (18.18%) selected the option 'to prevent heart failure' while 14 (9.79%) selected 'prevents bacterial infection (Table 3). However, the remaining selected; to 'treat syphilis' and 'to prevent stroke' as correct answers suggesting that some medical doctors

require additional education in this area. Fig. 7 shows that the response of the consultants with regards to the correct answer is statistically significant when compared to that of the other cadre of doctors p=0.001, Also, all cadre of doctors - consultants, registrars, house officers and even the senior registrars selected wrong answers, signifying that this area needs education. Rinku et al. [10] in a study on prescribing pattern of drugs in patients with RHD at tertiary care hospital found that Penicillin prophylaxis was prescribed for only 27.1% patients, out of which, only 4.2% were receiving benzathine benzyl penicillin showing the poorer knowledge of medical practitioners on the use of this drug as compared to our findings.

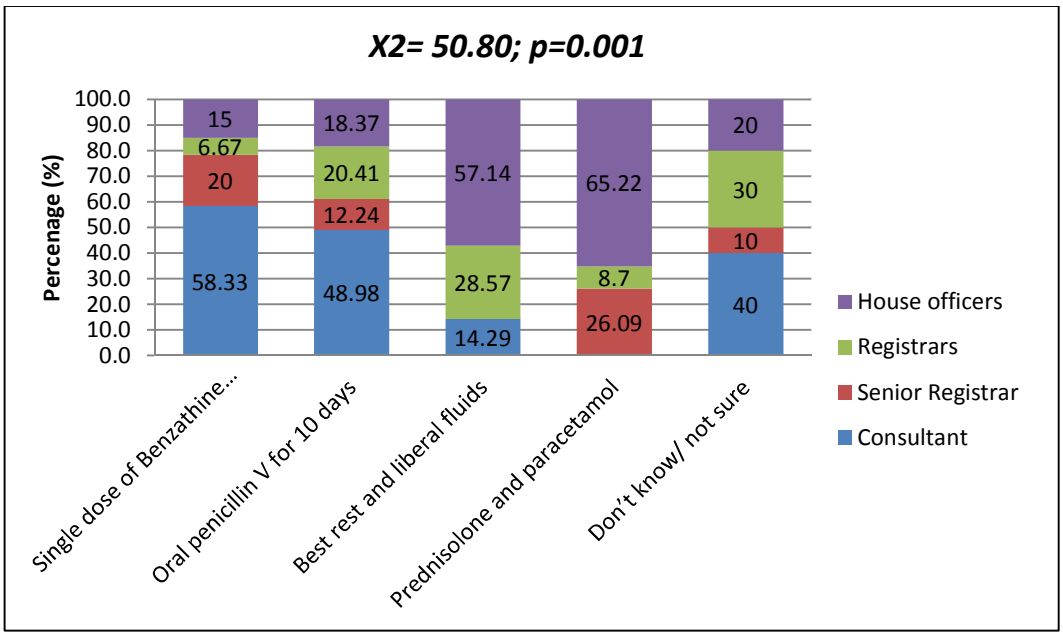

Fig. 6. How should confirmed group a streptococcal pharyngitis/sore throat be treated

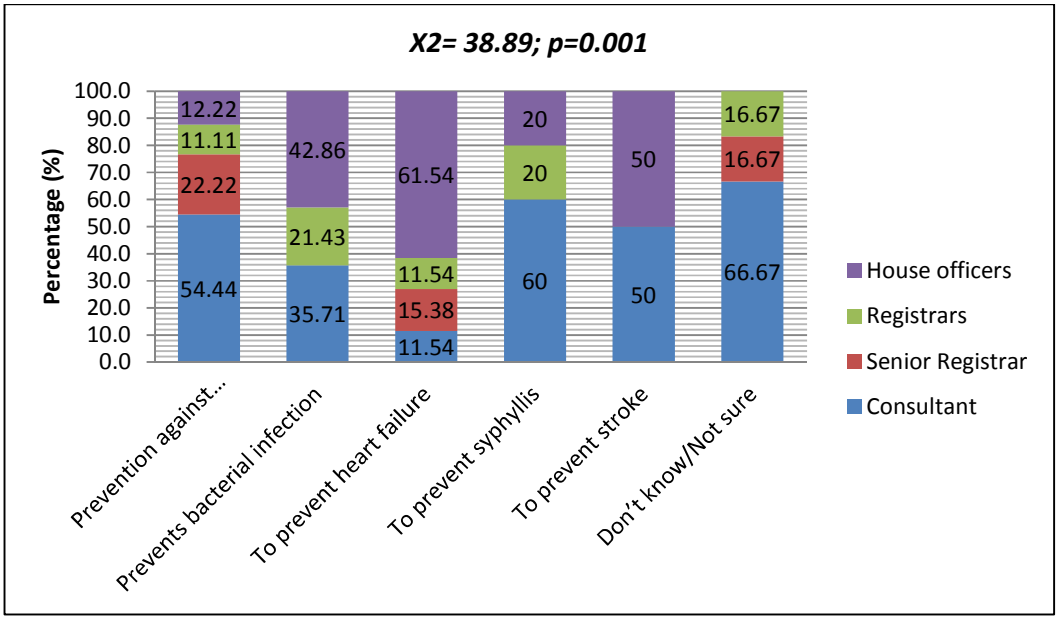

Fig. 7. Why are regular Benzathine penicillin injections important for people who have had ARF and RHD

Question 8: How often should Benzathine penicillin injections be given to people who have had ARF and RHD?

All participants' responses to the question regarding the correct timing and duration of Benzathine penicillin G (BPG) for people with a diagnosis of ARF and RHD are shown in Table 3. Seventy (56.91%) provided the correct response 'Every 21-28 days until the doctor gives the order to cease, at least a minimum of 10 years. Twenty seven (21.95%) said they 'don't know / not sure' while 21 (17.07%) said 'monthly for 3 to 5 years' Table 3. Fig.8 shows the differing cadre of doctors especially the registrars who selected the incorrect answers. The incorrect answers from these participant groups suggest that strengthening of knowledge around the timeliness and duration of BPG is required.

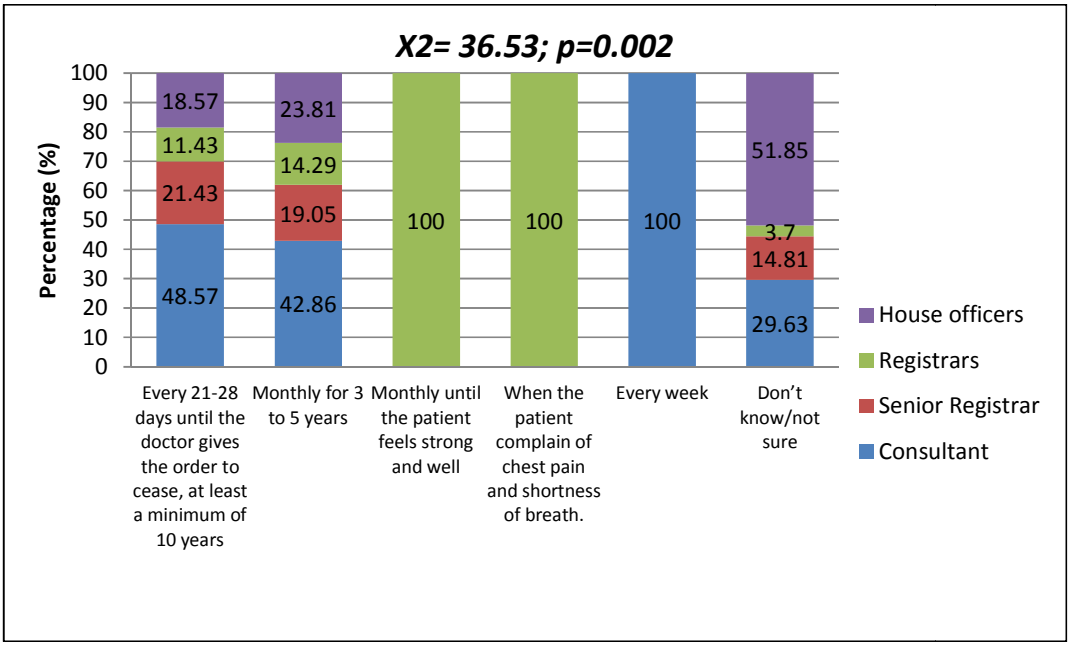

Fig. 8. How often should Benzathine penicillin injections be given to people who have had ARF and RHD?

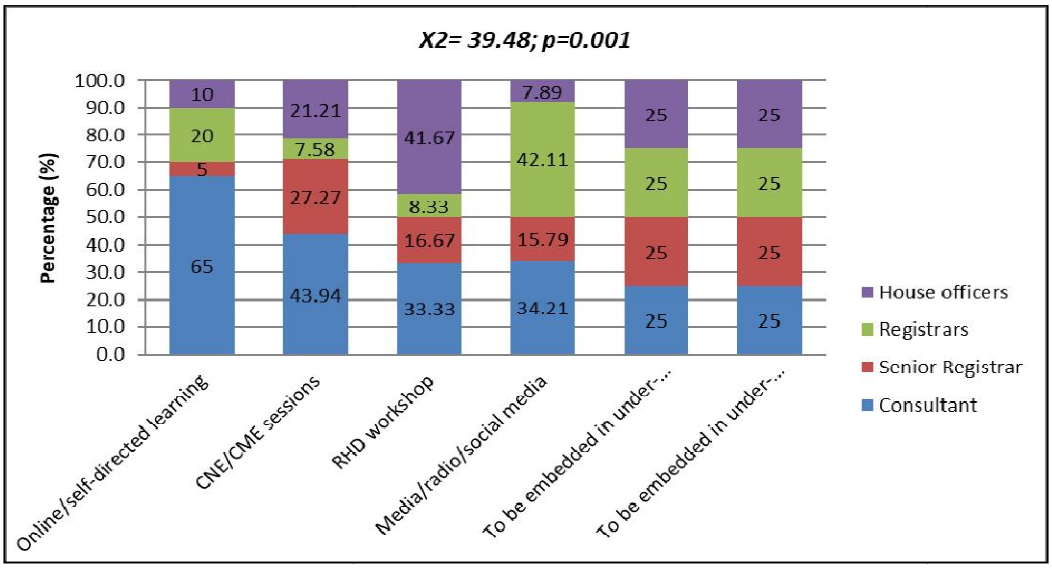

Fig. 9. What is the best way to improve ARF/ RHD knowledge for health professionals in Nigeria

Table 3. Knowledge and Practice 2

Characteristics	Frequency n=123	Percentage (%)
How should confirmed Group A *Streptococcal pharyngitis*/sore throat be treated? (n=156) (*Multiple Responses*)		
Single dose of Benzathine Penicillin-G injection	60	38.46
oral penicillin V for 10 days	49	31.41
Prednisolone and Paracetamol	23	14.74
Best rest and liberal fluids	14	8.97
Don't know/ not sure	10	6.41
Why are regular Benzathine penicillin injections important for people who have had ARF and RHD? (n=143) (*Multiple Responses*)		
Prevention against recurrence of ARF	90	62.94
To prevent heart failure	26	18.18
Prevents bacterial infection	14	9.79
Don't know/Not sure	6	4.20
To prevent syphyllis	5	3.50
To prevent stroke	2	1.40
How often should Benzathine penicillin injections be given to people who have had ARF and RHD? (n=123) (*Multiple Responses*)		
Every 21-28 days until the doctor gives the order to cease, at least a minimum of 10 years	70	56.91
Don't know/not sure	27	21.95
Monthly for 3 to 5 years	21	17.07
when the patient complain of chest pain and shortness of breath.	2	1.63
Every week	2	1.63
Monthly until the patient feels strong and well	1	0.81
What is the best way to improve ARF/ RHD knowledge for health professionals in Nigeria? (n=176) (*Multiple Responses*)		
CNE/CME sessions	66	37.50
Media/radio/social media	38	21.59
RHD workshop	36	20.45
Online/self-directed learning	20	11.36
To be embedded in under-graduate curriculum	16	9.09

Table 4. Knowledge and practice score on the prevention of Acute rheumatic fever (ARF) and rheumatic heart disease (RHD)

Characteristics	Frequency n=123	Percentage (%)
Knowledge and Practice Scores accessed using 9 questions/responses		
Good (7-9)	70	56.91
Poor (≤6)	53	43.09

Question 9: What is the best way to improve ARF/ RHD knowledge for health professionals?

The final question posed to participants related to how they would like to receive training or knowledge about ARF and RHD in the future: 'What is the best way to improve ARF/RHD knowledge for health professionals' Participants selected multiple answers, suggesting that access to a variety of modes of learning was preferred, the most common responses were for ARF and RHD training to be delivered through Continued Medical education (CME) sessions

(37.50%), media/radio/social media (21.59%), RHD workshops (20.45%), and by strengthening the curriculum in universities (9.09%) Table 3. Fig. 9 shows that all the cadre of doctors selected all suggested learning modes.

Knowledge and practice score on the prevention of Acute rheumatic fever (ARF) and rheumatic heart disease (RHD)

The study showed that 70 (56.91%) of the study participants selected at least seven correct answers out of the nine questions that assessed their knowledge and practice and so showed a good knowledge and practice of ARF and RHD Table 4.

4. CONCLUSION

This Health professionals KAP survey has provided valuable baseline insight into the knowledge and understanding level of medical practitioners in Rivers and Bayelsa states which will allow targeted education and development of health promotion resources. The overall knowledge and practice of ARF and RHD among doctors in Rivers and Bayelsa states found in this study was 56.91%. There are limited studies in this area for any good comparison but the authors think that this preliminary result is low and recommend appropriate training for all cadre of doctors using the suggested training models. Osman et al. [8] in Sudan noted an average level of knowledge of physicians of ARF and RHD in their study which improved to a good level following a single teaching session. Recommendation of this topic in the routine CMEs which have been adopted as part of training of physicians in Nigeria is advocated.

The overall responses of the consultants and senior registrars showed a higher level of awareness and understanding compared to their junior colleagues, however all cadre of doctors were variable in their answers especially the house officers and registrars and we suggest strengthening of health education across all areas while targeting the registrars and house officers as these group of doctors are frequently the first on-call and the diagnosticians in many health care facilities.

CONSENT

Written consent was obtained from all participating doctors and physicians who were randomly selected and invited to participate in the study by the authors.

ETHICAL APPROVAL

It is not applicable.

ACKNOWLEDGEMENT

The authors wish to acknowledge Drs Kininyiruchi Wobo, Maryjane Okeke andMesiobi Anene for their support in data collection.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Rheumatic fever and rheumatic heart disease. Report of a WHO Study Group. World Health Organization, Geneva, (Technical report Series No 923); 2001.
2. World Health Assembly 71. Rheumatic fever and rheumatic heart disease: report by the Director-General.World Health Organization; 2018.
(Accessed 22nd of August 2019)
3. Watkins DA, Johnson CO, Colquhoun SM, Karthikeyen G, et al. Global, regional and national burden of Rheumatic Heart disease. 1990-2015. NEJ Med. 2017;377(8):713-22.
4. Animasahun BA, Madise-Wobo AD, Kusimo OY. Nigerian children with acquired heart disease: The experience in Lagos. J Teh Univ Heart Ctr. 2017;12(4):160-166.
5. Sadoh WE, Uzodimma C, Daniels Q. Childhood acquired heart disease in Nigeria: An echocardiographic study from three centres. African Health Sciences. 2014;14(3):602-8.
6. Ekure EE, Amadi C, Sokunbi O, et al. Echocardiographic screening of 4107 Nigerian school children for rheumatic heart disease. Tropical Medicine & International Health. 2019;24(6):657-786.
7. Katzenellenbogen JM, Ralph AP, Wyber R, Carapetis JR. Rheumatic heart disease: Infectious disease origin, chronic care approach. BMC Health Services Research. 2017;17:793.
8. Osman GM, Abdelrahman SMK, Ali SKM. Evaluation of physicians' knowledge on

prevention of rheumatic fever and rheumatic heart disease before and after a teaching session. Sudan J Paediatr. 2015;15(1):37-42.

9. Maciu BS, et al. Rheumatic fever and rheumatic heart disease: Fiji health professionals knowledge, attitude and perception survey report; 2016.

10. Rinku G, Sahadeb PD. A study on prescribing pattern of drugs in patients with rheumatic heart disease at tertiary care hospital. Journal of Nobel Medical College. 2018;7(13):25-29. Available:https://doi.org/10.3126/jonmc.v7i2.22302,www.nepjol.info,www.nobelmedicalcollege.com.np

Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sdiarticle4.com/review-history/52225