KAP STUDY

Knowledge, attitude, and practice regarding treatment of group a beta haemolytic tonsillo pharyngitis and prevention of rheumatic fever among doctors in Karachi, Pakistan: A perspective study

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Abstract

Objective: To assess knowledge and practices associated with rheumatic fever among medical practitioners in an urban setting.

Method: The cross-sectional study was conducted at five major hospitals in Karachi from August to November 2019, and comprised house officers, postgraduate trainees, and general physicians of either gender. The subjects were given a questionnaire assessing their knowledge and perception regarding acute rheumatic fever as well as prophylaxis. Data was analysed using SPSS 25.

Results: Of the 247 respondents, 173(70%) were house officers, 31(13%) were postgraduate trainees and 43(17%) were general physicians. Overall, 202(82%) subjects were associated with some teaching hospital. Significantly more postgraduate trainees and general physicians answered correctly when asked to identify clinical and laboratory findings suggestive of Group A streptococcal throat infection than house officers ($p<0.001$). Among the house officers 49(28.3%), and among the postgraduate trainees 11(35.4%) knew the correct way to prescribe penicillin to prevent rheumatic fever. Among the general physicians, 20(46.5%) had accurate knowledge regarding the prescription.

Conclusion: Knowledge and practices of medical practitioners regarding rheumatic fever were less than ideal and may play a part in misdiagnoses of Group A streptococcal infections and, hence, prophylaxis.

Keywords: Rheumatic fever, Preventive medicine, Rheumatic heart disease, Pakistan. (JPMA 72: 2477; 2022)

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Introduction

Acute rheumatic fever (ARF) is an autoimmune reaction causing widespread nonsuppurative inflammation focussing on several organs of the body, primarily the heart, joints, skin, and the central nervous system (CNS).[1] ARF is a delayed complication of various rheumatogenic Group A Streptococcus (GAS) Pyogenes strains, infecting the pharynx and, in some rare cases, the skin.[2] ARF and its more serious sequalae, the rheumatic heart disease (RHD), is responsible for millions of children and adolescents suffering from heart conditions. The main target are the valves of the heart, most commonly affecting the mitral valve, followed by the tricuspid valve, eventually leading to severe heart failure due to compensatory ventricular hypertrophy, in absence of any medical or surgical intervention.[3] The prevalence of ARF and RHD has decreased in the past decades in the developed world due to better living conditions, access to modern medicine and easy availability of antibiotics.[4] More importantly, the use of penicillin for the prompt treatment of GAS throat infections have been shown to reduce the incidence of ARF following a GAS infection.[5] However, developing nations, such as Pakistan, are yet to curb this endemic as RHD is one of the most common causes of acquired heart disease in adolescents and the Indian subcontinent falls under the most affected areas of the world.[6] This high infiltration of RHD in the population is not just a burden on the economy and the health sector, but causes overall lower quality of life (QOL) in the young population afflicted with it, especially a disease that is highly preventable by proper identification of GAS infections and their prompt treatment.[7]

Ensuring proper prophylaxis in patients and the initial treatment of GAS infection is key and general knowledge regarding the disease and its different treatment modalities should be essential for general physicians (GPs), especially in a country with a higher frequency. Treatment of acute GAS infections is considered to be primary prophylaxis for ARF/RHD while a patient with positive findings of ARF/RHD is given secondary prophylaxis which has to be managed according to the patients' respective heart status and any associated

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valvular pathology. The prophylaxis comprising antimicrobials, tends to be for a longer duration. ranging 5-10 years, and may even be lifelong in some cases.[8] Thus, it is essential to assess the awareness of doctors about this disease as a child presenting with sore throat will be directed to a GP rather than a cardiologist. The current study was planned to assess knowledge and practices associated with RF among medical practitioners at various tiers in an urban setting.

Subjects and Methods

The cross-sectional study was conducted at five major public hospitals in Karachi from August to November 2019 after approval from the institutional ethics review board of the Dow University of Health Sciences (DUHS), Karachi. The sample population consisted of doctors associated with Jinnah Postgraduate Medical Centre (JPMC), National Institute of Cardiovascular Diseases (NICVD), Liaquat University Hospital, Abbasi Shaheed Hospital, and Civil Hospital Karachi (CHK). Doctors of either gender who agreed to participate were included and informed consent was obtained.

Doctors working in the departments of Surgery and Obstetrics and Gynaecology were excluded, as ARF patients are not referred to these departments. The sample was categorised into three groups; house officers (HOs), postgraduates (PGs), and general physicians (GPs). The sample size was calculated using OpenEpi[9] with an anticipated frequency of 50% and 95% confidence interval (CI).

Data was collected using a questionnaire having three sections. The first section recorded basic demographic details, while the second section assessed the participants' knowledge and perceptions regarding RF, its signs and symptoms, clinical and laboratory findings, and treatment modalities concerning primary prophylaxis and RF recurrence. The third section assessed secondary prophylaxis with regards to penicillin and its allergy. Each correct option was scored 1, while each incorrect option was given a score of 0.

The interviewers used standard protocol with all subjects. The participants were given time to fill the questionnaire privately to ensure accurate results by avoiding interviewer bias. The incomplete questionnaires were discarded, and no imputation method was used to maintain an accurate representation of the views of the sample population.

Data were analysed using SPSS 25. Categorical variables were expressed as frequencies and percentages, while continuous variables were expressed as mean and standard deviation. Chi-square test was used to check for disparity among the three groups. In the case of ordinal data, Mann-Whitney U test was used. $P<0.05$ was considered statistically significant in all cases.

Results

Of the 265 individuals approached, 247(93.2%) completed the questionnaire; 173(70%) HOs, 31(13%) PGs and 43(17%) GPs. Overall, 202(82%) subjects were associated with some teaching hospital (Table-1).

Regarding the definition of rheumatic fever, more HOs identified the correct definition compared to both PGs and GPs ($p<0.001$). More PGs and GPs answered correctly when asked to identify clinical and laboratory findings suggestive of GAS infection than HOs ($p<0.001$). Most participants 217(87.8%) knew how to treat patients with primary prophylaxis.

Most GPs 30(69.7%) and PGs 18(58.1%) knew the next best choice to prescribe when their patient was found to be allergic to penicillin. Only 68 (39%) HOs answered correctly ($p=0.002$).

Further, 38(22%) HOs and 17(39.5%) GPs correctly

Table-1: General demographics.

	n (%)
Designation	
House officers	173 (70)
Postgraduates	31 (12.6)
General physicians	43 (17.4)
Year of graduation	
1980-1985	11 (4.5)
1986-1990	14 (5.6)
1991-1995	10 (4.3)
1996-2000	5 (1.8)
2001-2005	3 (1.2)
2006-2010	3 (1.2)
2011-2015	32 (13)
2016-2018	169 (68.4)
Medical School of Physician	
Dow Medical College	99 (40.1)
Sindh Medical College	71 (28.7)
Liaquat University of Medical Health Sciences	7 (2.8)
Baqai Medical College	7 (2.8)
Hamdard Medical College	3 (1.2)
Karachi Medical and Dental College	21 (8.5)
Jinnah Medical and Dental College	39 (15.5)
Place of Work	
Civil Hospital Karachi	105 (42.5)
Jinnah Postgraduate Medical Centre	35 (14.2)
National Institute of Cardiovascular diseases	20 (8.1)
Abbasi Shaheed	46 (18.6)
Liaquat University Hospital	41 (16.6)

Table-2: Quality of responses.

Question (number of correct options marked)	House Officers (173)	Postgraduate Trainees (31)	General Physician (43)	Total (247)
1: 0	0	0	5	5
1	34	9	8	51
2	139	22	30	191
2: 0	3	0	0	3
1	95	8	12	115
2	55	10	14	79
3	20	13	17	50
3: 0	17	5	8	31
1	156	26	35	217
4: 0	105	13	13	131
1	68	18	30	116
5: 0	25	8	8	43
1	116	14	13	143
2	32	9	22	63
6a: 0	128	21	17	166
1	45	10	26	81
6b: 0	22	5	8	35
1	113	23	18	154
2	38	3	17	58
6c: 0	95	14	15	124
1	78	17	28	123
7: 0	23	7	5	35
1	101	13	18	132
2	49	11	20	80
8: 0	57	12	12	81
1	116	19	31	166
9: 0	38	12	13	63
1	135	19	30	184

Table-3: Statistically significant differences in responses according to independent variables.

Question	Designation (p - value)	Medical School (p - value)	Place of work	Attached with teaching hospital	Work experience in years (r - value)
1	0.001	0.037	0.001	0.389	0.358
2	0.001	0.001	0.001	0.228	-0.104
3	0.222	0.597	0.238	0.789	0.137
4	0.001	0.605	0.402	0.058	-0.88
5	0.001	0.207	0.001	0.494	-0.074
6a	0.001	0.4	0.001	0.127	-0.228
6b	0.016	0.032	0.027	0.317	0.114
6c	0.053	0.414	0.764	0.153	-0.20
7	0.088	0.001	0.001	0.434	0.057
8	0.619	0.012	0.012	0.387	0.015
9	0.106	0.015	0.010	0.864	0.150

identified the ways how penicillin is prescribed to prevent RF in a patient with a history of previous RF, and with a residual valvular lesion. Half of the participants 123(49.8%) knew how to prescribe penicillin as secondary prophylaxis.

Moreover, 49)28.3%) HOs and 1135.4%) PGs knew the correct prescription of penicillin to prevent RF in a patient with a history of previous RF compared to 20/(46.5%) GPs (p=0.003) (Table-2).

The total work experience in years was positively correlated with the professionals correctly identifying clinical and laboratory findings suggestive of GAS infection (r=0.230, p=0.001), as well as appropriately choosing the primary prophylaxis for GAS when a patient is allergic (r=0.185, p=0.003). Additionally, a significant association of total work experience in years was also seen with correctly identifying statements regarding recurrence of RF (r=0.188, p=0.003), and how would one prescribe penicillin as secondary prophylaxis (r=0.312, p=0.001).

No significant association was seen between individuals practicing at teaching hospitals compared to non-teaching hospitals with any of the questions (p>0.05) (Table-3).

Discussion

ARF caused by GAS infections is still one of the biggest contributors in the subcontinent to the number of acquired heart disease cases.[10] Current results reflected subpar knowledge amongst different tiers of doctors. The basic knowledge, such as defining RHD, was better answered by HOs, probably due to the recent memory acquisition in medical schools. The GPs were not far off in choosing the correct answers. A study conducted in Sudan assessed the knowledge of physicians regarding RF prophylaxis and re-evaluated them after a lecture on the subject, exhibiting a positive outcome as the scores went from average to good.[11] Adopting such a strategy in teaching and other hospitals and clinics regarding RHD and other preventable diseases that are endemic in the region would improve the knowledge and consequently benefit the patients and the community. The clinical and laboratory findings were lesser known as the percentage of correct answers halved across all ranks. PGs and GPs fared better than HOs by 10%, but this is a grave indicator that physicians may possibly misdiagnose a GAS infection and consequently not prescribe the appropriate drug and prophylaxis. Another issue in developing nations is the lack of testing for patients with sore throat, either due to test unavailability, financial constraints or mere negative behavioural issue related to seeking medical assistance for a child with sore throat due to lack of awareness.[12] Another reason worth mentioning is Pakistan's affinity to alternative medicine, including 'hakeems', homeopaths and even spiritual healers.[13]

Addressing the lapse in knowledge of the physicians via recurring lectures will eventually be able to create awareness amongst their communities regarding sore throats' long-term harm, and reduce the burden of RHD via preventable strategies. Almost all the respondents answered correctly when asked regarding the treatment of GAS infection without previous history of RF.

The knowledge and practices of primary prophylaxis in patients with penicillin allergies was correctly answered by GPs, followed closely by PGs and lastly HOs, of whom, more than half did not know the next best regimen of choice. Due to low literacy rates, the average Pakistani population is not able to identify drug allergies and usually no centralised patient registry exists. In these conditions, penicillin sensitivity tests are often ignored, and if a patient develops a serious allergic reaction, the outcome may be affected adversely, especially in less literate households that may resort to alternative medical treatments.[13] The current study revealed that only less than half of PGs, GPs and HOs could correctly identify two correct statements regarding recurring RF, with almost 20% not being able to identify any. HOs were even less equipped to answer this, with results dropping below the 20% mark that answered both options correctly, with almost 66% HOs identifying one correct answer. This lapse in knowledge maybe due to incompetent teaching methods and outdated information taught at medical schools.[14] Or merely due to muddled concepts over time due to lack of revision. Secondary prophylaxis is required by patients with pre-existing RF history. Secondary prophylaxis was questioned in multiple scenarios in relation to valvular lesions; (a) duration of penicillin regimen in patients without residual valvular lesion, (b) duration of penicillin regimen in patient with definite residual valvular lesion, and (c) duration of penicillin regimen after valvular surgery. In the first case, more than half the GPs answered correctly, while PGs and HOs fared poorly. In the second part, more GPs correctly identified the duration of treatment than the HOs and the PGs. Participants fared much better when asked regarding treatment post-surgery. Participants were asked which secondary prophylaxis regimen on Benzathine Penicillin G injection they advise in their clinical practice. Almost half the GPs answered correctly, followed by PGs and HOs. This trend is a comprehensible one, but the percentages of correct answers at all stages are alarming and explain, to some extent, the prevalence of ARF in Pakistan.

Total years of experience showed a positive correlation in questions regarding clinical expertise and treatment regimens. However, there was no correlation between the association of physicians with teaching hospitals, which is in line with literature.

RF has been prevalent in Pakistan for decades and progress has not been substantial. Guidelines by the World Health Organisation (WHO) recommend secondary prophylaxis to be ideal in reducing ARF and RHD load, but more recent studies suggest primary prophylaxis to be more successful and cost-effective.[15,16] The current study results indicated a need for health education interventions, as they are truly effective at enhancing awareness of disease control and promoting healthcare-seeking behaviour in populations with ARF and RHD.[17]

Along with doctors, there needs to be a multifaceted approach towards raising awareness regarding sore throat and its dangerous complication of RF amongst the population, as awareness is proportional to reported cases and, hence, treatment pursued.[17] This can be done via media, school campaigns, concerts or events involving government bodies alongside healthcare providers and community leaders. An exemplary model is of Costa Rica which nearly eliminated RF by eliminating the need for throat swab culture, which is often unaffordable in developing countries.[18] Educational programmes for doctors, nurses, students and other healthcare workers were conducted to highlight the need for prompt treatment of sore throat, and to treat it with primary prophylaxis of Benzathine Penicillin intramuscular (IM) injection. The rates dropped dramatically in 2 decades to 1 per 100,000.[18]

The fact that RF and RHD plague this part of the world more than the others and yet the level of knowledge and awareness among healthcare providers being subpar may be one significant factor in Pakistan failing to eradicate it. The results indicate lapses in knowledge of primary prevention amongst physicians at all levels, mostly the ones at initial training phases. Perhaps, feedback and improvement programmes should be initiated in hospitals, such as Continual Quality Improvement (CQI), which has reported improved workforce capabilities along with enthusiasm in providing better healthcare.[5] Regular lectures with the latest guidelines and assessment of doctors is necessary to improve the knowledge and practices of physicians. This is because doctors currently in training will be the ones caring for patients in primary setups. Medical colleges need to focus on teaching endemic diseases, such as RF and GAS infections, via scenario-based learning and modern teaching techniques to cement the diagnosis and prophylaxis regimens in minds of future professionals.

The current study has some limitations. First, it incorporated convenience sampling to reach the target

population, which means there may be a degree of bias in the results. Second, equal number of participants could not be enrolled in each group because there are more HOs and PGs compared to GPs in all hospital setups. Third, the sample belonged to one city only. More studies need to be conducted across the country to produce generalisabile results.

Conclusion

Knowledge and practices of medical practitioners regarding RF were less than ideal and may play a part in misdiagnoses of GAS infections and, hence, prophylaxis.

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References

1. Carapetis JR, McDonald M, Wilson NJ. Acute rheumatic fever. Lancet 2005;366:155-68. doi: 10.1016/S0140-6736(05)66874-2.
2. McDonald M, Currie BJ, Carapetis JR. Acute rheumatic fever: a chink in the chain that links the heart to the throat? Lancet Infect Dis 2004;4:240-5. doi: 10.1016/S1473-3099(04)00975-2.
3. Marijon E, Mirabel M, Celermajer DS, Jouven X. Rheumatic heart disease. Lancet 2012;379:953-64. doi: 10.1016/S0140-6736(11)61171-9.
4. Gordis L, Lilienfeld A, Rodriguez R. Studies in the epidemiology and preventability of rheumatic fever. II. Socio-economic factors and the incidence of acute attacks. J Chronic Dis 1969;21:655-66. doi: 10.1016/0021-9681(69)90037-x.
5. Robertson KA, Volmink JA, Mayosi BM. Antibiotics for the primary prevention of acute rheumatic fever: a meta-analysis. BMC Cardiovasc Disord 2005;5:11. doi: 10.1186/1471-2261-5-11.
6. Carapetis JR, Steer AC, Mulholland EK, Weber M. The global burden of group A streptococcal diseases. Lancet Infect Dis 2005;5:685-94. doi: 10.1016/S1473-3099(05)70267-X
7. Uzark K, Jones K, Slusher J, Limbers CA, Burwinkle TM, Varni JW. Quality of life in children with heart disease as perceived by children and parents. Pediatrics 2008;121:e1060-7. doi: 10.1542/peds.2006-3778.
8. Gerber MA, Baltimore RS, Eaton CB, Gewitz M, Rowley AH, Shulman ST, et al. Prevention of rheumatic fever and diagnosis and treatment of acute Streptococcal pharyngitis: a scientific statement from the American Heart Association Rheumatic Fever, Endocarditis, and Kawasaki Disease Committee of the Council on Cardiovascular Disease in the Young, the Interdisciplinary Council on Functional Genomics and Translational Biology, and the Interdisciplinary Council on Quality of Care and Outcomes Research: endorsed by the American Academy of Pediatrics. Circulation 2009;119:1541-51. doi: 10.1161/CIRCULATIONAHA.109.191959.
9. Dean AG, Sullivan KM, Soe MM. OpenEpi: Open Source Epidemiologic Statistics for Public Health, Version 3.01. [Cited 2022 June 25]. Available from URL: http://www.openepi.com/Menu/OE_Menu.htm
10. Papanikolaou PN, Christidi GD, Ioannidis JP. Patient outcomes with teaching versus nonteaching healthcare: a systematic review. PLoS Med 2006;3:e341. doi: 10.1371/journal.pmed.0030341.
11. Osman GM, Abdelrahman SM, Ali SK. Evaluation of physicians' knowledge about prevention of rheumatic fever and rheumatic heart disease before and after a teaching session. Sudan J Paediatr 2015;15:37-42.
12. Karthikeyan G, Mayosi BM. Is primary prevention of rheumatic fever the missing link in the control of rheumatic heart disease in Africa? Circulation 2009;120:709-13. doi: 10.1161/CIRCULATIONAHA.108.836510.
13. Shaikh BT, Hatcher J. Complementary and Alternative Medicine in Pakistan: Prospects and Limitations. Evid Based Complement Alternat Med 2005;2:139-42. doi: 10.1093/ecam/neh088.
14. Nasim M. Medical education needs to change in Pakistan. J Pak Med Assoc 2011;61:808-11.
15. Allen + Clarke. Evaluation of the Northern Territory Continuous Quality Improvement (CQI) Investment Strategy: Final Report. Canberra, Australia. Commonwealth of Australia, 2013. [Online] 2013 [Cited 2019 December 15]. Available from URL: http://www.amsant.org.au/wp-content/uploads/2015/07/CQIreport.pdf
16. Department of Child and Adolescent Health and Development World Health Organization. A Review of the Technical Basis for the Control of Conditions Associated with Group A Streptococcal Infections. Geneva, Switzerland. World Health Organization, 2005. [Online] 2005 [Cited 2019 December 20]. Available from URL:
17. Irlam J, Mayosi BM, Gaziano TA. Comment: Rheumatic fever and rheumatic heart disease: primary prevention is the cost effective option. Indian J Pediatr 2008;75:86-7.
18. Arguedas A, Mohs E. Prevention of rheumatic fever in Costa Rica. J Pediatr 1992;121:569-72. doi: 10.1016/s0022-3476(05)81146-1.