

# Approach of Intern Doctors to Antibiotic Prescription for Sore Throat

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## ABSTRACT

**Objective:** While former studies have investigated the approach of general practitioners (GPs) to antibiotic prescription, there is scarce evidence on the prescription trends for young, primary care doctors despite their cardinal role in the overall practice of antibiotic administration. The research aimed to study the approach of young doctors towards antibiotic prescription for a commonly encountered ailment, sore throat.

**Methods and Materials:** A cross-sectional study of the interns' clinical approach was conducted at CMH Lahore Hospital. A questionnaire containing four clinical vignettes, each with various presentations of sore throat was given to interns chosen by random, convenience sampling and 80 interns with a minimum clinical experience of 6 months participated in the study.

**Results:** Vignette 1, a child with tonsillitis had a good overall pick by 86% interns, and 93% of them correctly pursued to prescribe antibiotics. Vignettes 2 and 4, an adult and child with probable viral, upper respiratory tract infections (URTI) had a lower but noticeable prescription rate of 11% and 10%, respectively. Vignette 3, a supposed case of glandular fever was correctly inferred by nearly half (57%) of the interns, however the antibiotic prescription rate high at 59%. There was no difference in prescribing rates between male and female interns.

**Conclusion:** Young primary care doctors frequently prescribed antibiotics despite the underlying etiology. It can be inferred that young doctors lacked knowledge of the pathophysiology of various presentations of sore throat, e.g., bacterial, viral, as well as the latest guidelines on antibiotic administration.

**KEYWORDS:** Antibiotic resistance; Antibiotic misuse; Infectious mononucleosis; Intern; Sore throat; Throat swab; Upper respiratory tract infections

## INTRODUCTION

Sore throat is the primary symptom of pharyngitis [1]. About 10% of people present to primary healthcare services with sore throat each year [2,3]. Etiologically, it is caused by a variety of microbiological agents. Only 20 percent in children and 5 percent in adults is caused by bacterial agents such as group A beta-hemolytic streptococci (GABHS) [4]. Otherwise, most pharyngitis cases (40-80%) are self-limiting and viral in origin, mainly owing

to respiratory "cold and flu" viruses [3,5]. To correctly diagnose the underlying etiology and supposed treatment, certain scoring systems, and laboratory tests are available. Namely, the modified Centor score or rapid antigen test can help target antibiotic use by revealing an underlying infection with *Streptococcus pyogenes* (also known as Lancefield GABHS), which is one of the only agents that warrants an etiologic diagnosis and specific treatment [6-8].

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In a clinical setting, however, it is difficult to differentiate between bacterial and viral pharyngitis. Some clinical features that strongly suggest a viral etiology include cough, rhinorrhea, hoarseness, oral ulcers, coryza, conjunctivitis, and diarrhoea [8,9]. Hence, even testing for GAS pharyngitis is not recommended for children or adults with these features, let alone prescription of antibiotics [9].

Despite this, one in two patients presenting to their physician in primary care with sore throat receive antibiotics [10]. Firstly, this leads to a significant economic impact as it puts a burden on the overall health care budget [1]. Secondly, this overconsumption of antibiotics is a major contributor to the development of a more sinister issue, antimicrobial resistance (AR) [11,12]. It has also been shown to increase patient visits as it medicalizes self-limiting conditions, which culminates in a vicious cycle of further visits for the same condition [13].

To eradicate these problems, there is an urgent need to transform the attitude of doctors regarding the antibiotic prescription. It is proven that primary care is still responsible for most antibiotics prescribed to people [11]. Therefore, young doctors, who form the crux of primary care, play a pivotal role in controlling and preventing the misuse of antibiotics [14]. To shed light on the root of this matter, it is vital to first evaluate the current practice by young doctors. An analysis of their practice in prescribing antibiotics can

facilitate the development of appropriate interventions to improve antibiotic prescription and promote “antibiotic stewardship” globally [11].

## METHODS AND MATERIALS

After acquiring permission from the Ethical Review Committee (ERC), Reference number - 121/2019, a cross-sectional study was conducted at Combined Military Hospital (CMH), Lahore, for 3 months starting 1st January 2019 till 31st March 2019. A list of all interns was acquired from the administration, and 80 interns who had 6 months or more of clinical experience were chosen by random, convenience sampling and included in the study after thorough consent. Interns with less than 6 months of clinical experience or those who did not rotate in filter clinics were excluded from the study.

These interns were invited to fill out a questionnaire. The questionnaire was duplicated, after permission, from a 1994 study conducted in Australia [15,16]. The questionnaire used four clinical vignettes (Table 1) to assess the young physicians’ knowledge and clinical management plan to test and treat each case. An additional query on whether the doctors had heard about any scoring methods for sore throat was also asked (whether they had used it or not wasn’t recorded). Lastly, data was entered into SPSS v25, and descriptive statistics were drawn.

**Table 1:** Clinical Vignettes.

<b>Case 1:</b> An eight-year-old girl presents with a 24-hour history of sore throat and fever. On examination, she has a temperature of 38.5 °C, pus on both tonsils, and tender cervical lymph nodes.
<b>Case 2:</b> A 28-year-old man presents with a history of sore throat for two days and a non-productive cough. On examination, he is afebrile, has a red pharynx and his chest is clear.
<b>Case 3:</b> A 22-year-old woman presents with sore throat for two days and malaise. On examination, she has a temperature of 38° C, has pus on both tonsils with palatal petechiae, and has tender cervical lymph nodes.
<b>Case 4:</b> A seven-year-old boy presents with sore throat for two days and fever. However, on examination, he is afebrile. He has large pink tonsils with no exudate and no other abnormality is detected.

## RESULTS

From the total 80 interns working at CMH Lahore (an urban, tertiary care hospital) who consented to participate in the study, there were 58 females and 22 males, between the ages of 23 till 29. When queried about prior knowledge of scoring methods for sore throat, 20% claimed to have known some scoring method, while 80% had not known any.

Moving on to results of the cases, for the first vignette (Case 1), 86.3% of interns had the impression that the presentation was owing to a bacterial infection, 73.8% doctors went ahead to test for GAS and a sweeping 93.8% prescribed antibiotics.

Cases 2 and 4 showed signs and symptoms suggestive of a viral upper respiratory tract infection (URTI). For case 2, 85% suspected the correct etiology. 63.7% of case 4 respondents did indicate a viral suspicion, but 25% were uncertain of the agent. This could’ve been the reason why a throat swab was sought by 21.3% interns, while for case 2, 82.5% interns preferred to not investigate further after establishing the correct diagnosis. Additionally, this shows that interns tested more in the case of the child as compared to the adult with a viral sore throat. In terms of treatment, 11.3% and 10% for cases 2 and 4, respectively, still chose to prescribe an antibiotic while symptomatic treatment remained the predominant choice in both scenarios. Lastly, case 3 showed a variable response. On the one hand, 57.5% reckoned Epstein-Barr Virus (EBV) was

the underlying agent, and hence the Monospot test was the popular choice amongst investigations (52.5%). On the other hand, a significant 35% suspected GAS, went for a throat swab. In terms of treatment, nearly half (58.8%) went on to prescribe antibiotics. Overall, there was no difference in prescribing rates between male and female doctors (Table 2,3).

## DISCUSSION

The study aimed to analyse the perception of young interns towards antibiotic prescription for sore throat via analysis of their choices for 4 clinical vignettes (Table 1). The vignettes show presenting symptoms and pathophysiological signs of various exhibitions of sore throat. It’s a theoretical reflection as the cases were written scenarios rather than actual patients, which can believably suggest what happens in a clinical setting that leads to antibiotic misuse. From the 4 vignettes, case 1, a child with fever, sore throat, and physical findings of pus on tonsils and tender cervical lymph nodes is the only scenario that warranted antibiotic administration. This was correctly picked by 86.3% interns. However, the results revealed that a substantial proportion of respondents inappropriately prescribed antibiotics for latter cases. A considerable percentage of interns did so despite having a correct impression of the non-bacterial origin of the case. Previous studies like Nicholas et al. [16] hypothesized the cause of the inappropriate antibiotic prescription to be the lack of knowledge regarding pathophysiological features of sore throat and current

recommendations and guidelines of treatment. We believe this is also the cause of incorrect antibiotic prescription by interns. However, contrary to our study, which focused on young doctors their cohort comprised of general practitioners (GP), who have more years of clinical experience in comparison. However, the prior studies concluded that GPs had a generally accurate assessment of features of sore throat, and the problem was in the choice of prescription.

Case 3 remained a diagnostic dilemma for interns, hence, there was a split choice between group A streptococcus (GAS) and infectious mononucleosis (IM) and consequently, about 50% doctors proceeded to do a Monospot. It is worthwhile to mention that IM should be suspected by all doctors in patients 10 to 30 years of age who present with sore throat and significant fatigue, palatal petechiae, and lymphadenopathy (18). Nevertheless, one striking comparison with the Danchin et al. [17] study was that more than 90% of GPs appropriately identified the viral origin of cases 2 and 4, while in our study this percentage was lower, i.e., 85% for case 2 and 63% for case 4. This depicts that while interns have a good pick of clinical signs pertinent to bacterial infections, e.g. pus on tonsils, fever, etc. their suspicion of viral etiologies is poorer than GPs. Hence, it can be established that as compared to GPs, interns do have a knowledge gap regarding the pathophysiological features, this is possibly due to their lesser clinical experience.

The Danchin et al. [17] study also revealed that for vignette 1, 89% of GPs opted for antibiotics. In our study almost 94% of interns advised antibiotics. However, there was a noticeable difference when it came to the choice of investigations, in our study, 73.8% of interns proceeded with a throat swab, while in the 2018 study [18] only 18.4% GPs chose this test. It can be concluded that young

doctors abundantly investigate to back their judgment, perhaps because of diagnostic uncertainty. Another proof of this was found in results for case 2, where no GP (0%) in the study suggested any of the two tests (throat swab and Monospot) for the adult with a viral sore throat.

In addition to the above, when inquired about the motivation for antibiotic use, the common observation was that the majority of interns defended their advice of antibiotics by saying it would “prevent the risk of suppurative complications” (Table 3). This is opposed by The Sore Throat Guideline Group, 2012 who stated that prevention of suppurative complications is not a specific indication for antibiotic therapy in sore throat. They recommended that clinicians do not need to treat most cases of an acute sore throat to prevent quinsy, acute otitis media, cervical lymphadenitis, mastoiditis, and acute sinusitis. Therefore, there is room for further education of interns about clinical features as well as the latest management guidelines and scoring methods, e.g. Centro Score, especially in the context of increasing antibiotic resistance.

Altogether, some limitations must be discerned in this study. Firstly, the interpretation of our cohort cannot be extrapolated to young doctors as a whole, as the sample was chosen from graduates of the same medical college who have a rather similar learning curve, restricting the variability of the results. Secondly, although designed to replicate clinical scenarios the vignettes are written with a particular diagnosis in mind, this makes the symptomatology decipherable from the case itself. Whereas in a clinical setting, patients' symptoms are often not as simply put, and neither is the detection of some clinical signs such as “palatal petechiae” always possible by young interns. Thus, this method of survey is not indicative of the actual clinical acumen of the interns.

**Table 2:** The approach of interns to investigation and management.

Total n (%)	CASE 1	CASE 2	CASE 3	CASE 4
	80 (100%)	80 (100%)	80 (100%)	80 (100%)
<b>CLINICAL IMPRESSION: Clinical impression of house officers to sore throat in different case scenarios</b>				
GAS	69 (86.3%)	6 (7.5%)	28 (35.0%)	9 (11.3%)
Viral	6 (7.5%)	68 (85.0%)	3 (3.8%)	51 (63.7%)
Epstein-Barr virus	5 (6.3%)	2 (2.5%)	46 (57.5%)	0 (0.0%)
Uncertain	0 (0.0%)	4 (5.0%)	3 (3.8%)	20 (25.0%)
<b>INVESTIGATIONS: How many house officers ordered investigations?</b>				
Throat Swab	59 (73.8%)	8 (10.0%)	31 (38.8%)	17 (21.3%)
Monospot	9 (11.3%)	6 (7.5%)	42 (52.5%)	5 (6.3%)
No investigation	12 (15.0%)	66 (82.5%)	7 (8.8%)	58 (72.5%)
<b>MANAGEMENT: How many house officers prescribed antibiotics or recommended symptomatic treatment?</b>				
Antibiotic	75 (93.8%)	9 (11.3%)	47 (58.8%)	8 (10.0%)
Symptomatic	5 (6.3%)	71 (88.8%)	33 (41.3%)	72 (90.0%)

**Table 3:** Reasons for prescribing antibiotics to patients with sore throat.

Reason (Interns were able to detect multiple options)	Case 1	Case 2	Case 3	Case 4	Total
Patient appears extremely unwell	6	0	11	0	17
Reduce the risk of suppurative complications (e.g. Peritonsillar abscess)	53	5	18	5	81
Reduce the risk of non-suppurative complications (rheumatic fever, glomerulonephritis)	12	1	6	0	19
Diagnostic uncertainty	2	3	7	2	14
Patient expects to be prescribed antibiotics	1	0	0	0	1
Reduce duration of symptoms	4	2	6	1	13
Reduce pain	0	0	0	0	0
Leads to a shorter consultation	0	0	0	0	0

## CONCLUSION

Young primary care doctors frequently prescribed antibiotics despite the underlying etiology. It can be inferred that young doctors lacked knowledge of the pathophysiology of various presentations of sore throat, e.g., bacterial, viral, as well as the latest guidelines on antibiotic administration.

## STATEMENT OF AUTHORSHIP

The authors confirm that the manuscript, the title of which is given, is original and has not been submitted elsewhere. Each author acknowledges that he/she has contributed in a substantial way to the work described in the manuscript and its preparation.

## PLACE OF STUDY

Combined Military Hospital, Lahore, Pakistan (Outpatient department clinics)

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