

Public awareness of microbiological testing and antibiotic use for pharyngitis in Qassim, Saudi Arabia: A cross-sectional study

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Abstract

Pharyngitis represents a frequent condition requiring outpatient care, which usually stems from viral infections. The use of antibiotics remains widespread because clinicians face challenges when making diagnoses. The confirmation of Group A Streptococcus (GAS) infections requires microbiological tests, including throat swabs, cultures, and rapid antigen detection tests (RADTs), to determine proper treatment. The level of public understanding about these diagnostic tools in Saudi Arabia exists in an unknown state. A cross-sectional survey was conducted in Qassim, Saudi Arabia, during January and February 2025. A validated Arabic-language questionnaire evaluated participants' understanding of sore throat causes, awareness of diagnostic tests, antibiotic use, and willingness to undergo microbiological testing. Descriptive statistics and chi-square tests were used to analyze associations. Of the 208 individuals who accessed the survey, 198 completed it (95% response rate). Most participants (78%) did not know that throat swabs or RADTs are recommended for diagnosing streptococcal pharyngitis. One-third correctly understood that sore throats usually resolve without antibiotics. However, 80% were willing to undergo diagnostic testing after explanation, and 67% supported using test results to guide antibiotic use. Knowledge about pharyngitis was significantly associated with educational background and healthcare experience (p < 0.001). The research demonstrates that microbiology plays a vital part in enhancing pharyngitis management. Microbiologists create precise diagnostic tools while leading stewardship efforts through clinical test guidance and public education. Reducing antibiotic misuse and preventing complications depends on expanding testing and integrating microbiologists into primary care and community health strategies.

Keywords: Antibiotic use, Group A Streptococcus, microbiological testing, pharyngitis, Saudi Arabia.

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1. Introduction

Acute pharyngitis is an infection that is frequently encountered by primary care physicians all over the world. In some places, it contributes to approximately 20% of patient visits to outpatient clinics [1]. Sore throats tend to occur at least once every year in a substantial number of children and adults [2-4]. The primary bacterial most likely behind acute pharyngitis is Group a Streptococcus (GAS), although the number of viral infections greatly surpasses this figure [4-6]. A meta-analysis demonstrated that GAS infections affected 20-30% of children with sore throats, but only 5-15% of adults had this condition with viral infections making up the remaining cases [2]. GAS pharyngitis requires clinical recognition for antibiotic treatment because prompt antibiotic administration saves lives by preventing severe complications including rheumatic fever. The most difficult task arises when healthcare providers need to differentiate between streptococcal throat infections and viral infections. The Infectious Diseases Society of America "IDSA" issues guidelines that recommend performing throat cultures or rapid antigen detection tests (RADT) to confirm streptococcal pharyngitis before starting treatment [4]. These tests are a fundamental component of diagnostic stewardship [5] the responsible application of diagnostic tests to inform and optimize treatment. If clinical suspicion of GAS infection is high, a physician might start antibiotics while waiting for results, although routine testing helps prevent unnecessary antibiotics in uncomplicated viral infections [4]. Strikingly, uncomplicated viral and most mild bacterial sore throats, even in the absence of antibiotic treatment, resolve spontaneously within three to four days [6]. So, antibiotics "just in case," provides little advantage for the patient, while increasing exposure to risk and damage can resulted in the bigger issue of antimicrobial resistance. Despite these guidelines, their lack of proper guidelines has led to the indiscriminate prescribing of antibiotics for sore throats. A survey in Saudi Arabia, for instance, revealed that the public had a poor understanding of the appropriate use of antibiotics and antimicrobial resistance [7]. Until 2018, antibiotics were freely available at local pharmacies in Saudi Arabia and people self-medicated for infections like sore throats. Even in clinical practice, antibiotics are over-prescribed: a 2021 study found that of all the pharyngitis patients attending Saudi primary care centers, 79% were given antibiotics, although only 28% met the clinical criteria for fulfillment [8]. Broad-spectrum antibiotics were prescribed in roughly half of these patients, reflecting empiric habits that do not align with guidelines [8]. This is troubling, since GAS has remained universally susceptible to penicillin for decades [3] making narrow-spectrum penicillin or amoxicillin the recommended therapy for confirmed strep throat [4]. The practice of writing prescriptions for antibiotics without verifying bacterial infections indicates both medical staff failure to follow diagnostic procedures and patient expectations about sore throat treatment. The way people perceive antibiotics along with their beliefs strongly influences antibiotic conservation efforts. Patients who believe antibiotics work for all sore throats and that these medications speed up recovery regardless of viral infections create pressure on clinicians to make unnecessary antibiotic prescriptions [9]. General practitioners in the UK reported that patient expectations combined with an established practice of antibiotic prescription led them to provide antibiotics for sore throats despite minimal evidence of benefit [9]. The study conducted in Qassim Saudi Arabia revealed that sixty percent of parents expected their children to receive antibiotics when they had upper respiratory infections such as colds or sore throats [10]. On the other hand, research has shown that many patients with sore throat are primarily seeking relief from symptoms and reassurance, not necessarily antibiotics, and that effective communication by physicians can align care with evidence-based guidelines [11]. Public education about most sore throats being self-limited combined with confirmation of strep infections before antibiotic use could decrease unnecessary antimicrobial requests. Research shows that physician-patient communication interventions lead to better antibiotic use in pharyngitis by helping patients understand their condition and promoting self-care practices [11]. Introducing the public to the concept of diagnostic testing for sore throat is a key aspect of community diagnostic stewardship. If patients are aware of, and trust, tests like throat swabs or rapid antigen "strep" tests, they may be more accepting when a doctor decides to defer antibiotics until a positive test result is obtained. In Saudi Arabia, however, it seems that knowledge regarding such tests is scant. A few strep surveys conducted in Jeddah showed that around 3.8% of adults were familiar with the rapid strep test before the study, but after the explanations, over 93% favored having it implemented in community pharmacies to lower the misuse of antibiotics [12]. This shows that there is a positive attitude after people have been educated, however, there is a considerable lack of information to begin with. Health education campaigns that stress the importance of microbiological verification, such as 'test for strep throat before using antibiotics', have the potential to inform patients which in turn would decrease the need for physicians to inappropriately use antibiotics because patients would be making informed decisions. In 2018, Saudi Arabia's Ministry of Health enacted a policy that required a prescription for all dispensed antibiotics, thereby restricting their sale over the counter. This modification resulted in a small but immediate reduction in antibiotic use in the community [13]. However, the initial rebound in consumption patterns occurred relatively soon thereafter [13], indicating that enforcement is only part of the solution; there needs to be a shift in public perception and demand as well. Strengthening diagnostic stewardship—by making rapid strep tests available at clinics and pharmacies and educating healthcare providers and the public about the proper use of strep tests might be combined with antibiotic stewardship initiatives to improve pharyngitis treatment. In this regard, we attempted to assess the level of awareness and knowledge on microbiological testing of pharyngitis and antibiotic usage in the Qassim region. Qassim is a central region located in Saudi Arabia. Just like the rest of the country, respiratory infections are common in the region, and antibiotics have historically been easily accessible. Some prior local studies have investigated knowledge and attitudes towards the use of antibiotics in the general Saudi population [7] as well as in parents from Qassim [10]. As far as we know, none have particularly looked at the public awareness on throat swab tests for strep throat. Assessing a level of awareness and misconceptions is often the first step in public health education planning. The goal is to inform specific approaches, such as public campaigns or educational brochures in clinics, that foster evidence-based strategies whereby antibiotics are reserved for true medical necessity to avert complications and resistance.

2. Methods

2.1. Study Design and Setting

The research was conducted as a cross-sectional survey within the Qassim region of Saudi Arabia between January and February 2025. Qassim exists in the central part of Saudi Arabia where Saudi citizens live among both urban and rural areas. The research included all adult residents of Qassim who were at least 18 years old. I excluded individuals younger than 18 and those who were not residing in Qassim at the time of the survey. To account for potential non-response or incomplete surveys, we targeted a sample size of over 400 participants.

2.2. Sampling and Data Collection

The survey was shared through commonly used online communication channels, including widely used messaging platforms, to facilitate broad and convenient participation within the community. Participants were encouraged to forward the survey to others to increase reach. The survey introduction explained the purpose of the study, assured respondents of anonymity, and obtained their consent to participate. No personal identifying information was collected.

2.3. Survey Instrument

The questionnaire was developed in Arabic (the native language of the target population) and was derived from previously validated surveys on sore throat management and antibiotic use [14]. The questionnaire consisted of four sections:

- Section 1: Sociodemographic Data Questions about age, gender, nationality, education level and occupation (with an option to indicate if the respondent worked in a healthcare-related field).
- Section 2: Pharyngitis Knowledge and Awareness Questions that are focused on the understanding of sore throat's common causes (viral vs bacterial), its symptoms and risk factors, as well as the need for diagnostic tests such as throat swabs or RADTs.
- Section 3: Attitudes and Health-Seeking Behavior Focuses on the individual actions towards sore throats (use of home remedies, propensity to seek medical help, expectations for prescriptions), and beliefs about the need to prescribe antibiotics (for severe sore throat or fever).
- Section 4: Antibiotic Use Practices Questions concerning past behavior, such as, use of antibiotics without a prescription in the recent past, willingness to undergo a throat swab test if recommended, and complications of untreated strep throat.

At the end of the survey, an informational brief was provided to participants about proper antibiotic use and the role of testing, as a small educational and ethical consideration.

2.4. Data Analysis

Survey responses were collected and tabulated. For analysis, we used descriptive statistics (frequencies and percentages) to summarize the responses to each question. An overall knowledge score was calculated for each participant by summing the number of correct responses to key knowledge questions (covering sore throat causes, need for testing, and complications of strep throat). We examined associations between participant characteristics (such as education level, healthcare background, gender, and age group) and both knowledge and attitude outcomes. Chi-square (χ^2) tests were used to test for significant associations. For instance, we compared the proportion of respondents with good knowledge among those with higher vs. lower education, and similarly compared attitudes (like the tendency to demand antibiotics) across knowledge levels. A p-value of less than 0.05 was considered statistically significant for all analyses. Data analysis was performed using standard statistical software.

3. Results

3.1. Participant Characteristics

Out of the 208 individuals who opened the survey, 198 people completed it, making the response rate 95%. The majority of the participants were males who were under 40 years old (56%). Most of the respondents (99%) were Saudi nationals. Education levels were high: 77.3% of the participants had attained a university degree, and an additional 16.0% had completed high school; only one respondent reported having no formal education.

3.2. Knowledge of Sore Throat and Diagnostic Testing

Sore throats are a common experience for 92% of the participants. When asked about causes, 43% correctly identified viruses as the most common cause, but many were unsure or believed bacteria were responsible. Only a small fraction of the population was aware of throat cultures, and even fewer knew about rapid strep tests. Those who had heard of these tests were mostly healthcare workers or had learned about them during past medical visits. Only one-third (35%) of the participants knew that most sore throats do not need antibiotics to cure them. Approximately half of the respondents (52%) understood that the misuse of antibiotics leads to antibiotic resistance. The knowledge of the possible complications of untreated strep throat was not well articulated; rheumatic fever was mentioned by 13%, and abscesses by only 15%. Half of the respondents either did not know or stated that there were no serious complications. No significant differences were observed between the gender and age groups of the participants.

3.3. Attitudes and Health-Seeking Behavior

Participants had mixed views on antibiotic use. Around 30% believed that antibiotics are required for any severe sore throat, whereas 51% stated that they would only take antibiotics if the doctor said it was a bacterial infection. However, 20% said they might take antibiotics on their own if symptoms were bad enough. Most people (69%) preferred home remedies as their first line of treatment, which included warm drinks, gargles, lozenges, and rest. Approximately 78% of the participants admitted to using pain relievers such as paracetamol or ibuprofen. Only 8% listed antibiotics among their first choices for treatment. Regarding the visit to the doctor, nearly half (49%) of the participants would go to the clinic after 2–3 days of symptoms. Approximately 25% of the respondents said they would go to the doctor immediately if symptoms were very severe, while the rest would either wait for a longer time or self-treat until symptoms become worse. Only 12% of participants said the main reason they visit a doctor is to obtain antibiotics. Others included for wanting to be reassured, getting a sick note for work or school, or for a referral due to frequent sore throats. In the past six months, approximately 15% of the participants had used antibiotics without a prescription, many of whom used leftovers or relied on past experience.

3.4. The Awareness of Testing and the Willingness to be Tested

Although the knowledge of diagnostic testing at the onset was quite low, 80% of participants indicated that they would be willing to undergo a throat swab if it would help determine the need for antibiotics. Only 8% said no, and 12% were unsure. The main reasons for refusal included; Fear of discomfort, Cost, or no known reason. Importantly, 67% of participants agreed that it is important for doctors to determine whether a sore throat is bacterial or viral before giving antibiotics, showing strong support for diagnostic stewardship once the idea was explained.

3.5. Factors Affecting Knowledge and Attitudes

Those with higher education or healthcare experience were found to have better knowledge on the causes of sore throat, testing, and the need for antibiotics. Gender did not affect knowledge or attitudes. The older participants had a better understanding of complications. Knowledge was strongly correlated with how people behaved in this study. The data showed that 15% of participants who possessed good knowledge about sore throats needed antibiotics, yet this number increased to 45% among participants who had poor knowledge of sore throats, and this difference proved significant statistically. Healthcare workers demonstrated complete agreement (95%) that antibiotics must be confirmed for bacterial infections before they would use or provide these medications.

3.6. Summary of Results

Participants showed restraint in their treatment approach toward sore throats yet failed to understand when antibiotics should be used. People showed great interest in microbiological testing after it was explained to them even though they knew little about it. Public education along with better diagnostic tools such as rapid strep tests could assist people in using antibiotics correctly throughout their communities.

4. Discussion

This study provides valuable insights into the current state to public knowledge of microbiological testing and the use of antibiotics on pharyngitis in the Qassim region of Saudi Arabia. The results show some positive indicators but also worrying factors that require focus. To summarize, my research indicated that although most people do not take antibiotics at the first sign of a sore throat, there is a large gap of knowledge as to when antibiotics are actually necessary, including the part that diagnostic tests can play in informing that decision. One of the most notable gaps identified is the low public awareness of throat swab diagnostics. Nearly four out of five participants in our survey were unfamiliar with the idea of a throat culture or a rapid "strep test" for diagnosing pharyngitis. This is consistent with research from Jeddah, Saudi Arabia, where public awareness of rapid antigen tests was reported to be under 5% [12]. Such tests have been a standard part of care in many countries for decades to distinguish streptococcal from viral sore throats [4], yet our data, along with other local studies, suggest that the concept has not permeated into general public knowledge in Saudi Arabia. Historically, physicians in the region may have often prescribed antibiotics empirically (based on symptoms) without testing, due to factors like time constraints or lack of readily available rapid tests. This could have inadvertently conditioned the public to expect treatment based on symptoms alone, without the step of testing. The strong willingness of our respondents to undergo a throat swab once the idea was explained (80% said they would be willing) echoes the findings by Badr et al. [12], where over 90% of people supported the use of rapid tests when told it could reduce unnecessary antibiotic use [12]. This indicates that improving public knowledge about diagnostic options could be a key lever in promoting diagnostic stewardship. In other words, if people understand that "not all sore throats are strep, and it's important to test to know for sure," they might be more accepting of not receiving an antibiotic immediately and more supportive of the doctor performing a test first. Diagnostic stewardship in the context of pharyngitis means using diagnostic tests for GAS when appropriate (for example, if certain clinical criteria suggest a possible strep infection) and withholding antibiotics unless the test confirms a bacterial infection [6, 9]. By educating patients that a simple test can quickly distinguish a strep throat from a viral sore throat, healthcare providers can manage patient expectations and reduce conflict. Morgan et al. [5] have emphasized that such stewardship – leveraging the laboratory or point-of-care tests appropriately is an integral complement to antibiotic stewardship efforts [5]. Our study shows that the building blocks for public acceptance of this approach are present: people seem open to testing and do not overwhelmingly demand antibiotics as long as their symptoms are being addressed in some way. The burden is now on health authorities and clinicians to operationalize this by making rapid tests readily accessible in primary care and by communicating their purpose clearly during consultations. Another notable finding pertains to public understanding of antibiotics. A

considerable minority of participants possessed the erroneous belief that antibiotics are needed for curing a severe sore throat, or for treating any throat infection with fever. For example, close to 30% thought that antibiotics should be administered for any "very bad" throat infection. This percentage is lower than what has been observed in some other contexts – for example, in Italy, 57% of the public thought antibiotics would help most coughs and colds [15] which suggests there has been some progress in public understanding (perhaps through awareness campaigns). In a Qassim-based study focusing on parents, Alharbi et al. [10] reported that about 60% of parents expected an antibiotic to be prescribed for their children's colds or sore throats [10]. Our broader adult sample showed a somewhat more cautious attitude overall, which may reflect the impact of recent public health campaigns about antibiotic misuse in Saudi Arabia as well as the effects of the 2018 prescription restriction policy. The fact that 30% of adults view antibiotics as a solution for severe throat symptoms remains a matter of concern. The portion of the population who hold this belief might become more likely to demand antibiotics from doctors or take antibiotics on their own when they feel their condition is severe, thus leading to improper antibiotic use. Our research showed that approximately thirty percent of participants had used antibiotics before getting a prescription, which matches previous studies about antibiotic availability in Saudi Arabia before the new law took effect. The 2018 law that requires antibiotic prescriptions faces implementation hurdles so patients might seek antibiotics through leftover home supplies. A systematic review by Auta et al. [16] found that the Middle East has among the highest rates of non-prescription antibiotic use globally [16], a trend that will require continuous public health efforts to reverse. It is encouraging that many participants in our study demonstrated prudent behavior - using home remedies and analgesics first and not immediately seeking antibiotics for a sore throat. This kind of self-management approach to mild infections is something that should be reinforced. An international survey by van der Velden et al. observed similar patterns in Europe: a majority of individuals with sore throat managed their symptoms on their own initially and did not visit the doctor unless symptoms were prolonged [14]. In our study, while about 25% said they would go to a doctor right away for a very severe sore throat, the rest preferred to wait or treat symptoms for a few days, which could reduce unnecessary clinic visits and antibiotic requests. There is, however, a need to balance this with the risk of delayed treatment in true GAS cases - we wouldn't want people to avoid seeing a doctor when it is actually needed. So, informing the public about the "red flag" symptoms and the appropriate time for evaluation is useful. For instance, the public should be informed that a physician's appointment needs to be made in case of a very high fever, breathing or swallowing difficulties, or if a sore throat persists beyond 3–5 days and does not improve. This way, patients understand when they need to seek medical attention, while treatment can be postponed for the vast majority of cases that are less serious. When we compare our findings with those from other regions of Saudi Arabia and internationally, we see some common themes and some differences. A knowledge-attitude survey in Italy noted a poor understanding of antibiotic resistance among the public only around 10% knew what the term meant [15]. In our sample, roughly half of the participants were aware that inappropriate antibiotic use can lead to resistance. This could suggest that national awareness campaigns in Saudi Arabia (often conducted as part of the World Antibiotic Awareness Week and similar initiatives) are having some positive effect on general knowledge. El Zowalaty et al. [7] previously reported a generally low level of awareness about proper antibiotic use among the Saudi public (in 2015) [7] so any improvement is welcome, though it's hard to compare directly since the question formats differ. Culturally, in South Korea, a study found that many patients felt dissatisfied if they left a doctor's office without an antibiotic, essentially equating getting a prescription with receiving proper care [17]. These kinds of cultural expectations can vary widely by region. Our data suggest that in Qassim, people are not universally fixated on obtaining an antibiotic; many valued getting a doctor's note or simply reassurance over getting a medication. This difference might be partly due to concerted efforts by Saudi health authorities in recent years to convey that antibiotic overuse is harmful. Public campaigns and the new prescription-only law might have begun to reshape public opinion, though a formal qualitative study would be useful to confirm this hypothesis. A persistent gap in our setting, however, is understanding the "why" behind needing a test or not getting antibiotics immediately. This is where more nuanced public education is needed. Traditional health messages have often focused on "don't use antibiotics unnecessarily," but perhaps they haven't fully explained how a doctor determines what is necessary. Incorporating messages about diagnostic tests - for example, public service announcements that say something like "Your doctor may do a simple strep test to decide if you need antibiotics" - could bridge this understanding gap. Studies show that when patients are made partners in the diagnostic process (for example, using shared decision-making tools for infections), antibiotic use can drop without compromising patient satisfaction [11]. In primary care for pharyngitis, even a brief explanation from the doctor such as "We'll do a throat swab and only use antibiotics if it's positive, because unnecessary antibiotics won't help and can cause harm" can be effective. Patients then feel that an action is being taken (the test) and are less likely to feel that "nothing was done" if they leave without an antibiotic. Communication training for physicians is crucial in cultivating this understanding [9], ensuring they can confidently convey the reasoning to patients. Our results underscore the need to integrate public education about diagnostic stewardship into Saudi Arabia's overall healthcare strategy. The Ministry of Health's restriction on over-the-counter antibiotic sales is a supply-side intervention; it needs to be supported by demand-side interventions that educate the community. The slight decline followed by a rebound in antibiotic use after the 2018 policy, roughly a 10% initial drop, then a return to baseline, observed by Al-Jedai et al. [13] implies that lasting change requires more than just regulation. It requires changing public expectations and clinician prescribing habits simultaneously. Making rapid antigen strep tests widely available (in both clinics and potentially pharmacies under proper protocols) could give clinicians the tools to practice evidence-based medicine even in busy outpatient settings. Importantly, both healthcare providers and the public should be aware of the high accuracy and value of these tests. In one pediatric emergency department study, implementing a rapid strep test significantly reduced unnecessary antibiotic prescriptions [18]. Evidence like that supports the push for point-of-care testing as a standard part of managing pharyngitis. This study is, to our knowledge, among the first in Saudi Arabia to focus specifically on public awareness of microbiological testing for pharyngitis. It builds on previous work that examined general

antibiotic knowledge [7] and health-seeking behavior for sore throat [14]. By localizing the issue to the Qassim region, we provide data that regional public health stakeholders can use to guide interventions. For example, our finding that younger, well-educated adults are more open to new information suggests that social media campaigns in explaining when antibiotics are needed (and highlighting the concept of getting tested first) might resonate well with that demographic. Meanwhile, outreach through primary healthcare centers, perhaps via informational posters in clinic waiting areas or pamphlets handed out during visits, could reach older individuals.

5. Limitations

There are some limitations to note in this study. First, the use of an online survey and convenience sampling may limit the generalizability of our results. Our sample had a higher proportion of well-educated individuals than the general population of Qassim, which could mean we have somewhat overestimated awareness levels (less educated communities, who were underrepresented in our survey, might have even lower awareness and different attitudes). On the other hand, if knowledge gaps were observed even in this relatively educated sample, the need for public education may be even greater in the broader community. Second, the data on practices and attitudes are self-reported, which can be subject to social desirability bias.

Participants might have given answers they thought were "correct" or more socially acceptable (for example, endorsing careful antibiotic use) rather than admitting to behaviors that might be viewed negatively. We attempted to mitigate this by assuring anonymity, but the bias may not be eliminated. Follow-up qualitative research would be valuable to delve deeper into this perception. Lastly, our study did not track clinical outcomes or actual prescription rates among the participants. We cannot directly measure how the knowledge and attitudes reported here translate into real-world behavior when someone gets a sore throat. It would be useful in future research to link patient knowledge with actual antibiotic usage patterns, for example, to see if those with better knowledge indeed use fewer antibiotics or are more likely to request a diagnostic test. Implications for Practice Despite the above limitations, our findings have clear implications for practice. Health campaigns and clinicians should consider educational initiatives that focus on the following areas:

- Cause of Sore Throat: Emphasize to the public that viral infections are the predominant cause of sore throats and that these do not require antibiotics to get better. This message can reassure people that not every sore throat needs medication from the pharmacy.
- Role of Testing: Introduce and normalize the concept that a simple throat swab test can guide proper treatment. Public service messages could frame this positively, for example: "Accurate diagnosis for better treatment ask your doctor about the strep test." If the public views testing as a standard step, they may start expecting it (instead of expecting antibiotics).
- Appropriate Antibiotic Use: Continue to reinforce the dangers of antibiotic misuse, but also communicate the specific benefit of antibiotics in confirmed bacterial cases. The idea is a balanced message: antibiotics are crucial when needed (like for confirmed strep throat), but only when needed. Addressing concerns helps prevent avoiding the other extreme, we do not want individuals so scared of using antibiotics that they do not use them when they are truly needed.
- Symptom Relief and Self-Care: Inform the public on the availability of home remedies and nonprescription medications that effectively relieve sore throat pain and symptoms. Once individuals manage their pain, they may feel less need to obtain prescriptions. Our data shows many are already using such measures; formalizing this knowledge through advice from healthcare providers or guidance from community pharmacists could be beneficial. Encourage the utilization of fluids, salt gargles, rest, and pain relievers as the first measures taken.
- When to Seek Medical Care: Explain in what circumstances a sore throat necessitates visiting a physician. Some messaging could be: 'Visit a healthcare provider if you develop a high fever, have difficulty breathing or swallowing, notice swollen glands, or if the sore throat persists beyond 3-5 days.' This ensures that true cases of streptococcal infection and complications are not missed because people are too conservative and delay seeking care.

Our results indicate that healthcare providers require continuous educational support and resources to establish diagnostic stewardship practices. Healthcare providers need access to rapid strep tests (RADTs) in their clinics while their staff members receive proper training for test utilization. It also includes communication training for clinicians, so they can effectively explain to patients why a test is being done and why an antibiotic may or may not be given based on the result. Such communication, as shown in studies, can make a big difference [9]. Additionally, healthcare systems should address logistical barriers – for example, if a throat culture (which is the gold standard test) is done and takes 24–48 hours for results, there should be a mechanism (like a call-back system or a delayed prescription that the patient only fills if the culture is positive) to manage the wait. Workflows like these can be established in primary care settings to align practice with guidelines [4] and ensure patients with strep get timely treatment while avoiding treating those without.

5.1. Comparison with Other Regions

Our focus on Qassim revealed patterns likely similar to those in other parts of Saudi Arabia, though local culture and exposure to health campaigns might introduce some differences. It would be valuable to compare our results with data from major cities like Riyadh or Jeddah. A cross-sectional study conducted in Riyadh in 2021 found that around 11.5% of respondents still believed antibiotics can treat viral infections [8]. Our study similarly found that misunderstanding among roughly 20–30% of participants on that topic. The consistency across regions implies that a nationwide strategy is appropriate for public education. Additional considerations can be gained from studying countries that have successfully modified the public's use of antibiotics. For instance, numerous countries across Europe have conducted public awareness campaigns for

the past twenty years and have seen a gradual decrease in the prescribing of antibiotics for upper respiratory infections. This improvement is partly attributed to better public knowledge and adjusted expectations [14]. Saudi Arabia can adapt such strategies to its own cultural context, combining public messaging, clinician engagement, and policy enforcement.

6. Conclusion

In conclusion, the public in Qassim, Saudi Arabia, shows partial awareness and generally cautious attitudes regarding antibiotic use for pharyngitis, but there remain critical gaps, particularly in understanding the need for microbiological confirmation of strep throat. The knowledge deficit about streptococcal infections results in two major issues: physicians face pressure to prescribe antibiotics, while patients sometimes misuse antibiotics. The knowledge gap needs immediate attention to improve both diagnostic practices and antibiotic use in community settings. Healthcare authorities should establish educational programs with point-of-care diagnostic testing to provide patients and clinicians with the necessary information for better decision-making. The preservation of antibiotics for patients who need them will be ensured through these efforts while preventing complications from untreated GAS pharyngitis through timely, appropriate treatment. The current rise in antimicrobial resistance makes community health education and diagnostic stewardship initiatives more crucial than ever. The results of this study provide a baseline against which future improvements can be measured, and they highlight that with better awareness, the public is likely to support and engage in more rational use of antibiotics for sore throats. Ultimately, a well-informed public, combined with committed healthcare providers, will contribute to improved health outcomes and the preservation of antibiotic effectiveness for future generations.

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