

# Treatment of Acute Sore Throat in Malaysia: A Consensus of Multidisciplinary Recommendations Using Modified Delphi Methodology

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**Introduction:** Using antibiotics in the treatment of acute sore throats has been linked with antimicrobial resistance (AMR) and needs to be addressed. The consensus sought to improve diagnostic accuracy, decrease unwarranted antibiotic prescriptions and enhance patient outcomes.

**Methods:** A multidisciplinary panel of nine experts reviewed published literature and discussed current practices in managing sore throat. Ten evidence-based statements on sore throat and AMR, diagnostic accuracy and antibiotic prescribing, and symptomatic therapy were developed. A modified Delphi exercise was then carried out. A consensus was reached if at least 70% of the group agreed with the statement.

**Results:** All 10 statements for managing acute sore throat achieved consensus. The major concern of AMR caused by improper antibiotic prescribing, particularly in cases of viral sore throat, was recognized. This underscores the need for improved diagnostic tools, such as the McIsaac score, to reduce needless antibiotic prescriptions. To improve patient satisfaction, effective pain management using non-antibiotic alternatives such as paracetamol, non-steroidal anti-inflammatory drugs (NSAIDs), and flurbiprofen throat lozenges was recommended. Pain and inflammation can be adequately managed with low-dose NSAIDs. The potential benefits of topical NSAIDs were acknowledged for their milder safety profile than oral formulations.

**Conclusion:** A consensus was achieved on the use of a clinical diagnostic tool, prudent use of antibiotics, and symptomatic therapy in acute sore throat management. The McIsaac score and point-of-care testing (POCT) for the presence of group A beta-hemolytic *Streptococcus* (GABHS) can aid in the decision-making process for antibiotic use, reducing needless prescriptions. The mainstay of therapy is symptomatic treatment, which includes the use of NSAIDs.

**Keywords:** antibiotic, antimicrobial resistance, diagnosis, sore throat, symptomatic treatment

## Introduction

Sore throat (also known as pharyngitis) encompasses a burning, scratchy, or painful sensation in the throat, which is one of the most frequent reasons for seeking medical care.<sup>1</sup> The incidence of sore throat is ubiquitous across the globe. Studies estimate that adults experience on average 13.5–14.4 episodes of sore throat per 100 patient-years, while children are more susceptible, enduring up to 82.2–82.5 episodes per 100 patient-years.<sup>2–5</sup> Sore throat is typically a recurring condition; 48% of patients who experience sore throat and seek medical care report that they experienced sore throat 3–4 times a year, with each episode lasting for 2–5 days.<sup>6</sup> Acute sore throat is a distressing condition, as 70% of patients will experience moderate-severe pain.<sup>6,7</sup> It disrupts daily life, causing discomfort, difficulty swallowing, sleep disturbances and consequential decreased productivity because patients lack energy and experience difficulty concentrating.<sup>7</sup>

The challenges with acute sore throat management include the heterogeneity of etiologies and clinical presentations, which make accurate identification of the cause of the sore throat difficult. Symptoms range from mild discomfort to severe pain, accompanied by fever, cough, hoarseness, swollen lymph nodes and difficulty swallowing.<sup>8</sup> Viral, bacterial and non-infectious triggers (allergies, irritants) exist, but accurate differentiation of these causes of sore throat symptoms can be challenging, leading to overtreatment or undertreatment.<sup>9–11</sup> There is no universal gold standard in diagnosis, making targeted treatment challenging. Diagnosis primarily relies on physical examination and consideration of symptoms. While evidence supports non-antibiotic approaches for most cases, definitive guidance on symptom management and potential complications is lacking.<sup>12</sup> The McIsaac score and POCT for GABHS have been identified as valuable tools for improving diagnostic accuracy and guiding appropriate antibiotic use.<sup>13–15</sup> However, definitive guidance on integrating these tools into clinical practice for effective symptom management remains limited.

Variability exists between treatment guidelines for sore throat management across regions and institutions. Antibiotic-resistance concerns must be balanced with the pressing need for rapid symptom alleviation. Moreover, the guidelines predominantly focus on infectious etiologies, overlooking individuals experiencing non-infectious throat discomfort and providing limited suggestions for alleviating symptoms.<sup>16</sup>

Misdiagnosis and inappropriate antibiotic prescribing lead to antibiotic overuse.<sup>17</sup> Antimicrobial resistance (AMR) is exacerbated by the widespread inappropriate prescribing of antibiotics despite the fact that up to 70% of sore throat cases are not bacterial.<sup>17</sup> Using antibiotics inappropriately can result from a lack of accurate diagnostic tools, patient expectations of quick relief, and a lack of symptomatic-relief therapeutic choices to address acute sore throat pain.

Given the variety and inconsistency in clinical practice, exacerbated by increasing AMR, guidance in managing acute sore throat is needed. Our goals were to develop expert-led, evidence-based consensus recommendations that would provide general practitioners and primary care physicians with information and guidance to improve the consistency and quality of care for patients suffering from acute sore throat, thereby reducing unnecessary antibiotic prescriptions and improving patient outcomes.

## Methods

### Consensus Development and Scope of the Statement

The consensus process consisted of virtual meetings held among panel members between July 2023 and February 2024, and was developed using the modified Delphi process. The development team, comprising nine experts who are also the authors of this manuscript, brought expertise from various fields: infectious disease (one expert), otorhinolaryngology (two experts), respiratory medicine (one expert), clinical microbiology (one expert), primary care (one expert), general practice (two experts), and pharmacy (one expert). This diverse group represented both public and private settings, offering a multidisciplinary approach to managing patients with acute sore throat. The experts identified the core areas of interest and focused on three key themes: antimicrobial resistance and management of sore throat, diagnostic accuracy and antibiotic prescribing, and evidence-based symptomatic treatment.

### Literature Review of the Evidence

A literature search of the MEDLINE database using the PubMed search engine was undertaken to identify published, peer-reviewed articles addressing the questions, “What is the role of antibiotics used in acute sore throat management?” “What is the role of a clinical diagnostic tool in guiding acute sore throat management?” and “What is the role of symptomatic treatment and non-steroidal anti-inflammatory drugs (NSAIDs) in acute sore throat management?” Publications in English from January 2018 to June 2023 were retrieved using the search terms ‘pharyngitis’, OR “sore throat” and their MeSH terms AND/OR ‘antibiotics’, “antimicrobial resistance”, “clinical diagnostic tool”, “symptomatic treatment” and “NSAID”. Publication types were limited to meta-analyses and systematic reviews, randomized clinical trials (RCTs) and non-RCTs, observational studies and practice guidelines. Editorials, narrative reviews, opinions, case series and case reports were excluded. Additionally, a few articles were identified from the experience and information provided by the experts.

After examining the pool of information obtained, the expert panel drafted 10 preliminary statements that addressed the three major themes. These statements were subjected to a Delphi process, in which the evidence was examined and argued to provide a list of evidence-based recommendations. The evidence was graded using the Oxford Centre for Evidence-Based Medicine's 2009 Levels of Evidence:<sup>18</sup> level 1 (evidence from systematic reviews and meta-analyses of RCTs), level 2 (evidence from individual RCTs), level 3 (evidence from non-randomized controlled cohort studies), level 4 (evidence from case-control studies), and level 5 (evidence from expert opinion or consensus). Grade A recommendations are based on high-quality evidence from systematic reviews of RCTs or meta-analyses; Grade B, on moderate-quality evidence from individual RCTs or well-designed cohort studies; Grade C, on low-quality evidence from expert opinion, non-RCTs, or case-control studies; and Grade D, on very low-quality evidence, including case series. Articles were selected and rated in duplicate by two authors, and disagreements were resolved by consensus.

## Modified Delphi Process and Administration

Two virtual meetings were held. During the first meeting, the statements were reviewed and discussed considering current practice and available evidence. Subsequently, all panel members were provided with the modified statements, together with supporting evidence, prior to the second meeting. In the second meeting, the panel reviewed, proposed modifications and voted for the final statements. Voting was done anonymously and blinded. All experts responded using a 5-point Likert scale (A – Strongly agree; B – Agree; C – Neither agree nor disagree; D – Disagree; E – Strongly disagree). A consensus was reached if  $\geq 70\%$  of the group strongly agreed or agreed with the statement. A strong consensus was achieved if  $\geq 80\%$  of the group strongly agreed or agreed with the statement. When consensus was not reached, statements were modified and a second vote was conducted. A descriptive analysis was undertaken to provide an overview of the findings.

## Results

### Literature Review

Database searches yielded 153 items. The abstracts of the publications were reviewed; 119 were excluded. Thirty-four full-text papers were identified and evaluated for eligibility. After removing two narrative reviews,<sup>9,19</sup> 32 articles<sup>1,20–50</sup> were selected (Figure 1). Additionally, the experts identified four Malaysian guidelines/reports<sup>51–55</sup> pertaining to the scope of the consensus. The evidence levels included fourteen level 1 studies, four level 2 studies, seven level 3 studies, three level 4 studies, and eight level 5 studies.

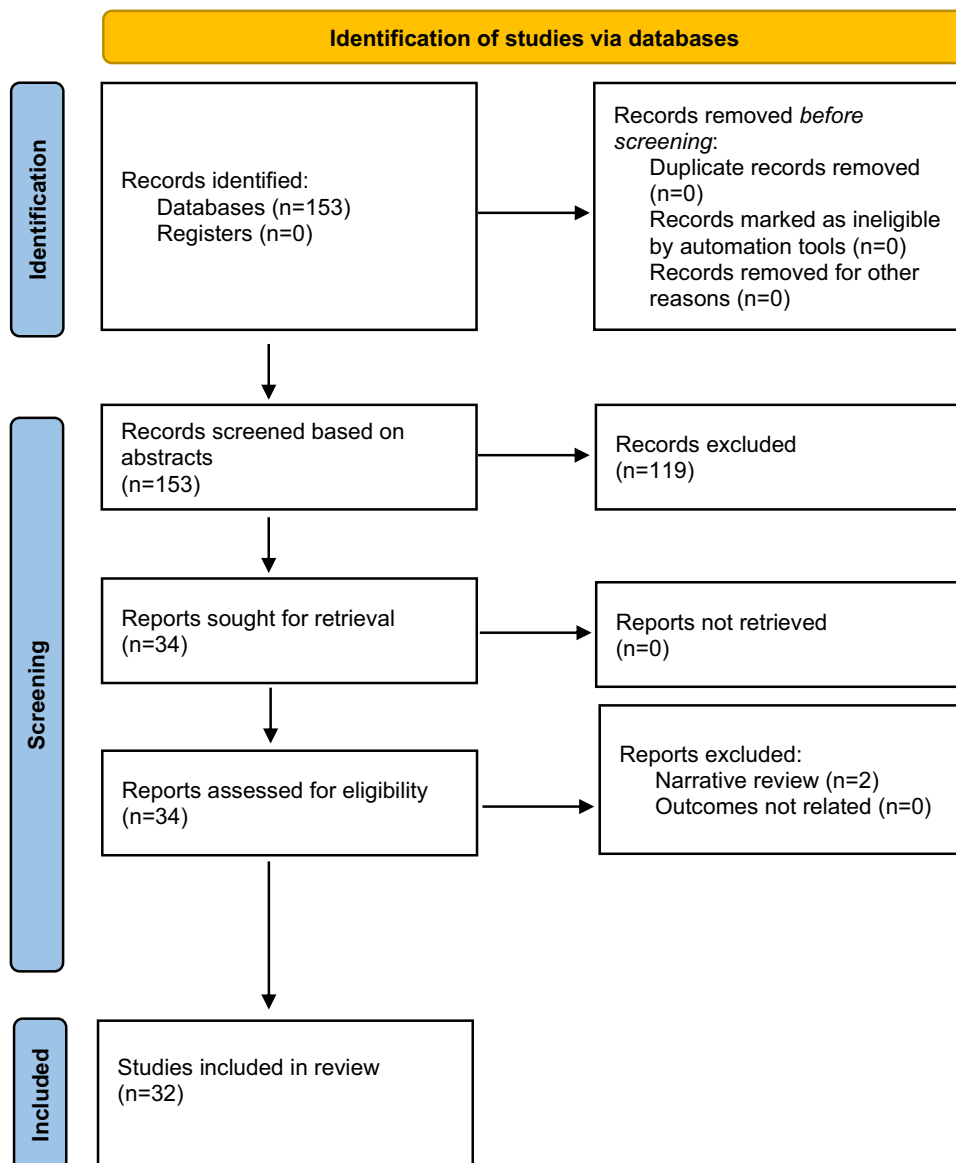
### Consensus Statements

During the second meeting, all statements reached a strong consensus after one round of voting. All nine experts agreed on all statements but one, on which eight of them agreed (88.9%). The consensus statements and levels of agreement are presented in Table 1. The summary of the recommendations is in Table 2.

## Antimicrobial Resistance and Management of Acute Sore Throat

The Antimicrobial Resistance Collaborators estimated that around 4.95 million deaths were associated with bacterial AMR in 2019. Among these deaths, an estimated 1.27 million were attributed directly to bacterial AMR.<sup>20</sup> It is projected that AMR may result in approximately 10 million fatalities worldwide by 2050.<sup>21</sup> The expert panel acknowledged that AMR has been a long-standing issue in Malaysia. The Ministry of Health Malaysia has been conducting annual AMR trend monitoring with annual publication of antibiotic-resistance surveillance reports since 2003. Decreases in resistance rates for *Staphylococcus aureus* were observed for penicillin, rifampicin, clindamycin, erythromycin, gentamicin and linezolid in 2022 compared with 2021.<sup>54</sup> The methicillin-resistant *Staphylococcus aureus* (MRSA) rate also decreased from 7.0% in 2021, to 6.0% in 2022.<sup>54</sup> A decreasing trend in resistance for *Streptococcus pneumoniae* was observed for all antibiotics tested, except for ceftriaxone, which was not reported before.<sup>54</sup>

Although the overuse or inappropriate use of antibiotics is widely recognized as a major initiator of AMR,<sup>22</sup> other linked factors, such as incorrect diagnosis, also play a role in the development of AMR.<sup>23</sup> Antibiotic misuse or overuse is



**Figure 1** Flow diagram of study selection.

also of concern in Malaysia. In a recent cross-sectional study conducted in private primary care clinics in Malaysia, less than half (42.9%) of the types of antibiotics prescribed for acute pharyngitis were appropriate, and more than half (58.5%) were overprescribed.<sup>24</sup>

The expert panel acknowledged that overprescribing antibiotics is not exclusive to primary practice; it is also seen in secondary care and varies with private and government sectors and with healthcare center-specific practice. The expert panel agreed that antibiotic-prescribing behavior is more cautious in public healthcare institutions than in private practice because antibiotic use is subject to monitoring and auditing processes. A notable example is the Malaysian Ministry of Health's 2022 policy on antimicrobial stewardship plan in healthcare facilities.<sup>51</sup>

Viral infections are the primary etiological infectious agents of upper respiratory tract infections (URTIs), although non-infectious reasons can sometimes result in acute sore throats.<sup>55</sup> In Malaysia, a single-center study conducted in the primary care clinic of University Hospital Kuala Lumpur concluded that viral pharyngitis is the commonest form of pharyngitis (64%).<sup>30</sup> Meanwhile, in neighboring Singapore, the National Healthcare Group Polyclinics identified that the prevalence of viral infection in URTI symptoms was 10 times that of bacterial infection.<sup>31</sup>

**Table I** Summary of Consensus Statements and the Degree of Agreement

No.	Statement	Levels of Evidence*	Grade of Recommendation*	Degree of Agreement
<b>Antimicrobial resistance and management of sore throat</b>				
1	Antimicrobial resistance is a major health concern, to be considered when treating acute sore throat.	Level 1: 1 study <sup>20</sup> Level 5: 2 studies <sup>21,54</sup>	Not applicable	100% (Strongly agree, 88.9%; Agree, 11.1%)
2	Antimicrobial resistance becomes more prevalent by antibiotic abuse and overuse, and this needs to be considered when evaluating sore throat treatment options.	Level 1: 1 study <sup>22</sup> Level 3: 1 study <sup>24</sup> Level 5: 1 study <sup>23</sup>	Not applicable	100% (Strongly agree, 88.9%; Agree, 11.1%)
3	Antibiotics are commonly prescribed to treat upper respiratory tract infections in primary care settings.	Level 3: 2 studies <sup>26,28</sup> Level 4: 2 studies <sup>25,27</sup> Level 5: 1 study <sup>51</sup>	Not applicable	100% (Strongly agree, 66.7%; Agree, 33.3%)
4	The most common cause of sore throat in an upper respiratory tract infection is viral infection, and antibiotics should play no role in the initial treatment in these cases.	Level 3: 3 studies <sup>29-31</sup> Level 5: 1 study <sup>32</sup>	Grade C	100% (Strongly agree, 100%)
<b>Clinical diagnostic tool and judicious use of antibiotics</b>				
5	The McIsaac (modified Centor) score is a useful tool to guide decision-making on antibiotic use for the treatment of upper respiratory tract infections.	Level 1: 1 study <sup>34</sup> Level 2: 2 studies <sup>33,35</sup> Level 4: 1 study <sup>36</sup> Level 5: 2 studies <sup>52,53</sup>	Grade B	100% (Strongly agree, 66.7%; Agree, 33.3%)
6	Infections of the upper respiratory tract caused by Group A streptococci should be treated with an antibiotic.	Level 1: 1 study <sup>38</sup> Level 5: 2 studies <sup>32,37</sup>	Grade B	100% (Strongly agree, 88.9%; Agree, 11.1%)
7	The primary cause of pain in a sore throat is inflammation, and symptomatic therapy is a key component of treatment.	Level 1: 1 study <sup>1</sup> Level 2: 1 study <sup>39</sup> Level 3: 1 study <sup>40</sup> Level 5: 1 study <sup>52</sup>	Grade B	100% (Strongly agree, 77.8%; Agree, 22.2%)
<b>Evidence-based symptomatic treatment</b>				
8	NSAIDs can give relief from the symptomatic pain of acute sore throat.	Level 1: 5 studies <sup>42-46</sup> Level 2: 1 study <sup>41</sup> Level 5: 1 study <sup>53</sup>	Not applicable	100% (Strongly agree, 44.4%; Agree, 55.6%)
9	NSAIDs have the potential ability to minimize the misuse of antibiotics during the initial treatment of acute sore throat.	Level 1: 2 studies <sup>47,48</sup>	Not applicable	88.9% (Strongly agree, 22.2%; Agree, 66.7%; Neither agree nor disagree, 11.1%)
10	The use of topical/localized NSAIDs in the treatment of pain in acute sore throat poses better benefit-risk ratio compared to oral NSAIDs.	Level 1: 5 studies <sup>43-45,49,50</sup>	Grade B	100% (Strongly agree, 55.6%; Agree, 44.4%)

**Notes:** \*The levels of evidence and grade of recommendation for each statement were based on the Oxford Centre for Evidence-Based Medicine's 2009 Levels of Evidence.

**Abbreviation:** NSAID, non-steroidal anti-inflammatory drug.

Despite the fact that non-bacterial infections account for 80% of sore throats, retrospective studies revealed an antibiotic-prescription rate of 68.4% for URTI in private clinics and 28.7% in public hospitals.<sup>25,26</sup> An in-depth investigation was conducted to analyze the prescriptions issued for URTI at 10 publicly financed primary healthcare clinics in Malaysia. The prescription procedures demonstrated inconsistencies with established standards, which might

**Table 2** Summary of Recommendations

No	Recommendation	Grade of Recommendation
1	Antibiotics are not indicated as an initial treatment for upper respiratory tract infections.	Grade C
2	The McIsaac (modified Centor) score helps guide antibiotic administration in the treatment of upper respiratory tract infections.	Grade B
3	Antibiotic therapy is indicated for upper respiratory tract infections caused by Group A streptococci.	Grade B
4	The mainstay of treatment for sore throats is symptomatic therapy.	Grade B
5	Topical/localized NSAIDs are preferable over oral NSAIDs in the management of pain in acute sore throats due to the benefit–risk ratio.	Grade B

**Abbreviation:** NSAID, non-steroidal anti-inflammatory drug.

facilitate the development of resistance.<sup>27</sup> A study on URTI patients (aged above 3 years) found that 29% of cases received inappropriate antibiotic prescription.<sup>28</sup> Symptom duration, chills presence, and diagnosis of acute tonsillitis were significant factors associated with inappropriate antibiotic prescription. This information highlights the importance of strengthening primary care practitioners' and general practitioners' comprehension of all potential causes of AMR.<sup>28</sup>

## Clinical Diagnostic Tool and Judicious Use of Antibiotics

The expert panel noted the urgency of rectifying the practice of prescribing antibiotics for URTI when the etiologic agent is unclear. The McIsaac score is one instrument that can help guide treatment decisions of acute sore throat.<sup>33</sup> In the McIsaac score, one point is added for each criterion. A score of 4 is considered to represent a high likelihood of bacterial infection, and antibiotic use is usually indicated. A score less than 2 is considered viral infection and does not require antibiotics (Table 3).

The validity of McIsaac scores has also been demonstrated. A retrospective review of 116 pediatric patients presenting with acute sore throat showed that the use of the McIsaac score significantly reduced unnecessary throat swab cultures, redundant antibiotic prescriptions, and overall antibiotic use in pediatric patients with sore throat.<sup>36</sup> The adherence rate of antibiotic prescription among pediatricians improved, from 45.0% before implementation to 67.9% after, proving its effectiveness in managing sore throat in children.<sup>36</sup>

**Table 3** The McIsaac Tool Used to Guide Treatment Decisions for Acute Sore throat<sup>30</sup>

Criterion	Point
Temperature $\geq 38^{\circ}\text{C}$	1
No cough	1
Tender anterior cervical adenopathy	1
Tonsillar swelling or exudate	1
Age 3–14 years old	1
Age 15–44 years old	0
Age >45 years old	-1
A point is assigned according to patient's signs and symptoms	

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The McIsaac score can be used by medical practitioners to aid the determination of appropriate testing strategies for patients, including when not to do throat culture or when not to use empiric antibiotic therapy. Antibiotics should only be prescribed for suspected or proven bacterial infections with a score greater than 3, because the presence of streptococci may be an accidental finding in a virus-induced sore throat.<sup>52</sup>

A Malaysian study found that most medical students had a reasonable understanding of antimicrobials, which could be attributed to helpful teaching about safe antibiotic prescribing.<sup>56</sup> The experts suggested that including the McIsaac score into the training curriculum for medical students was a critical component in improving their knowledge and awareness in this area. The panel of experts stated that medical practitioners in Malaysia should be encouraged to use the McIsaac score to assist their treatment decisions, as it is not often used in clinical settings. The McIsaac score can be used by healthcare providers to communicate effectively with their patients about the indications for administering antibiotics, as well as to reassure them.

Incorporating POCT for GABHS into the McIsaac score framework enhances diagnostic accuracy, as POCT allows for immediate confirmation of GABHS presence, further refining treatment decisions based on the McIsaac score.<sup>14</sup> A Cochrane review evaluating the diagnostic accuracy of rapid antigen detection tests (RADTs) for group A streptococci in children with pharyngitis found a summary sensitivity estimate of 85.6% (95% CI 83.3 to 87.6) and a summary specificity estimate of 95.4% (95% CI 94.5 to 96.2) across 105 test evaluations.<sup>57</sup> The high specificity implies that positive RADT results may not require throat culture confirmation and could be used to guide antibiotic prescribing decisions.<sup>57</sup>

Antibiotics are beneficial in treating GABHS to minimize illness duration, limit the probability of transmission, and prevent the development of complications.<sup>37,38</sup> However, the expert panel noted that in clinical practice, diagnosing the type of infection, particularly in the early stages, can be challenging. Withholding antibiotics leads to patient dissatisfaction; therefore, proactive communication of the reason for withholding antibiotics is desired. The expert panel acknowledged that patients may test positive for *Streptococcus A* but it may not be the etiological agent causing the symptoms. Therefore, prescription of antibiotics still depends upon clinical judgment.

Patients with acute sore throat also visit their healthcare professional for treatment of the pain caused by inflammation. In the absence of any indicators of potential issues, the consistent use of symptomatic treatment can effectively manage discomfort.<sup>1</sup> A comprehensive evaluation of interventions aimed at mitigating symptoms associated with acute infectious sore throat confirmed the efficacy and safety of symptomatic treatment in the management of acute sore throat.<sup>39</sup>

## Evidence-Based Symptomatic Treatment

Effective symptomatic relief with NSAIDs could serve as a potential factor in reducing overprescription of antibiotics. Evidence has shown that NSAIDs can be viable alternatives to antibiotics for symptomatic treatment of acute sore throat pain.<sup>47</sup> It has been shown that NSAIDs are effective as viable alternatives to antibiotics in managing acute sore throat symptoms during a time frame of less than 24 hours.<sup>47</sup> Both the National Institute for Health and Care Excellence 2018 and the Malaysia Clinical Practice Guidelines for the Management of Sore Throat 2003 recommend ibuprofen as a symptomatic treatment for sore throats.<sup>42,53</sup> Low-dose NSAIDs such as ibuprofen provide pain relief from acute sore throats and reduce localized inflammation.<sup>46</sup> An NSAID substitute for ibuprofen is flurbiprofen, which has been shown to be effective and tolerable in treating discomfort related to sore throats. Following administration of repeat doses of flurbiprofen lozenge during a 24-hour period, patients exhibited a 59% improvement in throat pain, a 45% decrease in the level of difficulty in swallowing, and a 44% reduction in throat swelling, compared with patients who received placebo treatment.<sup>43</sup> Using flurbiprofen spray is another effective option that can lessen the severity of symptoms without causing any unfavorable adverse effects.<sup>45</sup> A 2021 systematic review identified limited evidence on the potential for hemorrhagic events associated with 8.75 mg flurbiprofen use.<sup>50</sup>

Consequently, the panelists concluded that using NSAIDs to treat acute sore throat symptoms may reduce the prescription of antibiotics, thereby lowering the risk of AMR. Topical NSAIDs, such as lozenges or sprays, offer a lower risk profile than oral NSAIDs for acute sore throat treatment; neither gastrointestinal adverse effects nor the risk of renal failure are induced by them, in comparison with oral NSAIDs.<sup>49</sup>

## Discussion

### Antimicrobial Resistance and Management of Acute Sore Throat

AMR has become a prominent issue within the field of public health.<sup>58</sup> It presents a significant global health concern and stands as a prominent contributor to mortality rates worldwide.<sup>58</sup>

The availability of guidelines on when to treat infections, what type of antibiotic to use, and the duration of therapy will help to avoid AMR, but their proper application requires implementation and adherence monitoring. Patient education about the natural course of infections, shared decision-making, and addressing patient expectations are also instrumental for reducing inappropriate antibiotic prescriptions in future consultations. Pharmacists play a crucial part in helping to encourage safe antibiotic use. They serve as the “last line of defense” by assessing prescriptions for acute ailments such as sore throats, identifying potential hazards, and providing feedback to prescribers.

Viruses are the cause of most throat infections in both adults and children (85% of cases in adults; 70% of cases in children aged 5–15 years; 95% of cases in children less than 5 years old). Remarkably, GABHS is the primary cause of bacterial throat infections, which affect children aged 5 to 15 (30% of cases).<sup>9,28</sup> However, viral infection is still the most frequent cause of childhood URTI.<sup>29</sup> Antibiotic abuse and overuse exert selective pressure on microorganisms, favoring the survival and proliferation of resistant strains.<sup>59</sup> When antibiotics are used inappropriately or unnecessarily, sensitive bacteria are killed off while resistant bacteria survive and propagate. This process drives the evolution and spread of AMR within microbial populations.

### Clinical Diagnostic Tool and Judicious Use of Antibiotics

Clinical practice guidelines from organizations such as the Infectious Diseases Society of America and the American Academy of Pediatrics emphasize the importance of judicious antibiotic use and recommend against routine antibiotic treatment for acute pharyngitis unless specific bacterial pathogens, such as GABHS, are identified through diagnostic testing.<sup>32,60</sup> The National Antibiotic Guidelines 2019 and the Malaysia Clinical Practice Guidelines for the Management of Sore Throat 2003 both advocate using the McIsaac score.<sup>52,53</sup> The McIsaac score was developed to aid healthcare providers in identifying patients with acute pharyngitis who are at higher risk for GABHS and may benefit from antibiotic treatment. It assigns points based on clinical predictors such as fever, tonsillar exudates, tender anterior cervical lymphadenopathy, absence of cough, and age. The total score helps stratify patients into low, moderate, and high risk for GABHS infection.<sup>33</sup>

In addition to the McIsaac score, POCT for the presence of GABHS can be an effective diagnostic tool.<sup>14</sup> POCT allows for the rapid and accurate identification of GABHS during the patient’s visit, enabling immediate and appropriate treatment decisions.<sup>14</sup> The combination of the McIsaac score and POCT enhances the accuracy of diagnosis, ensuring that antibiotics are prescribed only when necessary, thereby promoting judicious antibiotic use and minimizing unnecessary antibiotic prescriptions.<sup>14,61</sup>

When attempting to distinguish between viral and GABHS infection, the McIsaac score shows an acceptable proficiency level.<sup>34</sup> A score of zero could rule out infection and hence facilitate prudent antibiotic prescription.<sup>34</sup> A retrospective, multicenter study conducted on patients with acute pharyngitis aged more than 3 years in the United States confirmed the usefulness and validity of the McIsaac score as an effective tool for diagnosing and treating patients with acute pharyngitis.<sup>35</sup> However, the McIsaac score has limitations, including performance variability across different populations and settings, reliance on subjective clinical findings, and the potential for overestimation or underestimation of GABHS infection risk. Therefore, clinical judgment and consideration of individual patient factors are also important in decision-making.

Inflammation is the primary cause of pain in sore throat, and symptomatic therapy plays a crucial role in alleviating discomfort and improving patient well-being. Healthcare providers should consider the use of analgesics, throat lozenges, warm salt gargles, hydration and rest as key components of treatment, along with addressing the underlying cause if necessary. Over-The-counter pain relievers can help reduce pain and inflammation associated with sore throat by inhibiting the production of prostaglandins, which are mediators of inflammation and pain.<sup>62</sup> A multicenter, randomized, active-controlled, open-label, parallel-group, international Phase 4 study found that pain relief is statistically significantly



correlated to pronounced reduction in both pharyngeal redness and inflammation.<sup>40</sup> The Malaysia Clinical Practice Guidelines for the Management of Sore Throat 2003 propose paracetamol, ibuprofen, throat lozenges and gargles as symptomatic treatments for sore throats.<sup>53</sup> While the recommendations do not specify the sort of throat lozenges to use, data from clinical trials have shown low-dose flurbiprofen lozenges to be beneficial in reducing throat inflammation and discomfort.<sup>63,64</sup> This recommendation underscores the significance of symptomatic pain management as a form of treatment and aligns with our consensus recommendations.

Gargling with warm salt water is a simple and effective home remedy;<sup>65</sup> it helps reduce inflammation, soothes the throat, and loosens mucus. Patients may be advised to gargle several times a day with warm saline solution to alleviate symptoms. Adequate hydration and rest are important aspects of symptomatic therapy for sore throat. Drinking plenty of fluids helps keep the throat moist and may help thin mucus secretions; rest lets the body recover from the underlying infection or irritation.

## Evidence-Based Symptomatic Treatment

High-quality evidence supports the use of NSAIDs to reduce fever and relieve sore throat in both adults and children.<sup>41</sup> NSAIDs are often preferred over other analgesics (such as acetaminophen) for the symptomatic treatment of sore throat due to their dual mechanisms of action targeting both pain and inflammation. An RCT compared the efficacy of ibuprofen versus paracetamol for sore throat in adults and found that ibuprofen provided superior pain relief and improved throat symptoms.<sup>66</sup> In adults, the repeat administration of ibuprofen lozenges for up to 4 days provides more effective and prompt alleviation of sore throat pain than placebo, while having comparable tolerability.<sup>46</sup> Alternative NSAIDs to ibuprofen include flurbiprofen, which has demonstrated efficacy and tolerability for management of sore throat-associated discomfort. Application of flurbiprofen topically in the form of throat lozenges or throat spray could quickly alleviate pain and lessen the intensity of symptoms.<sup>41,42</sup> Individual differences may exist in the selection of oral medication, throat lozenges and throat spray. The choice between topical and oral NSAIDs may depend on patient preferences and practical considerations. Some patients prefer the convenience and ease of administration of oral NSAIDs, whereas others prefer topical formulations like flurbiprofen lozenge or spray for focused relief. Factors such as ease of application, taste and cost may influence patient adherence and satisfaction with treatment.<sup>67</sup>

NSAIDs are generally well tolerated when used appropriately for short-term symptomatic relief. However, they are associated with potential adverse effects, including gastrointestinal irritation, peptic ulcer disease, renal toxicity and cardiovascular events (especially with long-term or high-dose use).<sup>68</sup> When prescribing NSAIDs, healthcare providers should consider factors such as the patient's medical history, comorbidities, and concomitant medications. One advantage of topical NSAIDs is their reduced systemic absorption compared with oral NSAIDs. By minimizing systemic exposure, topical formulations may lower the risk of gastrointestinal side effects and cardiovascular events associated with oral NSAID use.<sup>49</sup>

## Conclusion

Ten evidence-based statements are presented in this modified Delphi multidisciplinary approach, which healthcare professionals can apply in their clinical practice to manage patients with acute sore throats. All statements addressing AMR and sore throat, symptomatic treatment and antibiotic prescribing, and evidence-based symptomatic treatment reached strong consensus. The panel acknowledges the critical roles of POCT for the presence of GABHS and the McIsaac score in guiding treatment decisions. To mitigate the risk of AMR, the multidisciplinary panelists strongly agree on the use of NSAIDs for symptomatic treatment of acute sore throat, hence avoiding needless antibiotic prescriptions. Clinicians can utilize the consensus recommendations as an aid to shared decision-making and treatment choices, meeting the patient's expectations while assuring safe clinical practice.

## Data Sharing Statement

The current study reviewed published reports. It did not include new data analyses.

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## Author Contributions

All authors made a significant contribution to the work reported, whether in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval for the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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## Disclosure

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