

## Research Article

# A Questionnaire-Based Study in 12 Countries to investigate the Drivers of Antibiotic-Seeking Behavior for Sore Throat

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## Keywords

- Antibiotic resistance
- Antibiotics
- Over the counter
- Respiratory tract infection
- Sore throat

## Abstract

**Introduction:** Antibiotics are inappropriate for most sore throats and unnecessary use is a major cause of antibiotic resistance. This study aimed to understand the factors that drive patients with sore throat to seek antibiotics.

**Materials and methods:** Consumers from 12 countries (Australia, Brazil, China, France, Germany, India, Mexico, Russia, South Africa, South Korea, UK, USA), who had sore throat in the previous 12 months, completed a questionnaire on general attitudes to health and well-being and treatments used for sore throat and cold or flu.

**Results:** A total of 5,440 consumers completed the questionnaire (mean age 37 years, 54% female, average of four episodes of sore throat in the previous 12 months). Nineteen percent had used antibiotics to treat their last sore throat, although there was variation between countries. Antibiotic use was higher (23%) among respondents with more severe sore throat symptoms than less severe symptoms (15%). Antibiotic use was also higher (22%) among respondents who had cold/flu symptoms at the same time as their sore throat compared with those without cold/flu symptoms (11%). Efficacy was selected as a driver of treatment choice by 79% of those who took antibiotics and healthcare professional (HCP) recommendation was a strong driver of prescription medications in general.

**Conclusions:** The key drivers of antibiotic-seeking behavior are severe sore throat symptoms, perceived efficacy of antibiotics and HCP recommendation. These findings highlight the need for improved patient education and HCP–patient communication to provide effective symptom relief and dispel common misconceptions on the efficacy of antibiotics.

## ABBREVIATIONS

ESCMID: European Society of Clinical Microbiology and Infectious Diseases; GRIP: Global Respiratory Infection Partnership; HCP: healthcare professional; OTC: over the counter; URTI: upper respiratory tract infection

## INTRODUCTION

Antibiotics are ineffective and inappropriate for the majority of sore throats. Most sore throats resolve on their own within 3–7 days [1], and most (85–95% in adults) are caused by viruses [2]. Group A beta-hemolytic streptococcus is responsible for approximately 10% of sore throats in adults; it is the only commonly occurring bacterial throat infection with a risk of complications that may warrant antibiotic treatment [2–4]. Even

so, bacterial infections are generally self-limiting and the risk of complications is very low in most countries [1], so antibiotics are unnecessary for most patients [5,6]. Furthermore, the benefits of antibiotics are modest, reducing symptom duration by approximately 16 hours only [1]. Antibiotics are associated with potentially serious side effects such as diarrhoea and allergic reactions [7,8], so the risks versus benefits should always be considered.

Many guidelines state that antibiotics should not be used as a primary treatment for acute sore throat, but there is geographical variation between guidelines [9,10]. For example, US guidelines generally recommend that antibiotics are used in cases of proven group A streptococcal infection [4,11], whereas UK, Dutch, Belgian and European Society of Clinical Microbiology

and Infectious Diseases (ESCMID) guidelines, and the Global Respiratory Infection Partnership (GRIP) initiative advocate that antibiotics should be reserved for patients with severe symptoms or for those at high risk of complications [3,9,12,13]. Despite the existence of guidelines, there is evidence that they are not always followed [14,15].

Inappropriate use of antibiotics is a major factor in the development of antibiotic resistance, which is a serious and growing global problem [16,17]. Unfortunately, this practice remains common for upper respiratory tract infections (URTIs) including sore throat [5,19-21].

Patients often ask for antibiotics for their sore throat. A UK study found that a third of patients visiting their doctor for acute sore throat had a clear expectation of receiving antibiotics [22], while in a Belgian survey of patients with acute sore throat; the primary reason for visiting their doctor was to obtain antibiotics in 38% of cases [23].

Studies suggest that doctors prescribe antibiotics for respiratory tract infection to most patients who want them [24,25]. Reasons include the desire to preserve good relationships with patients [22], pressure from patients [26], and perceived pressure from patients [27,28]. There is evidence that the perceived expectations can be greater than the patient's actual expectations [29]. There may be no direct conversations about the patient's expectations, which can lead to an overestimation of their desire for an antibiotic prescription [30]. Antibiotic over-prescription can also be due to misdiagnosis [31,32], doctors being overcautious due to a fear of possible complications [27], and doctors not considering that not all bacterial throat infections require antibiotic treatment [3,9,12,13]. Doctors may also be more inclined to prescribe if they have limited time and feel that it is too time-consuming to discuss alternative treatments with the patient [33,34].

Hence, despite their limited efficacy for acute sore throat, patients want antibiotics, and doctors prescribe them. In order to change this behavior, there is a need for a greater understanding of the factors driving patients to seek antibiotics for sore throat, and doctors' reasons for prescribing them. In this large, multi-country, questionnaire-based study, members of the general public were asked about their attitudes to health and well-being, and treatments used for sore throat and cold or flu. This report focuses on the respondents who had sore throat in the previous 12 months, and aims to determine the factors that may drive antibiotic-seeking behavior.

## MATERIALS AND METHODS

Consumers from 12 countries (Australia, Brazil, China, France, Germany, India, Mexico, Russia, South Africa, South Korea, UK, USA) were interviewed from October to December 2009. The interviews were conducted online in Australia, France, Germany, the UK and the USA, and face-to-face in the other countries. Online consumers were contacted randomly from an online panel (recruited via email lists, banners, website and SMS adverts) while offline consumers were contacted randomly (stratified random) within selected geographical areas. Consumers who said they had sore throat in the previous 12 months (or 6 months for South Africa) completed a questionnaire (an online version of

the questionnaire for the online consumers and a paper version for the offline consumers). Consumers had to be aged between 18 and 65 years and had to have treated their sore throat (sleep, rest and consumption of fluids were not considered as treatments). The questionnaire had 137 questions in total, covering general attitudes to health and well-being and treatments used for sore throat and cold/flu.

## RESULTS AND DISCUSSION

### Sore throat incidence and perceived cause

Sore throat was experienced by a larger percentage of consumers in the developed markets (Australia 78%, France 72%, Germany 70%, UK 79%, USA 72%) than in the emerging markets (Brazil 39%, China 50%, India 51%, Mexico 45%, Russia 46%, South Africa 46%, South Korea 29%), in the 12 months preceding the interview (6 months for South Africa). This suggests global variation in the recognition of sore throat symptoms.

A total of 5,440 consumers reported having sore throat in the 12-month period and completed the questionnaire (Table 1). The mean age of the respondents was 37 years (range 18-65 years) and 54% were female. They had experienced an average of four episodes of sore throat in the previous 12 months (Table 1). For their most recent episode of sore throat, 50% claimed to know the cause. The sore throat was most commonly attributed to a bacterial infection by respondents in India (21%), South Africa (19%) and Germany (18%), whereas a viral cause was given most often in the UK (44%), Russia (34%) and South Korea (33%).

### Healthcare professional consultation

In all countries assessed, general practitioners and pharmacists (or pharmacy assistants) were the main healthcare professionals (HCPs) that were consulted for advice about sore throat. In Australia and China, pharmacists or pharmacy assistants were the most popular professionals to consult about sore throat, while in Germany both general practitioners and pharmacy personnel were consulted equally. In the other countries, advice was sought slightly more often from general practitioners than pharmacy personnel. Specialists were not consulted very often but were most popular in Brazil (17% of respondents) and China (16%).

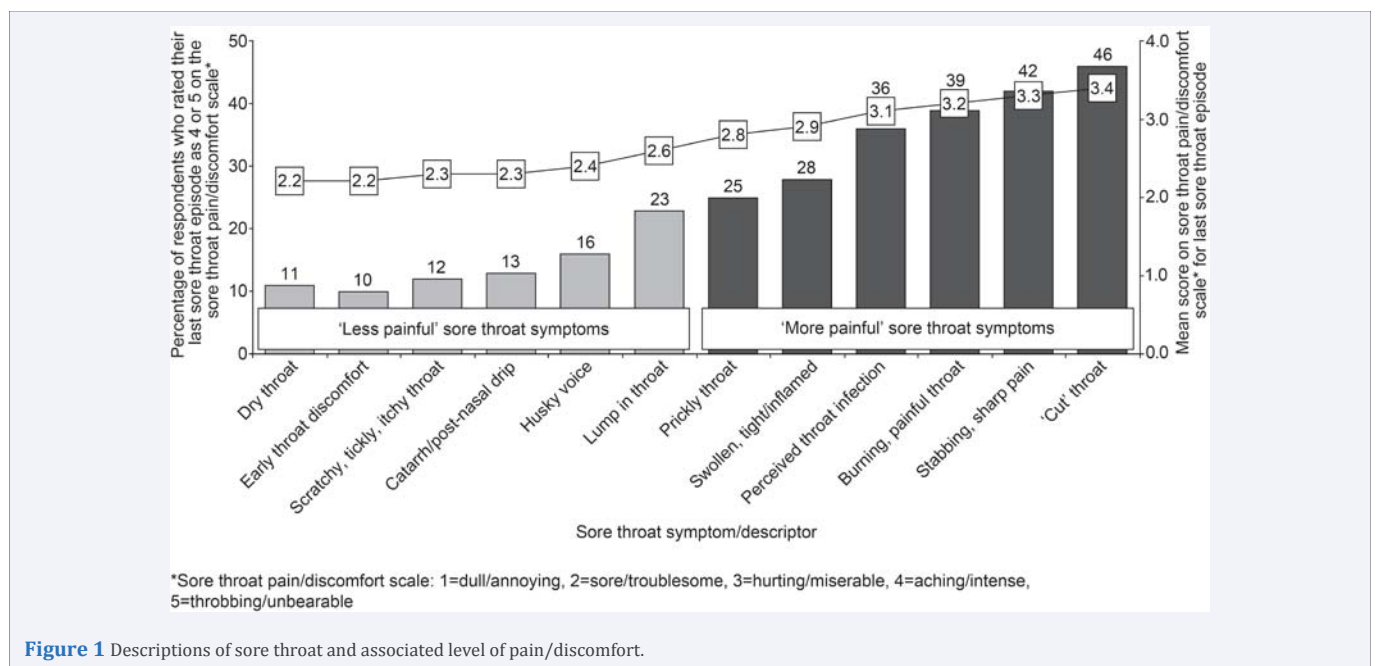
### Sore throat symptoms

When respondents were asked to think about their last episode of sore throat and select from a range of symptoms to describe their throat, the most common descriptors were 'scratchy, tickly, itchy throat' (42%), 'dry throat' (33%), 'early throat discomfort' (26%) and 'husky voice' (25%) (Figure 1). Using a sore throat pain/discomfort scale of 1 to 5 (where 1=dull/annoying, 2=sore/troublesome, 3=hurting/miserable, 4=aching/intense and 5=throbbing/unbearable), respondents described their last sore throat with a mean score of 2.8. There was a relationship between the symptoms described and the level of throat pain/discomfort (Figure 1). For example, mild discomfort was associated with symptoms such as 'dry throat' (mean discomfort: 2.2) and 'scratchy, tickly, itchy throat' (mean discomfort: 2.3), while phrases such as 'stabbing, sharp pain' (mean discomfort: 3.3) and 'cut throat' (mean discomfort: 3.4) were used to describe more severe discomfort. Respondents

**Table 1:** Respondent characteristics.

|  | Australia | Brazil | China | France | Germany | India | Mexico | Russia | South Africa | South Korea | UK  | USA | Overall |
|--|-----------|--------|-------|--------|---------|-------|--------|--------|--------------|-------------|-----|-----|---------|
| Respondents, n   | 428       | 503    | 652   | 415    | 423     | 652   | 404    | 394    | 337          | 396         | 403 | 433 | 5,440   |
| Mean age, years  | 39        | 36     | 38    | 40     | 42      | 35    | 35     | 39     | 37           | 39          | 39  | 40  | 37      |
| Female, %  | 57        | 58     | 53    | 55     | 54      | 44    | 53     | 58     | 52           | 62          | 56  | 57  | 54      |
| Sore throat episodes in the previous 12 months   | 4.2       | 3.9    | 4.3   | 4.1    | 3.6     | 4.3   | 4.1    | 3.5    | 5.0          | 4.0         | 3.5 | 3.6 | 4.0     |
| Respondents who used antibiotics for the last sore throat episode, %                             | 30        | 31     | 12    | 39     | 25      | 9     | 19     | 7      | 29           | 7           | 22  | 22  | 19      |
| Respondents who used antibiotics or prescription medications for the last sore throat episode, % | 36        | 46     | 42    | 68     | 40      | 70    | 53     | 16     | 61           | 75          | 27  | 28  | 48      |
| Mean pain/discomfort score*  | 2.3       | 2.8    | 2.4   | 2.5    | 2.3     | 3.2   | 3.5    | 3.1    | 2.8          | 3.0         | 2.4 | 2.3 | 2.8     |

\*On the sore throat pain/discomfort scale where 1=dull/annoying, 2=sore/troublesome, 3=hurting/miserable, 4=aching/intense, 5=throbbing/unbearable.



**Figure 1** Descriptions of sore throat and associated level of pain/discomfort.

who had sore throat with cold/flu symptoms were more likely to report more painful symptoms ('prickly throat', 'swollen, tight/inflamed', 'throat infection', 'burning, painful throat', 'stabbing, sharp pain' or 'cut throat') than those without cold/flu symptoms (25% versus 20%).

Most of the emerging markets (Brazil, India, Mexico, Russia, South Africa, South Korea) had a higher pain/discomfort score than the other countries (Table 1). Sore throat alone (without accompanying cold/flu symptoms) was most common in Mexico (69%), China (66%), South Africa (57%), Brazil (46%) and Russia (43%). This suggests global or cultural variation in the perception of symptoms and/or pain thresholds.

## Treatment decisions

The intensity of sore throat symptoms affected the respondents' treatment decisions. More severe sore throats were treated more often than less severe sore throats; for example, 29% with 'dry throat' and 30% with 'scratchy/tickly/itchy throat' always did something to treat their sore throat symptom versus 54% with 'stabbing, sharp pain' and 50% with 'cut throat'. When respondents were asked what made them treat their sore throat, 60% said they did not want their symptoms to get worse. Half of the respondents reported that they started treating their sore throat within 1 day and 75% within 2 days (Figure 2).

Respondents decided how to manage their sore throat based on symptom severity and HCP recommendation. For those who decided not to use an over-the-counter (OTC) treatment, when asked about the reason for this decision, 13% of respondents said their symptoms were too bad for an OTC treatment, 30% said symptoms were not bad enough, while 19% said that their HCP had recommended a non-OTC treatment. The most severe/painful sore throats prompted a consultation with a doctor; 37% sought advice from a doctor for mild sore throat (i.e. those who only reported symptoms shown in light grey in (Figure 1) versus 44% for severe sore throat (i.e. those who reported symptoms shown in dark grey in (Figure 1). Of the respondents who did not have cold/flu symptoms, 34% consulted a doctor compared with 40% of those with cold/flu symptoms.

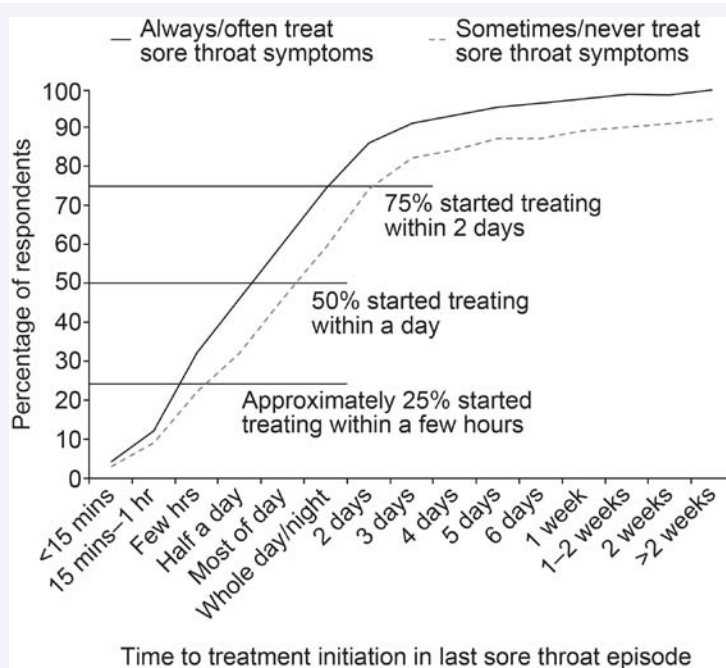
Antibiotics were used more often by respondents who had more severe symptoms. Overall, 19% of respondents used antibiotics to treat their last episode of sore throat (Table 1), 39% received prescription medications and 69% used OTC products. It should be noted that a proportion of the prescription medications may have been antibiotics (or medications containing antibiotics) but the respondents may have been unaware of this. Therefore, the total percentage of respondents who took an antibiotic may have been greater than 19%. Antibiotic use was higher (23%) among people with 'more painful' sore throat (i.e. those who had symptoms shown in dark grey in (Figure 1) compared with those without 'more painful' symptoms (15%) (Figure 3). Antibiotic use was most common in France, Brazil, Australia and South Africa, and the combined use of antibiotics or prescription medications was most frequent in South Korea, India, France and South Africa (Table 1). Antibiotic use was also higher (22%) among people who had cold/flu symptoms at the same time as their sore throat compared with those without cold/flu symptoms (11%). The top five symptoms associated with antibiotic use were:

'throat infection' (41%), 'swollen, tight/inflamed throat' (23%), 'burning, painful throat' (22%), 'stabbing, sharp pain' (21%) and 'cut throat' (21%) (Figure 4). However, respondents with milder symptoms such as 'dry throat' and 'early throat discomfort' also used antibiotics (in 13% and 12% of cases, respectively).

Many respondents believed that antibiotics are effective for sore throat. A total of 78% of patients cited efficacy as the prime driver of treatment decisions, while 79% of those taking antibiotics and 83% of those taking OTC products cited efficacy as a factor when choosing a treatment. Safety and convenience were reported as driving factors more often by respondents choosing OTC treatments (46% and 50%) than those who took antibiotics (40% and 39%). After using multivariate analysis to determine the correlation between drivers and certain treatment choices, the following factors were associated more frequently with prescription medications than OTC products: strong and powerful (69% versus 47%), works quickly (68% versus 56%), long-lasting (58% versus 48%) and HCP recommendation (73% versus 47%).

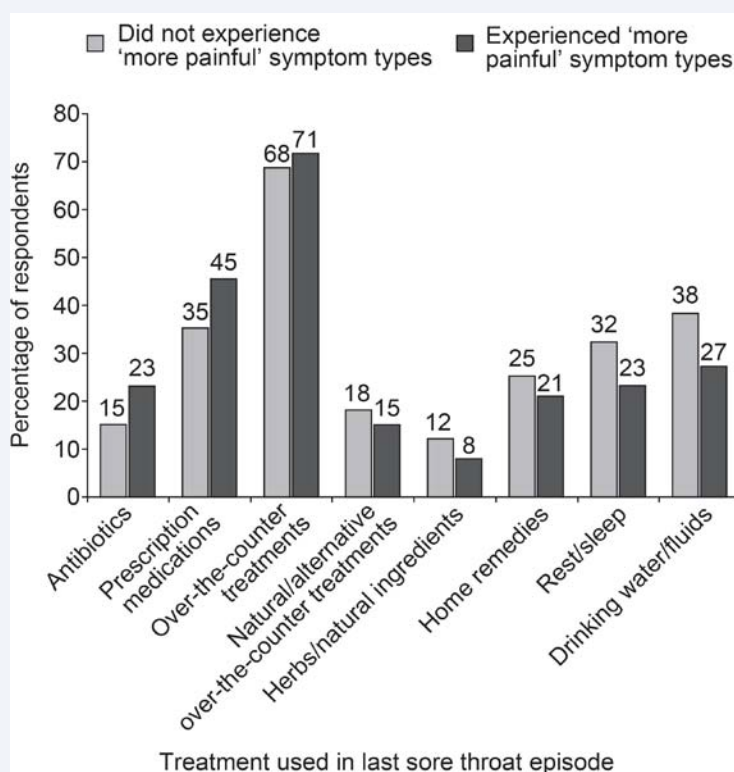
## Summary

This questionnaire-based study across 12 countries highlights that sore throat is common, with the respondents reporting an average of four episodes of sore throat a year. Antibiotic use varied between countries but, overall, 19% of respondents used antibiotics to treat their last sore throat. This percentage is higher than expected given that group A beta-hemolytic streptococcus, the only bacterial infection for which antibiotics may be indicated, accounts for only ~10% of sore throats in adults [2,4]. There are reports that patients can sometimes lack knowledge about their medications [35,36] so it is possible that a proportion of the prescription medications (used by 39% of patients) may have also been antibiotics. The findings suggest that inappropriate

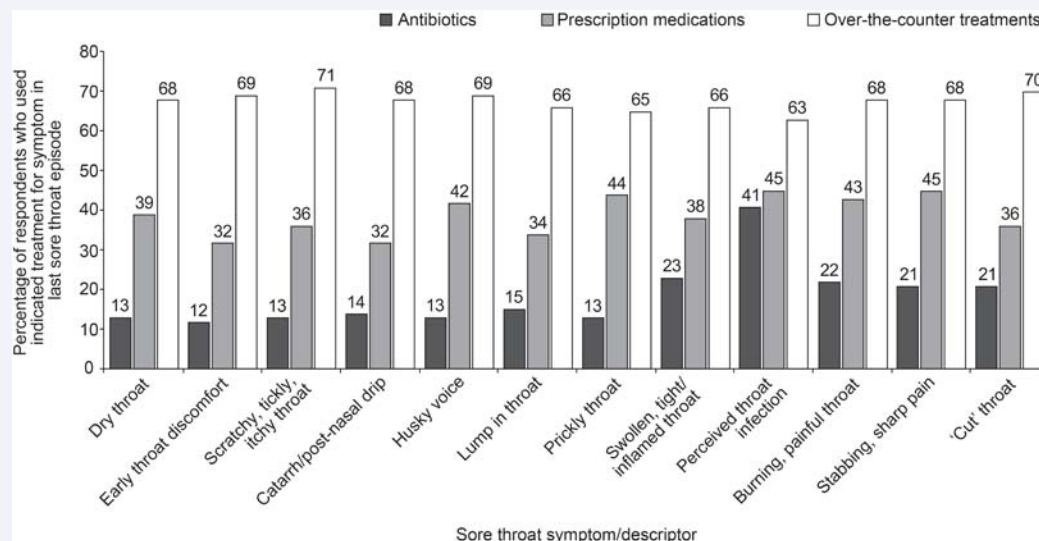


**Figure 2** Time of sore throat treatment initiation following onset of symptoms.





**Figure 3** Sore throat treatments by sore throat pain intensity.



**Figure 4** Sore throat treatments used for different sore throat symptoms.

antibiotic use for sore throat continues so there is still a need for change.

Understanding the reasons for antibiotic-seeking behavior is essential for developing strategies to reduce inappropriate antibiotic use. To understand a patient's treatment decisions, it is important to appreciate how the patient perceives their illness. Patients with sore throat often believe they know what is causing their condition. The perceived cause naturally influences

the patient's treatment decisions but the perceived cause may be incorrect. In this study, less than half of the respondents felt their sore throat was due to a viral infection, even though viruses are known to cause the majority of sore throats [2], and in some countries, the proportion attributing their sore throat to a bacterial infection was higher than the expected actual percentage of ~10% (e.g. 21% in India). If a patient believes their sore throat is caused by bacteria, it is likely that they will seek antibacterial treatment including antibiotics. Furthermore,

patients may not be familiar with what antibiotics can and cannot achieve for the different causes of sore throat, and this will also impact treatment choice. In this study, antibiotic use was higher among people with cold/flu symptoms than those without, suggesting that many consumers are unaware that antibiotics are ineffective against viral infections such as colds and flu and/or unable to recognize the symptoms that indicate a viral illness, such as cough, nasal congestion and rhinitis [37]. This is in line with research in Europe where a great deal of country to country variability was seen in consumer knowledge on the action of antibiotics and antibiotic resistance [38].

Another factor that inevitably affects treatment decisions is the patient's symptom severity. In this study, respondents with higher levels of pain or discomfort were more likely to visit their doctor and were more likely to have taken antibiotics or other prescription medications. These results are in line with a questionnaire-based study in Belgium where most patients (85%) visiting their doctor because of sore throat were seeking pain relief. Interestingly, patients who considered an antibiotic very/rather important, valued pain relief significantly more than patients who considered an antibiotic little/not important [23], suggesting there is a misconception among many patients that antibiotics provide symptom relief.

Of the respondents who took antibiotics in the present study, 79% chose efficacy as an important driver of treatment choice; other important drivers of antibiotics/prescription medications were strength, speed of onset, duration of relief and HCP recommendation, suggesting that many people view antibiotics as an appropriate and effective treatment for sore throat. This overestimation of the efficacy of antibiotics may lead to the desire for this treatment, potentially leading to conflict with the HCP.

In reality, antibiotics are inappropriate and ineffective for the majority of sore throats, and do not provide fast relief. Even if the sore throat is bacterial, antibiotics do not provide any immediate relief [1,39]. There is a clear need to dispel misconceptions and raise awareness amongst both patients and HCPs about the aetiology of sore throat and URTIs, the symptoms of a viral URTI, and what antibiotics can and cannot achieve.

The association between sore throat pain/discomfort and the desire to consult a doctor suggest that treatments that offer symptom relief, especially those that provide sore throat pain relief, would be more effective than antibiotics at meeting patients' needs. This is particularly true for patients with symptoms suggestive of a viral illness, where antibiotics are unlikely to provide any benefits. Symptom relief can be achieved by non-antibiotic OTC treatments such as local [40] or systemic analgesics [41]. Local sore throat treatments have the advantage of targeting the affected area (the throat) directly; they are available as lozenges, sprays and gargles, so there are a variety of format options for consumers [40,42].

The present study highlights that perceived efficacy is a key driver in treatment choice and, indeed, placebo-controlled clinical trials have demonstrated the efficacy of a range of topical OTC sore throat treatments [32,43-52]. Depending on the treatment, sore throat relief can be achieved quickly, for example, within

1-2 minutes with lozenges containing hexylresorcinol 2.4 mg (an antiseptic and local anesthetic) [44], amylmetacresol 0.6 mg and 2,4-dichlorobenzyl alcohol 1.2 mg (both have antiseptic and local anesthetic properties) [45] or flurbiprofen 8.75 mg (a non-steroidal anti-inflammatory agent) [52]. Duration of relief can be long-lasting, for example, a lozenge containing amylmetacresol 0.6 mg and 2,4-dichlorobenzyl alcohol can reduce symptoms for up to 2 hours [45,46] while a flurbiprofen 8.75 mg lozenge can provide relief for up to 4-6 hours [50-52]. Flurbiprofen 8.75 mg lozenge has also been shown to reduce sore throat symptoms in patients with relatively severe symptoms, such as those with 'bad sore throat' (defined as  $\geq 8$  on the Tonsillo-Pharyngitis Assessment and  $\geq 80$  mm on a 100-mm sore throat pain intensity scale) [53] and patients with a 'swollen and inflamed throat' [54].

This large study provides a unique opportunity to gain insight into the self-management of sore throat in 12 different countries across six continents. However, the study has several limitations. It was not designed for conducting statistical analyses between countries, and the heterogeneity of the population makes it difficult to compare the countries. Only consumers who had experienced sore throat in the previous 12 months (previous 6 months in South Africa) completed the questionnaire, so the study population may not be representative of the general population. Also, the volume and level of detail of the study data are limited by the questions included in the questionnaire.

## CONCLUSION

Sore throat is a common condition impacting many people across the globe several times a year. Patients often believe they know the cause of their sore throat, which sets their treatment expectations and influences their decision to consult an HCP. The severity of the symptoms also affects the desire to seek professional advice. The key drivers of antibiotic-seeking behavior are severe symptoms, perceived efficacy of antibiotics and HCP recommendation. An important underlying cause of all three of these drivers is the patient's belief (misconception) about what antibiotics can achieve.

These drivers highlight how inappropriate antibiotic use for sore throat can be reduced. Firstly, the patient should be made aware of the fast and long-lasting symptom relief that OTC products can provide. Secondly, there is a need for greater patient education to dispel common misconceptions about antibiotics. Thirdly, improving HCP-patient communication can help to ensure that the needs of the patient are met, patient misconceptions are reduced and unnecessary antibiotic prescribing is reduced.

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## Conflict of interest

Adrian Shephard is an employee of Reckitt Benckiser Healthcare International Ltd (Slough, Berkshire, UK).

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