ORIGINAL ARTICLE

# RELATIONSHIP BETWEEN UPPER RESPIRATORY TRACT SYMPTOMS AND TREATMENT-SEEKING BEHAVIOUR IN HEALTHY ATTENDANTS OF PATIENTS PRESENTING TO OPD CLINICS OF BBS TEACHING HOSPITAL ABBOTTABAD

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**Background**: Indiscriminate use of antibiotics is a well-known reason for increasing antimicrobial resistance. Upper respiratory tract infection presents with similar symptoms and signs irrespective of its bacterial or viral causes and is either ignored or managed aggressively by the primary care physicians. The objective was to determine the relationship between upper respiratory tract infections and treatment-seeking behaviour in healthy individuals attending the OPD clinics of BBS Teaching Hospital with their sick family members. **Methods**: Six hundred and eighty-five healthy individuals who accompanied patients to the OPD clinics of BBS Teaching Hospital, Abbottabad were enrolled in this cross-sectional survey. They were given a modified questionnaire to respond to and their replies were analyzed for assessment. **Results**: In a survey of 685 individuals, 98.2% were aware of antibiotics, but only 28.6% correctly understood their use against infections. Misconceptions about antibiotic resistance were common, with 54.5% believing it arises from human immunity. Only 31.53% consulted a doctor for upper respiratory symptoms and 72.6% of those expected antibiotics. Women showed higher antibiotic knowledge than men, but education level was a stronger predictor of both knowledge and attitudes. **Conclusion**: This study highlights a critical gap in public understanding and responsible usage of antibiotics, particularly in the context of upper respiratory tract infections. This study reveals that increased awareness and more informed attitudes about antibiotic resistance correlate with a decreased likelihood of inappropriate antibiotic prescription.

**Keywords**: AMR; Antibiotics; Resistance; Antimicrobial resistance; URTIs; Pharyngitis; Rhinitis

**Citation:** Abbasi MA, Nawaz M, Alam MA. Relationship between upper respiratory tract symptoms and treatment-seeking behaviour in healthy attendants of patients presenting to OPD clinics of BBS Teaching Hospital Abbottabad. J Ayub Med Coll Abbottabad 2023;35(4 Suppl 1):704–9.

**DOI**: 10.55519/JAMC-S4-12816

## INTRODUCTION

Upper respiratory tract infections (URTIs) frequently prompt individuals to consult a physician, representing a significant reason for medical visits worldwide.[1] However, there is variability in whether individuals with similar symptoms seek medical advice. This discrepancy may be influenced by personal interpretations of their symptoms.[2] The likelihood of a physician prescribing antibiotics is higher if they perceive a patient's expectation for such treatment.[3] Moreover, it has been observed that physicians often associate antibiotic prescriptions with enhanced patient satisfaction.[4–6] Nonetheless, there is often a mismatch between the physicians' assumptions of patient expectations and the actual expectations of the patients themselves.[3,7,8] Additionally, evidence suggests that patient pressure for antibiotics, whether expressed directly or implied through the presentation of symptoms, plays a limited role in influencing prescription decisions.[9,10]

The World Health Organization's Global Action Plan on Antimicrobial Resistance (AMR) identifies the enhancement of public awareness about antibiotics and AMR as a crucial strategic area, aiming to foster behavioural changes in antibiotic use at the population level.[11] Investigations into antibiotic use patterns in various countries reveal a common pattern of misunderstanding among people about the proper use of antibiotics and the emergence of antibiotic resistance. Research shows a correlation between limited knowledge of antibiotics and adverse usage habits, such as self-prescribing antibiotics or sharing remaining antibiotics with others.[12] Supporting this, qualitative studies demonstrate a general lack of understanding in the public about terms like ‘antimicrobial resistance’. People often believe they can self-diagnose the need for antibiotics, and receiving a prescription is sometimes perceived as confirmation of the seriousness of their illness.[13,14]

factors influencing antibiotic prescription for sore throat / upper respiratory tract symptoms are

multifaceted, encompassing elements related to both physicians and patients. General Practitioners (GPs) might resort to unwarranted antibiotic use due to assorted reasons, including perceived or actual patient expectations and pressure, the need to maintain a positive doctor-patient relationship, constraints in consultation time, uncertainty in diagnosis, and challenges in effective patient communication.[15,16] Additionally, there is a misconception among some GPs that prescribing antibiotics in a primary care setting does not significantly contribute to the development of antibiotic resistance.[15] While patient insistence is often a contributing factor to improper antibiotic use, many patients seeking relief from sore throat symptoms are primarily looking for symptom alleviation.[17] They may benefit more from reassurance and advice on appropriate self-care strategies.[18]

The objective of this research was to explore the general public's views on seeking medical care and self-handling symptoms associated with upper respiratory tract infections. Gaining insight into the motivations behind patients' decisions to consult physicians and their preferred treatment options can help in guiding healthcare professionals towards recommending the most effective methods for providing symptomatic relief.

## MATERIAL AND METHODS

The study engaged attendants of patients at BBS Teaching Hospital's OPD clinics in Abbottabad, from December 2022 through November 2023, through consecutive non-probability sampling methods. Eligibility for participation in the survey required attendants to be at least 18 years old and to have experienced a minimum of two upper respiratory tract symptom episodes in the preceding six months. Exclusion criteria included chronic conditions like diabetes mellitus, COPD, bronchial asthma, hypertension, chronic liver, or kidney diseases, compromised immune systems, active tuberculosis, or a history of tuberculosis. Additionally, individuals under eighteen were not considered for inclusion.

For this study, a specialized questionnaire was employed, originating from a comprehensive instrument developed and authenticated by Lim *et al*.[19] This original questionnaire comprised six sections, but for this investigation, only sections 1, 2, and 3 were utilized, in that order. Section 3 explored patient experiences in utilizing health care services, whereas Section 2 assessed their understanding of antibiotic resistance. From Section 1, we included questions 1.1 to 1.6 in this research.

The study evaluated participants' experiences in utilizing healthcare for upper respiratory tract infections (URTIs) and their knowledge about antibiotics. This included gathering data on their experiences, and understanding of antibiotic effectiveness, resistance, and proper usage. Additionally, the research explored participants' antibiotic usage habits for prevalent respiratory conditions.

Participants were assigned scores reflecting their knowledge and attitudes, based on their answers in these areas. Each question offered three options: 'Agree', 'Disagree', or 'Not sure'. Points were allocated for each correct or positive response (1 point), while incorrect or negative responses received no points (0 points).

The practices of participants regarding antibiotic use in their most recent primary care consultation for acute respiratory illness were categorized as follows: (1) anticipation of receiving antibiotics from the doctor (yes=1; no=0), (2) requesting antibiotics from the doctor (yes=1; no=0), and (3) being prescribed antibiotics by the doctor (yes=1; no=0).

An initial analysis was conducted to examine the link between participants' sociodemographic details and their scores on antibiotic knowledge and attitudes. This analysis utilized multivariable linear (Gaussian) regression and considered various sociodemographic factors, including age, gender, type of housing, household income, educational background, ethnicity, and marital status.

In further regression analyses, the relationship between antibiotic usage behaviours and antibiotic knowledge and attitude scores was examined. This was done through a multivariable linear (Gaussian) regression, considering sociodemographic factors. Subsequently, distinct multivariable logistic regressions were performed to explore the connection between participants' attitude scores and each of the three antibiotic-related behaviours: (1) the expectation of antibiotics, (2) the request for antibiotics, and (3) the prescription of antibiotics. The associations were presented using adjusted odds ratios (ORs) and the accompanying 95% confidence intervals (CIs).

The study participants were people accompanying patients to the OPD clinics of BBS Teaching Hospital Abbottabad and did not include any patients.

## RESULTS

During the study period, 750 individuals agreed to take the survey, yet only 685 individuals completed the survey. The median age of participants in the study was 39 years, ranging from 20 to 58 years. The majority were male (56.7%) and female (43.3%). A sizable portion of the participants were married (57.8%) and possessed education beyond the secondary level (68.4%). The demographic composition of the survey participants showed a lower

percentage of individuals residing in private housing and a higher percentage having completed graduation. In terms of antibiotic awareness, an overwhelming majority (98.2%) were familiar with the term 'antibiotics'. However, only a minority (28.6%) accurately identified antibiotics as effective against both bacterial and viral infections. A considerable number of participants believed that antibiotics expedite recovery from common respiratory ailments (55.4%) and mitigate severe symptoms associated with these conditions (62.5%).

Regarding antibiotic resistance, half (48.4%) of the participants had heard of 'antibiotic resistance', but a mere 8% were familiar with the acronym 'AMR'. Approximately half (49.5%) correctly understood that resistance develops when bacteria become immune to antibiotics. Nonetheless, many misconceived that resistance arises from human immunity to antibiotics (54.5%) or from diminished antibiotic potency due to excessive use (43.8%).

Awareness about the spread and impact of antibiotic-resistant infections on common ailments was limited. A huge portion (67.1%) either disagreed or were uncertain that antibiotic resistance could complicate the treatment of ailments like sore throats or urinary tract infections. Almost half (42.5%) did not believe that their antibiotic use influenced others' risk of contracting antibiotic-resistant infections. Similarly, 44.5% were unconcerned about acquiring such infections themselves if they used antibiotics correctly. The majority acknowledged that reducing AMR could be achieved through better infection control in hospitals (71.8%) and reduced antibiotic use (68.2%). However, fewer recognized the importance of hand hygiene (59.7%) and vaccination (55.7%).

In terms of responsible antibiotic usage, awareness was lacking. A majority agreed it is inappropriate to share antibiotics for similar (54.3%) or different (48.4%) symptoms with others. Only 3% deemed it suitable to give antibiotics to household pets. Fewer than 10% felt comfortable retaining leftover antibiotics for future use. Although over 90% concurred on the importance of completing prescribed antibiotic courses, nearly half believed it unnecessary if they felt better (47.9%) or had an alternative remedy (44.2%).

Regarding upper respiratory tract infection symptoms, only a third (31.53%) of the 685 respondents consulted a doctor when experiencing symptoms. The remainder self-medicated with antibiotics and cough syrups (59.0%), used over-the-counter medications including cough syrups (19.9%), relied on traditional remedies like green tea or boiled eggs (17.4%), or did nothing (5.3%).

Among the 216 individuals who sought medical attention for cold and flu symptoms, a majority of 72.6% anticipated receiving an antibiotic prescription, and 68.6% directly requested antibiotics from their physicians. However, a slightly larger portion of the participants, 53.4%, reported receiving an antibiotic prescription from their doctor, irrespective of whether they explicitly asked for it.

Of those prescribed antibiotics, 31.5% received an explanation from their doctor regarding the necessity of antibiotics. Contrastingly, only a smaller segment reported being informed about the potential side effects of antibiotics (18.8%) and the issue of antibiotic resistance (10.2%). Among the respondents not prescribed antibiotics, 38.6% were provided with an explanation by their doctor as to why antibiotics were unnecessary.

The median score for knowledge among participants was found to be seven, with a range from 0 to 14, while the median score for attitudes stood at 6, ranging from 0 to 11. Female respondents demonstrated higher scores in antibiotic knowledge (β: 0.63; 95% CI −0.13 to 1.02) compared to males, but their attitude scores were lower (β: −0.44; 95% CI −0.68 to −0.05). Participants with secondary education exhibited lower scores in both knowledge (β: −1.58; 95% CI −2.33 to −0.65) and attitudes (β: −1.21; 95% CI −1.81 to −0.79) relative to those with university-level education.

Participants' requests for antibiotics did not correlate with their knowledge and attitudes towards antibiotics. Nonetheless, an increased understanding of antibiotic resistance (Odds Ratio [OR]: 0.81, 95% Confidence Interval [CI] 0.72 to 0.98) and more informed attitudes (OR: 0.66, 95% CI 0.53 to 0.88) were linked to a reduced likelihood of doctors prescribing antibiotics.

## DISCUSSION

This study was a cross-sectional study of people's attitudes towards the management of upper respiratory tract infections with a view to their knowledge and attitudes towards the rational use of antibiotics. This survey of 685 individuals does not exactly paint a good picture of how antibiotics are used in society and highlights several issues addressed below. While a vast majority of participants were familiar with antibiotics, significant misconceptions persisted. Only a minority correctly understood antibiotics' effectiveness against bacterial and viral infections. Many participants erroneously believed that antibiotics are beneficial for treating common respiratory ailments and that resistance develops due to human immunity or reduced antibiotic potency. Half of the participants were aware of antibiotic resistance, but few knew about the acronym 'AMR'. There was a limited understanding that antibiotic resistance is caused by bacteria becoming immune to antibiotics, with many

attributing it to human immunity or antibiotic overuse. Most participants were unaware of the implications of antibiotic resistance on common ailments and did not recognize their personal antibiotic use as a factor in others' risk of contracting antibiotic-resistant infections. While most acknowledged that reducing AMR could be achieved through better infection control and reduced antibiotic use, fewer recognized the importance of hand hygiene and vaccination. There was a lack of awareness about responsible antibiotic usage, with a majority considering it inappropriate to share antibiotics. However, nearly half believed it unnecessary to complete prescribed antibiotic courses if they felt better or had an alternative remedy.

Only about one-third of the respondents sought medical advice for URTI symptoms, indicating a low tendency to consult healthcare professionals for such conditions. A significant majority of the participants chose self-medication, either using antibiotics and cough syrups, over-the-counter medications, or traditional remedies or opting not to take any action. This suggests a frequent practice of self-managing URTI symptoms without professional medical guidance. Among those who did consult a doctor, a high percentage expected or explicitly requested antibiotics, highlighting a prevalent assumption or desire for antibiotic treatment for cold and flu symptoms. Despite the expectations and requests of patients, a lower percentage (though still over half) reported receiving an antibiotic prescription. This indicates that while patient expectations and requests influence antibiotic prescribing, they do not entirely determine it. These findings point to a need for greater public education about the appropriate management of URTI symptoms, the risks of self-medication, and the appropriate use of antibiotics. There is also an implication for healthcare providers to manage patient expectations regarding antibiotic prescriptions and to reinforce guidelines for antibiotic use.

Among those prescribed antibiotics, only a minority received explanations about the necessity, potential side effects, and issue of antibiotic resistance. This highlights a gap in physician-patient communication. Female participants had higher knowledge scores, but lower attitude scores compared to males. Higher education was associated with higher scores in both knowledge and attitudes. Participants' knowledge and attitudes towards antibiotics did not influence their requests for antibiotics. However, a better understanding of antibiotic resistance and more informed attitudes were associated with a reduced likelihood of being prescribed antibiotics by doctors. These findings emphasize the need for improved public education on antibiotics and antibiotic resistance, better communication between physicians and patients, and the importance of targeting interventions based on demographic factors like gender and educational level.

Approximately 13.5% of participants correctly understood the mechanisms of antibiotic resistance, highlighting the necessity for enhanced public education on this topic. This lack of awareness aligns with results from other demographic antibiotic studies[20–22], and the WHO's multi-country public awareness survey on antibiotic resistance conducted across twelve countries[23]. Consistent with our observations, most individuals in these surveys erroneously believed that antibiotic resistance develops when the human body becomes resistant to antibiotics. Additionally, about half of the respondents perceived that antibiotic resistance is an issue exclusively affecting frequent antibiotic users.

A minority of participants seeking medical attention for upper respiratory tract symptoms anticipated receiving antibiotics, yet nearly half received them regardless of their expectations. This trend of prescribing antibiotics, often misaligned with patients' expectations, reflects a lack of optimal antibiotic prescribing practices. Participants who demonstrated a better understanding of antibiotics were less inclined to expect or accept antibiotic prescriptions. Nevertheless, the reliability of this data is limited, as it is based on self-reported information; thus, it is unclear if respondents obtained antibiotics or if their knowledge influenced their decision to accept prescriptions.

The study does not provide insights into the variance in antibiotic-seeking behaviours or prescription patterns in public versus private healthcare sectors. However, other international studies have shown the success of strategies like delayed prescriptions[24,25] and shared decision-making[26,27] in minimizing unnecessary antibiotic use, particularly for acute respiratory infections. Furthermore, evidence from various contexts suggests that reducing the number of medical consultations for respiratory conditions effectively decreases the number of outpatient antibiotic prescriptions.[28,29]

This study emphasizes the need for clear communication about antibiotic use for upper respiratory tract infections to manage public expectations and address antibiotic resistance. It highlights the importance of resources like clinical practice guidelines[30], improved diagnostic tools, and further training for primary care professionals. Additionally, regulating the commercial aspects of antibiotic distribution is critical.[31,32] Current campaigns focus on antibiotic effectiveness for specific conditions[29,33,34], but our findings suggest a need for better public education on antibiotic use in upper respiratory infections and the role of health

professionals in this education. Future research should investigate the main sources of antibiotic information and its impact on antibiotic-seeking behaviour. Regular follow-up surveys are essential to evaluate antimicrobial resistance interventions.

Our study's limitation is the possible non-representativeness of the general population in our survey, with an overrepresentation of university-educated individuals and those visiting our hospital's OPD. This could affect the generalizability of our findings.[35,36]

## CONCLUSION

This research represents the inaugural investigation into the public's understanding, perceptions, and behaviours regarding antibiotics and their resistance in the context of upper respiratory tract infections in Abbottabad. It establishes foundational data for evaluating the impact of subsequent initiatives. Findings underscore the critical need to enhance public consciousness about the proper utilization of antibiotics in treating upper respiratory tract infections and the processes leading to antibiotic resistance. Furthermore, the study underscores the value of standardized clinical guidelines for prescribing antibiotics, as well as educational materials and diagnostic instruments for healthcare practitioners. Insights gained should guide the development and execution of forthcoming programs and initiatives.

**Disclosure:**

MAA has received financial remuneration from GSK on numerous occasions for lectures/moderation of scientific sessions on Lower Respiratory Tract Infections and antimicrobial resistance.

MN has nothing to disclose.

## AUTHORS' CONTRIBUTION

MAA prepared the draft manuscript, collected data and shaped the final manuscript of the paper. MN, MAA helped collect data and reviewed the draft manuscript.

## REFERENCES


1. Esposito C, Garzarella EU, Bocchino B, D'Avino M, Caruso G, Buonomo AR, *et al*. A standardized polyphenol mixture extracted from poplar-type propolis for remission of symptoms of uncomplicated upper respiratory tract infection (URTI): A monocentric, randomized, double-blind, placebo-controlled clinical trial. Phytomedicine 2021;80:153368.
2. Mortazhejri S, Patey AM, Stacey D, Bhatia RS, Abdulla A, Grimshaw JM. Understanding determinants of patients' decisions to attend their family physician and to take antibiotics for upper respiratory tract infections: a qualitative descriptive study. BMC Fam Pract 2020;21(1):119.
3. Perera AI, Thomas MG, Petrie KJ, Frater J, Dang D, Schache KR, *et al*. Reducing expectations for antibiotics in patients with upper respiratory tract infections: a primary care randomized controlled trial. Ann Fam Med 2021;19(3):232–9.
4. Schwartz KL, Ivers N, Langford BJ, Taljaard M, Neish D, Brown KA, *et al*. Effect of antibiotic-prescribing feedback to high-volume primary care physicians on number of antibiotic prescriptions: a randomized clinical trial. JAMA Intern Med 2021;181(9):1165–73.
5. Kohut MR, Keller SC, Linder JA, Tamma PD, Cosgrove SE, Speck K, *et al*. The inconvincible patient: how clinicians perceive demand for antibiotics in the outpatient setting. Fam Pract 2020;37(2):276–82.
6. Rose J, Crosbie M, Stewart A. A qualitative literature review exploring the drivers influencing antibiotic over-prescribing by GPs in primary care and recommendations to reduce unnecessary prescribing. Perspect Public Health 2021;141(1):19–27.
7. Gojanovic B, Fourchet F, Gremeaux V. Cognitive biases cloud our clinical decisions and patient expectations: A narrative review to help bridge the gap between evidence-based and personalized medicine. Ann Phys Rehabil Med 2022;65(4):101551.
8. Strumann C, Steinhaeuser J, Emcke T, Sönnichsen A, Goetz K. Communication training and the prescribing pattern of antibiotic prescription in primary health care. PLoS One 2020;15(5):e0233345.
9. Boiko O, Burgess C, Fox R, Ashworth M, Gulliford MC. Risks of use and non-use of antibiotics in primary care: qualitative study of prescribers' views. BMJ Open 2020;10(10):e038851.
10. Duan L, Liu C, Wang D, Lin R, Qian P, Zhang X, *et al*. The vicious cycle of the public's irrational use of antibiotics for upper respiratory tract infections: A mixed methods systematic review. Front Public Health 2022;10:985188.
11. WHO. Global action plan on antimicrobial resistance [Internet]. Geneva: World Health Organization; 2015 p.28 [cited 2024 Jan 3]. Available from: https://iris.who.int/handle/10665/193736
12. Jamhour A, El-Kheir A, Salameh P, Hanna PA, Mansour H. Antibiotic knowledge and self-medication practices in a developing country: A cross-sectional study. Am J Infect Control 2017;45(4):384–8.
13. Torres NF, Solomon VP, Middleton LE. Patterns of self-medication with antibiotics in Maputo City: a qualitative study. Antimicrob Resist Infect Control 2019;8:161.
14. Davis ME, Liu TL, Taylor YJ, Davidson L, Schmid M, Yates T, *et al*. Exploring Patient Awareness and Perceptions of the Appropriate Use of Antibiotics: A Mixed-Methods Study. Antibiot Basel Switz 2017;6(4):23.
15. Fletcher-Lartey S, Yee M, Gaarslev C, Khan R. Why do general practitioners prescribe antibiotics for upper respiratory tract infections to meet patient expectations: a mixed methods study. BMJ Open 2016;6(10):e012244.
16. Little P, Dorward M, Warner G, Stephens K, Senior J, Moore M. Importance of patient pressure and perceived pressure and perceived medical need for investigations, referral, and prescribing in primary care: nested observational study. BMJ 2004;328(7437):444.
17. Van Driel ML, De Sutter A, Deveugele M, Peersman W, Butler CC, De Meyere M, *et al*. Are Sore Throat Patients Who Hope for Antibiotics Actually Asking for Pain Relief? Ann Fam Med 2006;4(6):494–9.
18. Van Der Velden AW, Bell J, Sessa A, Duerden M, Altiner A. Sore throat: effective communication delivers improved diagnosis, enhanced self-care and more rational use of antibiotics. Int J Clin Pract 2013;67:10–6.
19. Lim JM, Duong MC, Cook AR, Hsu LY, Tam CC. Public knowledge, attitudes and practices related to antibiotic use and resistance in Singapore: a cross-sectional population survey. BMJ Open 2021;11(9):e048157.
20. Tsuzuki S, Fujitsuka N, Horiuchi K, Ijichi S, Gu Y, Fujitomo Y, *et al*. Factors associated with sufficient knowledge of

antibiotics and antimicrobial resistance in the Japanese general population. Sci Rep 2020;10(1):3502.
21. Aslam A, Gajdács M, Zin CS, Binti Abd Rahman NS, Ahmed SI, Jamshed SQ. Public Awareness and Practices towards Self-Medication with Antibiotics among the Malaysian Population. A Development of Questionnaire and Pilot-Testing. Antibiotics 2020;9(2):97.
22. Lim JM, Chhoun P, Tuot S, Om C, Krang S, Ly S, *et al*. Public knowledge, attitudes and practices surrounding antibiotic use and resistance in Cambodia. JAC Antimicrob Resist 2021;3(1):dlaa115.
23. WHO. Antibiotic resistance: multi-country public awareness survey [Internet]. Geneva: World Health Organization; 2015 [cited 2024 Jan 3]. Available from: https://iris.who.int/handle/10665/194460
24. Spurling GK, Del Mar CB, Dooley L, Clark J, Askew DA. Delayed antibiotic prescriptions for respiratory infections. Cochrane Database Syst Rev 2017;(9):CD004417.
25. Little P, Moore M, Kelly J, Williamson I, Leydon G, McDermott L, *et al*. Delayed antibiotic prescribing strategies for respiratory tract infections in primary care: pragmatic, factorial, randomised controlled trial. BMJ 2014;348:g1606.
26. Légaré F, Labrecque M, Cauchon M, Castel J, Turcotte S, Grimshaw J. Training family physicians in shared decision-making to reduce the overuse of antibiotics in acute respiratory infections: a cluster randomized trial. Can Med Assoc J 2012;184(13):E726–34.
27. Coxeter P, Del Mar CB, McGregor L, Beller EM, Hoffmann TC. Interventions to facilitate shared decision making to address antibiotic use for acute respiratory infections in primary care. Cochrane Acute Respiratory Infections Group, editor. Cochrane Database Syst Rev [Internet]. 2015 [cited 2024 Jan 3];2017(2). Available from: http://doi.wiley.com/10.1002/14651858.CD010907.pub2
28. Gulliford M, Latinovic R, Charlton J, Little P, Van Staa T, Ashworth M. Selective decrease in consultations and antibiotic prescribing for acute respiratory tract infections in UK primary care up to 2006. J Public Health 2009;31(4):512–20.
29. Chahwakilian P, Huttner B, Schlemmer B, Harbarth S. Impact of the French campaign to reduce inappropriate ambulatory antibiotic use on the prescription and consultation rates for respiratory tract infections. J Antimicrob Chemother 2011;66(12):2872–9.
30. Lee TH, Wong JG, Lye DC, Chen MI, Loh VW, Leo YS, *et al*. Medical and psychosocial factors associated with antibiotic prescribing in primary care: survey questionnaire and factor analysis. Br J Gen Pract 2017;67(656):e168–77.
31. Chua A, Kwa A, Tan T, Legido-Quigley H, Hsu L. Ten-year narrative review on antimicrobial resistance in Singapore. Singapore Med J 2019;60(8):387–96.
32. Singh SR, Chua AQ, Tan ST, Tam CC, Hsu LY, Legido-Quigley H. Combating Antimicrobial Resistance in Singapore: A Qualitative Study Exploring the Policy Context, Challenges, Facilitators, and Proposed Strategies. Antibiotics 2019;8(4):201.
33. Al Omari S, Al Mir H, Wrayde S, Merhabi S, Dhaybi I, Jamal S, *et al*. First Lebanese Antibiotic Awareness Week campaign: knowledge, attitudes and practices towards antibiotics. J Hosp Infect 2019;101(4):475–9.
34. Huttner B, Saam M, Moja L, Mah K, Sprenger M, Harbarth S, *et al*. How to improve antibiotic awareness campaigns: findings of a WHO global survey. BMJ Glob Health 2019;4(3):e001239.
35. Thomson K, Berry R, Robinson T, Brown H, Bambra C, Todd A. An examination of trends in antibiotic prescribing in primary care and the association with area-level deprivation in England. BMC Public Health 2020;20(1):1148.
36. Adekanmbi V, Jones H, Farewell D, Francis NA. Antibiotic use and deprivation: an analysis of Welsh primary care antibiotic prescribing data by socioeconomic status. J Antimicrob Chemother 2020;75(8):2363–71.

| *Submitted: December 2, 2023* | *Revised: --* | *Accepted: December 16, 2023* |
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