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Knowledge, Perceptions, and Attitudes Regarding Antibiotic Use for Lower Respiratory Tract Infections: Insights from Patients in Sri Lanka

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Abstract. Antibiotic resistance is an emerging global public health threat. One of the main drivers of this threat is the inappropriate use of antibiotics. In Sri Lanka, antibiotic consumption is increasing, but little is known locally about how patients perceive antibiotics. We conducted a qualitative study to gain a better understanding of the knowledge, perceptions, and attitudes of patients regarding antibiotics and antibiotic resistance. Semi-structured interviews involving 18 patients with lower respiratory tract infection (LRTI) admitted to a large, public tertiary care hospital in southern Sri Lanka were conducted. Interviews were analyzed to identify themes regarding the patients' knowledge of LRTI etiology and treatment, perceptions and attitudes toward LRTI treatment, including antibiotics, and patient–physician communication. Most patients mentioned multiple care visits and the use of multiple pharmaceuticals prior to admission. Patients sought a quick resolution to their ailments and frequently visited several private physicians to obtain a satisfying answer. Self-medication was also common. Patients reused prescriptions for antibiotics, kept antibiotics for later use after prematurely stopping their course of treatment, and bought over-the-counter antibiotics. Patients' knowledge of disease etiology and antibiotics was poor. Only a few patients were aware of antibiotic resistance. Despite the desire to receive more information regarding disease and treatment, patient–provider communication was limited and mainly confined to prescription instructions. This qualitative study performed in Sri Lanka suggests that inappropriate use of antibiotics is a multifactorial problem. To improve antibiotic use, a multifactorial approach that includes educating the public, increasing awareness among physicians, and implementing systems-level changes to restrict access to antibiotics is urgently needed.

INTRODUCTION

Antibiotic resistance has become a major public health problem in the field of modern medicine.^{1–3} Compared with susceptible infections, antibiotic-resistant infections, such as community-acquired and healthcare-associated infections, are found at high rates worldwide and are associated with increased morbidity, mortality, and healthcare costs.^{2,4–7} Resistance to antibiotics is mainly driven by selective pressure and decades of widespread antibiotic use in medicine, agriculture, and the food industry.^{1,8,9} Several studies have shown a correlation between the amount of antibiotic consumption and the occurrence of antibiotic resistance.^{10–12} Antibiotics are frequently overused for respiratory tract infections.¹³ This overuse is frequently attributed to the difficulty distinguishing between viral and bacterial causes.¹⁴ This clinical dilemma is compounded in many low- and middle-income countries (LMICs), where resources are limited and diagnostics to differentiate between bacterial and viral infections are often unavailable. A previous study of outpatients with respiratory tract infections in Sri Lanka discovered physician attitudes toward the excessive prescription of antibiotics related to their assumption of patients' strong desires for antibiotics, diagnostic uncertainty, and competition with the private sector.¹⁵ Because antibiotic resistance is already high in Sri Lanka, action is needed before it is too late to fix the problem.¹⁶ Interventions to combat inappropriate antibiotic use

require ascertaining the current perceptions, knowledge, and attitudes of major stakeholders. Currently, patients' knowledge and perceptions about antibiotics and antibiotic resistance in Sri Lanka are poor. The goal of this study was to understand patients' knowledge, perceptions, and attitudes regarding antibiotics and antibiotic resistance to formulate new strategies to combat antibiotic resistance in Sri Lanka and other LMICs.

METHODS

Setting and patient selection. We conducted a qualitative study involving a subgroup of patients recruited for the Respiratory Infection and Severity in Sri Lanka (RISE-SL) study to explore the etiology and severity of lower respiratory tract infections (LRTIs) in patients at a tertiary care public hospital in Southern Province, Sri Lanka. The patient population with LRTI was selected for this qualitative study because prior studies have shown that respiratory infections are one of the most common reasons for inappropriate antibiotic use in Sri Lanka and across LMICs.^{15,17,18}

The RISE-SL study was initiated in April 2018. It enrolled patients 1 year of age or older who were hospitalized with an acute illness less than 14 days in duration with signs and symptoms consistent with both respiratory illness and acute infection. For this qualitative sub-study, patient selection was performed during January 2019. Newly enrolled patients in the RISE-SL study were selected based on purposeful sampling. Constant monitoring of sample variations and prioritization of patients who would likely enhance sample diversity were performed. Diversity of the sample group was based

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on age, sex, socioeconomic background, place of residence, and reported history of antibiotic use. Consent was obtained from patients 18 years of age or older and from the guardians of patients who were between 1 and 17 years of age. Assent was obtained from patients 12 to 17 years of age. For patients younger than 18 years of age, the guardians were interviewed. The initial sample comprised 20 interviews; however, the research team decided to stop data collection after 18 interviews because data saturation was reached. Data saturation was determined when no additional information was obtained from the interviews. Ethical approval for this study was acquired from the Ethical Review Committee of the Faculty of Medicine, University of Ruhuna, Sri Lanka, and the Duke University Institutional Review Board.

Interview procedure. An interview guide (Supplemental File 1) was developed through iterative discussions by the research team consisting of local research staff and principal investigators to ensure that all relevant topics would be included. The interview guide was organized into five sections: etiology and knowledge of disease; access to healthcare and reasons for seeking care; expectations of care; perceptions and knowledge of medications (antibiotics); and awareness of medication risks and side effects. Each section included example questions and follow-up probes to ensure that comprehensive information would be collected. The interview guide was pre-tested with three pilot interviews. After six interviews, the study team convened to discuss the emerging results. During this session, several adjustments to the interview guide were made to improve data quality and data collection; specifically, we added more open-ended questions and trained data collectors to perform more probing.

All interviews were conducted in Sinhala by a native Sinhala-speaking doctor (Y.A.) who was trained to conduct the interviews according to acknowledged qualitative interview standards.¹⁹ None of the research assistants and principal investigators worked in the hospital where data were collected. Interviews were conducted on the wards of the hospital where patients were admitted. Most of the interviews were conducted in a secluded area of the ward. Interviews were audio-recorded and then transcribed verbatim in Sinhala by independent native Sinhala speakers. Next, two native Sinhala speakers who were also fluent in English translated the Sinhala transcriptions to English. Backward translation was conducted for a random subset of interviews to check for linguistic validity, and any discrepancies were discussed within the research team.

Data analysis. All translated interviews were uploaded to the qualitative analysis software Atlas.ti Cloud (Beta version, 2019) for analysis. Coding of the transcripts was conducted in two stages using an applied thematic analysis approach.²⁰ First, structural coding was conducted based on the five domains of the interview guide; then, thematic coding was conducted to identify emerging themes in each of the domains. The coding process was conducted by the principal investigator (D.v.M.); a second independent reviewer (H.Z.) checked the initial coding for missing codes and themes. Discrepancies were discussed until a consensus was reached.

RESULTS

Patient characteristics. A total of 18 patients with LRTI were interviewed; of these, 11 (61.1%) were female. Three

patients were younger than 18 years, and the median age of the adult interviewees was 39 years (range, 21–80 years). Most of the patients (13; 72.2%) lived in rural or semi-rural areas. The educational level of most of the adult patients (9; 6%) was 10th grade or less; the remaining adults (6; 40%) had received further education.

Knowledge of LRTI and etiology of disease. Although most patients were able to identify the diagnosis for which they were admitted, many believed that they had become ill because of noninfectious causes such as taking a bath during the evening, drinking cold water, eating cold foods, being exposed to dust or car smoke, feeling tired, or being exposed to morning cold and dew (“When I touched the water I got a fever because it [the water] is cold.” — patient R0438). When asked about how they might prevent disease in the future, avoiding these noninfectious causes was cited by most of the patients. Only a few patients knew an infectious agent was the cause of their illness. For example:

[Interviewer]: “What do you think is the cause of the illness?”

[Patient]: “I worked in the medical wards. May be due to the infections there.” — R0414.

Care-seeking behavior. Patients weighed multiple considerations when deciding where and how to seek care. Patients frequently mentioned the cost of healthcare and medications, travel distance, and obligations at home (for example, obligations to family) as factors affecting their care-seeking behaviors.

In an attempt to find a way to overcome their illness sooner, most patients visited multiple physicians prior to their hospital admission. Moreover, most patients mentioned they visited a different physician during each appointment: “One time I got ill and got medicines from the government dispensary. These medicines did not work. Then, I got medicines from a private place. Which also did not work. Then, I went to the ‘R’ clinic. But those medicines also did not work. So, since there was no other option left, I came here” — patient R0409.

For the majority of patients, private clinics managed by a general practitioner or private dispensaries were preferred because they were located close to their homes. Many believed these facilities could provide them with a “quick cure.” For example:

[Interviewer]: “Why do you usually go to a private doctor?”

[Patient]: “Since I have to do my job, I am not able to stay in the hospital for weeks. This is how I try to get a quick cure. Only when I will not get better, I will go to a public hospital.” — R0409

Interviewees seeking care at public-managed facilities, such as the outpatient department of a public hospital or a public dispensary, stated their decision was financially motivated because care in the public sector is free. For example:

[Interviewer]: “What is the reason for you to go to the hospital?”

[Patient]: “Because we cannot afford to pay for the treatment. When you come to the hospital, they do all the investigations and treat us without us having to pay.” — R0477.

Patients' perceptions and knowledge of LRTI treatment. All patients stated that they had used multiple medications before being admitted to the hospital. Patients were prescribed an average of 3.5 medications (range, 2–6 medications) at each outpatient visit. Patients could not typically recall the names of the drugs they had been prescribed or the reasons why the medications were prescribed. Most patients identified their medication according to the color or shape of the tablet or capsule. For example:

[Interviewer]: "How do you know it is the same medication?"

[Patient]: "Because it looks similar to the last one. Earlier, I was given a red-colored capsule, later a white-colored tablet." — R0474.

Although all patients were receiving antibiotic therapy, only two patients responded that they knew that antibiotics were used to fight disease-causing bacteria. Four patients knew antibiotics were used for the treatment of phlegm and cough. Other patients thought antibiotics "boost the immunity" (patient R0409) or that they are "disinfectants" (patient R0476).

Four patients responded that they were aware that resistance to antibiotics could occur. Three patients were also able to explain that resistance occurs because of exposure to the antibiotic: "When medications are taken for a longer period, there is a tolerance" (patient R0474). Sources of information about antibiotic resistance included a physician, a friend, and informational billboards.

Almost half of the patients were not aware that the medication they had received could cause side effects. Seven patients noted they knew the medications they were using could cause side effects and were able to name some of these side effects. Side effects of antibiotics mentioned were allergic reactions, renal problems, liver problems, and constipation. Most patients stated they knew about these side effects because friends or family members told them about them. Two patients had received instructions from their physicians. Two patients received information from media outlets (television, newspaper).

Prescription reuse and antibiotic sharing. Almost all patients stated they always used a prescription when buying medication at the pharmacy because they believed they did not have the right knowledge to understand how to use and choose medication: "Doctors know. Medication is given according to the illness. We (patients) do not know" (patient R0423). Other reasons mentioned for using a prescription included the fact that if they developed a problem while using medication, they could ask the physician for advice: "If some problem arises, I can inform the doctor and get to know" (patient R0474). Three patients noted they used prescriptions because pharmacies asked for them.

Two patients believed that using medications without a prescription from a physician was not advisable, but they also noted that they kept prescriptions at home to reuse when needed:

[Interviewer]: "Are you taking that medication with the use of a prescription?"

[Patient]: "I have been keeping a prescription for that at home." — R0416

Most patients did not share medication at home. Three patients declared they kept leftover medications, including antibiotics, and shared them with family members when they became ill. For example:

[Interviewer]: "Do you share medicine with others?"

[Patient]: "Yes, for illnesses like the common cold or runny nose, but not for anything else. When my older child needs medicine, I sometimes adjust the dose." — R0466.

Two-thirds of the patients used traditional therapies prior to their admission to the hospital. Common therapies included drinking Ayurvedic herbal preparations and drinking boiled coriander with ginger. Almost all patients initially tried to cure their illness using traditional therapies, and they generally believed natural therapies were better. Only after their symptoms worsened did they decide to consult a physician or use medication: "I used traditional home remedies and waited. Only when it is not working I take medication" (patient R0481).

Patient-physician communication. The provision of instructions and information about medications differed greatly between inpatient and outpatient settings. Most of the patients stated they had not received any information about the medication they were receiving in the inpatient setting. In the outpatient setting (prior to admission), 15 patients had received information about their treatment; of these, nine received both written instructions and verbal advice from their physicians. Six patients received only written instructions. Information was typically confined to instructions for using the prescribed medications. Time was commonly mentioned as a reason why the patients had not received more information. For example:

[Interviewer]: "Does the doctor tell you how to take the medicine?"

[Patient]: "No, he does not have enough time. There are a lot of patients. If we do not understand anything they will explain. But one day when three of us went to get medicine from the hospital, they did not write them down. I got a nurse to write them down for me" (patient R0466).

Eight patients mentioned that they had not received information from the physicians in the hospital about their illness. Seven patients said they had received information about their illness from their physician, but the information was limited to a short description of their diagnosis without further elaboration. Three patients were told that they had an infection with a virus or other microorganism.

Patients expressed the desire to receive more information about their disease and the medications they were prescribed. Several patients stated they wanted more information to be able to identify and prevent potential side effects of medication. Another commonly heard statement was that patients would have liked more information from their physicians but were hesitant to ask because the consulting physician was in a hurry and they believed they would not understand the physician's explanation.

Trust in physicians and treatment compliance. A recurrent opinion expressed during the interviews was that patients trusted physicians and their medications. Patients seemed to

make assumptions about the quality of medication based on their opinion of the physician who prescribed them. Medications prescribed by a respected physician were considered to work well: “Everyone consults him. If you take medication from him, you get better” (patient R0406). Most patients stated they trusted their physician completely and were willing to receive any treatment prescribed by their physician.

Patients expressed they felt the responsibility to comply with the prescription from the physician: “Because the doctor prescribed medicines in order to cure the illness, I am motivated to take my medication” (patient R0440). However, some patients also stated that they stopped or adjusted their course when feeling better. For example:

[Interviewer]: “When you are taking antibiotics, do you take them exactly as the doctor tells you?”

[Patient]: “Yes. But when I get better, I will stop taking the medication before the course finishes.” — R0481.

Four patients also stated that they would stop their medication or adjust the dose based on their own initiative when side effects would occur. For example:

[Interviewer]: “What would you do when you will experience a side effect?”

[Patient]: “I cannot stop the course, so I would continue the prescribed medication but reduce the dose in the morning and take it only once in the afternoon.” — R0486.

DISCUSSION

In Sri Lanka, as in most of the world, the prevalence of antibiotic resistance is increasing.^{1,3} Inappropriate use of antibiotics by humans is a major contributor to this increase in resistance.^{6,8,11} During this qualitative study of patients receiving antibiotic therapy for respiratory tract infection, we identified several common reasons for antibiotic misuse. Patients expressed the desire for a quick fix from medication for respiratory symptoms. There was also an area of apparent cognitive dissonance; despite many patients placing great trust in their physicians and medications, they visited multiple providers until they received a treatment they thought was effective. Patients’ knowledge of antibiotics and antibiotic resistance was generally limited, but they expressed the desire for greater communication from their physicians regarding their illness and treatment. In this setting, improved patient education regarding respiratory illnesses and their treatments may help reset expectations regarding the need for medications and, consequently, reduce the overuse of healthcare resources.

Knowledge of LRTI etiology and treatment was generally low and mostly dominated by traditional beliefs. Patients had the desire to receive more information from their physician but noted that physicians had little time for advice about disease and treatment, and that communication between patients and providers was frequently limited to instructions regarding the usage of medication. A lack of knowledge of disease and treatment has been shown to be associated with poor compliance or antibiotic misuse.²¹ Greater education of patients in our setting regarding illness etiology and treatments may help improve the use of antibiotics as prescribed.

In other settings, tools have been created to assess patients’ understanding of antimicrobial prescribing practices.²² Such tools can help inform strategies for improving patients’ general health literacy or community-level knowledge regarding antibiotics. Strategies that have been recommended for improving patient health literacy include discussing medical issues and treatment at a level that does not assume prior knowledge of the disease, confirming patients’ understanding after teaching, and creating easily understandable written materials for patients.²³

In low-resource settings, creative strategies have been developed to improve community health literacy. In Myanmar, forum theater scripts and plays were created based on focus groups with members of the community to provide education about antimicrobials. The key messages from these plays were that antibiotics treat bacterial infections, antibiotics are not useful for colds, antibiotics should not be reused or shared with others, and that strategies like hand washing exist to prevent infections. Those who attended the plays preferred this method over formal teaching.²⁴ Plays have also been used as a means of education about antimicrobials in the United Kingdom for schoolchildren and their parents.²⁵

Although many participants stated they highly trusted in their providers, they would visit other providers until they were given what they felt was adequate treatment. Delayed antibiotic prescription strategies are designed to mitigate these practices. With delayed antibiotic prescription strategies, patients are given a prescription for antibiotics but instructed not to start treatment unless they do not improve by a given date or if their symptoms worsen.²³ These strategies would require implementation of appropriate education for patients so that they can follow instructions appropriately. Providers’ views differ regarding their acceptance of this strategy. During a study involving interviews and focus group discussions of general practitioners in Malta, some felt that delayed prescriptions maintained good provider–patient relationships and prevented physician shopping. Others used delayed prescriptions when there was uncertainty about the diagnosis or as a measure to “comfort” patients. However, others felt that providers should retain the power to decide if and when antibiotics are needed.²⁶ An alternative to delayed antibiotic prescription practiced more frequently in high-income countries is watchful waiting: patients are instructed to return if they have not improved or if they have worsened by a given time. However, watchful waiting requires adequate availability of follow-up, which limits its use in LMICs.²⁷ In settings such as this one, the frequent use of multiple providers would limit the ability to use delayed antibiotic prescriptions as a strategy.

Multiple visits lead to an overburdened healthcare system. During our study, long wait times and limited consultancy time were the main reasons why patients sought care at private care facilities or bought over-the-counter medication at local pharmacies. Because of changes in the infrastructure in the Sri Lankan national health system during the past decades, healthcare has become more accessible. As a consequence, physicians face increased patient volume, resulting in shorter patient visits.²⁸ This high volume leaves little time for physicians to provide patients with appropriate information about their disease and treatment. In addition, limited consultancy time is associated with the overprescribing of antibiotics by physicians.²⁹ During a prior study, patients’ demands for

medication were associated with antibiotic overuse and less adherence to treatment guidelines by physicians.¹⁵ Delayed antibiotic prescriptions could decrease the burden on primary care if fewer patients were physician shopping. However, such a strategy could not be implemented without improving the understanding of antibiotics by the population.

Some limitations of this study must be noted. Our study sample consisted mainly of hospitalized patients, presumably with more advanced disease compared with outpatients. Therefore, our results may not be generalizable to populations in an outpatient setting. Patients were mainly from rural areas and had a low socioeconomic status. Moreover, middle-aged males were under-represented in our sample. However, patients living in urban areas and those with a high socioeconomic status were difficult to find in our setting. Although such patients would have added different perspectives, we believe that our sample is representative of the population seeking care at this large hospital, which acts as both a primary and referral hospital. All interviews were performed on the wards, which did not allow for complete privacy; this may have influenced the responses given. Although efforts were made to establish mutual trust between the interviewer and patient, it is possible that some patients felt the need to provide socially desirable answers.

CONCLUSION

Antibiotic overuse and the inappropriate use of antibiotics are complex socio-cultural problems stemming from poor patient knowledge of diseases and treatment. As a result, patients may go physician shopping, self-medicate, or be non-compliant with prescribed treatment. At the same time, patients are not given the chance to change their perceptions and attitudes toward treatment because of the limited patient-physician information transfer. Strategies to increase health literacy and decrease practices such as physician shopping or buying antibiotics without prescriptions could improve the use and management of antibiotics in Sri Lanka and other LMICs.

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