Public practices towards antibiotics: A qualitative study

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ABSTRACT

Background: Antibiotic resistance is becoming a serious threat throughout the world. General community misuse and misconceptions in using antibiotics have been predicted to play a role in increasing antibacterial resistance (ABR). This study aimed to reveal the practicing antibiotic in the community, as information for national programs for reducing inappropriate antibiotic usage.

Methods: This study was a qualitative phenomenology approach, and the data collection was with in-depth interview. Semi-structured interviews with the interview guide were conducted from June 2019 to December 2019. Interview responses were transcribed, categorized, and coded for themes by thematic content analysis.

Results: We approached 26 participants. The most antibiotic used by participants was Amoxicillin and Supertetra®. Most participants did not know that antibiotics must be obtained from a pharmacy with a doctor's prescription. Even so, although some respondents already knew that antibiotics could only be obtained by prescription, some of them still get antibiotics without a prescription. Most informants got antibiotics from health workers (doctor-dispensed antibiotics, pharmacy staff, midwives, nurses) or non-health workers (stalls). Some of them used antibiotics as self-medication for reducing cold, flu, fever, pain, cough, headache, tired, and sore throat. Most respondents stopped their medicine when they were getting well, kept the remained antibiotics, and used it if they get sick in the future. Few participants shared their antibiotics to the family member.

Conclusions: Misuse and misconceptions about antibiotics occur in the general community. It is essential to educate the general public on an understanding of how to obtain and use rational antibiotics.

1. Introduction

Antibiotic resistance is becoming a serious threat throughout the world. Antibiotic resistance will cause infection therapy failure, increase morbidity, and mortality.¹ Although in the early, most antibiotic-resistant bacteria initially emerged in hospitals, now drug-resistant strains are becoming more common in the community.² A study by Lestari et al., 2007 in two major urban centers in Indonesia (Semarang and Surabaya) revealed that *Staphylococcus aureus* isolates $n = 361$ from 3,995 screened individuals were often resistant to tetracycline (24.9%), but it was not associated with hospital stay.³ A study by Duerink et al., 2007 revealed that of 3275 individuals (community 2494, hospital 781), 54% carried resistant *E. coli*.^{4,5} The emergence of antimicrobial resistance is predicted to correlate with selective pressure from the use of, often inappropriate, or antimicrobial agents in both hospital and community.

Misuse (inappropriate use of antibiotics, excessive use or consumption of antibiotics, and easy access to antibiotics; patients stopped their antibiotics when the symptoms were getting better⁶) and misconceptions (antibiotics could cure a variety of infectious diseases, including infections caused by viruses, such as flu, cough-cold, common cold, and fever event headache) about antibiotic use persist and continue to be more prevalent in the public area and it happened in many countries, especially in developing countries. Misuse and misconceptions in using antibiotics have been predicted to play a role in increasing ABR.^{7,8}

Therefore, this study aimed to reveal the practicing antibiotic in the community. Understanding the practices of antibiotics in public settings seems essential for health professionals and the government in developing appropriate programs in enhancing rational antibiotics use. An understanding of these issues can help pharmacists and other health care professionals to adjust health care, to match the individual needs

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of patients, and to develop a strategy to tackle the community members' problem regarding the use of the antibiotic.

2. Methods

2.1. Study design

This study was a qualitative phenomenology approach, and the data collection was with an in-depth interview. Before conducted the study, the protocol of study had been approved by the Medical and Health Research Ethics Committee of Faculty Medicine of Universitas Muhammadiyah Surakarta with reference number 2063/B.1/KEPK-FKUMS/III/2019.

2.2. Place and selection of key informants

This study was conducted in Boyolali, which included the area of Semarang, Indonesia. Based on the results of previous studies, there were findings of resistance occurred in Semarang.⁵ The selection of this place was purposive sampling. Twenty-six key informants were interviewed, and saturation among them had been attained. Saturation is defined as enough quality, completeness, and amount of information and no evidence of new information in the interviews.

For selection informants, the researcher contacted the leader in Boyolali and the leader of the Indonesian pharmacist association for obtaining permission. Study participants were selected based on different categories of individuals in each target group, for example, by age, gender, status, education, culture, and socioeconomic. It made the opportunity to gain a heterogeneous key-informant and to ensure that all segments of the target population were well represented. To gain this purpose, informants were chosen in a university and patients or customers who were met in pharmacies, an urban, and a suburb pharmacy and arrange the interview schedule. Inclusion criteria were participants who aged 18–65 years old, had used antibiotics, were able to communicate, had no amnesia disease, and were willing to be respondents. The exclusion criteria were the participant who was a healthcare professional employee or healthcare student because they had had health education, including antibiotics.

2.3. Data collection

Semi-structured interviews were conducted from June 2019 to December 2019. An interview guide was used during the interview (supplement 1). This instrument comprised a list of pre-determined, open-ended questions to explore respondents' practice regarding antibiotics. An interview guide includes key topic areas while also providing flexibility to explore unanticipated issues. The interview guide had been reviewed and validated by panel experts and a senior academic with expertise in infectious disease. A pilot interview guide has been implemented as a pilot study in three community respondents, and it was not included in the analysis.

The target informants were contacted to make definite appointments before the actual interview. The interview location was at informants' homes, pharmacies, or local community centers. Written consent was obtained before all interviews. All interviews were audio-recorded and written in the filed note. Open-ended questions of interviews were probed yielding in-depth responses about people's experiences in practicing antibiotics. Each interview was last in half to 1 h.

2.4. Data analysis

All data were anonymized on transcription using manual thematic analysis. Familiarizing the data by reading and re-reading the words, analytically, and critically the transcript and starting to think about what the data mean. Generating initial codes and reviewing the coded data to developing themes. Codes and themes were incessantly

Table 1
Participants' demographic characteristics.

No	Variables	n (26)	%
1	Gender		
	Male	10	38.5
	Female	16	61.5
2	Age groups (year)		
	18–27	5	19.2
	28–37	5	19.2
	38–47	10	38.5
	≥ 48	6	23.1
3	Marital status		
	Single	4	15.4
	Married	22	84.6
4	Education level		
	Elementary	3	11.5
	Primary education	2	7.7
	Secondary education	9	34.6
	Diploma	1	3.9
	Undergraduate	7	26.9
5	Employment status		
	Employed	21	80.8
	Student	2	7.7
	Housewife	3	11.5
6	Monthly household		
	< IDR.1.600.000	15	57.7
	IDR.1.600.000-Rp.3.000.000	8	30.8
	> IDR.3.000.000	3	11.5
7	Last time antibiotics were taken		
	currently	9	34.6
	< 3 months	5	19.2
	3–12 months	8	30.8
	> 12 months	4	15.4
8	Healthcare facilities frequently visited		
	Midwife	3	11.5
	Physician	9	34.6
	Drugstore	7	26.9
	community Health centers	6	23.1
	Nurse	1	3.9

reviewed and revised by discussing it with all the authors. The transcript was sent to informants to clarify and ask for feedback, whether any discrepancies.

3. Result

We approached 26 informants. Interviewing and analysis were conducted from June 2019 to December 2019. The characteristic of the data of the respondent is described in Table 1.

3.1. Analysis of data revealed some key themes

3.1.1. The most widely used antibiotic

During the study, 9 of 26 (34.6%) informants were currently using antibiotics, and 13 (40.0%) informants were using antibiotics in the past one year. Almost all informants have used amoxicillin antibiotics. The second most antibiotic used by respondents was Supertetra® (tetracycline). Other antibiotics that have also been used by informants were FG troches®, Cefadroxil, Penicillin, Amoxicillin-clavulanate, Ciprofloxacin, Gentamicin ointment, Hydrocortison ointment, Cefixime, Cefotaxime, and Kristapen®. Most respondents (18 respondents) received antibiotics from physician-dispensed antibiotics when respondents visited the physician. More than half of the respondents (15 respondents) had received antibiotics from pharmacies without a

doctor's prescription. Some respondents, when buying antibiotics, did not bring a prescription but brought a packet of antibiotics they had previously used. Eight respondents said that they had received antibiotics from midwives, and two informants had received antibiotics from paramedics/nurses. Surprisingly, five informants bought antibiotics from the stall. The type of antibiotic that was bought in a stall was Supertetra®/tetracycline.

P34: Two days ago, I complained that my body was hurting all; the joints also hurt but did not have a fever. I went to see a doctor; the doctor gave drugs, including amoxicillin. (43 years old man, N26).

P10: I took amoxicillin when I have a fever, inflammation, and cough. I visited the nurse, and I was given some medicine, I forgot the names of the medicines, but I still remember that there were amoxicillin and vitamins (20 years old man, N18).

P22: In the past, my child had a fever, cough, and runny nose, and then I went to the midwife. The midwife gave my child amoxicillin, and my child recovered. Now, if my child is sick, I prefer to buy amoxicillin at the pharmacy. (23 years old woman, N2).

P94: I usually buy Supertetra® at the stall. Stalls usually sell Supertetra® (48 years old female, N12).

The reasons why some respondents bought antibiotics at a pharmacy without a doctor's prescription were the long queue when visiting physician/midwife/nurse, the price of antibiotics was cheaper if purchased at the pharmacy compared to seeing a doctor, participants already knew how to use antibiotics, the risk of antibiotic ointment was minimum, and visiting a doctor/midwife would not be given antibiotics.

3.1.2. The reasons to take antibiotics

Most respondents who used antibiotics were not according to the indications. Respondents used antibiotics to deal with coughs, colds, fever, headaches/dizziness, feeling unwell/colds, tired, aching rheumatic pain, flu, plague, itchy throat, sore throat, before/after tooth extraction, inflammation, earaches, itching on the skin, knife wounds, minor burns, and tripping wounds. They reasoned that if the wound were not given antibiotics, it would get worse, and they knew that amoxicillin functions to dry the wound.

P8: If I and my family suffer from dizzy, headache, or unwell, we usually take amoxicillin (55 years old man, N6).

Only two respondents who used antibiotics based on the indications.

P27: My son gets an accident and should undergo an operation, and the physician gives my son Cefadroxil (35 years old woman, N5).

P24: When my daughter suffers from typhoid disease and hospitalized, the nurse injected antibiotics. I know because I ask what kind of this medicine and nurse said it was antibiotic (34 years old woman, N3).

3.1.3. Antibiotics use (duration, frequency, feeling better, reasons for stopping antibiotics)

When using antibiotics, the frequency of taking antibiotics for the majority of informants was not based on hours. For example, the rules of taking amoxicillin antibiotics are three times a day; the majority of respondents took amoxicillin in the morning, afternoon, and evening. In fact, some informants took amoxicillin once a day, twice a day, and never took it three times a day. Only two respondents took amoxicillin every 8 h. Respondents who received cefadroxil took it two times in the morning and evening. Another participant took cefadroxil three times a day. Informants, who complained of sore throats, took antibiotics of FG troches® once a day for five days duration. The informant who had experience using Supertetra® revealed how to use Supertetra® by being swallowed for adults and sprinkled on open wounds for children. Because children had difficulty in taking capsules, so she took the initiative to open the capsule and sprinkled the tetracycline in the open wound, and she only used it at night.

P80: Supertetra® is used for adults by drinking, but for children, I open the Supertetra® capsule, and I sprinkle it on the wound once night a day (48 years old woman, N12).

P50: I try to take amoxicillin once a day first. If it has not healed, I take three times a day (43 years old woman, N10).

Only a small proportion of respondents finished their antibiotics. Some reasons for finishing antibiotics were because the respondent believed that by completing the antibiotics course it would prevent antibiotics resistance. Other reasons for finishing antibiotics course were that respondents were afraid that if the antibiotics were not finished, the disease would get worse, and the virus had not died and must repeat taking antibiotics from the start. The majority of respondents stopped taking antibiotics when they felt better. Some respondents only took antibiotics for two days, and some respondents even used one strip or ten tablets of amoxicillin within three months because they took amoxicillin only once a day when they were unwell and immediately stopped taking amoxicillin after feeling better.

Apart from feeling better, another reason for stopping taking amoxicillin were no negative effects when antibiotics were stopped, bored, forgetful, and did not like taking medication. Experiences of drug side effects were also the reason for stopping the antibiotics course. In addition, some respondents suffered from drug side effects; these respondents still took antibiotics, but on their initiative, they reduced the frequency of taking antibiotics, which were initially three times a day to two times a day so that the duration of taking antibiotics was longer. However, some respondents kept taking antibiotics as usual when experiencing the side effects of drugs and told the doctors.

Most respondents used antibiotics individually and did not share with others, but two respondents shared antibiotics with other family members because they felt having the same disease. It caused the duration of antibiotics to take was not as it should be. They only took five tablets of amoxicillin each person.

P210: Yes, I once shared amoxicillin. I have a sore throat. I visited a nurse and got a strip of antibiotics. There was a member of my family who suffered from sore throat too. I thought we were suffering from the same disease. I shared antibiotics with him. Both of us take five tablets. By doing this, we save money (20 years old man, N18).

3.1.4. Forgetfulness

Fourteen of the 26 informants had forgotten to take antibiotics. Some respondents took antibiotics as soon as they remembered, but some of the respondents did not take antibiotics when they remembered. Respondents revealed that the most common cause of forgetfulness was feeling better, having activities, and the medicine was not taken while traveling. Respondents usually forget taking medication during the day, because of doing activities. A few respondents did not forget to take antibiotics because they were told by health workers to take antibiotics regularly.

P145: I once forgot not to take antibiotics (45 years old man, N4).

3.1.5. Remaining antibiotics

Most respondents (13 out of 26) had remaining antibiotics because they stopped taking antibiotics when they felt better or forgetfulness. Ten out of twenty-six respondents saved and used remaining antibiotics when they felt the same disease without consultation with health workers. Only one respondent consulted a health worker when she wanted to take leftover antibiotics. On the other hand, some respondents did not take the leftover antibiotics because of worry about the adverse effect. They disposed of the remaining antibiotics by burning, dumping them in the trash, dumping their contents, and then throwing them away. Two respondents gave antibiotic leftovers to pets, namely birds and chickens.

P28: when I recover, I stop taking antibiotics, and I save them. If I suffer from the same disease again, then I take antibiotics as long as it hasn't expired. If it expires, I'll throw it away. I get rid of the remaining antibiotics by burning or burying them (51 years old man, N23).

4. Discussion

Misuse and overuse of antibiotics may promote increasing ABR. In the pharmacy community, self-medication with antibiotics has become an essential factor driving antibiotic resistance.⁹ In many countries, patients can get antibiotics easily without a physician's prescription.^{10–14} Some studies in Indonesia related to the use of antibiotics had been conducted. Studied by Kimura and Nakamura, 2014 in six community pharmacies in Indonesia revealed that 48.5% customers bought antibiotics without prescriptions, 51.9% customers purchased antibiotics by showing drug samples that they did not take before or using drug samples from their leftover, and they were following advice by family/friends or pharmacist.¹⁵ In the other study in Yogyakarta Indonesia in 2010, 64% of antibiotics were usually purchased without a prescription in pharmacies, and Amoxicillin was the most popular (77%) antibiotic for self-medication besides Ampicillin, Fradiomycin-gamicidin, tetracycline, and ciprofloxacin.⁹ A systematic review study by Almohammed et al., 2019 revealed that most of the antibiotics used for self-medication were obtained from pharmacies, followed by a friend or family member, and penicillin (amoxicillin) was the most frequently misused antibiotic for self-medication.¹⁶

The accessibility of the community in obtaining antibiotics was also obtained from doctors who performed dispensing,¹⁷ and dispensing use increases antibiotic use by community.¹⁸ Some physicians unnecessarily prescribed and dispensed antibiotics for Upper respiratory tract infection.¹⁹ One of the factors identified for antibiotic prescriptions by doctors were perceived demand and expectation from the patients.²⁰

This study revealed that most respondents used antibiotics to treat minor ailment or symptoms that do not need antibiotics such as coughs, colds, fever, headaches/dizziness, feeling unwell/colds, tired, aching rheumatic pain, flu, plague, sore throat, inflammation, earaches, urticaria, knife wounds, and minor burns. In line with this study, another study in Yogyakarta Indonesia in 2010, 64% of respondents usually purchased antibiotics without prescription in pharmacies to treat the minor symptoms: the common cold, including cough, sore throat, and headache, with the length of use was mostly less than five days. The main reason for using non-prescribed antibiotics (54%) was the previous experience.⁹ Misuse and misconceptions about antibiotic use persist and continue to be more prevalent in public areas,²¹ and it happened in many countries, especially in developing countries.²² A systematic review conducted by Ocan et al., 2015 who reviewed thirty-four studies involving 31,340 participants between 2002 and 2012 revealed that respiratory (50%), fever (47%), and gastrointestinal (45%) were common disease symptoms that managed by antibiotics. Study in 1,037 Lebanese parents, more than 33.0% of parents considered that antibiotics are helpful in treating and expediting the recovery of their child with common cold infection.⁷ While a study in Yogyakarta Indonesia in 2010, more than half of respondents (71%) had incorrect knowledge regarding antibiotics for viral infections, and more than half of respondents (74%) believe that antibiotics can prevent worsening of illness.²³ Sharing antibiotics to others has been practicing as well. In line with a systematic review that twelve (12) studies reported inappropriate drug use, not completing dose (6/12), and sharing of medicines (4/12)¹⁴.

5. Strength and limitation

This study reveals how the practice of using antibiotics in the Boyolali community. It looks deeper into the phenomena of how people get antibiotics, how to use them, and the reasons for practicing antibiotics, which are essential to evaluate and assess the practice in the community members to create and tailor the type and area education to be implemented. Although the result of this study cannot be generalized to conditions elsewhere, this study can be used as a reference in uncovering people's practice in using antibiotics. It is a qualitative study

that explores the use of antibiotics in the community and does not see association and influence of the misuse of antibiotics to antibiotics resistance so that further research is needed to evaluate the influence of antibiotics misuse on antibiotics resistance.

6. Conclusion

The results of this study indicate that the practice of community members towards antibiotics is mostly not appropriate. Community members' knowledge about the indication or function of antibiotics and how to obtain antibiotics are low. They have a misconception about antibiotics, and it causes misuse or irrational antibiotics use. In addition, although respondents have been told to finish a course of antibiotics because they do not know the reason for completing the antibiotics course, the respondents do not finish the antibiotics treatment. A comprehensive intervention for community members to improve prudent antibiotics use is essential with some key elements: improving public understanding of what the indication of antibiotics, how to obtain antibiotics, how to use rational antibiotics, and the consequences of irrational use of antibiotics.

Declaration of competing interest

All authors report no conflicts of interest.

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Appendix

Supplement: Interview Guide Practices towards antibiotics

- 1 Are you currently using antibiotics? If not, when was the last time you used antibiotics? And what type of antibiotics do you use?
- 2 What are your considerations for using these antibiotics?
- 3 How do you get these antibiotics? Prompts:
 - Where did you get antibiotics?
 - Have you ever bought antibiotics at a pharmacy/drug store/grocery store without a prescription?
 - Have you ever asked your doctor to prescribe antibiotics? What prompted you to ask for antibiotics?
 - Do you get advice and information about using antibiotics from doctors, pharmacists or other health professionals? Tell us about your experience.
- 4 How do you use antibiotics?

Prompts:

 - Did you read the label/etiquette on the antibiotic packaging and follow the instructions written on the label? What motivated you to do that?
 - What are the dose, frequency, and duration of antibiotic use?
- 5 Do you always spend the antibiotics you take? What motivated you to do that?

Prompts:

 - Have you ever forgotten to take antibiotics and what do you do when you remember?
 - When do you stop taking antibiotics? What motivated you to do that?
 - Have you ever stopped taking antibiotics when you felt better when the antibiotics were not over? What drives you to do this?
 - How do you store antibiotics?
 - Have you ever saved antibiotics just in case if one day you are sick of using them? Why?
 - Have you ever shared antibiotics with other people? Tell us about

your experience.

6 Do you ever leave the antibiotics that you take?

- What do you do with the remaining antibiotics? What drives you to do this?

7 Have you ever experienced antibiotic side effects? Tell us about your experience?

Prompts:

- What do you do with the antibiotic side effects you experienced?

8 Do you have an allergy to certain antibiotics? Did you inform your doctor, pharmacist or other health care provider when you checked yourself that you have an antibiotic allergy?

9 Do you have livestock? Have you ever given antibiotics to your farm animals? Tell us about your experience.

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