

Original Research

Perceptions in the community about the use of antibiotics without a prescription: Exploring ideas behind this practice

Johanna APONTE-GONZÁLEZ , Angélica GONZÁLEZ-ACUÑA , José LOPEZ , Paul BROWN ,
Javier ESLAVA-SCHMALBACH 

Received (first version): 16-Oct-2018

Accepted: 20-Jan-2019

Published online: 10-Mar-2019

Abstract

Objective: The use of antibiotics without prescription is common in Colombia as well as in other developing countries. The objective of this study is to explore the attitudes and motivations associated with the use of antibiotics without prescription.

Methods: Focus group sessions were held with residents of Bogotá. Different socioeconomic groups were approached to identify possible differences of opinion. A semi-structured interview guide was used to guide the discussion, with thematic analysis used to identify central themes.

Results: In total, 21 people, aged between 25 and 50 years participated in four focus groups. The results suggest that the use of antibiotics without prescription is common practice. The main reasons included barriers to access to prescribed medications due to limited health insurance. Even those with adequate access to health insurance report being willing to use a treatment without a prescription if they have confidence in its effectiveness. The relationship with the physician is important, but pharmacy storekeepers are also highly trusted. While some participants understood that antibiotics can cure infections but cause serious adverse events, several misconceptions about antibiotics therapy were identified. These included a lack of knowledge of resistance transmissibility among communities.

Conclusions: The results have implications for interventions aimed at reducing inappropriate use of antibiotics, highlighting i) how lack of access to timely care creates an incentive to self-prescribe, ii) the key role that pharmacy storekeepers play in the Colombian healthcare system and the need to include them in interventions, and iii) the misconceptions about inappropriate use of medications that need to be addressed by educational programs. These findings provide insights to other countries where antibiotics misuse is also a problem.

Keywords

Anti-Infective Agents; Self Medication; Prescription Drug Misuse; Health Knowledge, Attitudes, Practice; Pharmacists; Pharmacies; Focus Groups; Colombia

INTRODUCTION

The World Health Organization has identified bacterial resistance to antibiotics as a critical public health problem in many parts of the developed and developing world.¹ This health threat is growing quickly, in part because the inappropriate use of antibiotics leads to the loss of efficacy and compromises the ability of health personnel to treat common infectious diseases. Therefore, medical costs increase, hospital stays are prolonged, and mortality increases.² There is an urgent need to develop effective programs and interventions aimed at decreasing the inappropriate use of antibiotics.

Non-prescription use of antibiotics is a global problem that

particularly affects developing countries, accounting for between 19% to 100% of antibiotic use in Nigeria and Sudan.³ In many developing countries, access is available without a prescription from pharmacies, and antibiotics are commonly used in communities for nonbacterial diseases. For instance, in Colombia, antibiotics are available without prescription from community pharmacies.⁴ Most community pharmacies are not run by professional pharmacists but by 'storekeepers' who have minimal training in pharmaceutical sciences. Although these storekeepers may have many years of experience managing the establishment and serving the community, the result is that antibiotics and other drugs are available in Colombia without oversight of a certified health professional. This is similar to the situation in many countries around the world (including 50% of countries in the Americas and 43% in Europe) where antimicrobials are freely available and regulations are not widely enforced.⁵

Ready access to antibiotics without a prescription is associated with an increase in antibiotic resistance, including outpatient use of antibiotics being correlated with Streptococcal resistance.^{3,6} Previous studies have identified a number of factors associated with inappropriate use of antibiotics, including barriers of access to primary care such as cost or a shortage of providers, availability of antibiotics without a prescription, and lack of knowledge about the harms that can arise from the inappropriate use of

Johanna APONTE-GONZÁLEZ. Pharm, MSc. Pharmacy Department, School of Sciences, Universidad Nacional de Colombia. Bogotá (Colombia). jaaponteg@unal.edu.co
Angélica GONZÁLEZ-ACUÑA. Pharm. Pharmacy Department, School of Sciences, Universidad Nacional de Colombia. Bogotá (Colombia). anagonzalezac@unal.edu.co
José LOPEZ. Pharm, MSc, PhD. Professor. Pharmacy Department, School of Sciences, Universidad Nacional de Colombia. Bogotá (Colombia). jjlopezg@unal.edu.co
Paul BROWN. PhD. Director Public Health and Health Sciences Research Institute, University of California. Merced, CA (United States). pbrown3@ucmerced.edu
Javier ESLAVA-SCHMALBACH. MD, PhD. Professor. Hospital Universitario Nacional de Colombia; & Clinical Research Institute, Faculty of Medicine, Universidad Nacional de Colombia. Bogotá (Colombia). jheslavas@unal.edu.co

antibiotics.⁷⁻¹² These studies highlight the importance of the structure of the healthcare system, norms of use among the population, and knowledge as key determinants in motivating the inappropriate use of antibiotics.

The purpose of this study is to explore the perceptions regarding the use of antibiotics without prescription in Bogotá, Colombia. A previous survey in Colombia identified that over 55% of the population reported using antibiotics without a prescription, citing delays and the time required to seek medical appointments, lack of economic resources, and problems getting leave from work as important factors.¹³ This study extends that work by examining the motivations and attitudes toward the use of antibiotics without prescription. Focus groups with residents of Bogotá explored the interpersonal, environmental, and organizational factors influencing decisions about the use of antibiotics.

METHODS

Sampling and recruitment

Participants were from Bogotá, Colombia (population est. of 8 million).¹⁴ Approximately 94% of the residents of Colombia has some access to health insurance.¹⁵ Residents of Bogotá were purposely sampled to obtain diverse experiences and ideas about the use of antibiotics without prescription. Inclusion criteria were being adult (18 years old or older) and literate. To help ensure diversity in socioeconomic status, participants were recruited from different areas of Bogota, including public schools (low to medium socioeconomic levels) and private companies (medium to high socioeconomic levels). Participants' level of education and access to health services were assessed to ensure variability in the sample. Focus groups were held separately for participants from each area.

During the recruitment phase, people were informed about the methodology of the research, that their participation would be voluntary, and that they would receive 20,000 COP (USD 7) in gratitude for their time. There were between four and ten participants per focus group.

Study design

Focus groups sessions were carried out. The aim was to collect information on the factors related to the practice of self-medication to support future interventions.

During the project formulation, researchers spent eight months asking people in Bogotá about the use of antibiotics without prescription, and observing cases when people take antibiotics without prescription. Based on this, four topics of interest were selected:

- Ideas in the community about antibiotics.
- Characteristics of the use of antibiotics without prescription.
- Main motivations for this behavior.
- Potential interventions to avoid the practice.

A semi-structured interview guide was developed using previous literature and knowledge of the Colombian health care setting. Three literature searches targeting Colombian

and international studies were conducted. The first searched for studies relating to situational factors influencing the decision to self-medicate with antibiotics (e.g., source of antibiotics, person who advised its use, symptoms of the patient, etc.) in Colombia. The second focused on studies from Colombia that explored the ideas, motivations, or reasons to self-medicate with antibiotics. And the third focused on international studies, including interventions aimed at reducing self-medication. A search strategy for each topic was defined in advance and conducted using Medline, Embase and Lilacs databases. The quality of the papers was assessed using STROBE Statement for Observational Studies and Consolidated Criteria for Reporting Qualitative Research (COREQ).^{16,17}

Three relevant papers were found in the first search, two in the second, and a further nine in the third.^{4,13,18-27} Some risks of information and selection bias were identified in these studies. The findings of literature review are summarized in Table 1. The semi-structured interview guide was developed and then revised in light of the feedback from an expert in qualitative research. Final version is in Online appendix 1.

The interview guide began by clarifying the concept of antibiotics for all participants; then, the use under prescription was mentioned, along with difficulties in accessing medical services. Next, the use of antibiotics without prescription was discussed and defined as the topic of interest for the conversation. After that, the discussion phase began.

Data collection

Four focus groups were conducted, including two at public schools and two in companies. The focus groups were conducted in Spanish—the participants' native language—by a member of the research team who is a pharmacist and had previous experience in conducting focus groups about the use of antibiotics in the community. Participants in the focus groups were informed that while the sessions would be audiotaped, their comments would be completely confidential and they may leave the session whenever they wished. The estimated duration of each focus group session was one hour. Written informed consent was read and signed by participants before starting.

The focus group sessions were conducted in a private room where the subjects were recruited for the study. Sessions were audiotaped and transcribed verbatim. These transcriptions were subsequently checked against the audios by the interviewer.

A constant comparison approach was used with researchers reviewing and thematically analyzing the transcripts at the end of each session. Data collection ended when the research team concluded that data saturation had been met for each of the different social groups.

Data analysis

Thematic analysis followed the framework method.²⁸ After becoming familiar with the audios and transcripts, two researchers independently coded data by using the QDA MINER LITE v 1.4.6 program. Transcripts were initially coded line by line, following the topics already identified in

Theme	Code	Findings	Reference
Ideas in the community about antibiotics	Effectiveness	Most people know that antibiotics work for infections.	4
	Risks	No study has asked people about this.	
	Resistance	No study has asked people about this.	
Characteristics of the use of antibiotics without prescription	Prevalence	56.1% have already self-medicated with antibiotics.	13
	Antibiotic	Amoxicillin, dicloxacillin and cephalixin.	4,18
	Symptoms	Respiratory, skin, urinary.	4,13
	Sources	Pharmacy, leftovers, shared with partners.	13
	Suggested by	Patient, pharmacy worker, relative, friend.	4,13
Main motivations for this behavior	Lack of resources	Time, money.	4,13
	Ideas	Medical appointment is not necessary: I already know what to take.	
	Health system	Delay in receiving attention.	
	Society	No permission to go to see a doctor. No medical insurance.	
Potential interventions to avoid the practice	Legislation to control antibiotics' sales	Already implemented in Brazil and Mexico.	19-21
	Education	Mixed evidence of effectiveness.	22-24
	Interventions in pharmacies	Effective.	25,26
	Prescriptions by other health professionals	Effective.	27

literature reviews (Table 1). The results of the two codifications were combined to obtain a single result. Any disagreement was resolved by consensus. These preliminary findings were analyzed by the research team. During this second discussion, existing codes were analyzed and further codes emerged from the data which could have not been predicted. Ideas mentioned by the participants that were novel in the study of this problem were identified. The final codification is in Table 2. Finally, data were charted into the framework matrix and analyzed by the authors.

Ethics approval

This research was approved by the ethics committee of the school of Sciences of the Universidad Nacional de Colombia on 2 May 2016.

RESULTS

Four focus groups were carried out between June and July 2016. In focus group #1 (FG#1), participants of low to middle socioeconomic level were reached in a public school. Focus group #2 (FG#2) was composed of participants of low socioeconomic level, recruited in another public school. Focus group #3 (FG#3) was intended

to interview participants of middle socioeconomic level, workers in a public institution. Finally, focus group #4 (FG#4) included participants of high socioeconomic level who worked in a private company.

In total, 21 people aged between 25 and 50 years participated (four in FG#1, five in FG#2, four in FG#3, and eight in FG#4). Gender, occupation, and educational level of participants are shown in Table 3. All participants contributed to the discussions, and no participant expressed or exhibited discomfort or displeasure with the other participants, the interviewer, or the questions. Participation was rich and fluent throughout sessions. Each session lasted one hour except for FG#2, which lasted 80 minutes. During the recruitment phase, six people refused to participate, claiming time limitations. No participant withdrew during the sessions.

Ideas about antibiotics

A: Antibiotic therapy

Diverse ideas about antibiotic therapy were found among focus groups. Firstly, some participants throughout the conversation confused antibiotics with other medications, even though the concept was explained in advance. For example:

Theme	Code
Ideas about antibiotics	A. Antibiotic therapy
	B. Effectiveness vs. safety
	C. Resistance
Self-medication experiences	A. Awareness and approval
	B. Associated symptoms
	C. Antibiotics known by the community
	D. Source of antibiotics
	E. Agent
Reasons to self-medicate	A. Problems related to health system
	B. Previous experiences
	C. Resources
	D. Society
	E. Factors that discourage self-medication
Possible interventions	A. Suggested by participants
	B. Suggested by interviewer

Table 3. Characteristics of the focus groups participants.				
Code	Gender	Education	Occupation	Medical insurance*
FG1-1	Female	Post-graduate	Worker	Regular
FG1-2	Female	Technical	Housewife	Regular
FG1-3	Female	High school	Housewife	Regular
FG1-4	Female	High school	Housewife	Regular
FG2-1	Female	High school	Independent worker	Regular
FG2-2	Female	High school	Independent worker	Regular
FG2-3	Female	High school	Housewife	Regular
FG2-4	Female	High school	Worker	Regular
FG2-5	Female	High school	Independent worker	Regular
FG3-1	Female	Professional	Worker	Special
FG3-2	Female	Professional	Worker	Special
FG3-3	Female	Post-graduate	Worker	Special
FG3-4	Female	Professional	Worker	Regular
FG4-1	Male	Post-graduate	Worker	Special
FG4-2	Male	Post-graduate	Worker	Special
FG4-3	Female	Post-graduate	Worker	Special
FG4-4	Female	Post-graduate	Worker	Special
FG4-5	Female	Post-graduate	Worker	Special
FG4-6	Female	Post-graduate	Worker	Special
FG4-7	Female	Post-graduate	Worker	Special
FG4-8	Male	Post-graduate	Worker	Special

* To facilitate the analysis, participants were classified into two broad categories: Regular health insurance, with normal attention times and basic services; and special health insurance, with expedited access and extra services.

FG2-1: “(my mom) had medication for the heart, for diabetes, for blood pressure, and my brothers had antibiotics for blood pressure.”

FG3-1: “I think I had used antibiotics, but maybe I’m ignorant. Is acetaminophen an antibiotic?”

However, others had a better idea about which drugs are antibiotics and their use:

FG2-5: “...to treat infections, like tonsillitis or otitis.”

FG3-4: “Acetaminophen is not an antibiotic. Antibiotics are like amoxicillin.”

Participants expressed different positions regarding the duration of the antibiotic therapy. Some people do not understand the need to complete a treatment course and others still have doubts:

FG3-1: “Once I only gave half the treatment to my son. When I noticed he was fine, I suspended the antibiotic. Because I thought that the less medicine the better. Usually I do not complete the cycles that doctors say, that of eight days.”

FG4-3: “My grandmother used to say that you had to complete the cycle of an antibiotic treatment, otherwise it would not work for you. This is a doubt I’d like to clarify.”

B: Effectiveness vs safety

When contrasting the ideas about effectiveness and safety, some participants identified antibiotics as powerful agents with the ability to heal fast:

FG4-8: “Because I want something that relieves me quickly, I’ve said to the doctor: give me an antibiotic. Because the belief is that the antibiotic acts faster, it’s more effective, much more powerful and then I’ll last less time feeling sick.”

FG1-3: “Antibiotics work almost always.”

At the same time, acknowledged the risks associated with antibiotics:

FG1-4: “I have heard that the antibiotics are dangerous, that they affect body defenses and make you feel weak.”

FG4-7: “My family used to say that antibiotics were such a bad thing that they even affect the teeth.”

This suggests that participants understood that antibiotics are a strong agents with the capability of healing and hurting at the same time. As one participant expressed it:

FG2-2: “The antibiotic has a benefit, but at the same time can work against to you. (...) this [the antibiotic] is going to heal you, but also affects other parts of your body. For example, in the case of children, it can affect teeth, eyes, red blood cells...or at least that is what people use to say.”

C: Resistance

In all groups, participants expressed some knowledge, even if vague or imprecise, about bacterial resistance. This is obtained through previous experiences, others’ experiences, or people’s comments.

FG3-1: “I have not thought about this, but I have heard what people say. Bacteria become resistant—this is to say that suddenly they join together and become stronger and do not accept the antibiotic. Then, if you take the antibiotic, this is not going to work.”

FG4-1: “The doctor said that if we gave the antibiotics four or five times per year, our son would produce defenses against the antibiotics, and he would need a stronger one. If the boy gets used to the antibiotic, he would need a higher level.”

When participants were asked about the seriousness of the antibiotic resistance problem, many expressed doubts. In addition, when the interviewer commented that resistance could be transmitted to others, participants showed surprise. Regarding this, participant FG2-5 said: “every day you learn something new”.

Self-medication experiences

A: Awareness and approval

In all the focus groups, participants said that in Bogotá self-medication with antibiotics is commonly practiced, either by themselves or by acquaintances. However, in no focus group was it explicitly affirmed that this was a good practice; on the contrary, several comments suggested disapproval. For example:

FG1-4: “My brothers use to self-medicate, but I do not like it. I rather prefer to go to the emergency room.”

FG4-5: “I want to teach my children to behave correctly. They do not know that I take antibiotics without prescription.”

B: Symptoms associated with self-medication

According to participants' comments, self-medication with antibiotics is commonly used to treat respiratory diseases. For example:

FG3-4: “Once my daughter had a sore throat. I looked for amoxicillin, I already knew that would work. She took three pills, and it was enough.”

However, in the hypothetical case that they had urinary symptoms, participants would always prefer to see a doctor, an even wait or pay for a medical appointment. Participant FG3-3 said: “I would see a doctor in that case [urinary symptoms], because those are strange sensations.”

C: Antibiotics known by the community

Amoxicillin was frequently mentioned during focus groups. Some participants used this medication to self-medicate:

FG2-5: “I regularly self-medicate. I already know the symptoms. When I feel earache and fever, I take acetaminophen and amoxicillin for 7 days, 21 capsules.”

FG4-5: “When I have a sore throat, doctors always give me amoxicillin. I already know! Then, when I have the symptoms, I go to buy the same. It always works!”

Other antibiotics mentioned by more than one participant were ampicillin, penicillin, benzyl-penicillin, and trimethoprim. In some cases, these were mentioned when referring to self-medication experiences.

D: Source of antibiotics

Basically, two sources of antibiotics for self-medication were identified. The more common was the pharmacy:

FG3-2: “If you are not close to a medical center, then, why do you have to go to a clinic? Better, let's go to the closest pharmacy. This is an alternative for you.”

FG4-5: “I have a pharmacy close to my house. They sell them [the antibiotics] to me without any kind of prescription.”

The second source is leftovers:

FG1-4: “I know a lady that was sick and I told her to visit the doctor. She answered that she had leftovers of a previous prescription. That she would take them because in the medical center she would receive the same drug.”

FG2-1: “You can keep some antibiotics for the next time.”

In general, participants prefer their own leftovers over others'. The latter option was barely mentioned, and some suggested a disqualification of other's practices of sharing antibiotics with their partners. Online purchase of antibiotics was not mentioned.

E: Agent

The influence of the agent in the decision to take antibiotics was noticed. The agent is known as the person or entity that can make decisions on behalf of another, or that affect another, known as the principal, which in this case would be the patient. The agent-principal relationship that has been most studied in health has been that of the physician and patient, but there may be others, like pharmacy storekeeper-client. The pharmacy storekeeper is the person who serves people at the pharmacy.²⁹

Pharmacy storekeepers were frequently mentioned as sources of medical information in the neighborhood. The advantages offered by the pharmacy worker are clear. Definitely, the attention in the drugstores is faster than in medical centers.

FG1-2: “If I'm caring for a very sick person, but I have to wait many hours [to receive attention] and I notice that he has high fever and notorious symptoms, I get desperate, and leave the medical center. What should I do? Go to the pharmacy storekeeper.”

In addition, the pharmacy storekeeper is usually a person known for years in the neighborhood, who is close to their neighbors and they trust him.

FG1-1: “In my neighborhood, he [the pharmacy storekeeper] was the savior. (...) Anytime you have symptoms, you visit him and get an injection. (...) I think half the neighborhood had contact with antibiotics because of him.”

FG2-2: “I got to know him [the pharmacy storekeeper] because he is broadly known in the neighborhood. (...) If he recognizes that he cannot do anything, he tells patients to go see a doctor. (...) Other pharmacy storekeepers sell the most expensive medicines. The one that I know does not do that.”

This person shows professionalism by looking into more about the disease and not prescribing hastily.

FG2-1: “I like that he asks what I have taken before. No-one else asks me what I have taken before. (...)”

When I show up at the pharmacy, I tell him if I have taken an herbal tea or an acetaminophen. Then he already knows and can identify what I can take now."

Finally, the pharmacy worker has advantages in terms of the quality of the product offered.

FG2-2: "While you go to the doctor and they give you the acetaminophen, he [the pharmacy storekeeper] changes the acetaminophen for an ibuprofen that works better. That is, while there [in the medical center], one is prescribed acetaminophen but he gives the option of taking something a little bit stronger, not generic."

Even participants with a higher education level or easy access to the medical service trust the pharmacy storekeeper:

FG4-6: "They [pharmacy storekeepers] learn every day."

However, at this point, there was disagreement, since others argued that the training of professionals such as nurses was better. For example, participant FG3-4 said: "I prefer the nurse [over the pharmacy storekeeper] because he studied more."

Secondly, participants self-medicate with the same antibiotic that already worked to relieve the known symptoms. This is the case of participants FG2-5 and FG4-5, quoted in section 3.2 C, and the experience related by participant FG1-4 in section 3.2 D.

Other agents could be a relative or friend with previous experiences.

FG2-2: "Your neighbor. Usually you tell her how you feel and she tells you what to take. Could be either your neighbor or your sister."

Finally, people do not trust websites to inform them about the use of antibiotics when they feel sick. Participant FG4-5 said: "According to my experience, searching online was not a good option (...) you are not certain about the sources."

Reasons to self-medicate

A: Problems related to the health system

Regarding reasons to self-medicate with antibiotics, there was a difference between social groups. Problems with access to the health system were referred to as the main cause by workers and housewives from the lower socioeconomic class (FG#1 and FG#2). These are their experiences:

FG2-1: "They examine you and two hours later they attend to you. Then, they come back to you, examine you again, and ask you to wait again. I tell you this because this has happened to me. I have had to wait almost seven hours to receive attention. That's the reason I do not go to see a doctor."

FG1-2: "If I go to the emergency room, people are completely gathered (...) and I have to wait hours and hours."

In addition, participants' previous experiences have created distrust in physicians, claiming that they only prescribe analgesics, the criteria between them are contradictory, and sometimes they show little interest in their patients:

FG2-4: "You stay the whole day there [medical center] and only receive an acetaminophen."

FG2-5: "[I visit] another doctor, and he says 'why did that other doctor prescribe you this?' And they start to contradict each other, and that has produced distrust in me. This makes me feel unconfident."

FG2-3: "The drugs I received at the hospital did not work."

It is interesting that groups of people with better access to health services mentioned that if they did not have that possibility, they would self-medicate to avoid having to go to the regular medical service. When asked to suppose they did not have special medical insurance, participants of FG#4 argued:

FG4-3: "I would go to a pharmacy and do whatever they told me to do."

FG4-4: "And if dad was not doctor, I would show up at the pharmacy and do whatever they say. I would not stay in a line for 1000 hours."

B: Previous experience

Prior knowledge about the medicine that may work was a reason frequently mentioned by participants with preferential medical service (FG#3 and #4). This is the case of participant FG4-5 in section 3.2 C. Also, a participant of FG#3 said:

FG3-2: "I considered that the symptoms were the same, and since I had been already prescribed this, and this worked the first time I bought it, in this case I would buy it again, because it was good and worked."

C: Resources

Regarding resources, participants of FG#1 mentioned that self-medication represents some economic savings. However, in FG#2, everybody agreed with participant FG2-1's preference for saving time:

FG2-1: "If I'm going to spend \$10.00 when I visit a doctor, here [in the pharmacy] I spend \$20.00, but save time."

D: Society

The only factor related to society was mentioned by participant FG3-3. She answered that one reason to self-medicate with antibiotics would be having to work.

E: Factors that discourage self-medication

On the other hand, three factors that prevent the practice of self-medication with antibiotics were identified. To begin with, a base disease that represents a certain severity can

lead the person to be attentive to any symptom and look for immediate medical attention:

FG1-2: "I have a heart problem. I cannot take anything without first seeing a doctor. Otherwise, I can aggravate my problem."

It was also found that those mothers who have experienced serious illnesses in their children in some cases become more aware of the risks associated with the misuse of drugs, and they avoid taking them without the prior recommendation of a physician.

Finally, several people in the different focus groups rejected self-medication for the children. Participant FG#2-5 said: "I self-medicate myself and my husband. But I don't do this with my children."

Possible interventions

A: Suggested by participants

When asked about possible interventions to address this situation, education was demanded in all focus groups:

FG1-2: "There should be advertising to inform about the risks of taking or not taking it, why and what it works for."

FG4-4: "People can receive education at work, which is the place where people spend most of their time."

Also, in all the focus groups, participants mentioned measures to definitely restrict the sale of antibiotics without prescription. However, some disagreed, arguing that it would be ineffective:

FG1-2: "I think that it [getting antibiotics] would then become an illegal business. One way or another, people would get them."

Finally, participants of low socioeconomic status suggested improving access to health services. For example:

FG2-5: "They should improve the medical attention. There is no other solution."

B: Alternative solutions suggested by interviewer

After hearing participants' suggestions, the interviewer suggested a couple of alternative interventions. The first was about having an official call center or website to receive advice on self-care from health professionals. Secondly, a fast service provided by other health professionals, but not doctors, in person and in the medical center was suggested. Neither of these options was well accepted by participants. They demanded a medical service provided by a doctor in person.

DISCUSSION

The objective of this study was to expand the understanding of the motivations, attitudes, and experiences related to antibiotics and their use without prescription in Colombia. The results suggest that access to antibiotics without prescription was widespread throughout pharmacies in Bogotá, in accordance with the findings of previous studies.³⁰ A primary reason for self-

medication was a lack of access to prescribed medications due to difficulties to get health services. Even those with adequate access to health insurance report being willing to use a treatment without a prescription if they have confidence in its effectiveness. In addition, the results suggest that while the patient's relationship with the physicians is highly influential, pharmacy storekeepers have a special position in the community. Some participants reported that these storekeepers are more trusted than other trained health professionals, including medical doctors. Some participants even reported being reluctant to accept prescriptions provided by other professionals. The results also suggest there is a need for reliable information, including the duration of a treatment with antibiotics.

This study builds upon previous quantitative studies of antibiotic use in Colombia.^{4,13,18} As in those studies, the results here suggest that the availability of antibiotics without a prescription and barriers to accessing primary care providers (including cost) are contributing factors to inappropriate use of antibiotics. This work extends the analysis by examining the motivations and attitudes toward the use of antibiotics without prescription, including the perceptions about pharmacy storekeepers and misconceptions about antibiotics and bacterial resistance.

The results are broadly consistent with the findings from previous studies. Health care access problems and relationship with doctors have been found in other studies as motivations for the non-prescription use.^{8,9,31} In this study, participants of all social groups argued that medical appointments are delayed and that attention in the Emergency Room can take many hours. In addition, service provided by the doctors is insufficient and even negligent. They feel that neither the insurance companies, nor the doctors are really interested in their health.

This is consistent with the results from a study in the U.S. on Latino emigrants, where some new arrivals report dissatisfaction with the services provided by physicians who seem unwilling to help or discuss their diseases and treatment.⁹ The emigrants considered that the need to have a medical prescription to buy a drug is just to enrich doctors. Latino adults frequently perceive that doctors want them to go for more than one visit just to earn more money, not for the patients' welfare.³¹

In addition, the important position of the pharmacy storekeeper found in this study is similar to the situation of other countries.^{7,8} It has already been described how shopkeepers and drug sellers prescribe drugs, especially in societies with poor health care systems. Their 'recipes' are affordable. Another advantage is that they can also be purchased by a person representing the patient. For the patient, a prescription shows to his peers that he is sick and he is entitled to the privileges and functions reserved for the sick. If the doctor does not prescribe a drug, he will use other means to legitimize his illness.³²

In the U.S., migrant community can get antibiotics from small stores in Latino neighborhoods where ethnically consistent and some imported products are sold. The storekeepers are reliable sources of medical information, since they are respected among the community and also

longstanding.⁷ They become reputable by the references provided via word-of-mouth, and emigrants have established a close relationship over years. Corner store clerks act also as lay pharmacists or nurses, providing advice about the required drug and required posology. Their advice is highly valued by community, even more in the absence of a doctor.⁸ This situation can take place even in developed countries.

The misperceptions about antibiotics identified in the focus groups is consistent with other studies which found that people expect drugs to be useful in solving their problems regardless of the therapeutic group.³²⁻³⁵ The fact that some participants did not distinguish antibiotics from other drugs, even after the interviewer's explanation, raises the possibility that antibiotics might have acquired a symbolic role as being an effective treatment for ailments other than the appropriate conditions. That is, people may see antibiotics as a more tangible way to deal with a health issue than other types of treatments.³²⁻³⁵ The perceived curative value separates antibiotics from other types of treatments that require medical supervision.

The results suggesting that people see antibiotics as effective for treating mild and common condition, like respiratory diseases, is consistent with the results from a study of Latino adults in Charleston, South Carolina. Participants in that study expressed a confidence in knowing how to treat uncomplicated illnesses, with visiting the doctor being reported as being excessive. Previous experiences with antibiotics are taken as reference to use the same antibiotic once again.³¹ In this way, they are ignoring that the use of antibiotics in most of the mild and common conditions is unnecessary.³⁶⁻³⁸

The results from this study suggesting that parents would not administer non-prescribed antibiotics to their children are consistent with findings from a previous studies, including cross-sectional study in India that found 85.2% of parents reported not being willing to give leftovers of antibiotics to their children.^{31,39} However, a study in Lebanon found that 58.4% of participants thought that administering non-prescribed antibiotics to children was correct.⁴⁰ It is unclear whether these differences are due to differing perceptions of the potential impact on children's health or resulting from a lack of access to primary care in some counties.

The understanding of antimicrobial resistance was vague among participants. They had doubts about seriousness of resistance, but at the same time, they could list a number of adverse effects related with the antibiotics. This is consistent with the results of a previous study in New Zealand where concerns about using antibiotics were related with toxicity rather than concerns about drug resistance.¹¹ Conversely, in Sweden, a country with relatively low rates of inappropriate antibiotic use, participants identified resistance as a health problem with terrible consequences even though it was very unlikely to affect them.¹² Future studies should examine whether an appropriate understanding of the dangers of resistance makes it less likely that people will inappropriately use antibiotics and the stability of those views in the face of barriers to access that exist in other countries.

The results have implications for the development of interventions aimed at reducing inappropriate use of antibiotics. While it has been noted that educational interventions on the use of antibiotics should consider the base knowledge of the audience for its development, the results here suggest these campaigns should also take into consideration the access issues that motivate much of this behavior.²⁴ These interventions might also include information about the transmissibility of bacterial resistance genes.⁴¹ This concept relates with the individual responsibility of appropriately using antibiotics to avoid affecting members of the community, an issue that is even more complicated when the life is at risk.¹²

Global authorities leading actions to tackle antimicrobial resistance draw attention to interventions to control access to antibiotics in the community.⁴² Although, plans have already been developed worldwide on this regard, some difficulties have been identified in these. For example, Mexico implemented programs to restrict the sale of antibiotics in pharmacies. This intervention was boycotted in the mass media by pharmacy owners affected by the measures. Additionally, people found ways to avoid the restrictions and continue to access antibiotics.^{43,44} Restrictive access would not completely solve this problem.

The implementation of strong controls to avoid over-the-counter sales of antibiotics was suggested by participants and some people may support this action because the use of antibiotics without prescription is already considered an inappropriate action. However, pharmacy storekeepers and individuals engaged in this practice can find a way to evade any control. This suggests that these actors should be involved as part of the solution, not part of the problem.

Regarding health services, the declared barriers to access to medical attention contrast with the easy and convenient access to antibiotics. It is necessary to favor access to health services to reduce non-prescription antibiotic demand. In the UK and the USA, non-medical prescribing has been authorized to enhance patient access to treatments.^{45,46} However, participants expressed disagreement with a measure like this. Appropriate training and the active promotion of capabilities of other health professionals is needed to implement alternative solutions.

On the other hand, former experiences in Mexico identified that education of the community is highly recommended when implementing measures to promote the use of antibiotics solely under prescription.⁴³ People need to be informed about the difference between viral and bacterial infections. Also, the uselessness of antibiotics needs to be clear. Didactic aids that correlate symptoms with viral disease evolution may prevent people from demanding antibiotics.

Given these findings and the understanding of antibiotic use without prescription, interventions can be designed. Future research can explore the effectiveness of such actions and how the previous knowledge about a public health problem actually supports the development of assertive actions.

The present study has several limitations. First, while the aim was to include participants from a wide range of socioeconomic backgrounds and conditions, the method of

selecting those participants (recruit at various locations) did not assure that there was adequate representation from many groups, including young people, the elderly, and marginalized groups. Thus, these results should be understood as representing the views of the participants in the study but not a thorough exploration of the views of the diverse populations that live in Colombia or even in Bogota. Additional studies are needed to identify how the views of other groups differ from those reported here.

Secondly, because participants were being asked to discuss a behavior – inappropriate use of antibiotics – with a research team, they might have been reluctant to express some views. This could have biased their comments in order to please the interviewer or the other participants. While confidentiality was granted from the beginning, and in all focus groups some participants admitted their bad practices related to antibiotics, future studies should consider other methodologies that might address this issue.

CONCLUSIONS

The study extends the knowledge of ideas in the community about inappropriate use of antibiotics, including the key role of pharmacy storekeepers. The results have implications for interventions aimed at

reducing inappropriate use of antibiotics, highlighting i) how lack of access to timely care creates an incentive to self-prescribe, ii) the key role pharmacy storekeepers play in the Colombian healthcare system and the need to include them in interventions, and iii) the misconceptions about inappropriate use of medications that need to be addressed by educational programs.

ACKNOWLEDGEMENTS

The authors thank Juliana Lopez—social worker—for her support in guiding the data analysis. Also, research assistants' support was greatly appreciated. This paper was reviewed by Proof-Reading-Service.com Ltd.

CONFLICT OF INTEREST

The authors state that they do not present any conflict of interests in the present investigation.

FUNDING

This work was supported by the Colombian Administrative Department of Science, Technology and Innovation COLCIENCIAS and the University of California, Merced.

References

1. World Health Organization. Containing antimicrobial resistant. review of literature and report of workshop on the development of a global strategy for the containment of antimicrobial resistant. Geneva: WHO; 1999.
2. World Health Organization. Combat drug resistance: no action today means no cure tomorrow. Statement WHO Director General, Dr Margaret Chan 6 april 2011. Available at: https://www.who.int/dg/speeches/2011/WHD_20110407/en/ (accessed Oct 16, 2018).
3. Morgan DJ, Okeke IN, Laxminarayan R, Perencevich EN, Weisenberg S. Non-prescription antimicrobial use worldwide: a systematic review. *Lancet Infect Dis*. 2011;11(9):692-701. doi: [10.1016/S1473-3099\(11\)70054-8](https://doi.org/10.1016/S1473-3099(11)70054-8)
4. Ortiz SP, Buitrago MT, Eslava DG, Caro A, Henríquez Iguarán D. [Characterising the purchase of antibiotics in drugstores in Bogotá: a users' perspective]. *Rev Investig Segur Soc Salud*. 2011;13(1):15-29.
5. World Health Organization. Worldwide country situation analysis: response to antimicrobial resistance. Geneva: WHO; 2015. ISBN: 978-92-4-156494-6.
6. Albrich W, Monnet D, Harbarth S. Antibiotic Selection Pressure and Resistance in *Streptococcus pneumoniae* and *Streptococcus pyogenes*. *Emerg Infect Dis*. 2004;10(3):514-517. doi: [10.3201/eid1003.030252](https://doi.org/10.3201/eid1003.030252)
7. Larson EL, Dilone J, Garcia M, Smolowitz J. Factors which influence Latino community members to self-prescribe antibiotics. *Nurs Res*. 2006;55(2):94-102.
8. Horton S, Stewart A. Reasons for Self-Medication and Perceptions of Risk Among Mexican Migrant Farm Workers. *J Immigr Minor Health*. 2012;14(4):664-72. doi: [10.1007/s10903-011-9562-6](https://doi.org/10.1007/s10903-011-9562-6)
9. Coffman MJ, Shobe MA, O'Connell B. Self-prescription practices in recent latino immigrants. *Public Health Nurs*. 2008;25(3):203-211. doi: [10.1111/j.1525-1446.2008.00697.x](https://doi.org/10.1111/j.1525-1446.2008.00697.x)
10. Homedes N, Ugalde A. Mexican pharmacies and antibiotic consumption at the US-Mexico border. *South Med Rev*. 2012;5(2):9-19.
11. Norris P, Chamberlain K, Dew K, Gabe J, Hodgetts D, Madden H. Public Beliefs about Antibiotics, Infection and Resistance: A Qualitative Study. *Antibiotics (Basel)*. 2013;2(4):465-76. doi: [10.3390/antibiotics2040465](https://doi.org/10.3390/antibiotics2040465)
12. Ancillotti M, Eriksson S, Veldwijk J, Nihlén Fahlquist J, Andersson DI, Godskesen T. Public awareness and individual responsibility needed for judicious use of antibiotics: a qualitative study of public beliefs and perceptions. *BMC Public Health*. 2018;18(1):1153. doi: [10.1186/s12889-018-6047-8](https://doi.org/10.1186/s12889-018-6047-8)
13. Fajardo-Zapata ÁL, Méndez-Casallas FJ, Hernández-Niño JF, Molina LH, Tarazona AM, Nossa C, Tejeiro JL, Ramírez N. [Self-medication with antibiotics : public health problem]. *Salud Uninorte*. 2013;29(2):226-235.
14. Departamento Administrativo Nacional de Estadística de Colombia. Population and Demography. 2018. <https://www.dane.gov.co/index.php/en/statistics-by-topic-1/population-and-demography/population-projections> (accessed Dec 10, 2018).
15. Ministerio de Salud y Protección Social. En 2015 aumentó en 990.385 personas el número de afiliados al sistema de salud. Boletín Prensa No 069 2016. 2016:2. <https://www.minsalud.gov.co/Paginas/En-2015-aumento-en-990.385-personas-el-numero-de-afiliados-al-sistema-de-salud.aspx> (accessed Dec 10, 2018).
16. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: guidelines for reporting observational studies. *Ann Intern Med*. 2007;147(8):573-577. doi: [10.7326/0003-4819-147-8-200710160-00010](https://doi.org/10.7326/0003-4819-147-8-200710160-00010)

17. Tong A, Sainsbury P, Craig J. Consolidated criterio for reporting qualitative research (COREQ): a 32- item checklist for interviews and focus group. *Int J Qual Health Care*. 2007;19(6):349-357. doi: [10.1093/intqhc/mzm042](https://doi.org/10.1093/intqhc/mzm042)
18. Espinosa JC, Fredy J, Geovo A, Andrea P, Novoa S. [Prevalence and determinants of self-medication with antibiotics in a community of Santiago de Cali in Colombia]. *Rev Cuba Farm*. 2014;48(1):43-54.
19. Santa-Ana-Tellez Y, Mantel-Teeuwisse AK, Dreser A, Leufkens HGM, Wirtz VJ. Impact of over-the-counter restrictions on antibiotic consumption in Brazil and Mexico. *PLoS One*. 2013;8(10):e75550. doi: [10.1371/journal.pone.0075550](https://doi.org/10.1371/journal.pone.0075550)
20. Moura ML, Boszczowski I, Mortari N, Barrozo LV, Chiaravalloti Neto F, Lobo RD, Pedroso de Lima AC, Levin AS. The impact of restricting over-the-counter sales of antimicrobial drugs: preliminary analysis of national data. *Medicine (Baltimore)*. 2015;94(38):e1605. doi: [10.1097/MD.0000000000001605](https://doi.org/10.1097/MD.0000000000001605)
21. Santa-Ana-Tellez Y, Mantel-Teeuwisse AK, Leufkens HGM, Wirtz VJ. Seasonal variation in penicillin use in Mexico and Brazil: analysis of the impact of over-the-counter restrictions. *Antimicrob Agents Chemother*. 2015;59(1):105-110. doi: [10.1128/AAC.03629-14](https://doi.org/10.1128/AAC.03629-14)
22. Alden DL, Tice AD, Berthiaume JT. Investigating approaches to improving appropriate antibiotic use among higher risk ethnic groups. *Hawaii Med J*. 2010;69(11):260-263.
23. Mainous AG, Diaz VA, Carnemolla M. A community intervention to decrease antibiotics used for self-medication among Latino adults. *Ann Fam Med*. 2009;7(6):520-526. doi: [10.1370/afm.1061](https://doi.org/10.1370/afm.1061)
24. Gibson JL. Lessons learned from a student-initiated antibiotic awareness program. *Am J Health Syst Pharm*. 2006;63(17):1590. doi: [10.2146/ajhp060192](https://doi.org/10.2146/ajhp060192)
25. Gastelurrutia MA, Larrañaga B, Garay A, Echeveste FDA, Fernandez-Llimos F. Impact of a program to reduce the dispensing of antibiotics without a prescription in Spain. *Pharm Pract (Granada)*. 2013 Oct;11(4):185-190. doi: [10.4321/s1886-36552013000400002](https://doi.org/10.4321/s1886-36552013000400002)
26. Abuya T, Fegan G, Rowa Y, Karisa B, Ochola S, Mutemi W, Marsh V. Impact of ministry of health interventions on private medicine retailer knowledge and practices on anti-malarial treatment in Kenya. *Am J Trop Med Hyg*. 2009 Jun;80(6):905-913.
27. Reeves D. The 2005 Garrod lecture: The changing access of patients to antibiotics - For better or worse? *J Antimicrob Chemother*. 2007;59(3):333-341. doi: [10.1093/jac/dkl502](https://doi.org/10.1093/jac/dkl502)
28. Gale NK, Heath G, Cameron E, Rashid S, Redwood S. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Med Res Methodol*. 2013;13:117. doi: [10.1186/1471-2288-13-117](https://doi.org/10.1186/1471-2288-13-117)
29. Scott A, Vick S. Patients , Doctors and contracts: an application of principal-agent theory to the doctor-patient relationship. *Scott J Polit Econ*. 1999;46(2):111-134. doi: [10.1111/1467-9485.00124](https://doi.org/10.1111/1467-9485.00124)
30. Vacca C, Niño C, Reveiz L. [Restriction of antibiotic sales in pharmacies in Bogotá, Colombia: a descriptive study]. *Rev Panam Salud Publica*. 2011;30(6):586-591.
31. Mainous AG, Diaz VA, Carnemolla M. Factors affecting Latino adults ' use of antibiotics for self-medication. *J Am Board Fam Med*. 2008;21(2):128-134. doi: [10.3122/jabfm.2008.02.070149](https://doi.org/10.3122/jabfm.2008.02.070149)
32. Van der Geest S, Whyte SR. The Charm of Medicines: Metaphors and Metonyms. *Med Anthropol Q*. 1989;3(4):345-367.
33. Van der Geest S, Whyte SR, Hardon A. The Anthropology of Pharmaceuticals: A Biographical Approach. *Annu Rev Anthropol*. 1996;25(1):153-178.
34. Van der Geest S. The Urgency of Pharmaceutical Anthropology: A Multilevel Perspective. *Curare*. 2011;34(1+2):9-15.
35. Lopez J, Orozco J. Enfoques conceptuales de las actividades asistenciales del farmacéutico [Thesis]. Universidad Nacional de Cordoba, 2016. Available at: <http://www.bdigital.unal.edu.co/59516/78/tesisdoctoradover94.pdf> (accessed Dec 10, 2018).
36. National Institute for Health and Clinical Excellence. Prescribing of Antibiotics for Self-Limiting Respiratory Trac Infections in Adults and Children in Primary Care - Nice Clinical Guideline 69.; 2008. Available at: <https://www.nice.org.uk/guidance/cg69> (accessed Dec 10, 2018).
37. Smith SM, Fahey T, Smucny J, Becker LA. Antibiotics for acute bronchitis. *Cochrane Database Syst Rev*. 2014;(3):CD000245. doi: [10.1002/14651858.CD000245.pub3](https://doi.org/10.1002/14651858.CD000245.pub3)
38. Spinks A, Glasziou P, Del Mar C. Antibiotics for sore throat (Review). *Cochrane Database Syst Rev*. 2013;(11):CD000023. doi: [10.1002/14651858.CD000023.pub4](https://doi.org/10.1002/14651858.CD000023.pub4)
39. Agarwal S, Yewale VN, Dharmapalan D. Antibiotics use and misuse in children: A knowledge, attitude and practice survey of parents in India. *J Clin Diagn Res*. 2015;9(11):SC21-SC24. doi: [10.7860/JCDR/2015/14933.6819](https://doi.org/10.7860/JCDR/2015/14933.6819)
40. Zahreddine L, Hallit S, Shakaroun S, Al-Hajje A, Awada S, Lahoud N. Knowledge of pharmacists and parents towards antibiotic use in pediatrics: A cross-sectional study in Lebanon. *Pharm Pract (Granada)*. 2018 Jul-Sep;16(3):1194. doi: [10.18549/PharmPract.2018.03.1194](https://doi.org/10.18549/PharmPract.2018.03.1194)
41. Del Mar C, Glasziou P, Lowe JB, van Driel ML, Hoffmann T, Beller E. Addressing antibiotic resistance. *Aust Fam Physician*. 2012;41(11):839-840.
42. World Health Organization. Global Action Plan on Antimicrobial Resistance. Geneva: WHO; 2015. Available at: http://www.who.int/drugresistance/global_action_plan/en/ (accessed Dec 10, 2018).
43. Zaidi MB, Dreser A, Figueroa IM. A collaborative initiative for the containment of antimicrobial resistance in Mexico. *Zoonoses Public Health*. 2015;62(Suppl 1):52-57. doi: [10.1111/zph.12166](https://doi.org/10.1111/zph.12166)
44. Dreser A, Vazquez-Velez E, Trevino S, Wirtz VJ. Regulation of antibiotic sales in Mexico: an analysis of printed media coverage and stakeholder participation. *BMC Public Health*. 2012;12:1051. doi: [10.1186/1471-2458-12-1051](https://doi.org/10.1186/1471-2458-12-1051)
45. Cope LC, Abuzour AS, Tully MP. Nonmedical prescribing: where are we now? *Ther Adv Drug Saf*. 2016;7(4):165-172. doi: [10.1177/2042098616646726](https://doi.org/10.1177/2042098616646726)
46. Latter S, Courtenay M. Effectiveness of nurse prescribing: a review of the literature. *J Clin Nurs*. 2004;13(1):26-32. Doi: [10.1046/j.1365-2702.2003.00839.x](https://doi.org/10.1046/j.1365-2702.2003.00839.x)