

“Two-colour capsules”: Self-management of health and the commonly used non-prescribed antibiotics amongst pharmacy customers

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Abstract

Background: Treating a variety of moderate and severe infections affecting human health is now possible thanks to the utilization of antibiotics. This explains why antibiotics are amongst the most commercialized, prescribed and utilized drugs in the world. Nevertheless, the persistent inappropriate use of these precious drugs is growing, with non-prescription sales and practices of self-medication with antibiotics (SMA) undermining the global efforts to rationalize the use and contain the antimicrobial resistance (AMR). This study aimed at identifying the commonly used antibiotics and the main health conditions leading to the practice of self-medication with antibiotics.

Methods: Between October 2018 and March 2019 we conducted a qualitative study with 32 pharmacy customers and 17 pharmacists working in nine private pharmacies in Maputo city. In-depth interviews and focus group discussions (FGD) were conducted with customers while in-depth interviews were held with pharmacists. The interviews were audio-recorded, transcribed, coded and analysed using latent content analysis. The COREQ (Tong, 2007) checklist for interviews and FGD was performed.

Results: The frequent use of non-prescribed antibiotics (NPA) was admitted by 30 of the 32 customers while 15 of the 17 pharmacists admitted NPA dispensing. The commonly used NPA were amoxicillin, cotrimoxazole, azithromycin, metronidazole, amoxicillin with clavulanic acid, tetracycline, doxycycline and erythromycin. Those were used after participants self-diagnosed or self-perceived health conditions related to sore throat, fever, cough, vaginal discharge, eye problem, common flu, urinary infection, respiratory infection, wounds and toothaches.

Conclusion: The self-management of illness, the need to save time and the therapeutic itineraries customers adopt, together with the suboptimal dispensing practices of pharmacists, enabled the growing practices of SMA among pharmacies customers. These paves the way to the utilization of antibiotics as a daily basis as an approach to self-manage health problems. Contextual interventions are needed to involve public health stakeholders, pharmacists and healthcare professionals to enlighten customers regarding the inappropriate use of antibiotics at all levels.

Background

The treatment of various moderate and severe infections affecting human health are now possible thanks to the utilization of antibiotics. It is inestimable the value of such medicines for health and in the increase of life expectancy in 2 to 10 years [1]. This value makes a plausible case for why antibiotics are one of the most commercialized, prescribed and utilized drugs in the world [2–7]. However, the irrational and abusive use of antibiotics in the pursuit of health in agriculture, veterinary and human health is driving the development and spread of antimicrobial resistance globally. Antibiotic resistance accounts for more than 2 million infections and at least 23,000 deaths annually in the United States of America [8] and 25,000 deaths in Europe [9, 10]. While in most low- and middle-income countries (LMICs) data and surveillance reports of infection and antibiotic resistance rates are limited, some reliable estimates

consider these rates to be higher in these countries [2, 11, 12] due to poor infection prevention control measures and the increased burden of infection.

Global trends of antibiotic use estimate that antibiotics are over-used in all regions, with a high incidence in resource constraint countries, some of which use three times the amount of antibiotics per population head compared to other countries with similar disease profiles [1]. Moreover, between 2000 and 2010, the consumption of antibiotic drugs increased in 71 countries by 35%-36%, with countries such as Brazil, China, India, Russia and South Africa accounting for 76% of this increase [8, 13]. The non-prescription sales and consequent practices of self-medication with antibiotics undermines global efforts to reduce the consumption, rationalize the use and contain antimicrobial resistance (AMR). Although self-medication is considered a component of self-care, self-medication with antibiotics may lead to delays seeking medical advice when needed, misdiagnosis, incorrect choice of therapy, incorrect manner of administration (too narrow or too broad), delayed antibiotic therapy in critical patients, and unnecessary use. This exposes patients to increased health risks, such as dangerous drug interactions, adverse drug effects, masking of severe disease, and, most distressing, accidental death and drug resistance [2, 10, 14].

Globally, the sales of antibiotics have increased, especially within the LMICs, where the robustness of the control and law enforcement capabilities are limited, faulty or non-existent. For instance, it is reported that 23% of the increase in the global retail sales volume of antibiotics was attributable to India, where regulations to control over-the-counter sales of antibiotics are poorly enforced [8]. In sub-Saharan Africa, the proliferation of pharmacies and the non-prescription sales of antibiotics have been reported in countries such as Democratic Republic of Congo, Malawi, Mozambique, Namibia, Tanzania and Zambia [15–18].

Latest evidence of Mozambique, has shown a grown research initiatives on the utilization of antibiotics by the public. This manuscript is part of a larger research using the same methodology to explore the practice of SMA in Maputo city. Our previous published manuscript regarding the patterns of SMA in Maputo city, reported five main patterns in which customers acquire the non-prescribed antibiotics namely 1) using the generic name, 2) describing the physical appearance and using empty package, 3) describing symptoms or health problem to pharmacists, 4) using old prescriptions and 5) sharing antibiotics with family, friends, and neighbours [16]. On the other hand, in a study conducted by Rodrigues (2020) in Maputo city, the practices of self-medication with antibiotics were analysed considering the rationales and the relationships among the local households [17]. This study used a sociologic approach to understand the rationales of the local users in Maputo city in light with the everyday practical situating such practices within their contextual contingencies and wider therapeutic consumption practices in individuals' everyday lives [17]. Another study by Mate et al. (2019), aimed at investigating the knowledge, attitudes and practices towards antibiotic use among adults in Maputo city reported poor knowledge about antibiotics and that non-prescribed antibiotics were purchased in pharmacies, despite this being legally prohibited [18].

Despite the evidence brought by the above-mentioned studies, there is still literature gap regarding the commonly used non-prescribed antibiotics in Maputo city. This is worth investigating to generate evidence that will complement the existent evidence. Together, these local evidence would better inform policymakers, health care providers and health promoters. Through this evidence, locally tailored interventions to improve the infection prevention control measures and promote the rational use of antibiotics at all levels can be implemented. This study thus, aimed at identifying the commonly used antibiotics and the main health conditions leading to the practice of self-medication with antibiotics in Maputo city.

Methods

This manuscript is part of a large study conducted in Maputo city aimed at exploring the practices of SMA, the data generated is large in nature thanks to the qualitative method employed and the data collection technique (interviews and focus group discussion) used to deeply understand the utilization of non-prescribed antibiotics. The data collected included; knowledge of antibiotics, patterns of SMA, the reasons participants gave to use non-prescribed antibiotics, the antibiotics used frequently, the dispensing practices of pharmacists and the factors influencing SMA.

Considering the complexity of gathering and report the data in one manuscript, we present the results in 4 manuscripts. Therefore, the study design, the sample size and the overall methodology are the same for all the manuscripts.

Study Design And Setting

This study uses a cross-sectional qualitative approach to develop an understanding of the complexity of the phenomenon of SMA and the utilization of non-prescribed antibiotics for self-diagnosed health problems. Data collection occurred from October 2018 to March 2019 in nine private pharmacies from three socio-economic areas (high, middle and low) of Maputo, the capital city of Mozambique.

Private pharmacies were included as the public pharmacies are run by state-related organizations that strictly enforce the prescription-only dispensing of antibiotics. Private pharmacies are owned by individuals who are licensed to dispense and whose pharmacies are registered within the Ministry of Health (MoH). Despite the legislation governing prescription only medicine (POM), enforcement in the private sector is difficult to non-existent. The National Directorate of Pharmacy (NDP) provided the researcher with a list of 451 private pharmacies, 150 of which based in Maputo city.

Study Participants

Two categories of participants were included: the pharmacy customers and the pharmacy professionals (pharmacists). All participants were residents of Maputo city and spoke Portuguese, the official language

of Mozambique. While the inclusion of customers was due to the need to describe the practice of SMA and record the commonly used antibiotics as well as the reasons for their use, the inclusion of pharmacists was based on the need to enrich the data and capture the views and the perspectives of the dispensers.

Sampling And Recruitment Strategies

Sampling Pharmacies and Pharmacists

There are at least 150 pharmacies in the city in three different socio-economic areas. The registered private pharmacies on the government list were categorized according to the socio-economic status (high, middle and low) of their location (zone) in the city. Using the Excel random number function, three pharmacies were randomly selected from each socio-economic area ($n = 9$). The first three pharmacists in each of the socio-economic zones were recruited by telephone based on information provided to us by the NDP at the Ministry of Health, with modified snowball sampling technique being used to recruit the other pharmacists working in their pharmacies. This was done by asking each pharmacist to identify at least two other pharmacists working in the identified pharmacies who were most likely to consent to participate. We contacted 19 pharmacy professionals, of whom 17 agreed to participate, but after the withdrawal of two, we conducted 15 face-to-face in-depth individual interviews.

Sampling Pharmacy customers

Using a purposeful sampling strategy, the researcher approached pharmacy customers after they had exited the pharmacy. All customers who purchased any medicine between 8:00 am to 6:00 pm during the study period and could not provide a valid prescription was cordially invited to show their medication purchases. If the purchased medicine was an antibiotic in the form of tablets, capsules, pills, drops, cream/ointment or syrup, the customers were invited to participate. Customers less than 18 years old and those purchasing antibiotics on behalf of someone else were excluded. Overall 84 customers were approached, of whom 44 had valid prescriptions and were excluded. The remaining 40 without a valid prescription reduced to 32 with the refusal by eight to participate. Twenty gave consent to participate in individual interviews and 12 to participate in the FGD only. Followed by in-depth interviews, two FGD was held with six participants each.

Study Tools And Data Collection

Pharmacists

The interview guide for pharmacists was developed after an extensive literature review of similar studies. Primary data were collected using face-to-face in-depth interviews with open-ended questions. The interview guide was based on the objectives of the study and consisted of demographic information (e.g.

age, gender, education level, profession), of questions regarding dispensing practices and reasons, the perceptions of pharmacists regarding customers attitudes and behaviours towards antibiotics use, compliance with the law and guidelines for antibiotic dispensing. Interviews occurred at places and times determined by the pharmacists. At the end of each interview, pharmacists were given the freedom to express their views.

Customers

The individual interview guide for customers consisted of demographic characteristics (e.g. age, gender, education level, profession), knowledge about antibiotics, attitudes and behaviors towards antibiotics use, patterns and reasons for SMA, sources and the commonly used antibiotic. Definition of antibiotics, self-medication, antibiotic resistance as well as the list of antibiotics being officially used within the country was included. The FGD aimed to find commonly recurring themes, trends and reasons behind the practice of SMA. Participants from the FGD were different from the individual interviews to ensure a variety of participants. These two tools were combined to reach the central characteristics of the phenomenon across different participants in the individual and group perspective to enrich the data and enhance the trustworthiness of findings [61]. Semi-structured interviews allow for structure, flexibility, and flow, ensuring that the interviewer addresses the research questions in full, prompting and probing respondents for further information where necessary.

Customers participating in the FGD received a small amount (500.00 MTN = R100 = 10 USD) to compensate for transport and call/SMS expenses due to the need to arrange a suitable day and time for the discussion. FGD took place in a public municipality garden in the city centre, in the mornings (a less popular time). A week before data collection, two days' workshop on the research instruments and objectives of the study took place. To ensure that clarity, length, and quality of interview guide, after first 2 interviews, with all categories of participants, research assistants, and the main researcher had a two-hour section to discussing and reviewing the interview guide.

Data Management And Analysis

The interviews were audio-recorded in Portuguese, transcribed verbatim and translated. To check the accuracy of the translation, one randomly selected record was translated and then back-translated by a bi-lingual researcher. The transcripts were coded and thematically analysed. The lead researcher read the transcripts to familiarise herself with the data and made analytical notes to inform the coding stage. Data were coded by two coders. During coding, a selection of transcripts was read line by line and initial labels or 'codes' applied to each passage that described the essential meaning of the data within. The coding tree included the main questions, the answers of participants, and the extracted themes and subthemes.

Results

The results are presented below according to the following themes that emanated from the analysis process namely: a) customers' perceived need for self-management of illness, and expectations when using NPA, b) the importance of time in the self-management of illness, and the past successful experience with antibiotics, c) the antibiotics used for self-medication and d) the main health problems leading to SMA.

Demographics Of Participants

Participants who presented purchased NPA included men 10 (31%) and women 22 (69%) ranging in age from 19 to 67 years old. The average age was 35 years old. The researcher identified four levels of education: primary (1st–7th graders), secondary (8th–12th graders), and first degree (university graduate level). Table 1. Shows the demographic characteristics of customers and pharmacists with variation in age, education level, gender, professional training and years of professional experience.

Table 1
Demographic characteristics of participants

Customers					
Variable	Characteristic	No. (%)	Variable	Characteristic	No. (%)
Age	19–20	3 (9.4)	Gender	Male	10 (31.2)
	21–30	10 (63)		Female	22 (68.8)
	31–40	9 (28)		Primary	7 (21.8)
	41–50	6 (19)		Secondary	16 (50)
	51–67	4 (13)		Tertiary	9 (28.1)
Pharmacists					
Age	24– 34	3 (9.4)	Gender	Male	6 (35.2)
	35–44	10 (63)		Female	11 (64.7)
	45–47	9 (28)		Professional Experience	1–5 years 10 (58.8)
					6–15 years 7 (41.2)

The perceived need for self-management of illness and expectations when using NPA

The need to take responsibility of their own health was noticed among participants, who evidenced the need and right to seek cure and treatment for health problems, as indicated in their sentiments below:

"I just bought cotrisha (cotrimoxazole), I have to treat my cough" (Customer 12).

"When I feel sick? It depends on the problem ...but I make sure I treat myself" (FGD 2).

A question explored the participants understanding of medicines, their expectations regarding taking antibiotics without prescription. Two participants said:

"These medicines are very important, as they treat our diseases...hmm when I take medicines I hope to recover fast" (Customer 5).

"They are goods! In fact, they (medicines) are very important after all they help to combat some pathologies that the immune system cannot itself, we take and use them willing to get rid of illness and go on with life"(Customer 1).

Participant's concerns using non-prescribed antibiotics were assessed throughout the question: do you have any concerns and fears regarding your self-medication attitude? What are your fears when you use these medicines?

Despite the majority referring that they had never had problems with self-medication, two in the FGD expressed some fear, but did not express any guilty or regret taking non-prescribed antibiotics, they were more interested wanted to treat their conditions despite possible bad outcomes. Those participants remembered experiencing problems, such as diarrhoea and skin allergies after taking amoxicillin and cotrimoxazole tablets:

"Medicines they help, but sometimes depends on your body... I once took cotrimoxazole and got pimples and dark itching skin...but the cough disappeared" (customer, FGD2).

"we took then to became well...me, I got diarrhoea after taking these famous tablets (amoxicillin), the pharmacists said I shouldn't take with milk or after eating yogurt"(customer, FGD1).

Time Management And The Past Successful Experience With Antibiotics

The time spent at the pharmacy when seeking health care plays an important role in the practice of SMA. Participant's complaint about the long time they needed to spend in the health facilities waiting to be seen. They stressed that time is a precious resource and is not worth spending many hours or the whole day, knowing that they can adopt other therapeutic itineraries, such us going to seek advice and request medicines from the pharmacy. Regarding this, one participant said:

"Most of the times you just get to the public hospital to find out that the nurse or doctor is late, you wait forever to be assisted and when assisted you get the prescription, but they have a shortage of drugs...so you should go buy at outside private pharmacies, which is simply a good thing" (customer 17).

In this study, participants often stressed they knew about antibiotics from their own or relatives' successful past experiences. These experiences were more likely to be considered when a new sickness event appears, or the same past symptoms come back and individuals have to take decision on the strategies to seek health care. The following was stated by two:

"I got the prescription before when I had to seek medical appointment! Hmmm...This time I have same difficulties swallowing, but they are almost finishing so I need more of this (antibiotic- azithromycin)." (Customer 1).

"I know these tablets (amoxicillin with Clavulanic acid) I went to a doctor before...months ago (...)" (Customer 2).

According to the pharmacists, patients take advantage of physicians' prescriptions and medical information from past experiences or other sources, to the point that they can request the less popular and even more potent non-prescribed antibiotics. Two pharmacists expressed:

"the internet is doing its part in this process...it looks like we are all health care providers now, and it looks fine until you get into troubles "(Pharmacist 3).

"Patient seeks medical help at the hospital or clinic, once, then twice, the doctor or nurse prescribes the same antibiotic; for any pain amoxicillin, for any cough...cotrimoxazole, so people get confidence in a certain antibiotic..." (Pharmacist 8).

The Commonly Used Antibiotics For Self-medication

With the support of the national list of imported antibiotics, participants were asked to indicate or talk about antibiotics (other than the ones purchased) they have used without prescription despite having purchased non prescribed antibiotics, two participants from the high socio-economic area denied any past use of antibiotic without prescription:

"...No, I've never used it before without the paper...I'm buying for the first time."(Customer 18).

"Without a prescription?! I never used antibiotics, today I bought to complete the dose" (Customer14).

The remaining participants mentioned they have used a variety of antibiotics, such us amoxicillin cotrimoxazole, azithromycin, metronidazole, amoxicillin with acid clavulanic, tetracycline, doxycycline and erythromycin. As the quotes below indicate:

"I used azithromycin and (...) I used the cotrimoxazole" (Customer 10).

"I already used erythromycin once to my child...and I already used cotrimoxazole and azithromycin, yes." (Customer 3).

"I ask the pharmacist for "two colours" used to treat inside wounds" (Customer 2).

"We live in a very dusty environment, so time to time we have a cough and blocked nose, I bought cotrishia (cotrimoxazole), they treat cough very well" (Customer 17).

The list of antibiotics purchased by the participants shows that amoxicillin was the most purchased (customers), with participants requesting the simple amoxicillin, or the one combined with clavulanic acid one to treat various health conditions. This was endorsed by two customers and mentioned in one FGD, where participants confessed using amoxicillin, and amoxicillin with clavulanic acid:

"I think amoxicillin...I use a lot even for the family, yes... amoxicillin and the other white one for cough, cotrishia (cotrimoxazole)." (Customer 9).

"If you have on your list...I bought the new amoxicillin the big white tablets...I think is with acid something...It is for a respiratory problem."(Customer 11).

" what I see...hum...we use a lot of that amoxicillin, I see many people, friends, family using hmmm using the "two colours capsules" and now there is a better one with an acid...white one, expensive but also good..." the other participants agreed. (Customers FGD 1).

Pharmacists corroborated that the most commonly dispensed and/or sold antibiotics in a daily basis are amoxicillin 500 mg, popularly known as "two colours" (presented in half yellow and half red colours), followed by amoxicillin with clavulanic acid and cotrimoxazole:

"Amoxicillin, cotrimoxazole, oh yes! The most wanted, they request much more amoxicillin in capsules with two colours" (B. Pharm).

"Hum amoxicillin for example, in one month in a high demand pharmacy mine like you dispense between 5000 to 10000 pills...it sells a lot."(Pharm, Technician,).

"Amoxicillin...the majority requests and purchase..." (Pharm. Technician).

"Oh cotrimoxazole! Yeah, a lot, many HIV positive customers use cotrimoxazole as a prophylactic...we do sell that and the combined amoxicillin."(B. Pharm).

Sexually transmitted infections (STI) has contributed to the increased demand for some antibiotics that were previously only known by the physicians and pharmacists. Interviewed pharmacists contend that these antibiotics are well known by customers, who request for self-diagnosed and to self-treat STIs.

"I don't know who taught customers about azithromycin and doxicilin...but many customers request these for their reported symptoms related to STI's"(B. Pharm).

"Amoxicillin combination with clavulanic acid always sells, but nowadays doxycycline and Azytro (azithromycin)...they request a lot."(Pharm. Technician).

"interestingly I see some changes, some clients don't want the common "two colours"...they now use a lot azytro (azotomycin), doxycycline, for complaints of urinary tract infection, sore throat for ...yeah" (B.Pharm).

From the pharmacists' point of view, clients are knowledgeable about even the more potent antibiotics, and suspect they are taking advantage of physicians' prescriptions that were previously less well known, now being requested for self-medication. Two experienced pharmacists argued:

"What I see is trending, even with the prescriptions, is azithromycin and doxycycline, and also cipro (cyproflaxin)... and I think self-medicated patients are also following that trend...maybe..." (B. Pharm).

"before it was...let me say "fancy" to prescribe amoxicillin with clavulanic acid...but now I see prescriptions of azithromycin, ciprofloxacin...then the customers are now learning and purchasing as well, laughs"(B. Pharm).

The pharmacists admitted they perpetuate the practice of SMA by dispensing NPA as shown in the passages below:

"We, pharmacists, know all the consequences of NPA dispensing, we know. But when you get to the position at the pharmacy as a magic trick you tend to forget all." (BPharm.).

"The person has fever and cough or pain and comes to the pharmacy...?!! There is a concerning deliberated behaviour of self-medication...and we pharmacists we do contribute" (Pharm. Technician).

The pharmacists not only recognize the increasing practice of SMA, with customers requesting more of the recent and broad-spectrum antibiotics but noted with concern that is not only the growing attitude of self-medication, but also the wrong utilization of self-prescribed antibiotics. Their argument is that customers request antibiotic in small quantities which do not allow them to complete at least a 3- or 5-days course;

"a patient self-medicating with antibiotics, for example, accesses cotrimoxazole and take just 10 tablets for 2 days, or amoxicillin and take for 3 days...they are doing it wrong either". (B.Pharm).

"Some customers buy 10 capsules of amoxicillin 500 mg, which only takes 3 days...see it's another problem then". (Pharma. Technician)

The health problems driving the practices of self-medication with antibiotics

All the participants expressed their intention to recover from a bad health condition as the main motive for seeking medication. They mentioned sore throat, fever, cough, vaginal discharge, eye problem,

common flu, urinary infection, respiratory infection, wounds, and toothaches, as the illnesses for which they self-medicated with antibiotics. Two participants said:

"... the weather is bad so I got fever in the night and now I have cough and pain, I know these tablets (amoxicillin with clavulanic acid) will treat me." (Customer 26).

"... these (azithromycin and amoxicillin) are to treat this sore throat and the fever I have, this (chloramphenicol) is for my eyes." (Customer 22).

"Hum...I have to get rid of the pain when going to the toilet...then I bought these medicines (doxycycline and cotrimoxazole vaginal cream) and the cream to apply (Customer 21).

This was endorsed by pharmacists, who reported that most customers purchase antibiotics, and some share the health problems for which they request them, indicating they mainly dispensed non prescribed antibiotics for colds, flu, cough, sore throat, tract respiratory problems, vaginal discharge, eye problems, fever and pain, dental pain and urinary infections. The quotes below can illustrate:

"The person has fever and cough or pain and comes to the pharmacy...request antibiotics!!" (Pharma. Technician).

"People buy amoxicillin for flu, cotrimoxazole for cough...they want tetracycline and chloramphenicol for eyes, many complaints." (B. Pharma).

"Some complaints of cough with mucus and difficulty breathing...some young ladies buy amoxicillin with cotrimoxazole for vaginal discharge...most share with me since I'm a lady also...laughs" (Pharma. Technician).

Discussion

This research applied a qualitative approach to identify the commonly used non-prescribed antibiotics and illustrate the health problems people face during their daily life and the indulging SMA practices. The findings confirm the inappropriate use antibiotics among Maputo city private pharmacy clients and the drugs often being used incorrectly or inappropriately for self-diagnosed health problems. Medicines are an important part of the process of healthcare seeking, being essential to the health care system, to health care providers and to the individuals [19]. With most customers using non prescribed antibiotics combinations to self-treat, self-diagnosed and self-perceived illnesses, this research highlighted the easy accessibility of a variety of antibiotics by customers at private pharmacies in the city. These results are in line with those reported by other researchers [2, 14, 16, 18, 20–24], where customers had no difficulties accessing antibiotics for self-medication.

By using antibiotics, participants express their desire to recover from bad health conditions. Participants might not perceive the aetiology of the disease, and do not look to kill or inhibit the growth of bacteria, they simply want to alleviate or cure the disease [25]. This behaviour of seeking cure or alleviation of

disease, demonstrated the responsibility individuals assume for their health. This is also rather regarded as the right to be entitled to take care of their health. However, what participants may not understand is that using non prescribed antibiotics is against the law and the health safety of individuals. Provider costumers with correct knowledge of antibiotics and its uses, as well as of the bad outcomes and disadvantages of using antibiotics for self-medication, concomitant to other health promotion measures could contribute to discouraging the practices.

The time spent at a health facility specially the public ones is regarded as a constraint to access health care services. In this way, participants consider other therapeutics itineraries and strategies to seek care such as requesting advice from pharmacists, purchase medicine directly from the pharmacy as an option to solve their health problems. Therefore, the need to seek treatment while saving time has a great influence on the practices of SMA. Health care providers need to think in strategies to reduce the time spent at a health facilities simultaneously, promoting behavioural modifications by providing pertinent and user-friendly information regarding the suitable use of antibiotics within the pharmacies and health care centres would be key to the success of strategies for managing antibiotic utilization and contain antimicrobial resistance. Contextually adapted behavioural theories, including the theory of planned behaviour, supported by health Anthropology and other social sciences, could be suitable approaches to better understand and address the self-medication behaviour among the general public.

The results show that amoxicillin and amoxicillin with acid clavulanic were the most requested and used antibiotics, with cotrimoxazole tablets and vaginal cream also being commonly used by the participants. Different results were reported in a study conducted in Ethiopia, where the most used antibiotics were ampicillin/cloxacillin, metronidazole, co-trimoxazole, ciprofloxacin and lastly amoxicillin [26]. The results of our study are similar to studies conducted in Guatemala [27, 28], Zambia [29] and Ethiopia [30]. In relation to the main health complaints leading the use of the above-mentioned antibiotics, common cold, flu, cough, sore throat, tract respiratory problems, vaginal discharge, eye problems, fever and pain, dental pain and urinary infections were the most reported health problems. Advances in medicine have proven that antibiotics are not effective to treat non-bacterial diseases and viral infections, and when a bacterial infection is present, specific antibiotics are needed to treat particular infections. Physicians and other qualified health professionals are entitled to determine which antibiotic should be used for which bacterial infection upon clinical assessment of the patient. If patients and customers were exposed to this information in all health facilities and pharmacies, in parallel with other actions aimed at raising awareness, they would be more likely to take informed decisions and avoid self-diagnosis and self-treatment with antibiotics.

The results show some changes in the trends of NPA requesting and use, with customers requesting other classes of antibiotics (macrolides), more potent such as azithromycin, doxycycline, and ciprofloxacin, this utilization is linked to the growing occurrence of STIs. Despite suspecting that this might be due to the occurrence of bacterial resistance of the penicillin class, this study was not able to correlate this trending with the emergence of resistant bacteria for the previously used classes. Costumers make use of past experiences and take advantage of physicians' prescriptions. Similar results were reported in a study

conducted in India, where the request for non-prescribed but more potent antibiotics was frequent, suggesting that customers also learn from prescribers and become quickly informed [9, 31]. This ability to learn about health information represents an opportunity for pharmacists', physicians and health promoters to disseminate the correct information about the rational use of antibiotics.

Despite admitting dispensing the non-prescribed antibiotics to their customers, pharmacists noted with concern that SMA is not only growing but customers are using the antibiotics incorrectly. It was also noted that customers request antibiotics in small and suboptimal quantities that do not allow them to complete at least a 3- or 5-days course, similar results being reported in other studies [32–34]. This represents another problem that should be addressed by disseminating the correct information. Although some customers are aware of the risks of SMA, they might not be aware of the public health implications of the practice. This represents a problem to be addressed by all stakeholders to improve antibiotic stewardship and conservancy. Having appropriate information regarding the public health implication of SMA people are more likely to avoid such practices. However, this information should be constant and contextually adjusted.

Limitations Of The Study

The results presented contribute to the general understanding of the commonly used antibiotic. This study may serve as exploratory evidence basis for understanding community expectations, perceptions and uses of antibiotics. However, limitations of this study include those known for qualitative descriptive studies, one example is the fact that some participants had to recall the name of antibiotics they used in the past, which may have the potential of recall bias. In other hand, the pharmacies included are not representative of all pharmacies in Maputo. Another limitation is that it appeared more significant to present the commonly used antibiotics and the health problems rather to present the frequency of in which each reported antibiotic were used.

Conclusion

The idea of self-management of illness, the need to save time and the therapeutic itineraries customers adopt, together with the suboptimal dispensing practice of pharmacist, are enabling the growing practices of SMA among private pharmacies customers. The findings have unravelled substantial evidence of the irrational and inappropriate misuse of antibiotics. Private pharmacies customers self-diagnosed and self-treated themselves by requesting and purchasing non-prescribed antibiotics at private pharmacies with no reference to physicians' consultancy, advice and prescription. In addition, the majority of non-prescribed antibiotics were used to self-treat illnesses that do not necessarily need antibiotic therapy. The non-compliance with dispensing prescription-only-medicines is real and concerning. Dispensers were sufficiently trained and aware of the public health implication of their non-compliant dispensing practices. In this way, it's our proposal that multifaceted interventions are needed to involve public health stakeholders, pharmacists, and healthcare providers to enlighten customers, through public education, regarding the inappropriate antibiotic use at all levels.

Abbreviations

AMR - Antimicrobial resistance

GNI - Gross National Income

LMICs - Low-and-middle-income countries

MRSA - Methicillin-Resistant Staphylococcus Aureus

NPA - Non-prescribed antibiotics

PRISMA – Preferred Reporting Items for Systematic Review and Meta-Analysis

POM- Prescription Only Medicine

RCT – Randomized Control Trial

SMA - Self-Medication of Antibiotic

STI – Sexually transmitted disease

UKZN – University of KwaZulu Natal

WHO- World Health Organization

Declarations

Ethical approval and consent to participate

This study was reviewed and approved by the Humanities and Social Sciences Ethical Committee (HSREC) from University of KwaZulu Natal, Durban, South Africa and by the National Bioethics Committee for Health (CNBS) from the Ministry of Health, Mozambique. Subjects gave written consent to participate and written confirmation that there was an understanding of the objectives of the interview, that the subjects themselves were willing and able to participate, and that they could decline to participate further at any time.

Consent for publication

Not applicable

Availability of data and material

The raw data was attained in Portuguese language, the datasets were transcribed and translated to English. The data are not publicly available as it contains information that could compromise research

participant privacy/consent. Therefore, the datasets analysed for this paper will be assessed from the corresponding author upon rational request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

NFT is the principal investigator and the lead author of the manuscript. NFT conceptualized and prepared the draft proposal of the study under the supervision of LEM and VS. Both LEM and VS assisted in all stages of the research process and with the manuscript revision and redaction. NFT, LEM and VS contributed to the reviewed draft version of the manuscript and approved the final version.

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Figures

ANTIBIOTICS PURCHASED

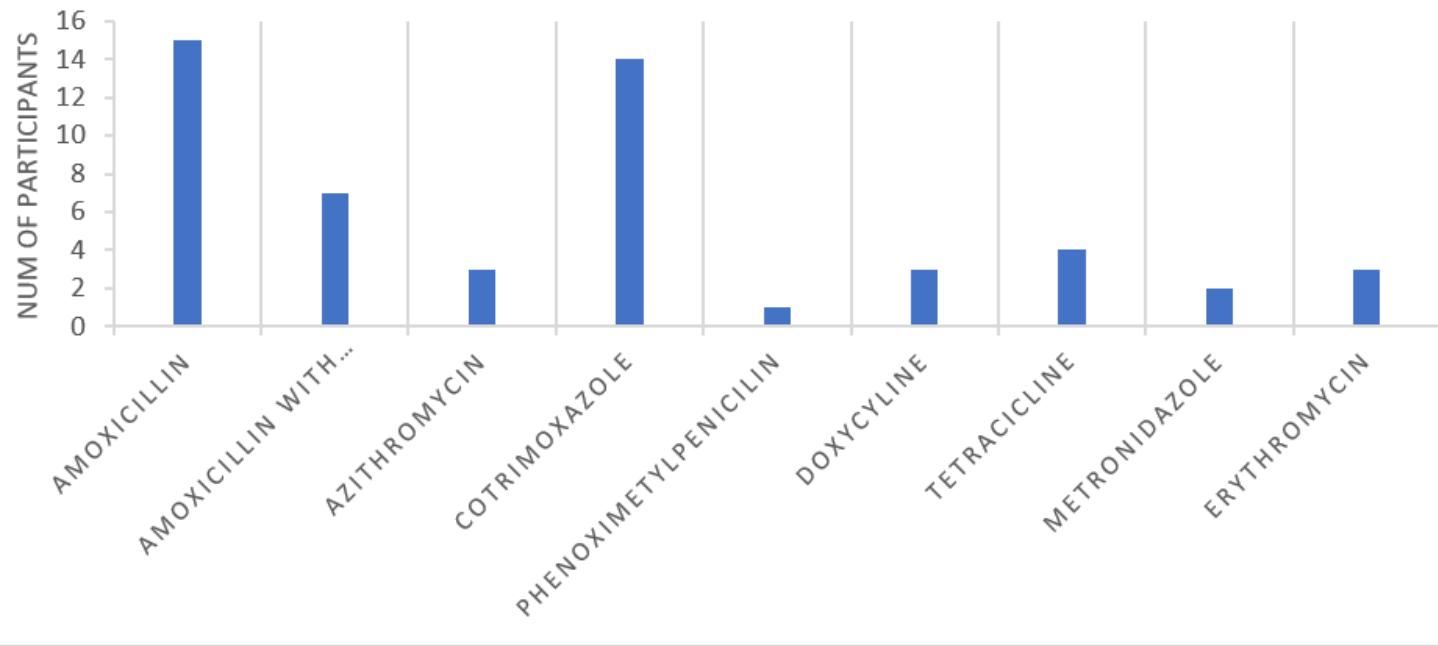


Figure 1

Antibiotics acquired by participants