

THE MISUSE OF ANTIBIOTICS: WHOSE RESPONSIBILITY IS IT, ANYWAY?

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ABSTRACT

The growing problem of antimicrobial resistance, with the decline in the development of new antibiotics, is becoming a global threat. Imprudent use of antibiotics, including self-medication has been found to be one of the major factors. Self-medication with antibiotics in Sudan is high at 49%. The aim of this study is to assess the beliefs, behaviour and factors that lead to the practice of self-medication with antibiotics (SMA) in order to formulate appropriate interventions to help control the development of antimicrobial resistance. **Methods:** Focus group discussions were carried out involving 27 adult participants from non-medical background who have used antibiotics within the past six months. Questionnaire guide was used to explore their current practices with regard to antibiotic use and the factors that led to using them

without prescriptions. Data was analysed in a thematic way using a frame work approach.

Findings:

- Knowledge about antibiotics generally was found to be inadequate.
- Reasons for using antibiotics without prescription included dissatisfaction with health services and doctors' attitudes, cost, difficulties to access doctors and convenience.
- Awareness of antibiotic resistance was poor and antibiotics were regarded as safe medicines.

Conclusion: This research showed a poor knowledge and irrational attitude towards SMA among study participants. Improper practice was influenced by participants' knowledge, attitudes and misconception regarding SMA. Intervention studies need to be carried out to determine ways to restrict over-the-counter purchase of antibiotic and to constrain SMA behaviour.

KEYWORDS: Self-Medication, Antibiotic Use, Antimicrobial Resistance.

INTRODUCTION AND BACKGROUND

Self-medication is defined as “the use of drugs to treat self-diagnosed disorders or symptoms, or the intermittent or continued use of a prescribed drug for chronic or recurrent disease or symptoms”.^[1] Self-medication with antibiotics (SMA) involves the use of non-prescribed antibiotics with the aim of treating a perceived infection.^[2] It is common in both developed and developing countries, in which the point prevalence ranges from 3% to 75%.

It has been argued that self-medication for minor ailments can reduce the burden on health care system especially in resource poor countries, yet it has its drawbacks; especially when it comes to antibiotics.^[3] Self-medication with antibiotics, especially when accompanied with poor knowledge and lack of awareness, differs in that it has the potential to harm the society as a whole and not just the patient. Irrational use or abuse of antibiotics, including failure to complete therapy, skipping of doses or reuse of leftover antibiotics, potentially exposes patients to suboptimal doses of therapy. Such behaviours create an environment that promotes antibiotic resistance.^[4] Self-medication with antibiotics is considered as one of the major factors related to the growing problem of antibiotic resistance.

During the past two decades, antibiotic resistance increased dramatically and is acknowledged to be one of the most serious threats to the treatment of infectious diseases.^[5] It is increasingly recognized as a key public health concern for both developed and developing countries due to its potentially alarming socioeconomic impact on health. Besides wasting lives, hampering the control of infectious diseases and increasing the costs of health care; antibiotic resistance jeopardizes health-care gains to society and threatens health security.^[6]

Antibiotic resistance is a growing international problem affecting both current and future generations. Resistance that develops in one area of a country may easily spread nationwide. The global problem of antibiotic resistance is particularly pressing in developing countries, where the infectious disease burden is high.^[7]

In a study from Pakistan, nearly 50% of newborns with infections due to *Acinetobacter* died within a short time frame; 71% of the bacteria were resistant to all antibiotics. Another study in Tanzania stated that the death rate in children from Gram-negative bacteria in one study was more than double that of malaria.^[8] While in the EU, the economic burden associated with

antibiotic resistant infections resulted in approximately 2.5 million extra hospital days in 2007, and the overall societal costs were estimated to about 1.5 billion Euros per year.^[9]

To-date, most of the studies on self-medication explored the prevalence of the problem at different levels and settings. However, only limited studies investigated the actual determinants of self-medication with antibiotics as well as the level of awareness of antibiotic safety and antibiotic resistance. Most of the studies were conducted using quantitative research methods which limit the possible range of findings in understanding these behaviours. Quantitative research might not be the most appropriate method to study beliefs and behaviour nor are questionnaires, even if self-completed as they limit the participants' options and do not allow full expression.

In order to rationalize the use of antibiotics and preserve the effect of the current available agents, in depth studies looking more behind the driving factors and reasons leading to this practice are needed. The need for such studies was emphasized by Radyowijati and Haak^[10] who stated:

'If interventions into antibiotic use are to be effective, future research must explore in more depth the socio-cultural rationality of antibiotic usage. The most productive approach would be to combine quantitative studies of the patterns of antibiotic use with the rich variety of qualitative methodsto explore determinants.'

In Sudan, Self-medication with antibiotics was found to be high. In one study, it was found that 73.9% of the study population had used antibiotics or antimalarials without a prescription and in another study about 48.1% of the respondents have used antibiotics without prescription.^[11]

This paper is based on a study carried out in Sudan to gain an insight into the current practice of self-medication with antibiotics and investigate the beliefs, behaviour and practices that lead to the use of antibiotics without prescription in Sudan. The objectives of the study, included among others.

- To investigate the beliefs and behaviours behind the use of antibiotics without prescription in the community.
- To consider the current practice (use and means of getting the antibiotics) with regard to self-medication with antibiotics in the community.

- To highlight the level of knowledge among the community with regard to the impact of self-medication with antibiotics.
- To identify mechanisms to promote the rational use of antibiotics in the community.

METHODS

Study design

Due to the nature of the study, qualitative methods was seen to be more appropriate to understand a health-related behaviour through asking “why and how” though it does not produce a representative sample for the population.^[12] Convenience sampling was used with regard to group identification, as access to a wider population was not possible due to time and cost constraints. Although the groups were predefined, yet the actual participation in the study was voluntary.

Study site and population

The study was conducted in Khartoum involving staff at Sudan Medical Council (SMC), the Ministry of Health, a group of mothers and school teachers. The study mainly involved adults, over 18 years of age with prior experience of self-medication with antibiotics and willingness to participate in the study. Any health professionals and people working in pharmaceutical industry were excluded from the study.

Data collection

This study was conducted using focus group discussions (FGDs), which are a relatively low cost; an efficient way of generating information; and quickly identify core issues. FGDs are known to provide a representation of diverse opinions and the chance for people to share experiences and different perspectives, which generate even more information.^[13]

Four FGDs were conducted. The number of participants for each group ranged from 6-8 and all totalled to 31 respondents. Out of the 31 volunteers 27 participated in the study.

Data analysis

Framework analysis which involves a number of distinct though highly interconnected stages was used.^[14] Analysis started concurrently with data collection; observational notes were written immediately after each focus-group interview reflecting about the interview, the settings and the non-verbal behaviours expressed by the participants.

Ethical consideration

In the study, ethical issues were considered carefully. Participants were approached by the researcher who provided them with information sheets and asked them if they want to join the study. They were assured of the confidentiality of their response in the study. Informed consent forms were hand delivered to all participants with the researcher's contacts in case further information was needed. As the research dealt with information which could be private or confidential, anonymity was ensured throughout the study (the participants' names were not used and all data was anonymous, coded and safely stored. Ethical approvals were obtained from relevant bodies in Sudan.

MAJOR FINDINGS

Four focus group interviews were conducted. The total number of participants recruited was 31 but only 27 participated. Of this number, 54% were females and 46% were males. The participants age ranged from 18 to >50 years and the levels of education ranged from those who did not have formal education to those who completed higher education.

Knowledge and beliefs about antibiotics

The participants defined antibiotics as medicines used in the treatment of infections, colds and wounds specifically. They described them as tablets, capsules, injections, syrups and IV fluids. Many participants also described antibiotics as medicines to treat pain.

Nearly all participants stated that they have used antibiotics without medical advice at some point to treat allergy, flu, undefined general infections, tonsillitis, wounds and relieving pain (stomach pain and toothache). Some of the participants believed that antibiotics are used to treat everything, including headaches, sinusitis and peptic ulcer.

Reasons for using antibiotics without medical advice***Dissatisfaction***

The reasons given by participants for not seeing a doctor before using antibiotics varied greatly. The most common factor stated by participants is their dissatisfaction with the doctors and probably lack of confidence in them, as illustrated in the following two quotes. Many participants described doctors as uncaring and that they do not show much concern. They do not listen to their complaints and they write a prescription in a hasty manner.

“Once I went to a consultant I had some kind of allergy, in three minutes he was done with me, just three minutes...I told him I had allergy and he just wrote me a prescription, he didn't ask me any questions. Doctors do not show much concern when you go to see them”. (Male respondent).

“I go to the doctor, he gives me tablets but they usually do nothing at all.” (Male respondent).

Some of the participants believed that going to the doctor may not be necessary as the doctor will end up prescribing an antibiotic too, the same antibiotic that can be simply purchased from the pharmacy.

“When you go to a doctor you have to sit and wait. At the end the doctor gives you the same antibiotic as the pharmacist, so we go to the pharmacy and save time.” (Male respondent).

“Waiting and money (laughs)!! And at the end he tells you what the pharmacist will.” (Male respondent).

Simple and common ailments: Another very common reason for not going to the doctor is that most of the participants find it unnecessary to visit a doctor for the ailments that they have encountered before. The majority stated that they usually know what their infections are and those mainly included colds, tonsillitis and chest infections and that they could easily manage it on their own.

Time was another reason for opting to treat themselves. It was very apparent that they were not satisfied with waiting and the long queues. Many participants said that it was very inconvenient to wait for days in order to get an appointment with the doctor, their complaints could not wait that long.

“I once went to ‘Dr X’, I had a sore throat. It was the first day of the month and I was told to come and see him on the 19th. Come and see him on the 19th because there are no appointments available??!!!! I just went directly to the pharmacy because I just can't sit with my sore throat and fever! From that day I didn't like going to doctors.” (Female respondent).

Cost and financial reasons were also factors that discouraged the participants from visiting the doctor. Participants found the whole process of seeing the doctor very costly, which included the

cost of travelling to the doctor, the cost of the fees for treatment and not to mention the cost of the list of investigations the doctor may request.

“It may not be right to buy a medicine without seeing a doctor but financial constraints make people do so. Doctors cost and even the investigations they ask for cost a lot and we might be left with no money for the drug, I know some people who end up with no money after seeing the doctor and doing all investigations. In this case they tend to go directly and buy the medicine” (Female respondent).

Access

Geographical access to the doctor was another reason, participants find pharmacies easier to reach and as a result they purchased their antibiotics directly.

“I go to the pharmacist because he is nearby and you can easily reach him. Anyhow I find the pharmacist a professional who knows more about medicine.” (Male respondent).

Antibiotic choice

The type of antibiotic is reported to have been chosen on the basis of previous experience of using it, convenience in terms of form and duration of use and the source.

Previous experience

Most of the participants bought their antibiotics directly from the pharmacy and their choice for antibiotics were based on previous experiences; nearly all stated that they bought antibiotics that they have used before.

“I personally didn’t go directly and buy an antibiotic without a prescription. Once I had sinusitis and the doctor prescribed an antibiotic, after that I started buying the same antibiotic whenever I need it, it could be for sinusitis or for wounds sometimes.” (Male respondent).

“According to my experience, for example I have used that antibiotic before and it treated me, I go and buy it again. If it does not treat me I ask for another stronger antibiotic.” (Female respondent).

While some participants depended on the pharmacist’s advice on antibiotic choice and bought what he/she recommended, others relied on other peoples’ experiences with antibiotics.

"I see what people around me used and if it did them good for their infections then I use the same antibiotic according to their experience with that particular antibiotic." (Male respondent).

Convenience

The choice of some antibiotics was sometimes made according to different preferences. Some of the participants stated that the duration of use of antibiotics usually affects their choice; they preferred short courses and single dose antibiotics. While some found having to swallow tablets or capsules many times daily very inconvenient, they usually choose injectable antibiotics.

"I prefer the short courses usually, 8, 5 or 3 tablets." (Male respondent).

"I prefer benzyl penicillin, even if doctor prescribes me tablets I ask for injections because they are quick...taking tablets is troubling having to swallow them every 6 hours or so and I tend to forget but not with injections." (Female respondent).

Compliance was found to be very poor; participants reported that hardly complied with the dose regimen and time schedule. The majority of the participants said that they discontinued antibiotics when they felt better, discarding the remaining medication or keeping it for further use when needed or even giving it away to others. Only few participants mentioned to have completed their entire course.

"For me, if one capsule made me feel better I stop using them. I keep the rest of the antibiotic, if I find someone who has the same symptoms I had I give it to him or when I feel I need them I use them immediately." (Male respondent).

It was also found that most of the participants failed to take their antibiotics on time. Some took them irregularly or when needed while others found it difficult to follow the time schedule as reported from the following quotes.

"First I used to take it every 6 hours and sometimes every 3 hours and sometimes whenever I feel pain I take it. I stop it when the pain disappears." (Female respondent).

"If I forget my medicine I just take it the time I remember." (Male respondent).

"It is hard to remember taking drugs on time, when you don't feel the pain anymore you just forget." (Male respondent).

Almost all participants reported that, even if it is prescribed by a doctor they do not buy the whole course of antibiotics. They would buy only a single strip or one-day supply of antibiotics due to different reasons. One of the reasons is said to be due to the fact that participants tend to discontinue taking their antibiotics as soon as they feel better so they decide to buy a single strip only.

“When I get better I stop and I throw away the rest of it. I usually buy one strip because I know I never finish it, and even this one strip I don’t take all of it.” (Male respondent).

Source

Although the majority purchased their antibiotics from the pharmacy, others used leftovers or shared antibiotics with family or neighbours.

“Sometimes I go to my neighbours and ask them if they have that coloured capsule, the red and black one. I have this belief that the black and red caps treat any infection.” (Female respondent).

“When I buy an antibiotic from the pharmacy and he tells me to take it every 6 hours or so, I stop or forget taking it as soon as I am better. I keep it if anyone else needs it or if I myself need it again.” (Female respondent).

Knowledge on safety

The participants had different beliefs on the safety of antibiotics. The majority described antibiotics as safe medicines which have no harm at all, while some respondents believed that antibiotics could be unsafe if they are overused; yet their knowledge in this aspect was found to be quite deficient as stated below.

“I don’t find it risky using an antibiotic, when I take them I don’t feel that using them will do me any harm.” (Female respondent).

“I think they are safe otherwise they wouldn’t have been used that much. I use antibiotics with no fear unlike other drugs like those used for heart disease.” (Female respondent).

“I don’t think they are very safe especially their overuse.” (Female respondent).

Knowledge of “antimicrobial resistance”

The awareness on antibiotic resistance was found to be very poor. Most of the participants responded that they heard the term “antimicrobial resistance” but were unable to describe; what it meant to them and others appeared to construct a meaning based on the word “resistance”. The latter defined antibiotic resistance as the antibiotic being ineffective, or as the body being resistant to the medicine. Although they all agreed that resistance could be due to the misuse of antibiotics yet they were not aware of the exact meaning, its causes and the impact of the phenomenon. Some of the definitions mentioned include.

“The body got so used to the antibiotic due to overuse till it became resistant to it so the drug has no effect. I think the irregular use of the drug causes it, everybody does. We tend to forget.”
(Female respondent).

“Resistance is when your body resists the treatment, sometimes it does nothing... it doesn't cure you.” (Male respondent).

“Resistance is like when you are feeling better; you are resisting the disease like fighting it back.” (Male respondent).

DISCUSSION

The knowledge about antibiotics was found to be remarkably poor which was comparable to the findings of several studies carried out in Malaysia^[15], United Arab Emirates^[16], Jordan^[17], United Kingdom^[9] and USA^[18] where only a few demonstrated that there was a good level of knowledge about antibiotics. The misconception that antibiotics are pain relievers was similarly found in a study done in Jordan^[17], which may have serious implications as it causes the intermittent use of antibiotics that could increase the chances of development of resistance. In fact, from my general observation in the context of Sudan, it is evident that health promotion programmes targeting public awareness - especially with regard to the use of antibiotics - are generally weak. Being a member of the community, the absence of such programmes in the different media is clearly noticeable.

Antibiotics without prescriptions were mostly acquired from the community pharmacies, a practice found to be also common in United Arab Emirates^[13], Jordan^[2], Palestine^[19] and Greece.^[20] Although pharmacists have the expertise to advise both on the choice of medicines and their safe and effective use, yet the dispensing of antibiotics needs to be more regulated, which is a major issue in Sudan. At this point we may start to think about the knowledge and

skills of the pharmacists themselves. Are they aware of what they are doing? Are they aware of the antimicrobial resistance issue and how such practices affect the development of resistance? Are the pharmacists aware of their responsibilities towards patients in giving treatments, counselling and advice and not selling medicine?.

The majority of the participants claimed to purchase a single strip or a one-day supply of antibiotics. Financial aspect was one factor, but the main factor was their previous experience. They stated that half the course was capable of alleviating the symptoms making the rest of the course unnecessary. It is apparent that the dispenser plays a major role in this aspect necessitating further investigation in current dispensing practices. Lack of knowledge of patients and health professionals, patient demand, pressure of pharmaceutical promotion and lack of regulation may all contribute to this practice and need to be further studied.

Another source of antibiotics was leftover medication held in the home. This was also found to be the main source of antibiotics used for self-medication in the United Arab Emirates^[16], Pakistan^[21], Poland^[22], Europe^[23] and USA^[24] The fact that left over of antibiotics for further use shows the poor knowledge or poor compliance and this is one of the shortcomings of public education by concerned bodies.

The study also showed that the choice of antibiotics depended on different factors. It depended on previous experiences, friends' and relatives' advice and leftovers at home. This was comparable to many studies in Abu Dhabi^[16], Jordan^[2], Pakistan^[25] and Poland.^[22] In contrast to what was found in Palestine, where one study showed that the majority of the respondents' chose their antibiotics based on self-decision.^[19]

However, some of the participants, who went directly to the pharmacy, relied on the pharmacist's choice/advice. From my general observations, the dependence on relatives' and friends' advice is more dominant in Sudan indicating again the shortcomings of health promotion and awareness raising health education programmes.

Other preferences for the choice of antibiotics brought up were the dosage regimen and duration of use. Participants preferred short courses and single dose antibiotics describing them as more convenient. This poses a new threat because these are new antibiotics which could soon be ineffective if used inappropriately. This shift, from old to newly developed antibiotics, exacerbates the emergence of new resistant organisms soon rendering the new agents ineffective

while we are in an era of a growing need to optimize the use and conserve both old and new antibiotics.^[26]

The study also revealed that compliance was poor; participants hardly complied with the dosage regimen/time schedule. The majority of the participants discontinued antibiotics as soon as symptoms improved. There was a range of responses when asked about discontinuing the medication. Some stated that there is no use to take a medicine if you feel better and continuing could cause harm. They saved the rest of the course for them or their family if the same symptoms are experienced again. Interestingly this was found in a study conducted in nine European countries were 24% of the patients saved part of their antibiotic courses for future use.^[26] Continuing to take the medication was also described as boring. These factors might well explain why short course and single dose antibiotics are preferred. Discontinuing the medication and poor compliance might drive health professionals to prescribe short-term antibiotics which are preferred by patients increasing the threat to the new developed antibiotics.

The majority of participants failed to take their antibiotics according to the time schedule. Antibiotics were taken irregularly and only when remembered. This again illustrates the poor knowledge and lack of awareness about antibiotic use and calls for educational interventions.

When it comes to the behaviour towards antibiotics, the misuse of these drugs is quite evident. Failing to take the full course of antibiotics, forgetting to take antibiotics on time, sharing other people's antibiotics or using an unfinished course of antibiotics for another illness were common practices.

This study identified many factors for using antibiotics without prescription, e.g. dissatisfaction with doctors' attitude and medical service which is similar to the findings in a study that was carried out in India^[27] but different from what was found in China where one study indicated that respondents trusted hospitals and doctors considering them as effective and of good quality.^[28]

Similar to the findings of a study conducted in Hong Kong where respondents attributed antibiotic abuse to the doctor's responsibility^[29], most of the respondents from a focus group discussion thought it is not necessary to visit the doctor because they claimed that doctors always prescribe antibiotics. This is backed up by another study on the prescribing pattern in the Sudan, where nearly 67% of the prescriptions were found to contain antibiotics (standard <30%) which shows a serious problem of irrational prescribing.^[30] In view of this, the irrational and

overprescribing of antibiotics could be one of the main causes that made people deal with them. These are in contrast to what was revealed in a study in Sweden where more respondents reported trusting doctors for not prescribing an antibiotic which could also be due to the laws and regulations restricting antibiotic prescribing.^[31]

The attitude of doctors was an important issue brought up by respondents, not giving patients enough time or allowing them to express their major concerns created a gap. This clearly discourages patients from visiting the doctor. The doctor–patient relationship has been and remains a keystone of care: the medium in which data are gathered, diagnoses and plans are made, compliance is accomplished and healing, patient activation and support are provided.^[32] In this study the satisfaction with doctors was low and they have been described as uncaring. This is comparable to what was found in India where low satisfaction with medical practitioners was one of the reasons for buying antibiotics without a prescription.^[28] In the Sudan context, this could be attributed to work overload of doctors who have to see many patients in one shift as well as dual practice, i.e. combining both private for profit and public services which puts doctors under much stress adversely affecting the required doctor-patient link.

Another factor that discouraged patients from visiting the doctor was the waiting time. Some patients have to wait for days to get an appointment in private clinics or queue up to see the doctor in public hospitals. This was described as inconvenient and time consuming. Therefore patients preferred going directly to the pharmacy. Pharmacies were described as being nearby and open all day, making them convenient for most people to reach at any time in addition of saving money that patients pay to doctors for consultation. Similar findings were reported in a study from Nigeria where 58% of the respondents said that they purchase their antibiotics from private pharmacies.^[33] The equitable distribution of community pharmacies is essential, as they act as a first-line healthcare source in some areas. However, this distribution should be supported with a high level of regulation. The availability of qualified pharmacists equipped with the appropriate knowledge, qualification and skills is fundamental in order to ensure and promote good pharmaceutical practice.^[34]

The determinants of self-medication with antibiotics revealed in this study were comparable to those in low-income countries which included over-the-counter sale of antibiotics, cost of medical consultation, low satisfaction with medical practitioners and misconceptions regarding the efficacy of antibiotics.^[7]

The awareness of respondents about the possible adverse effects was obviously low as they described antibiotics as safe medicines in comparison to anti-diabetic, cardiovascular and antihypertensive drugs. The term 'antimicrobial resistance' was clearly misunderstood and the definition provided by the majority matched the term 'tolerance' instead. This was comparable to what was found in Wales where the participants believed that antibiotics become less effective with repeated use because the body becomes 'used to' or to become 'immune' to them.^[35] Although the participants stated that this phenomenon is caused by the misuse and overuse of antibiotics, nevertheless their knowledge on antibiotic resistance was found to be deficient. They believe that the misuse or over use of antibiotics affects them personally but did not understand the impact and consequences of this practice upon the whole society and eventually the whole world. This goes in line with the findings of a study in Hong Kong^[30], which showed that participants knew the term 'antibiotic resistance' but did not understand it. They believed that repeated use of antibiotics was the cause but its actual and potential harm was unknown³⁵ which indicates the need to enhance public education on this issue.

The findings of this study show the importance of understanding the public's attitudes, beliefs and knowledge towards antibiotic use in order to address the issue effectively and develop the most appropriate interventions. The answer does not lay on public education only; as recommended by most of the studies conducted previously in this area. The fact that the patients expect more from health services; the lack of clarity about the roles of pharmacists and doctors; the belief that the shortcut by directly visiting the pharmacy saves money and time to the users; and the belief that the misuse of antibiotics will cause no harm shows the need for exploring more about the beliefs, attitudes and practices of the general public in order to develop appropriate, meaningful, relevant and effective interventions in order to address the problems of antimicrobial resistance.

CONCLUSION

This study yielded important information about the behaviour towards antibiotics and factors that led to their use without doctors' advice. Although some of these factors may be common determinants of self-medication in general, yet it was important to study them in relation to the participants' attitudes and behaviours towards antibiotics.

The study also showed that the knowledge about antibiotic use is very deficient and the term antibiotic resistance was not understood at all. However, since these results are not generalisable, further quantitative studies are needed to determine the prevalence of the findings.

The clear misconceptions and lack of knowledge about antibiotics contribute greatly to their inappropriate use and eventually to the development of antibiotic resistance calling for immediate interventions. Ensuring the appropriate use of antibiotics and controlling inappropriate self-medication with antibiotic requires action at several levels.

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