

Public knowledge, attitudes and behaviour towards antibiotic usage in Windhoek, Namibia

Dawn D Pereko^{a*}, Martie S Lubbe^a and Sabiha Y Essack^b

^aSchool of Pharmacy, North-West University, Potchefstroom, South Africa

^bSchool of Health Sciences, University of KwaZulu-Natal, Durban, South Africa

*Corresponding author, email: dineopereko@gmail.com

Background: The development of antibiotic resistance is a globally recognised human health threat. Overuse of antibiotics is a major contributory factor to the development of resistance. As end users, the public play a role in antibiotic use and the development and spread of resistance. The purpose of the study was to assess the knowledge, attitudes and behaviour of the general population of Namibia accessing care in the private sector regarding antibiotic use.

Methodology: A cross-sectional survey based on self-administered questionnaire was distributed to 600 patients through pharmacies in Windhoek, Namibia. The survey was conducted from March to June 2013.

Results: A total of 446 completed questionnaires were collected. Eighty percent (80%) of respondents reported to have used antibiotics in the past year mainly for colds and flu symptoms. The majority of respondents obtained antibiotics through a valid doctor's prescription. A prevalence of fifteen percent (15%) of self-medication with antibiotics mainly obtained from pharmacies without a prescription was reported. Eighty percent (80%) of respondents reported completing the antibiotic course. Gaps in population understanding of antibiotics were observed. Sixty-four percent (64%) of the respondents thought that antibiotics were effective against viruses with just less than half revealing that they should take an antibiotic for a cold. Seventy-two percent (72%) of respondents understood that unnecessary use of antibiotics makes them ineffective.

Conclusion: Major findings of this study include the sale of antibiotics without a prescription; over prescribing of antibiotics for self-limiting upper respiratory tract infections; and, the presence of gaps in knowledge, attitudes and behaviour of the general population towards antibiotics and their use.

Keywords: antibiotic use, attitudes, knowledge, resistance, self-medication

Introduction

Since their discovery, antibiotics have been hailed as one of the most important discoveries in medical history.¹ Antibiotics have been used successfully to treat infections for the past seventy years; have made the management of infectious diseases easier; and, have contributed to decreased morbidity and mortality due to infectious disease.²

However, globally the gains achieved through antibiotics are threatened by the development of antimicrobial resistance (AMR) in both hospital and community settings,^{3,4} making standard treatment ineffective, complicating patient management and increasing patient morbidity and mortality.^{5,6} The development of resistance is associated with high antibiotic usage,⁷ particularly inappropriate use.⁸ The development of resistance to antibiotics is exacerbated by social factors including misconceptions about antibiotics; views on infectious diseases; inappropriate prescribing and use; patient demand; self-medication; and, non-compliance.⁹

It is therefore important to determine what the community understands about antibiotics and how they use them. However, population-based studies on knowledge and attitudes concerning antibiotics are few;¹⁰ and, those that have been conducted found limited public knowledge and understanding of antibiotics and their usage. In Namibia, no such study has been done. The objective of this study is to determine the knowledge, attitudes and behaviour of the general Namibian population accessing care in the private sector, regarding antibiotic use.

Methods

Ethical considerations

Ethical clearance for this study was provided by the North-West University Research and Human Ethics Committee (Ethical clearance number NWU-00028-13-s1). Additionally, only pharmacies that were willing to participate were included in the study. The study was anonymous to ensure confidentiality.

Study design

This was a cross-sectional community-based study conducted between 1 March 2013 and 30 June 2013 in Windhoek through a self-administered questionnaire that was distributed through randomly selected private pharmacies. Twenty pharmacies were selected and requested to collect 30 surveys. The questionnaire was divided into two sections: demographic information; and, knowledge of and attitudes towards antibiotics. Of the 600 questionnaires (targeted study sample), 446 respondents were above 18 years of age and comprised the final sample size.

Data analysis

Statistical analyses was performed in SAS Version 9.1.3 (SAS Institute, Cary, NC). All statistical significance was considered with probability that $p < 0.05$. The practical significance of the results was computed when the p -value was statistically significant ($p \leq 0.05$). Variables (age, gender, education level, and employment) were expressed using descriptive statistics such as frequencies (n) and percentages (%). Chi-square test (χ^2) was used to determine if an association exists between proportions of two or more groups, The Cramer's V statistics was used to test practical significance of this association.

Results

The survey was completed by 446 of the targeted 600 respondents. In terms of demographic characteristics, age groups stratified as 18-24 years, 25-30 years, 31-38 years and > 38 years were almost equally represented. A greater number of respondents were female (66.14%, $n=446$), employed (85.48%, $n=427$), on medical aid (76.76%, $n=439$) and educated beyond grade 12 (54.71%, $n=435$). Approximately eighty percent (80.36%, $n=438$) had used antibiotics in the past 12 months.

Antibiotic usage was statistically significantly higher among the respondents whose education level was greater than grade 10 ($p = 0.009$, Cramer's $V=0.1394$). The majority of respondents (85%) received their antibiotics through a doctor's prescription. Although self-medication was prevalent at 15.47%, the majority of whom obtained them through the pharmacy evidencing a contravention of pharmacy regulations. Significantly higher numbers of males ($p < 0.0001$; Cramer's $V = 0.2072$) and people with medical aid (61.82%, $p = 0.030$, Cramer's $V = 0.1254$) obtained antibiotics without a prescription.

Fifty six percent (56%) of respondents (more females (66%) than males (34%)) used antibiotics for a cold or flu. Cold and flu symptoms included sore throat (15%), cough (12%) and fever (14%). Thirty-two percent (32%) of participants reported the diagnosis of upper respiratory tract infections (URTI) while 45% reported a diagnosis of "unspecified" infection as the reason given by their doctor for the use of antibiotics. Only 14% of respondents (mostly males < 25 years-old) requested antibiotics from their doctor. Eighty percent (80%) of the respondents reported completing the course while the remaining 20% stopped taking antibiotics because they felt better.

The respondents had to answer 5 questions related to knowledge and behaviour concerning antibiotic use. Tables 1 and 2 below present the responses as well as the association between responses and respondents' demographics:

Age, employment and education was strongly associated with taking antibiotics for colds in that older participants were more inclined to seek antibiotic treatment.

Table 1: Knowledge and behaviour regarding antibiotics

Statement	N	True	False
Antibiotics kill viruses ($n = 419$)	419	268 (64%)	15 (36%)
When I have a cold (sore throat, cough, runny/blocked nose, fever), I should always take an antibiotic to feel better ($n = 420$)	420	174 (41%)	246 (59%)
When I have a cold, I should get an antibiotic to prevent it from getting worse ($n = 417$)	417	194 (46%)	223 (54%)
When I visit a doctor, sick enough with a cold, I usually expect an antibiotic ($n = 417$)	417	183 (44%)	234 (56%)
Unnecessary use of antibiotics makes them ineffective ($n = 416$)	416	301 (72%)	115 (28%)

Table 2: Association of demographic variables with statements

Statement	Gender		Age		Medical Aid		Employment		Education	
	<i>P</i>	<i>v</i>	<i>p</i>	<i>v</i>	<i>p</i>	<i>v</i>	<i>p</i>	<i>v</i>	<i>p</i>	<i>v</i>
Antibiotics kill viruses	0.05	-0.10	0.51	-0.07	0.03	0.13	0.02	0.14	0.23	0.10
When I have a cold, I should take antibiotics to get better quicker	0.34	0.05	0.01	0.16	0.62	0.05	0.00	0.16	0.01	0.17
When I have a cold, I should take antibiotics to prevent it from getting worse	0.23	0.05	0.03	0.15	0.05	0.12	0.20	0.09	0.06	0.14
When I visit a doctor, sick enough with a cold, I usually expect an antibiotic	0.53	0.03	0.36	0.09	0.12	0.10	0.50	0.06	0.08	0.13
Unnecessary use of antibiotics makes them ineffective	0.90	-0.01	0.01	0.16	0.51	0.06	0.36	0.07	0.03	0.15

Discussion

This study revealed three areas of concern: the sale of antibiotics without a prescription; prescription of antibiotics especially for self-limiting upper respiratory tract infections; and, the limited knowledge and sub-optimal behaviour of the general population with regard to antibiotics and their use.

While the majority of participants (85%) reported to use antibiotics obtained through a doctor's prescription, it is concerning that 15% reported to have self-medicated with antibiotics. Self-medication is a common phenomenon in both developed and developing countries with rates ranging from 3% to 75%.^{11,12} Even more concerning is the finding that 82% of all self-medication cases purchased the antibiotic from a pharmacy without a prescription, contrary to Namibian law (Act 13 of 2003) which classifies antibiotics as "prescription only medicines" that cannot be sold without a doctor's prescription.. This practice is not unique to Namibia but is prevalent in many countries.¹³ Studies have shown that antibiotic purchased without a prescription were mainly on the advice of the pharmacist.^{14,15} While not much has been documented on the reasons why pharmacists dispense antibiotics without a prescription, some have suggested patient demand as an influencing factor.¹⁶

Tighter enforcement of pharmacy laws and regulations together with educating both pharmacists and the general population is needed to address the issue of self-medicating with antibiotics. Stricter reimbursement practices should be employed by the medical aid to discourage patients from purchasing antibiotics without a prescription. These could include charging the patient for such antibiotics and not honouring the claim from the pharmacy that issued the antibiotics without a prescription.

Between 44% and 49% of respondents in this study agreed with the statements concerning the use of antibiotics for a cold and flu – a well-documented finding^{17,18} evidencing general misconceptions among the public regarding the use of antibiotics for common infections, especially respiratory tract infections.¹³ These findings are in line with van der Velden et al. who showed that antibiotics in primary care are mainly prescribed for

respiratory tract infections, which are usually self-limiting and do not require antibiotic treatment.¹⁹

Two statements were used to assess respondents' knowledge of how antibiotics work. The majority (64%) of the respondents incorrectly agreed with the statement "antibiotics kill viruses". This lack of knowledge on the indication of antibiotics is universally reported and not unique to Namibia. For instance, studies in Malaysia reported similar findings to Namibia with 67% of their respondents agreeing with the same statement.²⁰ When discussing the reasons for the use of antibiotics, we highlighted that the respondents indicated respiratory tract infection symptoms (which are self-limiting and could be viral in nature) as the reason they used antibiotics. These findings can be explained by the fact that most of the respondents think that antibiotics kill viruses, therefore they are likely to seek antibiotic therapy for their viral infections. This validates previous reports on the misconceptions regarding the role of antibiotics among patients.^{19,21}

Our study did not assess if respondents understood what a virus is. Other authors of similar studies suggested that the general population might be confused with the term "virus" and may not understand the difference between bacteria and a virus.¹⁸ In our study, we noted that respondents used the term "infection" when responding to their doctor's diagnosis. Given the fact that infections can be viral or bacterial, it is no wonder that patients would not know the difference between viruses and bacteria if only the term "infection" was used. This highlights the importance of health care providers explaining the differences between viral and bacterial infections when communicating with patients. Furthermore, it also highlights the need for the population to be educated on the indications and actions of antibiotics.

The second statement in determining the knowledge of antibiotics used in our study was "unnecessary use of antibiotics makes them ineffective". Encouragingly, 72% of the respondents correctly agreed with the statement. This is similar to what was reported in Nigeria (76%) and higher than what was reported in New Jersey (58%) and Malaysia (59%).^{17,20,22} Younger respondents (less than 30 year-old) were the ones who showed the least knowledge of the relationship between antibiotic over-use and the development of resistance. Similar findings where the knowledge of resistance increased with age was reported by Belkina et al.¹⁵

The attitudes of respondents towards antibiotics were assessed by three statements. Just less than half (41%) of the respondents agreed incorrectly that when they have a cold they should take an antibiotic to get better quicker. Again, 47% believed that they should take an antibiotic for a cold to prevent it getting worse; while, 44% expressed that when they are sick enough (with a cold) to visit a doctor, they expect an antibiotic. This is in line with the body of evidence that showed that 25% to 67% of respondents agreed with these statements.^{8,16,17,20-23} As with other studies, there was an association between age, level of education and incorrectly agreeing with this statement. Younger respondents (18-24 years) and those with a lower level of education (less than grade 11) displayed this belief.

There exists a correlation: respondents who believe that antibiotics kill viruses also tend to believe that they should take antibiotics when they have a cold to recover faster. These respondents also believe that they should take antibiotics when they have a cold to prevent it from getting worse and also

reported to expect an antibiotic from a doctor when severely sick with a cold. The converse was also found true: respondents who knew that the unnecessary use of antibiotics makes them ineffective also reported that they should not take an antibiotic to prevent their cold from getting worse.

Conclusion

The results of the survey suggest that population-based surveys are important in understanding the public's attitude towards antibiotics as such knowledge is important in contributing to efforts to minimize inappropriate use of antibiotics. Understanding the magnitude of the problem and the population groups most affected can help tailor the efforts to improve antibiotic use among the public to the local situation.

Stringent enforcement of pharmacy regulations; continuous professional education for doctors and pharmacists on the consequences of inappropriate antibiotic use; and, education of the public specifically to discourage unnecessary use of antibiotics are suggested interventions.

Acknowledgements – The authors wish to acknowledge the participants and the pharmacists who facilitated data collection.

References

1. Cars O, Hedin A, Heddini A. The global need for effective antibiotics—moving towards concerted action. *Drug Resist Update*. 2011;14:68–9.
2. Carlet J, Collignon P, Goldmann D, et al. Society's failure to protect a precious resource: antibiotics. *Lancet*. 2011;378:369–71.
3. Ashley EA, Lubell Y, White NJ, et al. Antimicrobial susceptibility of bacterial isolates from community acquired infections in Sub-Saharan Africa and Asian low and middle income countries. *Trop Med Int Health*. 2011;16(9):1167–79.
4. World Health Organization (WHO). The evolving threat of antimicrobial resistance – options for action. Geneva: WHO; 2012.
5. CDC. Antibiotic resistance threats in the United States. US Department of Health and Human Services, Centre for Diseases Control and Prevention. 2013. Georgia, USA.
6. World Economic Forum. Global risks. Geneva: World Economic Forum; 2013.
7. Bell BG, Schellevis F, Stobberingh E, et al. A systematic review and meta-analysis of the effects of antibiotic consumption on antibiotic resistance. *BMC Infect Dis*. 2014;14:13–38.
8. Yah YS, Edrin YO, Odeh EN. Patterns of antibiotic usage by adult populations in the city of Benin, Nigeria. *Scientific Research and Essay*. 2008;3(3):81–5.
9. Harbarth S, Samore MH. Antimicrobial resistance determinants and future control. *Emerg Infect Dis*. 2005;11(6):794–801.
10. Andre M, Vernby A, Berg J, et al. A survey of public knowledge and awareness related to antibiotic use and resistance in Sweden. *J Antimicrob Chemother*. 2010;1292–6.
11. Morgan DJ, Okeke IN, Laxminarayan R, et al. Non-prescription antimicrobial use worldwide: a systemic review. *Lancet Infect Dis*. 2011;11:692–701.
12. Ameko E, Achio S, Alhassan S. Effects of self-medication on the efficacy of four antibiotics commonly used in Ghana on clinically isolated micro-organisms. *Int J Pure Appl Sci Technol*. 2012;10(2):62–70.
13. Jose J, Jimmy B, AlSabahi AGMS, et al. A study assessing public knowledge, belief and behavior of antibiotic use in an Omani population. *Oman Med J*. 2013;28(5):324–30.
14. Sabry NA, Farid SF, Dawoud DM. Antibiotic dispensing in Egyptian community pharmacies: an observational study. *Res Social Adm Pharm*. 2014;10(1):168–84.
15. Belkina T, Al-Warafi A, Eltom EH, et al. Antibiotic use and knowledge in the community of Yemen, Saudi Arabia and Uzbekistan. *J Infect Dev Ctries*. 2014;8(4):424–29.
16. Radyowajati A, Haak H. Determinants of antibiotic use in developing world. *Child Health Res Project Special Rep*. 2002;4(1):1–39.