

The Use And Misuse Of Antibiotics Among Students Of Family Health University College

Okereke RN¹, Nuamah MA^{1,2*}, Fleischer-Djoleto CE¹

¹ Department of Community Health, Family Health Medical School, Family Health University College, Teshie, Ghana

² Department of Obstetrics and Gynaecology, University of Ghana Medical School, College of Health Sciences, Korle Bu Teaching Hospital, Accra, Ghana

*Corresponding Author: Mercy A Nuamah

Address: Department of Community Health, Family Health University College, Teshie, Ghana Phone: +233 249298354 Email: mnuamah@fhu.edu.gh

Abstract

Introduction: Research shows that globally mortality rate caused by antimicrobial resistance is expected to rise from 700,000 deaths per year to 10 million deaths by 2050. Although antibiotics are very essential drugs in the health sector, the indiscriminate use and unrestricted access to antibiotics has led to antimicrobial resistance which has become a major public health concern across the globe. Therefore, the study seeks to assess the knowledge, attitude and practices of medical students at the Family Health Medical University College on antibiotics usage.

Methods: This was a cross-sectional descriptive study in which data was obtained from 142 participants using an online questionnaire. Students were invited to participate in the study through the distribution of questionnaire and consent form via mail. The questionnaire was made up of four sections namely demographic information, knowledge on antibiotics, attitudes with regard to antibiotic use and personal behaviours regarding the use

of antibiotics. Data analysis was performed using SPSS version 21 and Microsoft Excel.

Results: One hundred and thirty-four of the 142 participants (94.4%) consented to knowing antibiotics and 88.1% could name more than three classes of antibiotics. The prevalence of self-medication was 66.9% and reasons for self-medication were reported to be low cost of antibiotics 35/95 (36.8%) easy accessibility of antibiotics over the counter 67/95 (70.1%) and long time spent at health facilities 60/95 (63.2%).

Conclusion: The study revealed low cost of antibiotic drugs, easy accessibility of drugs and long delays in hospitals as reasons for the high percentage in self-medication among medical students.

Keywords: Antibiotics, misuse, resistance, self-medication, medical students.

Introduction

The discovery of antibiotics by Fleming in 1928 is a great breakthrough in medicine as it been used to treat many bacterial infections. However, it is often used inappropriately in developing countries.¹ Antibiotic misuse, such as skipping doses,

incomplete antibiotic treatment, self-medication and lack of compliance with antibiotic regimen leads to antimicrobial resistance.² Antibiotic therapy constitutes a major form of treatment in Ghana, yet due to lack of implementation and adherence to standard protocols on antibiotics, they are readily

available on demand from hospitals, community settings, over the counter in pharmacies, drug or chemical stores without prescriptions.³ Currently world-wide, one of the major threats to public health is antibiotic resistance. Research shows that globally mortality rate caused by antimicrobial resistance is expected to rise from 700,000 deaths per year to 10 million deaths per year by 2050.² Overall, there is a need to enhance the scientific understanding of the factors linked with routine use of antibiotic and its misuse. A study reported that, the influx of antibiotics into Ghana from manufacturers, both foreign and local, leads to over-the-counter services without prescription.⁴ Until now, most of the efforts at trying to manage the use of antibacterial agents have been directed toward the health workers that prescribe it, international and national antibiotic policies, educational programs and guidelines. A study done by Helegbe revealed that about a third of people use antibiotics in the treatment of common colds although the cause of common cold is usually viral.⁵ Furthermore, since patients' expectations also influence irrational antibiotic prescribing, this could bring about the rise of antibiotic overprescribing and/or misprescribing.⁶ Thus, it is necessary to address one's knowledge and beliefs on the proper antibiotic usage. In 2014, it was revealed that despite having sufficient knowledge about antibiotics and its adverse effects, there was misunderstanding among undergraduates on the use of antibiotics in viral related conditions.⁷ This study seeks to assess students' involvement and reasons for the misuse of antibiotics.

Method

The study was a cross-sectional descriptive study in which data was obtained from participants using an online questionnaire. The study site was Family Health University College, Teshie adjacent the Kofi Annan International Peace Keeping Training Centre in the Ledzokuku Municipal Assembly of Ghana. Students were invited to participate in the study through the distribution of questionnaire and consent form via mail. The questionnaire was made up of four sections namely demographic information, knowledge on antibiotics, attitudes with

regard to antibiotic use and personal behaviours regarding the use of antibiotics respectively. The study questionnaires contained both closed-ended and open-ended questions. Ethical clearance was obtained from the University of Ghana Medical School, Community Health Department. Informed consent was obtained with respondents' "Yes" answer. Each questionnaire took about 10th -15th minutes to complete. Data collection was from 10th to 16th September, 2020. Only online responses from students who were willing and had consented to participate were used in the analysis. Responses were entered into Microsoft Excel and Statistical Package for Social Sciences (SPSS version 21) was used for the analysis.

Results

A total of 142 respondent's data was finally used in the analysis of this study after performing the necessary data cleansing and excluding incomplete questionnaires. The study considered Medical students in level 100 to 600. The distribution of gender and ages are shown in Table 1. Over half, that is 80 out of 142 (56.3%) of respondents were in their clinical years (levels 400 to 600).

Table 1 Sociodemographic characteristics of study participants

Characteristics	Group	Frequency (N)	Proportion (%)
Gender	Male	50	35.2
	Female	92	64.2
Age group	< 20	24	16.9
	20-35	112	78.9
	>35	6	4.2
Educational level of study participants	100	22	15.5
	200	6	4.2
	300	34	23.9
	400	9	6.3
	500	38	26.8
	600	33	23.2

Abbreviation: N, Number of participants in a group; %, percentage of people in group

On knowledge of antibiotics, 134 of 142 participants (94.4%) consented to knowing of antibiotics. Out of this number, 127 (94.8%) were able to mention at least one antibiotic drug as shown in figure 1.

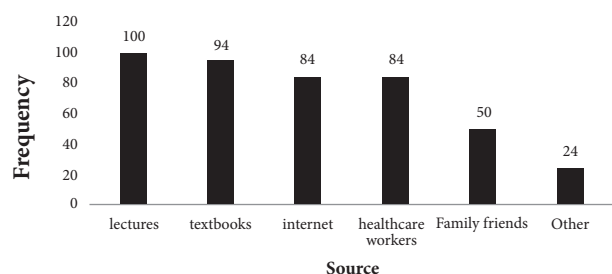


Figure 1 Distribution of source of information among the study participants.

The most familiar antibiotics among the participants were Penicillin, Cephalosporins and Fluroquinolones (Table 2). Antibiotics such as Chloramphenicol, Clindamycin, Vancomycin and Metronidazole were grouped as others. Concerning the sources of information about antibiotics, lectures was selected as the major source of information on antibiotics for most of the students (Figure 2). Student had varied opinions on the need for antibiotics usage (Table 2). Majority of the respondents answered correctly that antibiotics should not be used to treat Headache, Common cold, Constipation and Malaria. These were; 125/142 (88.0%), 89/142 (62.7%), 108/142 (76.1%) and 116/142 (81.7%) respectively.

Table 2 Responses when asked to mention three classes of antibiotics.

Antibiotic group	Total=127 n(%)	Frist response n(%)	Second response n(%)	Third response n(%)
Penicillin	125 (98.4)	72 (57.6)	33 (23.4)	20 (16.0)
Cephalo- sporin	38 (29.9)	10 (26.3)	8 (21.5)	20 (52.6)
Fluoro- quinolones	38 (29.9)	15 (39.5)	19 (50.0)	4 (10.5)
Macrolides	27 (21.3)	3 (11.1)	20 (74.1)	4 (14.8)
Aminogly- cosides	33 (25.9)	5 (15.2)	25 (75.6)	3 (9.9)
Tetracyclins	9 (7.1)	1 (11.1)	6 (66.7)	2(22.2)
Others	84 (66.1)	20 (23.8)	44 (52.4)	20 (23.8)

Abbreviation: n, counts of participants; %, percentage of participants

Out of the total participants, 127 respondents (90.1%) have heard about antimicrobial resistance while the others have not. On the section that assessed the knowledge of the effects of antibiotic use and misuse; the results showed that almost all respondents 141/142 (99.3%) know that bacteria can become resistant to antibiotics. Majority 137/142 (96.5%) of the participants reported that high risk of antibiotics resistance is as a result of more antibiotic usage in the society and this has become a national and worldwide problem. However, a few (10.6%) of the respondents lack knowledge on whether or not antibiotic resistance was a worldwide problem.

Using a three (3) point Likert scale to answer a set of seven statements by ticking whether 'Agree', 'Disagree' or Neutral, almost all 141/142 (99.3%) respondents correctly agreed that antibiotics are essential drugs in the field of Medicine. A maximum of 77/142 (54.2%) respondents disagreed that antibiotics should be kept at home for easy access and use, 32/142 (22.5%) persons agreed and 33/142 (23.2%) respondents were indifferent respectively. Also, 109/142 (76.8%) respondents disagreed that antibiotics can be stopped once symptoms improved, 17/142 (12.0%) were indifferent and 16/142 (11.2%) agreed. Hundred and twenty-five out of 142 (88.0%) respondents disagreed that previous or left-over antibiotics drugs can be taken whenever similar symptoms arises, 8/142 (5.6%) agreed and 9/142 (6.3%) were neutral to the statement. Responding to the prompt 'the body can fight mild infections on its own without antibiotics', 120/142 (84.5%) respondents correctly agreed, 18/142 (12.7%) were indifferent and 4/142 (2.8%) disagreed. A hundred and nineteen out of the 142 (83.8%) respondents answered it is inappropriate to take antibiotics when you have sore throat and cold, 5 (3.5%) agreed that antibiotics should be taken when one has sore throat and cold and 18/142 (12.7%) were indifferent. Fifty-seven out of 142 (40.1%) participants agreed that persistent cough needs to be treated with antibiotics, 44/142 (31.0%) were indifferent to the prompt and 41/142 (28.9%) disagreed to the use of antibiotics in treating persistent cough.

Table 3 Knowledge of the effects of antibiotic use and misuse

Effects of Antibiotics	Frequency of antibiotic among participants n=142		
	Yes	No	I don't Know
Antibiotics usually cause diarrhoea	77 (54.2)	45 (31.7)	20 (14.1)
Antibiotics can have negative effects on the body's normal flora	131 (92.3)	5 (5)	6 (4.2)
Antibiotics can have effects on the liver and kidneys	123 (86.6)	1 (0.7)	18 (12.7)
Antibiotics can cause stomach ulcer	51 (35.9)	54 (38.0)	37 (26.1)
Bacteria can become resistant to antibiotics	141 (99.3)	1 (0.7)	0 (0)
The more antibiotics we use in the society, the higher the risk of resistance developing	137 (96.5)	2 (1.4)	3 (2.1)
Infections caused by bacteria that develop resistance are difficult to treat	138 (97.2)	1 (0.7)	3 (2.1)
Antimicrobial resistance is an issue of concern in Ghana	113 (79.6)	10 (7.0)	19 (13.4)
Antimicrobial resistance is a big problem worldwide	123 (86.6)	4 (2.8)	15 (10.6)

Values are presented as: counts and (percentages)

In assessing the practices or behaviours of respondents towards antibiotic usage, 135 (95.1) of the respondents said they have ever been given antibiotics as prescription drugs. Out of this, 107 (79.3%) reported that they took the full course of antibiotics.

Among the 28 (20.7%) who did not take their full antibiotics course, 15 gave a reason that their symptoms improved, 3 respondents had to stop taking their drugs because of side effects of the antibiotics, 2 respondents (7.1%) got tired taking their medication, 4 respondents (14.3%) also forgot taking their drugs and 4 persons (14.3%) claimed to hate taking pills.

Participants were asked how often they self-medicated with antibiotics; only 1 respondent self-medicate very often, 22 respondents (15.5%) do so sometimes, 72 respondents (50.7%) seldom self-medicate, while 47 respondents (33.1%) has never self-medicated with antibiotics. However, when participants were asked if they had taken any antibiotics (self-medicated with antibiotics) within the past 12 months, 80 respondents (56.3%) answered no, while 62 respondents (43.7%) answered yes. The 95 participants expressed various opinions for self-medications. However, most reasons for self-medication was associated with low cost of antibiotics 36.8% (35/95), time spent at hospital or clinic as compared to getting

over the counter purchases 63.2% (60/95) and easy accessibility of antibiotic drugs over the counter 70.1 (67/95).

Discussion

Several varying factors such as knowledge about antibiotics, social circumstances and existing healthcare systems influence antibiotic use and misuse in various parts of the world. This study targeted medical students from family Health Medical School. The students demonstrated good knowledge about antibiotics and antimicrobial resistance. This can be attributed to their medical background that introduces them to the various antibiotics needed in medical practice. It was evident in the study as majority of the students indicated their knowledge was obtained from lectures and textbooks as compared to health workers and family. The majority correctly identified conditions that can be treated with antibiotics, namely, Typhoid fever and vaginal discharge. Examples of conditions that cannot be treated with antibiotics were identified by participants as headache, constipation and malaria. This is similar to a study by Donkor et al⁷ which revealed that despite having sufficient knowledge about antibiotics and its adverse effects, there was misunderstanding among undergraduates on the use of antibiotics in viral related conditions.⁷ The misconceptions regarding the use of antibiotics for viral infections is also consistent with findings from

other international studies.⁸ Common cold is a self-limiting viral illness which does not require the use of antibiotics and can usually be managed easily.⁹ There is a need for health workers, practitioners and academicians to educate students and community members on bacterial and viral infections to prevent inappropriate use of antibiotics as misuse can lead to antimicrobial resistance.

Participants attitude and perception with regard to antibiotic use was fair, as more than half of respondents correctly agreed or disagreed with more than half of the statements proposed to them in that section. With regard to personal behaviours towards antibiotic use, quite high degree of antibiotic consumption was evident in the study. Antibiotics were mostly prescribed and 95.1% of participants had received antibiotics as prescribed drugs, 79.3% of which completed the full course of their prescribed medication. The high adherence can be attributed to the doctors explaining the correct use of the drug (75.4%) in addition to participants' knowledge of effect of noncompliance and antimicrobial resistance as study participants were medical students. Despite being medical students, the study revealed that a small proportion (24.6%) of students had not received advice on how to take antibiotics and the need to complete the full course.

The absence of advice on how to take antibiotics can lead to the increase of resistance in the community as participants will be more likely to stop taking antibiotics when symptoms improve.⁸ From the study, it is evident that knowledge on antibiotic is still not sufficient as students reported keeping drugs at home for easy access when similar symptoms occur.

Most students (61.1%) reported that left over antibiotics can be taken from the previous use when similar symptoms occur. This portrays a non-compliance with antibiotics use. Hence, it is important for healthcare providers to continuously advice patients on the importance of completing the full course of an antibiotic. Healthcare professionals can also recommend to the public to return leftover antibiotics to prevent future use, which is unsafe

and hence should be discouraged. Pharmacy practitioners can play a role in counselling patients on the possible risk if the course of antibiotic therapy is incomplete.

Self-medication among students was high but not a common practice. Some of the factors that influence the use of self-medication in this study include easy access, long delays at the hospitals and use of previous prescription for similar symptoms. Compared to similar studies conducted among non-medical tertiary student in Ghana, Nigeria and Pakistan, our study did not show much difference in reasons for self-medication between medical and non-medical students. This confirms the assertion that apart from having good knowledge about antibiotics, the reasons for self-medication among medical students are not necessarily different from that of the general population.⁹ A similar study conducted among a population in Alexandria also suggested that even though good knowledge was exhibited among students and professionals in the medical field, their attitude and practices with antibiotic self-medication was similar to that of people with no medical background.¹⁰ Although a good level of knowledge about antibiotics was found in this population, there are still gaps in proper usage of antibiotic use.

In conclusion, the study revealed ready availability of medication, low cost of antibiotics and long delays in hospitals as the reasons for the high percentage in self-medication. Awareness of the proper use of antibiotics among the students is greatly required to correct their misconceptions and prevent the rise of antimicrobial resistance.¹¹ Target oriented education on the use and abuse of antibiotics across the populace should be employed and pharmacists should be actively involved in the education of clients on the proper use and the long term effects of abuse of antibiotics.

Conflict of interest

The authors declare that they have no competing interests.

References

1. Tagoe D, Attah, C. A Study of Antibiotic Use and Abuse in Ghana: a case study of the Cape Coast Metropolis. *The Internet Journal of Health*. 2010;11(2)
2. Shahpawee NS, Chaw LL, Muharram SH, Goh HP, Hussain Z, Ming LC. University students' antibiotic use and knowledge of antimicrobial resistance: what are the common myths? *Antibiotics*. 2020 Jun;9(6):349.
3. Abu-Helalah, M., Alshraideh, H., Hijazeen J., Al-Zu A, Abu, Hassan., Al-Sbou. (2015) Antibiotics Use and Misuse among University Students in Jordan. *Bull Environment Pharmacol Life Sci Vol*; 4(5) PP 62-71.
4. Newman MJ, Frimpong E, Donkor ES, Opintan JA, Asamoah-Adu A. Resistance to antimicrobial drugs in Ghana. *Infect Drug Resist*. 2011;4(1):215- 220. doi:10.2147/IDR.S2176
5. Tagoe D, Attah C. A Study of Antibiotic Use and Abuse in Ghana: a case study of the Cape Coast Metropolis. *The Internet Journal of Health*. 2010;11(2).
6. Helegbe GK, Aryee PA, Mohammed BS, Wemakor A, Kolbila D, Abubakari AW, Askanda S, Alhassan R, Barnie C, Donkoh AA, Ofosu E. Seroprevalence of malaria and hepatitis B coinfection among pregnant women in tamale metropolis of Ghana: a cross-sectional study. *Canadian Journal of Infectious Diseases and Medical Microbiology*. 2018 Jan 1;2018.
7. Pechere JC. Patients' interviews and misuse of antibiotics. *Clinical infectious diseases*. 2001 Sep 15;33(Supplement_3): S170-3.
8. Donkor ES, Tetteh-Quarcoo PB, Nartey P, Agyeman IO. Self-medication practices with antibiotics among tertiary level students in Accra, Ghana: a cross- sectional study. *International journal of environmental research and public health*. 2012Oct;9(10):3519-29.
9. Shahpawee NS, Chaw LL, Muharram SH, Goh PH, Hussain Z, Ming LC. Antibiotic Consumption and Knowledge of Antimicrobial Resistance: Online Survey.
10. Queenan K, Häslar B, Rushton JA. One Health Approach to Antimicrobial Resistance Surveillance: Is There a Business Case For it? *Int J Antimicrob Agents*. 2016;48(4): 422-27.
11. Kotb M, ElBagoury M. Sale of antibiotics without prescriptions in Alexandria, Egypt. *Journal of Pure and Applied Microbiology*. 2018 Mar 1;12(1):287- 91.