

Evaluation of the Knowledge, and Attitude of Non-Healthcare Students in Central University Ghana on Antibiotic Resistance

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Abstract

This study was designed to evaluate the knowledge, attitudes, and perceptions of non-healthcare students regarding antibiotic use and antibiotic resistance at Central University, Miotso, Ghana. This study involved students from all levels studying non-healthcare courses at the Central University of Ghana. The study was conducted over three months. The questionnaire consisted of demographics as well as questions on respondents' knowledge, attitudes, and perceptions regarding the use of antibiotics and antibiotic resistance. Data were analyzed using STATA analysis software version 12.0. The sample size comprised 1000 students, with 550 being female and 450 male. Of these, 60.96% stated that they had used antibiotics within the last 12 months. A small number of respondents (31%) indicated that they always consulted with a physician before starting an antibiotic, and students (68.75%) across all levels agreed that most colds get better on their own without antibiotics. This study also showed a significant association between students' knowledge of antibiotics and their level of study ($p = 0.007$). Our study suggests that most of the respondents were aware of the severity of antibiotic resistance, but almost all of them had inadequate knowledge on the use of antibiotics and on how they can contribute towards curbing the menace of antibiotic resistance. There is therefore a need to include information programs on the judicious use of antibiotics and antibiotic resistance as part of all degree programs.

Keywords: Antibiotics, Knowledge, Attitude, Perception, Non-healthcare students

INTRODUCTION

Antibiotics have played a crucial role in the management of infectious diseases since the discovery of penicillin over 100 years ago, and their use in healthcare has significantly improved the health and well-being of patients over the years [1]. Along with these benefits, the overuse and misuse of antibiotics has emerged [2, 3], with approximately 50% of patients receiving unnecessary antimicrobial agents [4]. The overuse of these antimicrobial agents contributes to the development of multidrug-resistant microorganisms, high incidence of mortality, as well as increasing cost of further treatment [5, 6].

Studies have shown that the under-regulated availability of antibiotics [7], poor prescription practice by healthcare providers [8, 9], and policy inadequacies in the acceptable daily intake of antibiotics in animals [9] are some of the contributing factors to antimicrobial resistance in Ghana. Studies have postulated that the use of antibiotics will continue to rise, driven by increasing revenues in developing countries and improved access to healthcare [6, 10]. While an improvement in the existing regulatory practices is needed to

combat antimicrobial resistance [11], it is also imperative to continuously and consistently evaluate the use of antibiotics among the general public in order to conserve their effectiveness and to contribute to curbing the global problem that is antibiotic resistance [10].

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In recent years, several studies have been carried out on the knowledge, attitude, and perception of antibiotic use and antibiotic resistance among healthcare students in tertiary institutions in Ghana [12, 13] and other parts of the world [14-18], but there are few studies conducted specifically with non-healthcare students as the focus group in these institutions. Asante *et al.* in 2017 highlighted the gap in perception as well as knowledge of antibiotics prescription practices among prescribers in Ghana [13]. The identification of this shortcoming highlights the importance of assessing the knowledge and attitudes of students studying non-healthcare programs towards antibiotic use and antibiotic resistance, as these students comprise the general public. This assessment is also imperative in order to develop interventions among this target group that will prevent the misuse and overuse of antibiotics. Therefore, this study evaluated the knowledge, attitudes, and perceptions of students studying non-healthcare courses regarding antibiotic use and antibiotic resistance.

MATERIALS AND METHODS

Study Design and Participants

A cross-sectional study was carried out at Central University, Miotso-Ghana. The questionnaire was administered to undergraduates studying non-health care programs from the Business School, Law School, School of Theology, School of Engineering, and the Faculty of Arts and Social Sciences. Students from the first (level 100), second (level 200), third (level 300), fourth years (level 400), and postgraduate students were included in this study. The questionnaires were administered both via online and paper forms. Online formats of the questionnaire were accessible via Google[®] forms from Jan 30 to Mar 30, 2020. Participation was voluntary.

Questionnaire Development

The questionnaire employed for this study was developed and adapted from previous studies carried out on students by various researchers [17, 19-21]. It consisted of 41 individual questions divided into four sections comprising demographic characteristics, personal use of antibiotics, knowledge assessment on antibiotic resistance, as well as attitudes and perceptions towards antibiotic use and antibiotic resistance.

Statistical Analysis

STATA Statistics/Data Analysis Software (StataCorp, Texas), version 12.0, was used to analyze the data obtained. Descriptive analysis was employed, and results were expressed as percentages. Chi-squared test was employed to compare the difference in the proportions of qualitative variables. $P < 0.05$ was considered to be significant.

Ethical Approval

The research was approved, and consent to participate was obtained according to the committee for Human Research Ethics and Publications of the Medical Sciences School, KNUST, and Komfo-Anokye Teaching Hospital,

CHRPE/RC/Oct2017. This study formed part of a series of studies conducted on AMR in Ghana.

RESULTS AND DISCUSSION

The total sample size was 999, of which 55% were males and 45% were females. The highest number of respondents were students studying Business (27.83%), with 13.81% studying Communications and languages, followed closely by Law (13.31%), Architecture (10.01%), and Computer Science (7.01%).

Personal Use of Antibiotics

Over half (70%) of the respondents could accurately identify an antibiotic (amoxicillin) among other drugs, which included paracetamol, diclofenac, and tramadol. Over half of them (60.96 %) had taken antibiotics orally in the last 12 months, with just 16% prescribed by a doctor. This study also found that respondents whose household or family member worked in the healthcare sector were unlikely to obtain their antibiotic medication from an approved healthcare provider compared to others (**Figure 1**).

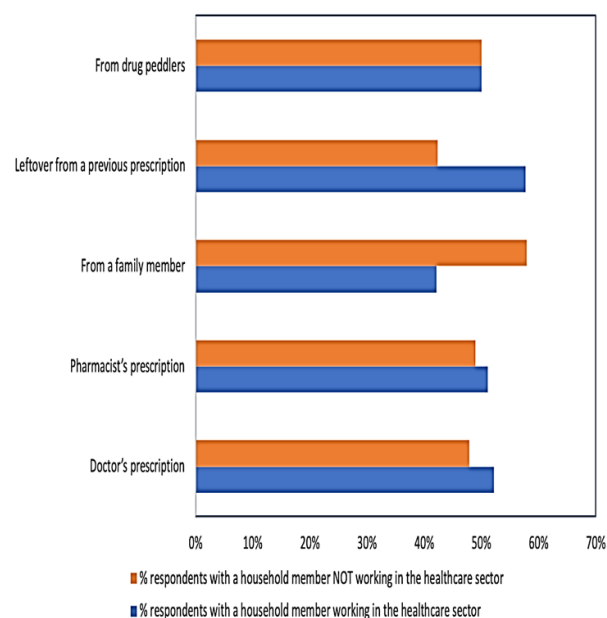


Figure 1. Personal use of antibiotics; a comparison of how antibiotics were acquired between students whose family member worked in a healthcare sector and those who did not.

There was no statistically significant difference between the students who had a member of the household working in healthcare and those who did not, and their acquisition of antibiotics (Pearson's Chi-squared test, $p = 0.466$). However, nearly 58% of the respondents tended to use leftover antibiotics from households where a member of the family worked in the healthcare sector, in comparison with 42.3% of respondents who did not have a member of the household working in the healthcare sector only.

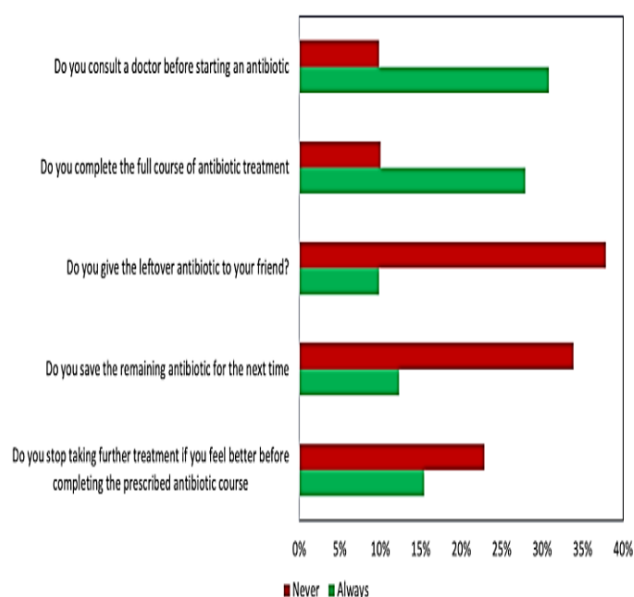


Figure 2. Students' practices and attitudes towards antibiotic use.

All students were asked to respond to several statements regarding their knowledge of antibiotic resistance. Majority of the students were agreed on all statements with no statistically significant difference in the responses between different levels of study; however, overall, an average 45.9% agreed that animals can become resistant to antibiotics ($p = 0.106$); It was interesting to note that an overwhelming average of students (68%) agreed that bacteria can become resistant to antibiotics ($p = 0.007$). Overall, there appeared to be reasonable knowledge regarding antibiotic resistance, with

increasing knowledge from level 100 to postgraduate level students.

(* Pearson chi-squared test, $p < 0.05$ is considered significant).

The responses towards antibiotic use showed that over 15% of the respondents stopped taking antibiotics once they felt better, and only 27% completed their course of antibiotics, with 9.84% giving antibiotics to their friends.

Knowledge and Perceptions of Respondents Regarding Antibiotics and Antibiotic Resistance

The majority of students (78.26%) across all departments agreed that there are bacteria in the human body that are good for our health. Less than half of them (49.15%) knew that antibiotics do not kill viruses, and so 42.64% of them said antibiotics are effective against colds. Only 37.04% of respondents agreed that the use of antibiotics for the management of colds can contribute to the development of antibiotic resistance (Table 1). The most common topics students across all disciplines and levels would like more information on are the medical conditions for which antibiotics are used (nearly 45.6% overall average), as well as how to use them (Table 2). Respondents were asked what they thought were potential contributors to antibiotic resistance. More than half of them (65.36%) agreed that the excessive use of antibiotics by humans, in livestock (65.57%), as well as poor infection and control practices (78.68%) were important contributors to antibiotic resistance. The majority of respondents (93.19%) agreed that public awareness of antibiotic resistance was essential in managing the global antibiotic resistance problem.

Table 1. Non-healthcare students' knowledge of antibiotic resistance

Statements	Agree with statement (%)					*P value
	Level 100 (n=326)	Level 200 (n=180)	Level 300 (n=174)	Level 400 (n=233)	Postgraduate Students (n=86)	
Antibiotics are effective against bacteria	78.83%	76.11%	81.03%	77.25%	82.56%	0.673
Bacteria can become resistant to antibiotics	66.67%	70%	57.65%	66.09%	80.23%	0.007
Humans can become resistant to antibiotics	60.74%	60.56%	58.62%	56.22%	67.44%	0.255
Animals can become resistant to antibiotics	48.77%	47.49%	40.23%	40.77%	52.33%	0.106
Incorrect use of antibiotics can make them ineffective	59.82%	65%	60.92%	61.80%	74.42%	0.162

Table 2. Topics on which non-healthcare students require more information.

Topics	Want more information (%)				
	Level 100 (n=326)	Level 200 (n=180)	Level 300 (n=174)	Level 400 (n=233)	Postgraduate students (n=86)
How to use antibiotics	28.53%	31.67%	31.61%	33.91%	45.35%
Resistance to antibiotics	15.95%	23.89%	20.69%	19.74%	31.40%
Medical conditions for which antibiotics are used	42.64%	46.11%	39.66%	45.06%	54.65%
Prescription of antibiotics	17.79%	22.22%	21.26%	18.45%	23.26%

Links between the health of humans, animals, and the environment	14.72%	14.44%	15.52%	18.03%	15.12%
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An overall average of 34.21% wanted information on how to use antibiotics. It was surprising to find that less than 16% of the students were interested in information on links between human health and animals and the environment.

Attitude towards Antibiotic Use and Antibiotic Resistance

Students across all disciplines and all levels of study performed well above average on their attitude and perception of the use of antibiotics for the treatment of coughs

and colds. The majority of students did not quite agree that skipping antibiotic doses contributes to the development of antibiotic resistance. There were no significant differences observed in the responses with respect to students' level of study (**Table 3**); however, an average of 61.1% of students overall believed that antibiotics helped them recover quickly when they had a fever. Students performed well below average with regard to their medication practice, with only 28% of them always completing the antibiotic course. A small proportion of them (31%) always consulted a doctor before starting on an antibiotic.

Table 3. Students' attitude towards antibiotic use and resistance

Attitude questions	Level 100 (n=326)	Level 200 (n=180)	Level 300 (174)	Level 400 (n=232)	Postgraduate students (n=86)	*P-value
Bacteria that are resistant to antibiotics spread easily from person to person	78.13%	70.27%	82.14%	75.47%	71.43%	0.823
Most coughs, colds, and sore throats get better on their own without the need for antibiotics	68.75%	81.08%	67.86%	64.15%	57.14%	0.350
Healthy people can carry antibiotic-resistant bacteria ^a	78.13%	91.89%	82.14%	77.36%	76.19%	0.426
When I get a fever, antibiotics help me get better quickly ^b	50%	59.46%	67.86%	47.17%	80.95%	0.059
Skipping 1 or 2 doses does not contribute to the development of resistance ^b	53.13%	45.95%	42.86%	58.49%	57.14%	0.624

* P value obtained from chi-squared test. ^a Percentages of agree and strongly agree are combined. ^b Percentages of disagree and strongly disagree responses are combined.

This study was carried out to evaluate the knowledge, perception, and attitude of non-healthcare students towards antibiotics and antibiotic resistance. Our survey showed that respondents had limited knowledge of the use of antibiotics and antibiotic resistance. This result is obtained because all students who participated in this research do not have any healthcare background, which highlights the importance of awareness in the fight against antibiotics misuse and the development of resistance. Although 78.68% of respondents agreed that antibiotics are effective against bacteria, only half of them (49.15%) disagreed that antibiotics could also kill viruses, which explains why 42.64% of them thought that antibiotics were effective against colds caused by viruses. A similar observation was reported in Poland, where 80% of respondents agreed that antibiotics kill bacteria, and 60% of them also agreed that antibiotics can kill viruses as well [22]. This brings to light the importance of knowledge dissemination on the differences between viruses and bacteria, not only to non-healthcare students but to other members of the population as well.

Half of the respondents (50.65%) had at least one member of their family or household working in the healthcare sector. There was, however, no significant difference between these respondents and others in how they obtained their last course of antibiotic medication and their general antibiotic medication practice (**Figure 1**). This result postulates that the presence of a healthcare worker in a household does not

translate to proper medication practice for other family members in the house. This gives credence to the poor antibiotic prescription practices observed by healthcare providers in Ghana and globally [13, 23, 24].

A less-than-adequate personal behavior towards antibiotic medication was also observed because non-healthcare students are often overlooked when it comes to antibiotic education programs. This explains why the majority of students want more information on how to use antibiotics (45.35%) and medical conditions for which antibiotics are used (54.65%). This observation is in line with previous studies [21, 25, 26] where more than half of the respondents wanted more information on the use of antibiotics.

According to the WHO, patients should always complete the full prescription of antibiotics, whether they feel better earlier or not [27]. However, this study highlighted the poor medication practice among the respondents, with only 27.89% of them stating that they always complete their prescribed antibiotic treatment course, and 15.41% of them saying they stop taking the treatment if they start to feel better (**Figure 2**). These results are not exclusive, when compared with a study reported by WHO stating that respondents in China were also more prone to not completing the full course of antibiotics when they felt better [27]. This undesirable practice, which has been shown to contribute to antimicrobial

resistance, has also been observed among respondents in other studies [28].

CONCLUSION

The level of knowledge, attitude, and perception of non-healthcare students toward antibiotic use and antibiotic resistance was below average. This study highlights the need for educational awareness interventions for students across all disciplines, including healthcare, to improve their knowledge, attitudes, and perceptions of antibiotics and antibiotic resistance, ultimately aiming to curb this growing problem.

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