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KNOWLEDGE, ATTITUDE AND PRACTICE OF ANTIBIOTICS AMONG MEDICAL STUDENTS IN VIETNAM

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ABSTRACT: *Globally, the use of antibiotics remains a common practice. This cross-sectional study aimed to determine the knowledge, attitudes and practices of medical students regarding the use of antibiotics without a prescription. Specific insights were gained from the context of Vietnam. The results concurred with previous literature addressing a significant rise in antibiotic resistance, leading to measures curbing the inappropriate use of antibiotics. Regarding the previous year, a significant number of participants were in agreement or strong agreement that they had taken antibiotics at least twice. Most participants understood the purpose of using antibiotics correctly, and most of Vietnam's medical students understood some of the risks associated with the improper use of antibiotics. However, Vietnam's national healthcare system is costly and formed a push factor that led to the use of antibiotics, with the majority found to have taken antibiotics at least twice during the previous year. Thus, there is a need for education programmes in Vietnam that target institutions of higher education as well as the larger community. Education regarding the correct use of antibiotics and the risks of antibiotic resistance is critical, especially if the intervention is complemented by medical subsidisation.*

Key words: *antibiotic, attitude, knowledge, practice, Vietnam.*

INTRODUCTION

In recent years, there has been growing interest in the management and use of antibiotics, especially regarding practices, attitudes and knowledge of communities. Scientists, such as bacteriologists, have assumed a leading role in these investigations [1]. In the Asian context, antibiotic resistance is increasing, and it has been suggested that the inappropriate use of antibiotics and high rates of antibiotic use for conditions like upper respiratory infections have raised concerns [2]. Globally, most commonly used antibiotics have seen an increase in the resistance of bacterial pathogens [3]. This increase in antibiotic resistance has translated into increased mortality and morbidity, and antibiotic resistance also creates an economic burden [4].

In developing countries, health systems struggle with many issues, such as weak institutional structures and chronic underfunding. Major factors in the rise of antibiotic resistance include insufficient infection control measures (through which the spread of resistant bacteria in hospitals and communities could be minimised), self-medication, incomplete treatment, and irrational drug use (including unnecessary prescribing and over-prescribing of antibiotics, especially when patients present with viral infections) [5]. Regarding the use of antibiotics and the measures through which resistant bacteria could be spread, medical doctors' prescribing behaviours play a significant role [6]. Another factor plays an additional role in shaping the success of sustainable antibiotic-prescribing intervention programmes [7].

In particular, medical students are important for the success of such programmes. A 2016 study acknowledged that research had been conducted about the knowledge, attitude and practices regarding

antibiotic prescribing, but most of these investigations ended up targeting community and hospital settings [8]. Also, most of the current literature targets middle-income countries (such as Peru and Brazil) and high-income countries (such as the U.S. and most of the European countries) [9]. In the current study, the primary purpose was to investigate the knowledge, attitude and practices of medical students relative to antibiotic prescribing, with a particular focus on the context of Vietnam.

As mentioned above, antibiotic prescribing is a leading problem, especially in the wake of increasing antibiotic resistance. Recently, the literature has examined the significance and impact of antibiotic resistance. It has been established that resistant bacteria cause infectious diseases [10]. Most of these diseases are difficult to treat and have been found to increase the rate of mortality and morbidity among patients [1]. The use of antibiotics for a viral infection, such as the common cold, antibiotic prescribing is increasing, although this trend threatens to compromise the health status of concerned parties [2]. Also, the high risk of resistant strains has increased due to the lack of new classes of antibiotics [3]. It is also worth noting that most previous studies failed to discern whether trends in antibiotic use (without a prescription) occur uniformly or vary based on differences in the socio-cultural and demographic characteristics of the affected populations or the effects occur uniformly regardless of individual variations. Furthermore, the studies fail to describe specific practices and levels of knowledge in settings like hospitals and the community about the use of antibiotics without a prescription. This study focused on medical students in the Vietnamese context to address these gaps.

Notably, medical students were selected because they reflect a highly educated cohort capable of discerning various issues, such as the motivations, effects and counteractions surrounding the use of antibiotics where variables, such as knowledge, attitude and practices of medical students about the use of antibiotics, could be predicted. Also, medical students were selected because they were likely to offer informative results that could be useful for the future of antibiotic use in Vietnam. This cross-sectional study aimed to determine the knowledge, attitude and practices of medical students regarding the use of antibiotics without a prescription.

METHODS

Study design and study population

This study was a cross-sectional design based on data from online surveys in May-August 2017. In this study, the target population involved medical students in the context of Vietnam. The inclusion and exclusion criteria required that the participants were attached to universities in Vietnam, with the data collection procedure assuming a nationwide approach. Before collecting data, the participants were informed that the decision to participate was voluntary and that they could withdraw at any time.

Ethical statement

The purpose of the study was explained to the participants, with participant anonymity achieved by avoiding the use of personal details of the participants. Instead, random numbers and codes were used. Regarding data privacy, this study adhered to ethical specifications by ensuring that unauthorised access was barred. In particular, strong passwords were used to store electronic information. The researchers reviewed previous literature to determine possible similarities and differences regarding the use of antibiotics among medical students in Vietnam and the findings obtained in previous studies.

Study instrument and data collection

The process of collecting data involved an online questionnaire. The questionnaire was designed to discern how much medical students understood about antibiotics and hence, predict their knowledge about the use of antibiotics. The questionnaire was designed so that the initial data gathered the demographic characteristics or features of the participants, followed by questions that sought to establish the specific objectives of the study. The demographic data included the age and gender of each participant as well as the length of time they had studied at the university. The aim of collecting information about length of stay was to ensure that individuals who had stayed or lived in Vietnam for a relatively significant period were interviewed, a trend predicted to attract reliable results. The study used a cross-sectional design in which the participants were selected conveniently. The validity and reliability of the results were assured by asking the same question(s) to different medical students.

Regarding questions that sought to establish the study's specific objectives, the questionnaire was designed so that some questions focused on the participants' knowledge while others addressed their attitudes

regarding the use of antibiotics. The third category of questions included questions that sought to understand the behaviours of the participants relative to the use of antibiotics. Notably, the latter category of questions sought to determine the practices embraced by the participants relative to the subject under investigation. To understand the medical students' knowledge, questions about specific issues included their views about the effectiveness of antibiotics, the side effects associated with antibiotics, the concept of drug resistance and the relationship of disease and drug susceptibility and sensitivity.

Relative to the attitude of the participants towards the use of antibiotics without prescriptions, questions included reasons for the abuse, the influence that antibiotics had or were likely to have on the students and their families and the seriousness associated with antibiotic abuse. To understand the practices embraced by the medical students regarding the concept of antibiotic use, several issues were investigated, including drug withdrawal status, the level of understanding about the doctor's prescriptions and other prescription drugs, and the frequency of which they had used antibiotics whenever they experienced illnesses, fever or other symptoms. Additional questions were asked to unearth the participants' perception of the use of antibiotics without prescriptions. These questions included the proper use of antibiotics, college course studies, eagerness for knowledge, information channels used before using antibiotics and the source of antibiotics knowledge. Apart from questions that sought to collect the participants' demographic information, other questions focused on the study's objectives were analysed using a five-point Likert scale with options for closed-ended questions ranging from 'in strong agreement' to 'in strong disagreement'. For purposes of analysis, the study was designed in such a way that only questionnaires with at least 80% percent of the questions answered were included in the analysed responses

Data analysis

The collected data were entered into Microsoft Excel 2013 for Windows®. Descriptive statistics were applied for data analysis.

RESULTS

This study relied on primary and secondary data. This decision aimed to ensure that the primary data obtained from the Vietnamese context is compared with the literature documented from previous studies that focused on the same subject in developing countries, including Vietnam. Thus, the results could help in making inferences and relating the information obtained from medical students to information reported in earlier scholarly investigations about the attitude, practices and knowledge of the use of antibiotics without a prescription.

Demographic data

One hundred questionnaires were administered to the participants online. Of the 100 participants, 78 participants returned their questionnaires for analysis. Using 95% as a level of significance, testing these results suggests that the response rate was high (78%) and that the findings obtained were likely to be statistically significant. Since the participants had various social backgrounds, it was also worth inferring that the results could be related to the rest of the population in Vietnam relative to the subject being studied.

Regarding gender, male participants accounted for 66.67% of the responses received while female participants accounted for 33.33% of the responses (male participants: 52; female participants: 26). Another parameter that was analysed addressed the respondents' ages. The majority of participants belonged to the age bracket of 31-35 (34.62) while others (21.80%) belonged to the age bracket of 26-30 years and 19.23% representing the bracket of 36-40 years. Also, 6.41% of the participants were 20-25 years of age, while 17.95% of the participants were over 40 years of age.

To discern if the study had collected data from an experienced population, the participants were asked to indicate how long they had lived or stayed in Vietnam. On this parameter, mixed outcomes arose. Whereas 12.82% of the participants indicated they had stayed in Vietnam for less than a year, those who had stayed in the country for over 20 years accounted for 19.23% of the responses received. Those who had stayed in Vietnam for a period of 11-20 years represented 28.21%, while 39.74% had stayed in the country for 1-10 years. Based on these results, this study inferred that the majority of the participants had stayed in the country for significant periods. Thus, the results were obtained from an experienced population that was deemed capable of discerning issues surrounding the knowledge, practices and attitude towards the use of antibiotics without a prescription.

Table 1: Demographic information (N=78)

Characteristics	n	%
Gender		
Male	52	66.67
Female	26	33.33
Age (years)		
20-25	5	6.40
26-30	17	21.80
31-35	27	34.62
36-40	15	19.23
>40	14	17.95
Duration of stay in Vietnam (years)		
<1	10	13.00
1-10	31	40.00
11-20	22	28.00
>20	15	19.00
Antibiotic usage		
Self-medication	42	53.85
Consulted doctor	30	38.46
Others	6	7.69

One of the initially investigated issues involved the participants' self-limiting symptoms and illnesses as well as the actions they had taken in response. Some of the most common self-limiting syndromes or illnesses reported by the respondents included suspected pneumonia, fever, abdominal pain, diarrhoea, sore throat, headache and the common cold. These findings concurred with those documented in the literature about common conditions that had consistently encouraged self-medication, especially with antibiotics, among populations. For medical students who had histories of one or more self-limiting illnesses, 53.85% indicated they had resorted to self-medication by using antibiotics, while 38.46% stated they had used injectable antibiotics after seeing doctors and receiving prescribed antibiotics. The rest of the participants indicated that they had not taken specific actions after experiencing illness, with the financial burden facing Vietnam's healthcare system and populations cited as a driving factor behind this trend.

Participants' response to previous self-limiting illness

The practices of medical students regarding the use of antibiotics was investigated based on their behaviours. On this variable, the demographic factors of age and year of the study did not play a significant moderating role in shaping the participants' responses. Another aspect involved the participants' knowledge about the use of antibiotics, especially the benefits and risks. The results obtained were summarised as follows.

Table 2: The beliefs and knowledge of the participants about the use of antibiotics

Questionnaire	Frequency	Percentage
Unprescribed antibiotic usage has side effects such as diarrhoea and gut flora		
In strong agreement	51	65.38

In agreement	24	30.77
Neutral position	3	3.85
Total	78	100.00
If you have used unprescribed antibiotics, have you completed the full course of treatment?		
In strong agreement	38	48.72
In agreement	21	26.92
Neutral position	19	24.36
Total	78	100.00
The use of unprescribed antibiotics is convenient and reduces health care expenses.		
In strong agreement	42	53.850
In agreement	34	43.590
Neutral position	2	2.560
Total	78	100.00
Self-medication, irrational drug usage and the misuse of drugs cause resistant microorganisms.		
In strong agreement	46	58.97
In agreement	25	32.05
Neutral position	7	8.97
Total	78	100.00
Leftover antibiotics can be given to roommates and friends if they get sick.		
In strong agreement	39	50.00
In agreement	27	34.62
Neutral position	11	14.10
Total	78	100.00

Finally, the participants were asked about the feasibility of certain interventions where the use of unprescribed drugs could be addressed. Similar to most of the previous results, mixed outcomes were documented. Whereas some participants pointed out the need to address the push factors, others advocated implementation of strategies where pull factors attracting medical students' use of unprescribed antibiotics could be curbed. The solutions ranged from socioeconomic to cultural and political arenas. The results were summarised as shown below.

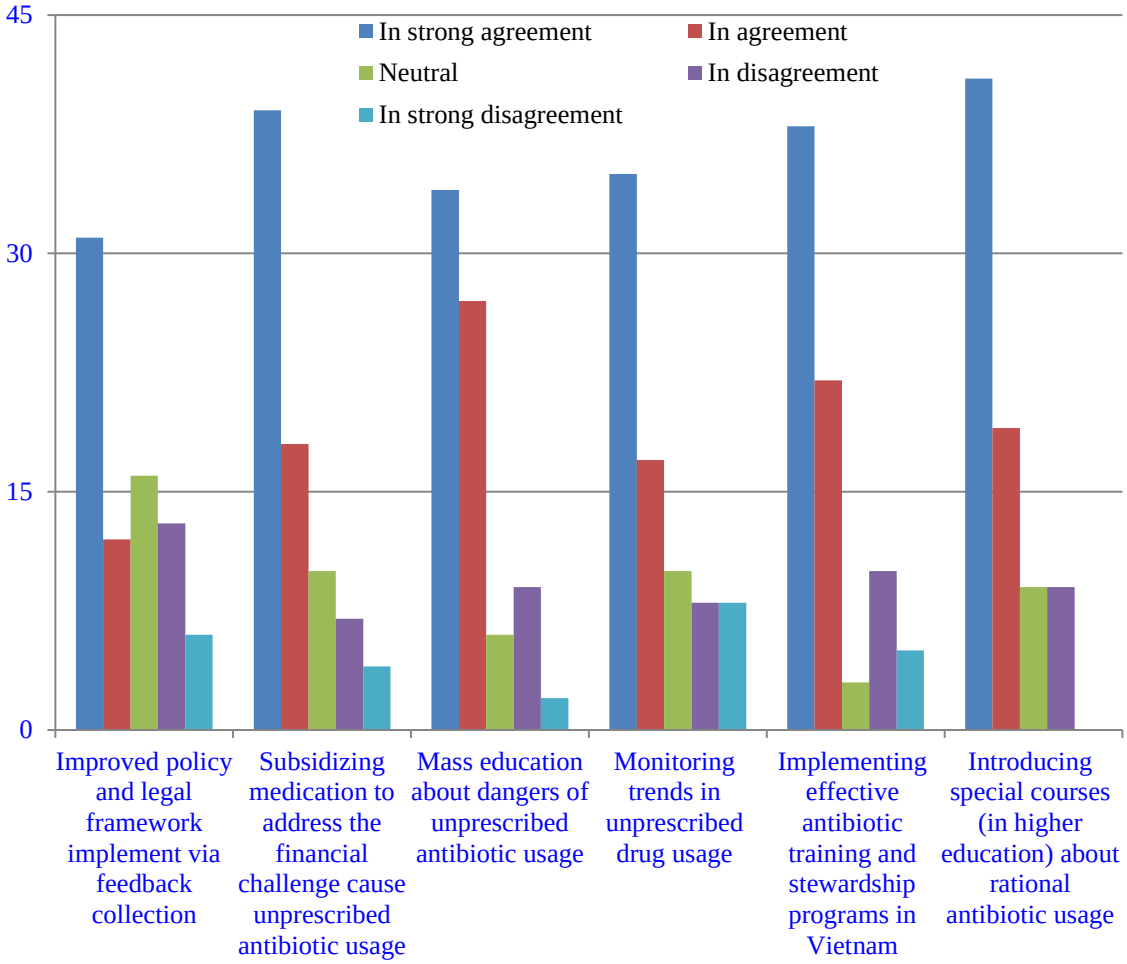

Fig 1: Participants' response to Likert scale questions

DISCUSSION

Globally, the general public's use of antibiotics remains a common practice. Because the general public can easily access antibiotics, antibiotic resistance is rising. The results obtained concurred with those reported in previous literature describing the previous decade's significant rise in antibiotic resistance, a trend attracting some measures to curb the inappropriate use of antibiotics. When asked about the previous year, a significant number of participants were in agreement or strong agreement that they had taken antibiotics at least twice. These results concurred with those documented by Abu Taha and colleagues [1]. Similar to previous results, this study revealed that most of the students understood that the indiscriminate use of antibiotics causes poor outcomes. Hence, knowledge about the use of antibiotics was found to be good. The results also concurred that most of the respondents understood the beneficial role of using antibiotics correctly. This study found that most of Vietnam's medical students understood some of the risks associated with poor use of antibiotics. However, it remains notable that the national healthcare system of Vietnam is costly, and this problem forms a push factor that made many people resort to the use of antibiotics, with the majority found to have taken antibiotics at least twice during the previous year.

Our results further demonstrated an inverse relationship between knowledge about the use of antibiotics and the frequency of using antibiotics. The majority of this study's participants who understood the side effects of using antibiotics without a prescription were less likely to engage in the activity. The implication is that knowledge has a significant impact on antibiotic resistance, where individuals who understand the side effects associated with this use often express willingness to atop an otherwise injudicious use of antibiotics. Most of the participants also agreed that conditions, such as fever and the common cold, could be treated with antibiotics. Regarding influence, it also established further that public attitudes shaped individuals' decision to use (or not use) antibiotics. In particular, it was evident that when individuals had a casual attitude about antibiotics, there was a likely increase in antibiotic resistance risk. This inference was identified by a relatively large number of participants who were uncertain about the risk of antibiotic resistance. Similar findings were reported regarding the importance of fully completing antibiotic courses. In particular, most individuals who were uncertain about the risk of antibiotic resistance being predictable by a casual attitude about the use of antibiotics had poor understanding relative to the completion of a course of antibiotics.

Some of the motivations behind participants' preference for antibiotics included the need to avoid hospital consultation costs and the ease of access to antibiotics in Vietnam. In the previous year, individuals who had used antibiotics at least twice were found to have failed to complete their courses of antibiotics even though this failure tends to cause insufficient eradication of the condition(s) being treated [8]. Also, the study strived to establish reasons why individuals who had used antibiotics failed to complete the course of medication. The findings demonstrated that many participants had abandoned the antibiotics because they believed the antibiotics had not worked, or they felt better after using antibiotics for some time. As such, the study predicted that failure to complete the course of medication accounted for the participants' increase in the frequency of using antibiotics, with the majority using the medication at least twice. The implication is that this study pointed to a relationship between three factors, so that poor practices and lack of knowledge regarding the correct use of antibiotics caused an increase in the frequency of the use of antibiotics.

The question about the participants' practices relative to the use of antibiotics also focused on the frequency of use vs the ability to complete the course of medication. As mentioned above, the group that took antibiotics at least twice was less likely to complete the course. For participants who had used antibiotics once or not at all, this study established that the group was more likely to finish the course. Hence, the study established an inverse correlation between the frequency of use of antibiotics and the completion of the course of antibiotics. The concept of attitude was examined further based on the impact of the attitude towards the use of antibiotics and the frequency of taking the drugs. For these parameters, many individuals were uncertain about the safety of antibiotics, with similar results collected regarding antibiotic resistance. The results illustrate that the frequency of using antibiotics and the attitude of participants about the use of antibiotics did not exhibit a statistically significant relationship.

Despite the informative nature of these results, this study had a few limitations. For instance, the subjects' honesty determined the accuracy of the responses received. Given that online questionnaires were administered, predicting this factor proved difficult. Also, a convenience sampling approach was used to select the participants, although this research approach could attract social desirability bias, making the results less

reliable and emerge as results that could not be generalised to the rest of the population [7]. Another limitation was that the study was cross-sectional, implying that it accounted for the views and lived experiences of the participants at the time of the study. As such, the study could neither give insight into the previous experiences of the participants regarding the use of antibiotics nor predict their knowledge, practices and attitude towards the use of antibiotics without a prescription in the near and far future.

Based on the results obtained from this study, education programmes regarding antibiotics should be implemented in Vietnam, targeting individuals in institutions of higher education as well as the rest of the community. The central subjects to be addressed should be those that advocate for the correct use of antibiotics to reduce the risk of developing antibiotic resistance. It is also recommended that relevant authorities in Vietnam's healthcare system implement educational interventions for the general public and practitioners. This recommendation is informed by the previous literature in which results demonstrate that educational interventions yield significant improvements in knowledge of antibiotic resistance and indications. Overall, the study offered valuable content relative to the practices, attitude and knowledge about the correct use of antibiotics among medical students.

CONCLUSION

However, Vietnam's national healthcare system is costly and formed a push factor that led to the use of antibiotics, with the majority found to have taken antibiotics at least twice during the previous year. Thus, there is a need for education programmes in Vietnam that target institutions of higher education as well as the larger community. Education regarding the correct use of antibiotics and the risks of antibiotic resistance is critical, especially if the intervention is complemented by medical subsidisation.

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CONFLICTS OF INTERESTS

The authors have no conflicts of interests to declare.

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