

Knowledge Regarding Antibiotic Use, its Resistance and Consequences among Higher Secondary Students in Private Schools of Kathmandu Valley

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ABSTRACT

Introduction

The lack of awareness on the appropriate use of antibiotics, its dose and duration is one of the leading causes of global antimicrobial resistance (AMR). AMR poses a growing threat to public health, as infections from resistant strains of microbes become increasingly difficult to treat, resulting in prolonged illness and greater risk of death. Hence, this study would be an important reference for determining the scope of the problem which will be essential for formulating and monitoring an effective response to antibiotic use and its problem of resistance.

Methods

A descriptive cross-sectional study was done among higher secondary level students from selected schools in Kathmandu valley. Baseline data was collected after a tutorial session through semi-structured questionnaires which was based on past researches and verified using expert consultation. Ethical consideration was maintained throughout the study. Descriptive statistics was used to find out the KAP level including knowledge score and attitude-practice score of the selected population.

Results

Among 465 participants conducted in our research, the overall average knowledge score of the participants was found to be 73.3% while the attitude-practice score was 60.53%. It was found that 80.86% of the participants had heard the term "antibiotic resistance". The knowledge score percentage among the students of grade 10 and 11 had no significant difference (p value= 0.592).

Conclusion

Our study concludes that if topics like antibiotics and their judicious use is well covered in school curriculum, it can produce measurable change in knowledge, attitude and practice level of the students.

Keywords: *Attitude, antibiotics, antimicrobial resistance, knowledge, practice*

INTRODUCTION

The lack of awareness on the appropriate use of antibiotics, its dose and duration including self-medication is one of the leading causes of global antimicrobial resistance (AMR).¹ Therefore, strategies that encourage antimicrobials to be used more responsibly and less often are needed

to safeguard human health to reduce substantial economic and clinical burden. This includes awareness campaigns targeting the public to raise the profile of the issue and induce societal and cultural change.² Higher secondary level students, in their formative level of schooling are the most malleable group to adopt practices such as the use

of antibiotics irrationally without proper supervision and care. Therefore, targeting this demography is crucial to bring positive attitude about the use of antibiotics amongst themselves, their family and the society as a whole. Identifying the variables that affect the behavior of adolescents towards use of antibiotics is thus substantial.

METHODS

The study was conducted over a period of 3 months from July 2019 to October 2019. The questionnaire structure and content was designed taking references from various similar literatures. They were adapted for our settings by the study team. The questionnaire was pilot tested in a nearby private higher secondary school and was finalized after expert consultation. Five different private higher secondary schools inside Kathmandu valley were chosen based on convenience sampling. The questionnaire consisted of single answer responses, multiple answer responses and 5-point Likert scaling type questions. Sample size for the study was calculated from Raosoft at 95% confidence interval, 5% margin of error, population size of 20000 (estimate made considering about 100 higher secondary schools in Kathmandu each with 200 science students each). The students were first tutored by pertinent experts in the field before they were provided with the questionnaires. Data was collected by distributing self-administered questionnaires after taking informed expressed consent from the participants.

The questionnaire had two types of questions. The first type of question assessed the knowledge on the use, resistance of antibiotics and the consequences of antibiotic resistance. The second type included questions assessing their attitude and practice regarding antibiotics. The rest were designed to assess other variables such as perception and exposure. The respondents answered 16 different questions independently in 20 minutes following a tutorial class beforehand.

Responses for different questions were coded to facilitate data entry and data analysis for uniformity. Responses from the 5-point Likert scale questions were condensed into three categories: agree, neutral, and disagree. The data was entered in Excel 2019 and analyzed using 25.0 version of SPSS Statistics software.

For calculating knowledge score, we gave each correct answer a score of 1 while each wrong answers a score of 0. Each question out of 6 knowledge questions in the knowledge section only had one correct answer and at least one

wrong answer. This way, a respondent could score a maximum of 6 and a minimum of 0 in this section. For calculating attitude and practice score, a score of 1 was given to "disagree," a score of 2 was given to "neutral," and a score of 3 was given to "agree." All the questions were positively framed. There was one question for attitude and one for practice, therefore, the maximum scores for attitude and practice equaled to 4 while the minimum score equaled to 1. The other questions were perception based. The total knowledge score (K-score), attitude-practice score (AP-score) were calculated using MS Excel 2019. In addition, the total percentages of knowledge score and attitude-practice score of students were evaluated and the corresponding P-value was calculated using two sample t- test in SPSS, to see whether the gap in KAP scores among grade 11 and grade 12 students was statistically significant.

RESULTS

Our study included 465 participants from five private higher secondary level schools inside Kathmandu valley. The mean age of the respondents was 14.26 years. More than half of them (59.5%) were males. Among several sets of questions asked, 35.27 % of respondents didn't remember the last time they took antibiotics while 20% responded to have taken them in the last month. Only a marginal proportion (5.16%) responded to have never consumed antibiotics. About one third (35.91%) of the participants took antibiotics within last one year while 23.87% responded to have not taken any in that interval. Among those who consumed antibiotics, 65.8% took them under doctor's prescription.

On the basis of six questions to assess the knowledge of antibiotic resistance, the average knowledge score (k score) was found to be 73.3%. The frequency of respondents who correctly answered that antibiotics were used to treat bacterial infections was 241 (51.83%). We also found that 74.41% correctly responded about the intake of antibiotics to be stopped only after the completion of full course as directed. The respondents who thought that antibiotics given to their family or friends should not be taken without medical consultation even under similar illnesses was 84.52%. Out of the total respondents, 80.86% correctly answered that antibiotic resistant infections could make medical procedures like surgery, organ transplants and cancer treatments much more dangerous. The respondents who believed that many infections are becoming increasingly resistant owing to rampant usage of

Table 1. Assessment of knowledge

Questions	Frequency (%)
Antibiotics are used to treat	
• Viral infections	39 (8.39)
• Bacterial infections	241 (51.83)
• Parasitic infections	2 (0.43)
• All type of viral, bacterial and parasitic infection	121 (26.02)
• Don't know	40 (8.60)
• Missing	22 (4.73)
When should intake of antibiotics be stopped?	
• When they felt better	76 (16.34)
• Whey they had taken all the drugs as directed	346 (74.41)
• Don't know	43 (9.25)
Is it okay to use antibiotics given by friends/family?	
• Yes	24 (5.16)
• No	393 (84.52)
• Don't know	48 (10.32)
Statements	
• Antibiotic-resistant infections could make medical procedures like surgery, organ transplants and cancer treatment much more dangerous	376 (80.86)
• Many infections are becoming increasingly resistant (difficult to treat) by antibiotics	388 (83.44)
• Resistant bacteria can spread from person to person	340 (73.12)

antibiotics was 83.44%. Around 3/4th (73.11%) believed that resistant bacteria could spread from person to person. The K-score percentage of grade 11 and 12 were found to be 74.15% and 72.5% respectively with a p-value of 0.592 which shows that the difference is not significant.

The term "antibiotic resistance" was heard by 80.86% of the respondents. However, only 32.69% had heard the term "superbugs". They responded to have heard the term "antibiotic resistance" respectively from doctor/nurse (40.86%), family/friends/social media (11.4%) and only a few (4.73%) couldn't remember the source. More than half of the respondents (57.42%) agreed that farmers should not be promoted to use antibiotics in food producing animals. At a response rate of 77.85%, only 40.33% of the participants had heard about post antibiotic era. Also, at a response rate

Table 2. Assessment of attitude and practice

Questions	Frequency (%)
Attitude : People should use antibiotics only when they are prescribed by a doctor or nurse	
• Agree	450 (96.77)
• Neutral	10 (2.15)
• Disagree	5 (1.07)
Practice : Did you take a doctor's prescription during illness?	
• Yes	306 (65.80)
• No	62 (13.33)
• Don't remember	97 (20.86)

of 86.2%, 60.8% had heard about one health concept.

The overall attitude-practice (AP) percentage was found to be 60.53%. The respondents who believed that antibiotic resistance occurred because of using antibiotics without physician's prescription was 56.77% and those who believed that it occurred by using antibiotics when they are not necessary was 56.55%. Out of total respondents, 42.8%, 18.7% and 15.9% responded the common side effects of antibiotics as headache, nausea/vomiting and rashes/ allergic reactions respectively while 29.9% didn't know about the side effects.

At a response rate of 80%, the responses to questions assessing their understanding on the consequences of antibiotic resistance respectively were longer duration of illness (38.71%); increased burden on health system (28.76%); higher mortality (23.39%); longer treatment (15.86%) and treatment with expensive drugs (10.32%).

DISCUSSION

Our study aimed to assess the knowledge, attitude, and practice (KAP) of students regarding antibiotics, resistance and its consequences in selected private higher secondary schools of Kathmandu valley. Among the respondents, 35.27 % didn't remember the last time they took antibiotics and about one third (35.91%) of the participants took antibiotics within last one year unlike the survey report by WHO which reported that 65% of the respondents across 12 countries reported having taken antibiotics within the past six months. (3) Among those who had consumed antibiotics, 65.8% took them under doctor's prescription. Whereas, in contrast to this finding, is the study report by Pereko, Lubbe & Essack where

82% of the respondents mentioned pharmacy as a source of taking antibiotics.⁴

On the basis of six questions set to assess the knowledge of antibiotic resistance, the average k-score percentage was found to be 73.3%. Among the total respondents, 51.83% correctly answered that antibiotics were used to treat bacterial infections, whereas in a study report by Kandelaki, Lundborg & Marrone it was seen that 55% of the respondents believed in antibiotics to be beneficial against viruses.⁵ A total of 48.6% responded that not completing the full course of antibiotics is one of the causes of antibiotic resistance. This finding agrees with the study done among Chinese in Hong Kong where 75.1% supported the statement that incomplete courses of antibiotics would lead to undesirable consequences.⁶

Our study found that 84.52% answered that the antibiotics prescribed to their family or friends should not be taken without medical consultation even if the illnesses resemble. A contrast to our study can be seen in a survey by WHO (2015) where 25% of respondents across 12 countries responded that it is acceptable to use antibiotics given to a friend, family member, as long as they were used to treat the same illness.⁷

Our study revealed that 80.86% of the students had heard the term "antibiotic resistance". This finding is in line with the study done in Palestine which showed that 65.0% of respondents had heard the term.⁸

Out of total respondents, 42.8%, 18.7%, and 15.9% responded to the common side effects of antibiotics as headache, nausea/vomiting and rashes/ allergic reactions respectively. Only 29.9% didn't know about the side effects. Among those who responded, 26.2% of the respondents in a study by Deo et al had mentioned nausea and vomiting as the major side effects.⁹ At a response rate of 80%, the responses on the consequences of antibiotic resistance respectively were longer duration of illness (38.71%); an increased burden on the health system (28.76%); higher mortality (23.39%); longer treatment (15.86%) and treatment with expensive drugs (10.32%). This is similar to what was reported on awareness study done regarding the impact of antimicrobial resistance by Eliopoulos, Cosgrove & Carmeli and Kim, Moon, Kim which stated that there is a direct correlation of hospital length of stay and the cost, future length of stay, and mortality.^{10,11} All the results we explored are found to be satisfactory compared to other similar literatures, which may be due to the fact that a tutorial class was already taken beforehand implying that if this topic is

properly addressed in their curriculum, it wouldn't be a difficult thing to grasp into.

CONCLUSION

Our study concludes that the higher secondary level students can understand the burden, impact, and consequences of antibiotic resistance as well as get oriented to bring about positive changes in their attitude and practice if they are well tutored. Thus, it might be substantial to add coverage on antibiotics, its resistance and the consequences in the curriculum itself, right from the higher secondary-school level to help delay the post antibiotic era.

CONFLICT OF INTEREST

None declared.

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