

Research article

Knowledge, Attitude and Practice on Antibiotics Use among Medical Students

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ABSTRACT

Background and Objectives: Bacterial resistance has reached an alarming proportion in developing countries because of various reasons like indiscriminate use of antibiotics and its availability as over the counter (OTC) drugs. This study is to get an overview of students understanding of antibiotics and to compare the knowledge, attitude and practice (KAP) on antibiotic use among undergraduate medical students.

Material and methods: This was a descriptive cross-sectional study conducted among undergraduate medical students of Janaki Medical College. A structured and customized self-administered questionnaire was used to collect data on socio-demographic and knowledge, attitude and practice (KAP) regarding antibiotic use of medical students. Data were analyzed using SPSS version 20. $P < 0.05$ was considered statistically significant.

Results: Out of 183 undergraduate medical students from first, second and third year of Janaki medical College, 115 (62.8%) were male and 68 (37.2%) were female. Among medical students, mean rank of knowledge on antibiotic use among first year (mean rank = 89.36) and second year (mean rank = 87.50) was lower compared to third year (mean rank = 97.78). The mean rank for attitude among first year (mean rank = 87.75) and second year (mean rank = 94.38) was lower compared to third year (mean rank = 94.56). Likewise, practice of antibiotic use was low among first year (mean rank = 61.27) and second year (mean rank = 105.91) compared to third year students (mean rank = 115.19). There is significant difference of mean rank for the practice ($p < 0.0001$) but not for knowledge and attitude on antibiotic use among the students studying in different years.

Conclusion: This study showed varying level of knowledge, attitude and practice on antibiotics use among undergraduate medical students of first, second and third year, suggesting that continuous educational intervention on rational use of antibiotic should be made mandatory in the all the academic years of undergraduate medical curriculum, for promoting judicious use of antibiotics, minimizing self-medication and impacts of antibiotic resistance, and for rational antibiotics prescription by future doctors.

Keywords: Antibiotic use, Knowledge, Attitude, Practice, Medical students

INTRODUCTION

Antibiotics use in preventive and curable therapy have saved life of countless patients

and improved patient care in general [1]. An antibiotic is a type of antimicrobial substance active against bacteria and is widely used in

the treatment and prevention of bacterial infection [2]. They are among the most commonly used and misused or overused of all drugs, due to their effectiveness and easy access [3]. Antibiotic consumption varies widely between countries. As measured in defined daily doses per 1,000 inhabitants per day, Mongolia had the highest antibiotic consumption rate of 64.4 where as Burundi had the lowest rate of 4.4 in the year 2018 [4].

The inevitable consequence of their widespread use has led to the emergence of antibiotic-resistant pathogens, fuelling an ever-increasing need for new drugs at a time when the pace of antimicrobial drug development has slowed dramatically. Successful antimicrobial therapy of an infection ultimately depends on the concentration of the antibiotic at the site of infection and intact host defenses [5]. Antibiotic resistance has become a major global health problem that threatens our ability to treat common infectious diseases and needs urgent action [6].

Bacterial resistance to an antibiotic is attributable to three general mechanisms: (1) the drug does not reach its target; (2) the drug is not active; or (3) the target is altered [5]. It has reached an alarming proportion in developing countries because of various reasons like indiscriminate use of antibiotics and its availability as over the counter (OTC) drugs [7]. World Health Organization has classified antimicrobial resistance as a widespread "serious threat that is no longer a prediction for the future, it is happening right now in every region of the world and has the potential to affect anyone, of any age, in any country"[8].

Antibiotics are usually considered safe and well tolerated. However, some antibiotics

have been associated with a wide extent of adverse side effects ranging from mild (fever and nausea) to very severe (photo dermatitis and anaphylaxis) depending on the type of antibiotic used, the microbes targeted and the individual patient [9, 10].

There are several studies conducted on KAP of medical students on antibiotic resistance, however only few studies on KAP of medical students on antibiotic use have been published in Nepal [11], and to my knowledge no such study has been conducted in Province 2 of Nepal. Based on the theoretical knowledge that the undergraduate medical students gain through classes, what changes in their attitude towards antibiotics use has taken place and whether they actually reflect the knowledge and attitude in practice of rational drug use or not, lead to the initiation of this study of KAP on antibiotics use.

MATERIAL AND METHODS

A cross sectional study was conducted among medical students of first, second and third year studying at Janaki Medical College (JMC), Janakpur from August 2019 to September 2019. All the students were informed about the purpose of study and consent was taken prior to study. Based on, previous studies on KAP of antibiotic use, a structured self-administered questionnaire was designed and customized to cover all the main key points of the research and in a way that suited the context of medical students, to measure the KAP and socio-demographic details of respondents [12, 13, 14]. The questionnaire comprised of 4 sections and included 55 questions on the following: (1) Section A for demographic characteristics; (2) Section B for knowledge on antibiotics use (17 questions); (3) Section C for attitude towards antibiotic use (14 questions); and (4) Section D for practice of use of antibiotics (12

questions). Answers were recorded as, 'Yes' or 'No' or 'Don't know' for sections B and C whereas answers to section D were recorded as 'Yes' or 'No'.

The section on knowledge of antibiotics use (Section B) had questions on microbes and the disease/infections caused by them, sources of antibiotics, their rational uses, side effects and resistance. The section on attitude of antibiotics use (Section C) had questions on attitude towards emerging issues related to antibiotic misuse, combination of antibiotics, and sensitization program for rational use of antibiotics. The section on practice of antibiotics use (Section D) had questions on how the respondents and their family members use antibiotics, self-medication, prescription of antibiotics, treatment course with antibiotics and

management of leftover antibiotics.

The self-administered questionnaire was distributed to students in classrooms. Those students who filled up the written consent after understanding the objectives of study were enrolled in the study. Study was commenced after obtaining permission from institutional review board (IRB), of JMC.

The data was entered into MS excel and transferred to SPSS 20 for analysis. Descriptive statistics were employed to summarize the data. Percentage and mean rank for KAP were calculated. Also, KAP were presented by diagram. $p < 0.05$ was considered statistically significant.

RESULTS

In the current study, out of 183 students, 115 (62.8%) were male and 68 (37.2%) were

Table 1: Socio-demographic characteristics of medical students by gender

Characteristics	Total No (%)	Gender	
		Male (n=115, 62.8%)	Female (n=68, 37.2%)
Age group			
20 years & less	96(52.5)	53(46.1)	43(63.2)
More than 20 years	87(47.5)	62(53.9)	25(36.8)
Religion			
Hindu	166(90.7)	102(88.7)	64(94.1)
Others*	17(9.3)	13(11.3)	4(5.9)
Current academic year			
1 st year	67(36.6)	48(41.7)	19(27.9)
2 nd year	48(26.2)	23(20.0)	25(36.8)
3 rd year	68(37.2)	44(38.3)	24(35.3)
Family income(NPR/per month) †			
<50,000	75(41.0)	57(62.6)	18(35.3)
50,000-1,00,000	48(26.2)	22(24.2)	26(51.0)
>1,00,000	19(10.4)	12(13.2)	7(13.7)
Source of Income			
Agriculture	36(19.7)	31(27.0)	5(7.4)
Service and Business	147(80.3)	84(73.0)	63(92.6)
Place of Residence			
Nepal	168(91.8)	107(93.0)	61(89.7)
India	15(8.2)	8(7.0)	7(10.3)

**Muslim/Buddhist/Christian, † Missing 41

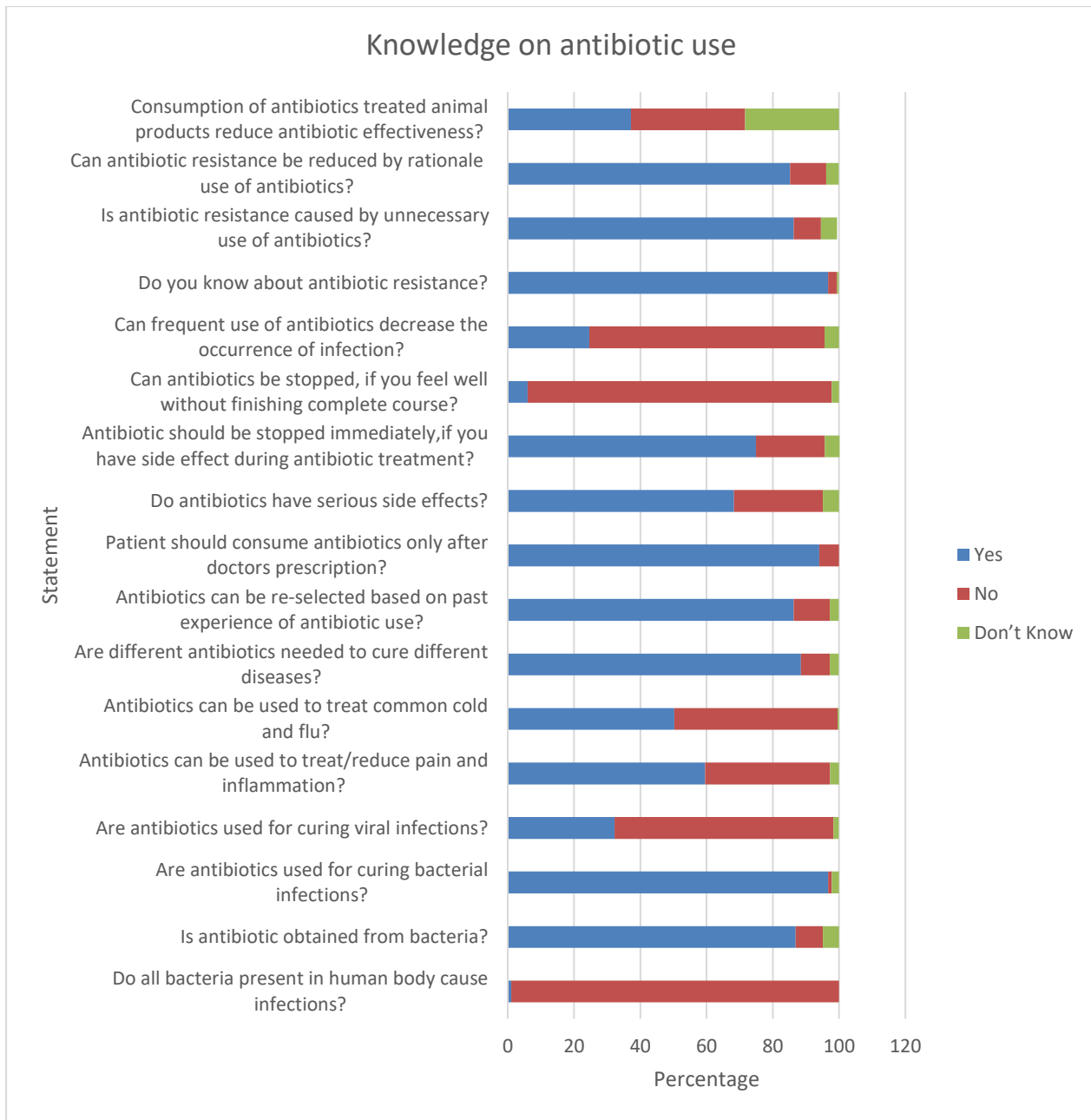


Figure 1: Knowledge on antibiotic use

female from first (36.6%), second (26.2%) and third year (37.2%) medical students. Most of them belonged to age group 20 years and less (52.5%) and majority were Hindu (90.7%) by religion. More than one fourth of their family income was between 50,000 to 1,00,000 in Nepalese rupee (NPR) and majority (80.3%) of their family were involved in services or business as source of

income. Majority of them were Nepali nations whereas few were from India (Table -1).

Knowledge on antibiotic use among medical students: Figure 1 shows the responses in percentage to the knowledge related questionnaire on antibiotic use. Most of the student have a knowledge that all bacteria present in human body do not cause infection (98.9%), antibiotics are used for

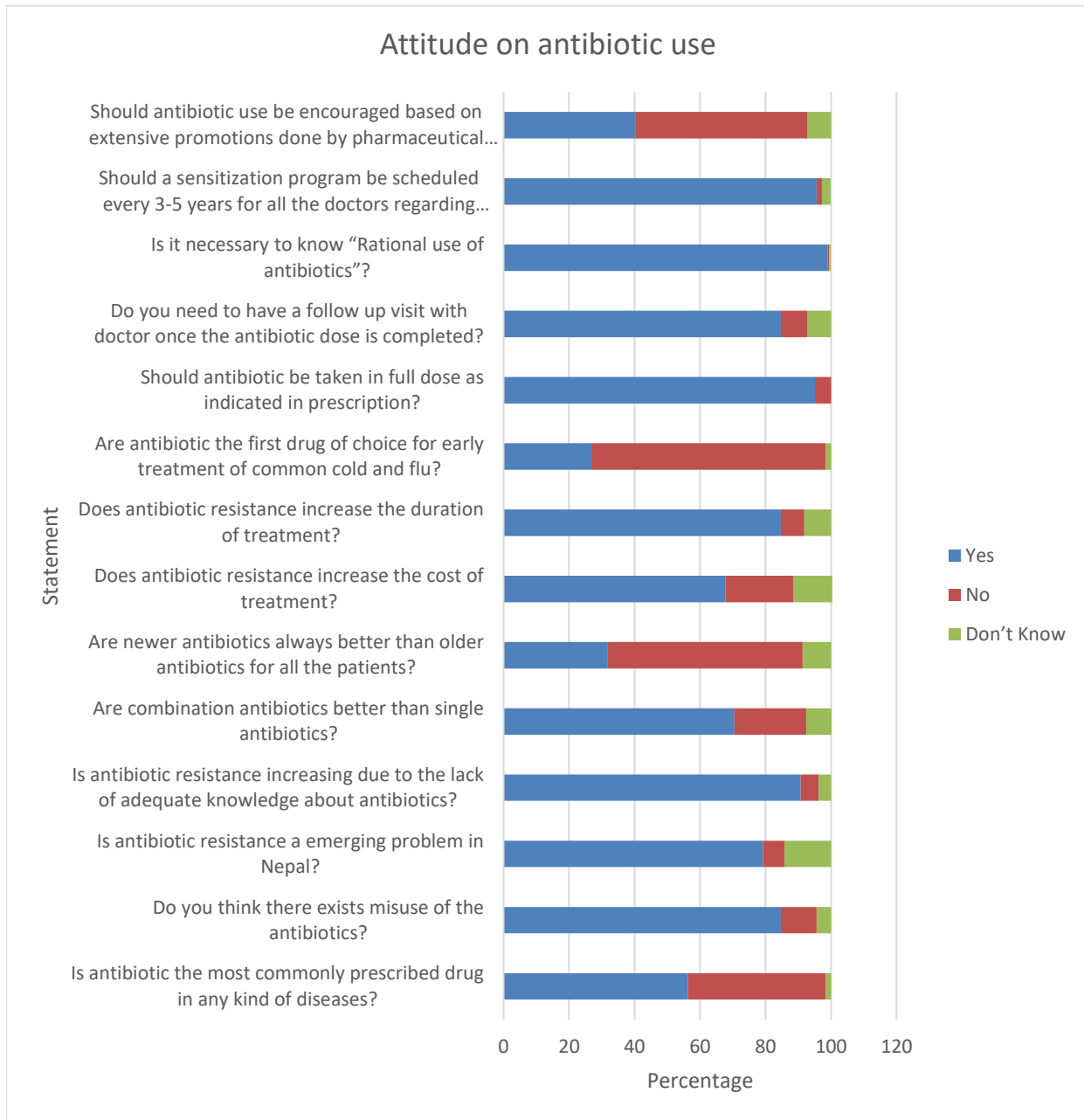


Figure 2: Attitude on antibiotic use

curing bacterial infections (96.7%), and antibiotics should be taken for complete course as prescribed (91.8%). Also, most of them knew about antibiotic resistance (96.7%). However in contrast to good knowledge reflected with these questions, many have reported that antibiotics can be used to treat/reduce pain and inflammation

(59.6%) and also antibiotics can be used to treat common cold and flu (50.3%).

Attitude on antibiotic use among medical students: Figure 2 shows the responses in percentage to the attitude related questionnaire on antibiotic use. Most of the student agree that, it is necessary to know "Rational use of antibiotics" (98.9%) and lack of adequate knowledge about antibiotics is

the cause of increasing antibiotic resistance (90.7%). Also most of them recommend that a sensitization program should be scheduled every 3-5 years for all the doctors regarding rational use of antibiotics (95.6%). However

in contrast to good attitude reflected with these questions, few have reported that antibiotic resistance is not an emerging problem in Nepal (6.6%) and that use of antibiotics should be encouraged based on

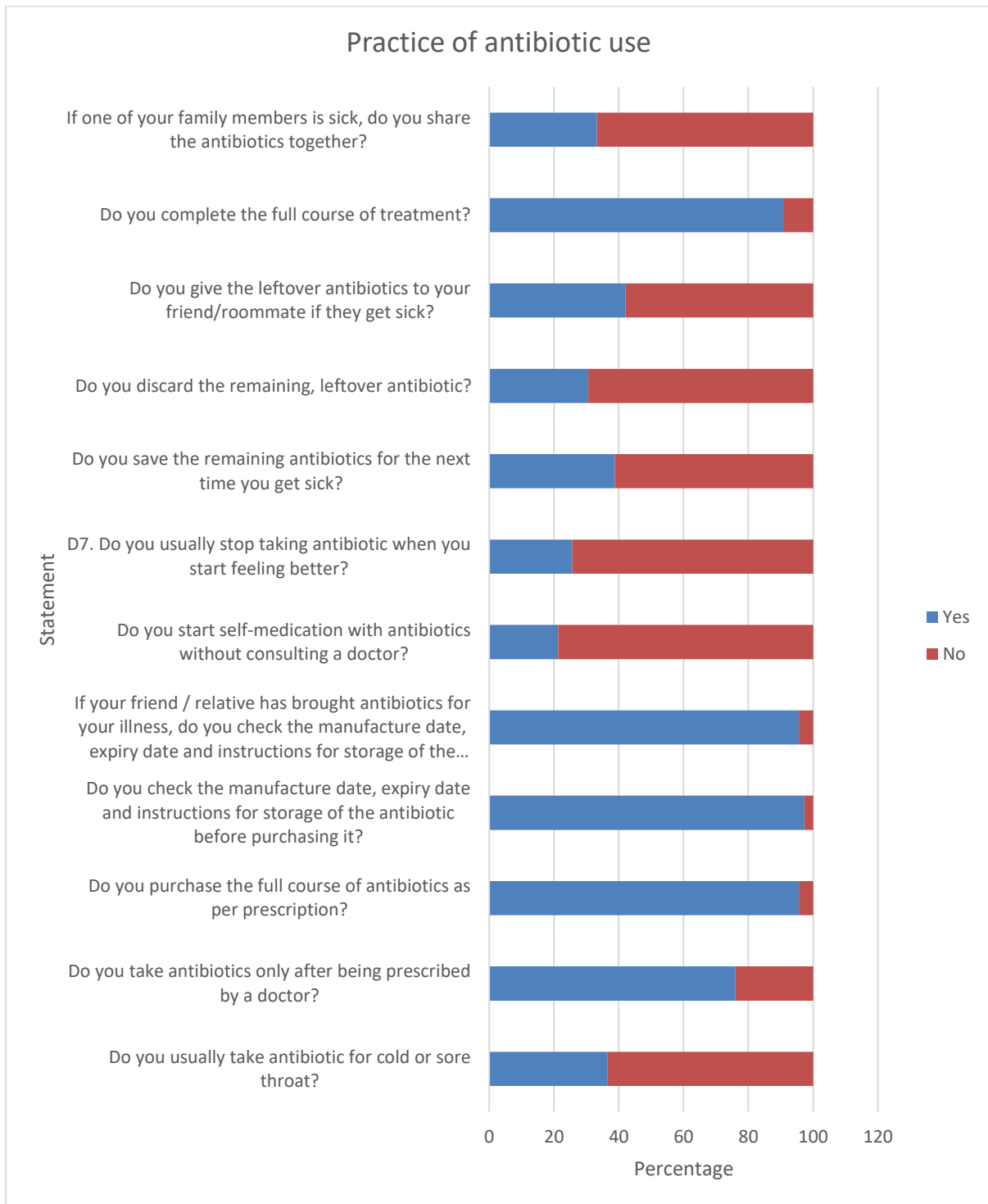


Figure 3: Practice of antibiotics use

extensive promotions done by pharmaceutical companies (40.4%).

Table 2: Socio-demographic characteristics associated with knowledge, attitude and practice on antibiotic use among medical students.

Characteristics	Total No (%)	Knowledge		Attitude		Practice	
	158 (100)	Mean rank	p-value*	Mean rank	p-value*	Mean rank	p-value*
Age group							
20 years & less	96	90.13	0.609	88.38	0.321	91.38	0.864
More than 20 years	87	94.07		96.00		92.69	
Gender							
Male	115	93.02	0.730	94.13	0.470	86.70	0.073
Female	68	90.27		88.40		100.97	
Religion							
Hindu	166	91.52	0.697	94.68	0.029	93.76	0.152
Others	17	96.68		65.79		74.82	
Current academic year							
1 st year	67	89.36	0.504	87.75	0.702	61.27	<0.0001
2 nd year	48	87.50		94.38		105.91	
3 rd year	68	97.78		94.56		115.19	
Family income (NPR/ per month)							
<50,000	75	71.89	0.781	73.48	0.051	71.71	0.880
50,000-1,00,000	48	68.91		61.96		69.71	
>1,00,000	19	76.50		87.79		75.18	
Missing							
Source of Income							
Agriculture	36	89.74	0.771	101.88	0.203	93.31	0.866
Service Business	147	92.55		89.58		91.68	
Place of Residence							
Nepal	168	92.54	0.639	92.15	0.899	89.68	0.044
India	15	85.97		90.37		117.93	

*p-value calculated for Mann-Whitney U test or Kruskal-Wallis Test; **missing; n= 41

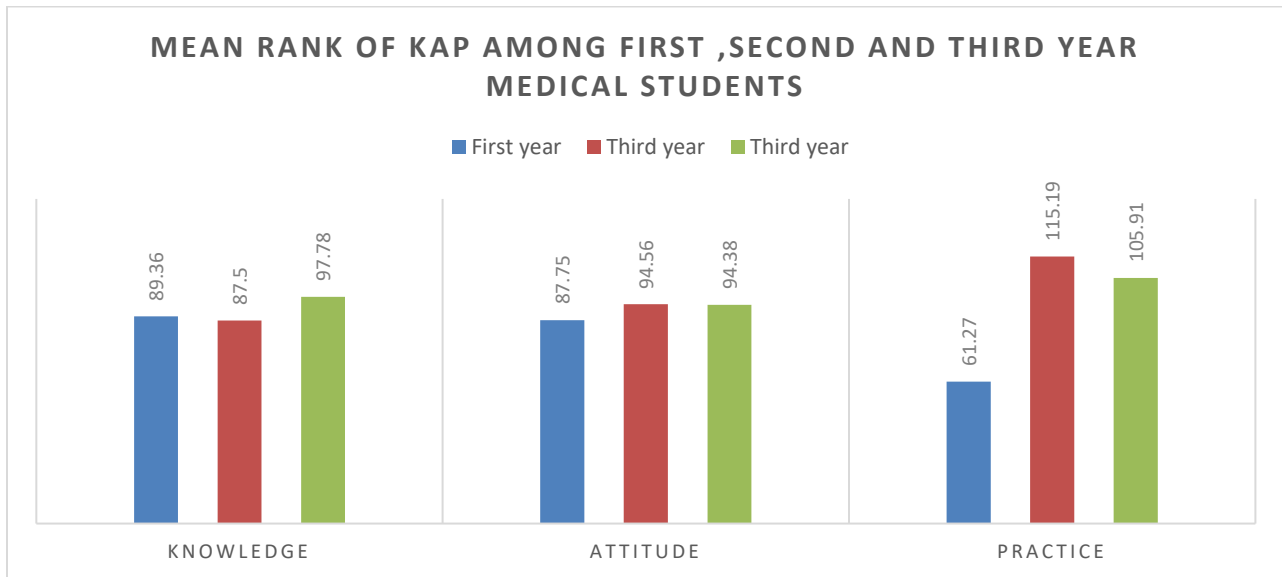


Figure 4: Mean rank for knowledge, attitude and practice on antibiotic use among first, second

Practice of antibiotic use among medical students: Figure 3 shows the responses in percentage to the practice related

questionnaire on antibiotic use. Most of the student purchase full course of antibiotics as prescribed by doctor (95.6%) and also

Table 3: Knowledge, attitude and practice on antibiotic use associated with medical care seeking behavior among medical students.

Characteristics	Total No (%)	Knowledge		Attitude		Practice	
	183 (100)	Mean rank	p-value*	Mean rank	p-value*	Mean rank	p-value*
Health care facility for medical care							
Government	59(32.2)	105.54	0.036	102.08	0.061	94.73	0.144
Private	101(55.2)	87.51		83.83		94.95	
Both	23(12.6)	76.96		102.02		72.04	
Number of visit to health care facilities††							
None	21(12.1)	82.31	0.492	81.76	0.844	85.05	0.752
1-3 times	97(56.1)	90.94		86.95		87.84	
> 3 times	55(31.8)	81.84		89.08		93.81	
Relatives working in health care facilities							
Yes	74(40.4)	94.82	0.546	100.74	0.041	83.97	0.085
No	109(59.6)	90.09		86.07		97.45	
Use of antibiotic in the last year							
Yes	45(24.6)	83.43	0.204	81.11	0.105	81.49	0.118
No	138(75.4)	94.79		95.55		95.43	

*p-value calculated for Mann-Whitney U test or Kruskal-Wallis test; ††missing; n=10

practice checking of manufacture date, expiry date and instructions for storage of the antibiotic before purchasing (97.3%) or before consuming it (95.6%). However in contrast to good practice reflected with these questions, few have a practice of self-medication with antibiotics (21.3%), and also save the remaining antibiotics for the next time they get sick (38.8%) or give the leftover antibiotics to their friend/roommate when they get sick (42.1%).

Knowledge, attitude and practice on antibiotic use associated with medical care seeking behavior among medical students:

The mean rank of knowledge, attitude and practice level of first year, second year and third year is compared in figure 4 whereas Table 3 shows the knowledge, attitude and practice on Antibiotic use associated with medical care seeking behavior among medical students. Majority of the students (55.2%) visited private health care facility for medical care. The number of times, students visited, health care facilities is mostly (56.1%) between 1 to 3 times and most of the students (59.6%)

don't have any relative working in health care facilities. Similarly most of the students (75.4%) have not used antibiotics for the last 1 year.

Students who visited government hospitals had statistically significant higher knowledge (mean rank = 105.54, p = 0.036) on antibiotics use compared to those who visited private or both private and government hospitals (mean rank = 87.51 and 76.96 respectively). The attitude of students visiting private hospitals for medical care was lower (mean rank = 83.83) to that of those visiting the government hospitals (mean rank = 102.08) or both private and government hospitals (mean rank = 102.02). The practice of students visiting government and private hospitals for medical care was similar (mean rank= 94.73 and 94.95 respectively), however it was higher compared to that of the students visiting both private and government hospitals (mean rank = 72.04) for medical care. Likewise, the student whose relatives were working in health care facilities had significantly higher level of attitude on antibiotic use (mean

rank=100.74) than those whose relatives were not working in health care facilities (p=0.041)

DISCUSSION

In Nepal, knowledge about antibiotic use, its pharmacokinetics, pharmaco-dynamics properties and resistance is taught to medical students in first and second year in preclinical phase. However, in this study third year medical students have also been included, assuming that they have a better knowledge, attitude and practice on antibiotics use as they are exposed to clinical knowledge and bed side clinics more than their juniors. Therefore, this study was conducted to assess the level of Knowledge, Attitude and Practice (KAP) on antibiotic use among students of preclinical phase students and third year and to compare the KAP of antibiotic use between them.

In this study, 96.7% of students had knowledge that antibiotics are used for curing bacterial infections which is similar to studies done by Shaik et al. in South India [15], and that antibiotics should be taken for complete course as prescribed (91.8%). Also, most of them had knowledge about antibiotic resistance (96.7%), which was caused by unnecessary use of antibiotics (86.3%) and which could be reduced by rationale use of antibiotics (85.2%). Thus, they had good knowledge about antibiotic usage and resistance, which is in accordance with studies done by Khan et al. [16] and Scaioli et al. [17]. However, the results on reduction of antibiotic effectiveness due to consumption of animal products showed mixed response, as they were not aware about the evolving threat of antimicrobial resistance [18].

Our study showed that attitude towards rational use of antibiotic, and lack of adequate knowledge about antibiotics being a reason

for antibiotic resistance was quite good (98.95% and 90.7% respectively). However the attitude towards rational use of antibiotics is mixed as, few have reported that antibiotic resistance is not an emerging problem in Nepal (6.6%), combination antibiotics are better than single antibiotics (70.5%) and that use of antibiotics should be encouraged based on extensive promotions done by pharmaceutical companies (40.4%). Same kind of mixed attitude was seen in other studies as well [15, 19]. It was found that 26.8% of students believed that antibiotics should be the first drug of choice for early treatment of common cold and flu which was in contrast to that of 60% in study done by Azevedo et al. in Braga [20].

This study showed majority of the students (76%) took antibiotics after being prescribed by a doctor, purchased full course of prescribed antibiotic (95.6%) and also completed the full course of treatment with antibiotic (90.7%). The results are in consistent with study done by Padmanabha et al. in India [21], but are in contrast to study done by Zafar et al. in Pakistan [22].

Self-medication by the students was observed in 21.3%, while 38.8% agreed that they save left over antibiotics but only 42.1% revealed that give the leftover antibiotics to their friend / roommate when they get sick. The results on practice of antibiotics were mixed as 69.4% said they discarded the leftover medicine while on the other hand 38.8% said they save the leftover antibiotics. Number of authors have reported adequate knowledge on antibiotics use however the attitude and practice regarding antibiotic use was inadequate which is in concurrence to the results of this study [16, 23]. The knowledge, attitude and practice level of first year students was lower compared to second and third year students. The attitude level of

second year was comparable to third year but the practice level was higher than that of third year.

This study gives us an idea of knowledge, attitude and practice concerning antibiotic usage and its resistance among future prescribers of our college, which can help us to plan for a continuous reinforcement of antibiotics, oriented teaching learning activities throughout the undergraduate medical course.

CONCLUSION

This study showed varying level of knowledge, attitude and practice (KAP) on antibiotics use in different year students of undergraduate medical students, suggesting that continuous educational intervention on rational use of antibiotic should be made mandatory in the curriculum, for promoting judicious use of antibiotics, minimizing self-medication and antibiotic resistance, and for rational antibiotics prescription by future doctors.

Limitations of the study included recruitment of small sample size from a single private teaching hospital and exclusion of 4th year and final year medical students and interns who will have a better knowledge compared to their juniors as they are more exposed to clinical knowledge and bed side clinics.

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