

Assessment of Knowledge, Attitude and Practice of Antibiotic Usage amongst Undergraduate, Intern and Postgraduate Dental Students - A Questionnaire Based Study

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ABSTRACT

Background: Antibiotics serve as a vital and useful armamentarium to combat against various harmful pathogens. Unfortunately, excessive and imprudent uses of these drugs have led to antibiotic resistance which is now a rapidly growing serious threat to human health. The aim and objective of the study was to assess the knowledge, attitude and practice of antibiotic use and its resistance amongst Undergraduate, Intern and Postgraduate dental students.

Materials and methods: The study included 140 dental students (Undergraduates, Interns and Postgraduates) from Mahatma Gandhi Postgraduate Institute of Dental Sciences, Pondicherry, India. Modified questionnaire was distributed amongst the participants so as to assess their knowledge, attitude and practice regarding antibiotic use and its resistance. Data was analysed using descriptive statistics, chi-square test and ANOVA test.

Results: The mean ages of the Undergraduate, Intern and Postgraduate students were 20.28, 22.97 and 26.05 years respectively. Out of total 70 Undergraduate students, 24.29% were males and 75.71% were females. Out of total 35 Interns, 40% were males and 60% were females, and out of 35 Postgraduate students, 37.14% were males and 62.86% were females. Knowledge, attitude and practice mean score were higher in Postgraduate students than Interns and Undergraduate students which was statistically significant.

Conclusion: Our results indicated the need to educate dental students further regarding antibiotic use and the risk related to antibiotic misuse and resistance.

Key Words: Antibiotic, resistance, knowledge, attitude, practice

INTRODUCTION

Antibiotics, the most frequently prescribed drugs around the world. But unfortunately, it has been prescribed irrationally in large number of cases. [1] Around 70 to 80% of antibiotic prescriptions are unnecessarily prescribed by the health professionals. Imprudent uses of these drugs have resulted to antimicrobial resistance, which is now emerging as one of the major threats to health care globally. [2] Resistance is a serious issue leading to serious difficulty in treating infections caused by bacteria. The problem of resistance is compounded in developing countries due to many reasons which include self-medication without prescription, over the counter (OTC) availability of antibiotics, high medical consultations fees, insufficient regulation of antibiotics, and lack of satisfaction with medical practitioners. [3]

World Health Organization (WHO) has described antibiotic resistance as a major global health problem that threatens our ability to treat common infectious diseases and needs urgent action. [4] A strong correlation between the levels of antibiotic usage and antibiotic resistance have been shown in various studies, where populations who use lower amount of antibiotics develop lower amount of resistance toward bacteria. Various approaches have been developed to

meet the challenges which are posed by its spread. One of the approaches is to conduct various institutional program and educational programs in the public sector and medical sector regarding antibiotic resistance and its complications, and regarding the steps which can stop its development and spread. [5] To enhance the strength of such program, an idea about the knowledge, attitude and practice concerning antibiotic use and its resistance among health care professional students are very important. Hence, the present study was undertaken amongst Undergraduate (UG), Intern and Postgraduate (PG) dental students so as to assess their knowledge, attitude and practice (KAP) of antibiotic use and its resistance.

MATERIALS AND METHODS

This study was questionnaire based single cross-sectional study done amongst 140 dental students from Mahatma Gandhi Postgraduate Institute of Dental Sciences in Pondicherry, India, in which 70 were undergraduates (3rd year-35 and 4th year-35), 35 were interns and 35 were postgraduates. A modified questionnaire were developed from earlier KAP study conducted amongst the medical students, KAP study done in Nepal amongst the nursing and dental students, KAP study conducted amongst the undergraduate dental students and KAP study conducted in China amongst the medical students. [2,4,6,7] The questionnaire was comprised of 2 parts: part 1 of the questionnaire included demographic data of the participants like age, gender. Part 2 contained questionnaire to assess the participant's knowledge (5 questions), attitude (5 questions) and practice (5 questions) regarding the antibiotic use and its resistance. After taking informed consent from the participants, questionnaire was distributed. The response for knowledge-based questions were assessed in terms of 'true' or 'false', and attitude and practice-based questions were assessed in terms of 'yes' or 'no'. The performance was assessed by score (correct response = 1, incorrect

response=0) and total scores obtained was calculated.

Statistical Methods

The data were analysed using descriptive and inferential statistics. Association between variables was done using chi-square analysis. Comparison of group mean was done using ANOVA. A significant of $p < 0.05$ was considered and all the analysis were done using SPSS 20

RESULTS

Table 1 demonstrates demographic characteristic of the participants. A total number of 140 students participated in our study. The mean ages of the undergraduate, Intern and postgraduate students were 20.28, 22.97 and 26.05 years respectively. Out of total 70 Undergraduate students, 24.29% were males and 75.71% were females. Out of total 35 interns, 40% were males and 60% were females, and out of 35 Postgraduate students, 37.14% were males and 62.86% were females. Gender distribution and mean age of students in the three groups are depicted in Figure 1 and 2 respectively.

Table 2 demonstrates participant's knowledge-based questions. Maximum correct response was given for question 1 and 4 whereas minimum correct response was given for question 2 (UG students-38.57%, Interns-25.71%, PG students-28.57%) by all three groups. 61.43% UG students, 74.29% Interns and 71.43% PG students wrongly perceived that antibiotic will speed up the recovery of cold and cough. The statistically significant differences among three groups were seen only in question no. 4 and 5 ($p < 0.05$).

Table 3 demonstrates participant's attitude-based questions. 67.14% UG students, 57.14% Interns and 85.71% PG students agreed that there is abuse of antibiotics. Only 38.57% UG students, 34.29% Interns and 60% PG students agreed for the question "do you think antibiotic resistance affects you and your family's health". All the three groups poorly

responded to question no. 4, only 11.43% UG students, 17.14% Interns and 14.29% PG students perceived that adverse effects can be reduced by using more than two antibiotics at a time. Statistically significance difference was seen in all the questions ($p < 0.05$) except question no. 4.

Table 4 demonstrates participant's practice-based questions. Majority of the students (each group $>70\%$), 74.29% UG students, 71.43% Interns and 74.29% PG students had self-medicated with antibiotic without consultation from the physician. 88.57% PG students, 60% Interns and

41.43% UG students reported to complete the full course of prescribed antibiotics. There was statistically significant difference amongst the three groups in all the questions ($p < 0.05$) except question no.1

Table 5 demonstrates total mean comparison of Knowledge, Attitude and Practice (KAP) among three groups. KAP mean score was higher for Postgraduate students followed by Interns and Undergraduate students and there was statistically significant difference amongst three groups ($P < 0.05$). Figure 3 depicts mean score of KAP in three groups.

Table 1: Demographic characteristic of students

Groups	Number of participants	Mean Age	SD	Gender
UG	70	20.28	.886	Females=53 (75.71%) Males=17 (24.29%)
Intern	35	22.97	.663	Females=21(60%) Males=14(40%)
PG	35	26.05	1.589	Females=22(62.86%) Males= 13(37.14%)

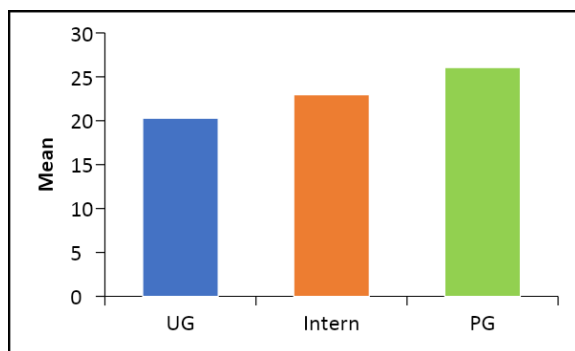


Figure 1: Gender distribution in three groups

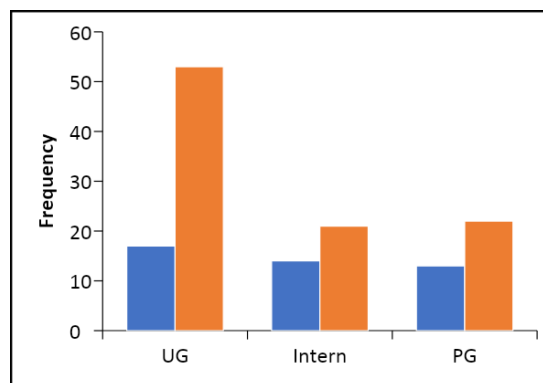


Figure 2: Mean age of the students in three groups

Table 2: Knowledge of the students on antibiotic use and its resistance (true / false)

Questions (correct response)		True	False	P value
1. Antibiotic can cure infections caused by virus? (False)	UG	18 (25.71%)	52 (74.29%)	0.101
	Intern	9 (25.71%)	26 (74.29%)	
	PG	3(8.57%)	32 (91.43%)	
2. The use of antibiotics will speed up the recovery of cold and cough? (False)	UG	43(61.43%)	27 (38.57%)	0.344
	Intern	26 (74.29%)	9 (25.71%)	
	PG	25 (71.43%)	10 (28.57%)	
3. Super infection is an adverse effect of antibiotic use? (True)	UG	36 (51.43%)	34 (48.57%)	0.209
	Intern	18 (51.43%)	17 (48.57%)	
	PG	24 (68.57%)	11 (31.43%)	
4. Indiscriminate use of antibiotics leads to emergence of antibiotic resistance? (True)	UG	56 (80%)	14 (20%)	0.016
	Intern	25 (71.43%)	10 (28.57%)	
	PG	34(97.14%)	1 (2.86%)	
5. Efficacy better, if the antibiotics are newer and costlier? (False)	UG	43(61.43%)	27 (38.57%)	0.000
	Intern	10(28.57%)	25 (71.43%)	
	PG	3 (8.57%)	32 (91.43%)	

Table 3: Attitude of the students towards antibiotic use and its resistance (yes/no)

Questions (correct response)		Yes	No	P value
1. Do you think there is abuse on antibiotics at present? (yes)	UG	47 (67.14%)	23 (32.86%)	0.030
	Intern	20 (57.14%)	15 (42.86%)	
	PG	30 (85.71%)	5 (14.29%)	
2. Do you think antibiotic resistance affects you and your family's health? (yes)	UG	27 (38.57%)	43 (61.43%)	0.050
	Intern	12 (34.29%)	23 (65.71%)	
	PG	21 (60%)	14 (40%)	
3. Do you think skipping one or two doses of antibiotic does not contribute to the development of antibiotic resistance? (No)	UG	52 (74.29%)	18 (25.71%)	0.007
	Intern	21 (60%)	14 (40%)	
	PG	15 (42.86%)	20 (57.14%)	
4. Do you think adverse effects can be reduced by using more than two antibiotics at a time? (yes)	UG	8 (11.43%)	62 (88.57%)	0.715
	Intern	6 (17.14%)	29 (82.86%)	
	PG	5 (14.29%)	30 (85.71%)	
5. Abuse of antibiotics has become the main cause leading to bacterial resistance? (yes)	UG	48 (68.57%)	22 (31.43%)	0.007
	Intern	23 (65.71%)	12 (34.29%)	
	PG	33 (94.29%)	2 (5.71%)	

Table 4: Practice of antibiotic use and its resistance (yes/no)

Questions (correct response)		Yes	No	P value
1. Have you ever taken any antibiotic without physician consultation? (No)	UG	52 (74.29%)	18 (25.71%)	0.946
	Intern	25 (71.43%)	10 (28.57%)	
	PG	26 (74.29%)	9 (25.71%)	
2. Do you take the full course of antibiotics prescribed by the doctor? (Yes)	UG	29 (41.43%)	41 (58.57%)	0.000
	Intern	21 (60%)	14 (40%)	
	PG	31 (88.57%)	4 (11.43%)	
3. Do you stop taking antibiotics when you start feeling better? (No)	UG	54 (77.14%)	16 (22.86%)	0.000
	Intern	22 (62.86%)	13 (37.14%)	
	PG	8 (22.86%)	27 (77.14%)	
4. Do you save the leftover antibiotics for the future use? (No)	UG	39 (55.71%)	31 (44.29%)	0.005
	Intern	23 (65.71%)	12 (34.29%)	
	PG	10 (28.57%)	25 (71.43%)	
5. Do you give the leftover antibiotics to your friend / roommate if they get sick? (No)	UG	43 (61.43%)	27 (38.57%)	0.002
	Intern	25 (71.43%)	10 (28.57%)	
	PG	11 (31.43%)	24 (68.57%)	

Table 5: Knowledge, attitude and practice mean scores in Undergraduate students, Interns and Postgraduate students

Variable	Groups	Mean	SD	F value	P value
Knowledge	UG	2.828	1.955	3.362	0.038*
	Intern	2.942	1.954		
	PG	3.771	1.214		
Attitude	UG	2.114	1.740	4.275	0.016*
	Intern	2.142	1.957		
	PG	3.114	1.470		
Practice	UG	1.728	2.132	7.474	0.001**
	Intern	1.885	2.138		
	PG	3.314	1.728		

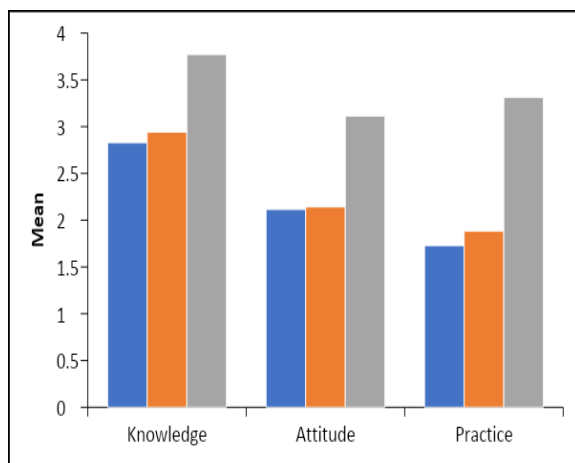


Figure 3: KAP mean scores in three groups.

DISCUSSION

Antibiotics are important to modern medicine and antibiotic resistance is a serious threat to human health worldwide. The relation between antibiotic exposure and its resistance is obvious both at the population level and in individual patients. Reducing unnecessary use of antibiotic is thus essential to mitigate antibiotic resistance. [8] It is widely known that any use of antimicrobial despite appropriate and justified, contributes to the emergence of resistance, but unnecessary and too much of

use makes the situation worse. [9] The prevalence of antimicrobial resistance varies significantly between and within countries and between different pathogens. [10] In developing countries, antimicrobials misuse is facilitated by their availability as OTC sale, without prescription and through unregulated supply chain. [9]

Our current study showed higher KAP mean score in PG students than Interns and UG students and there was statistically significant difference amongst the three groups. The knowledge amongst the students towards role of antibiotic in minor viral illness in our study was doubtful as in one hand they (>70% of each group) were aware of the fact that viral infection cannot be cured by antibiotics, on the other hand they (> 60 % of each group) perceived that antibiotics can speed up the recovery of common cold and cough, assuming common cold and cough as bacterial illness. Such wrong assumption may lead to high rate of antibiotic overconsumption and inappropriate use, and consequently will lead to development of antibiotic resistance.

Majority of the students (82.14%) in our study were aware of the fact that indiscriminate use of antibiotic leads to emergence of antibiotic resistance. The maximum correct response was given by PG students (97.14%) and minimum correct response was given by Interns (71.43%) followed by UG students (80%) for the question "Indiscriminate use of antibiotics leads to emergence of antibiotic resistance". The finding in UG students was higher than final year students of MBBS (78.94%), BDS (70.83%) and BSc nursing (58.10%) in a study done by Hemant Kumar Dutt et al. [3]

In the present study, more than 70% of students believed that abuse of antibiotics has become the main cause leading to bacterial resistance, which was in accordance with another study conducted amongst Chinese students by Ying Huang et al, [7] but was not in consistent with the findings in the study done by Poonam Patel et al amongst medical students (87.29%). [11]

Considerable number of students in our study believed that skipping few doses of antibiotic does not contribute to resistance. For the question "do you think skipping 1 or 2 doses of antibiotic does not contribute to the development of antibiotic resistance", UG students (74.29%) gave maximum incorrect response and least incorrect response was given by PG students (42.86%). Our finding in each group was higher than the finding in a similar study previously done by Manali Mahajan et al. amongst MBBS undergraduates. [12]

Self-medication to some extent has a positive effect on individuals as well as health care systems in general if practiced properly. However, studies done in various settings indicate high prevalence of self-medication practice ranging from 38.7% to 83% frequently associating it with irrational use of medications. [13] In the present study, more than 70% of students (in each group) had practiced self-medication which was very much higher than the findings amongst dental students (36%) in the survey conducted in health science students in a University in South India. [14]

In our study 42.14 % of the students reported not completing the full course of prescribed antibiotic which was comparatively lesser than the finding amongst nursing students (68.50%) but higher than dental students (26.90%) and MBBS students (32.10 %) in the survey done in an Indian university. [14] Only 57.86% reported completing the full course of prescribed antibiotic which was very low when compared to the finding in the study conducted by Dawnji SR et al, though the study was done amongst second year medical students. [2]

Around 52% of students agreed that they stocked leftover antibiotic for future use and 56.43% used to give their leftover antibiotic to their roommates or friends when they get sick. These findings were not consistent with the previous study. [12]

This study gives us an idea of knowledge, attitude and practice concerning antibiotic usage and its resistance amongst

budding dental health professionals in our Institution, which can help us to plan for an effective curriculum. The limitation of this study was small sample size and recruitment of participants from a single Institution.

CONCLUSION

This study showed higher Knowledge, attitude and practice (KAP) mean scores regarding antibiotic use and its resistance in Postgraduate students than Interns and Undergraduate students. The level of practice mean score was very low in both Undergraduate students and Interns when compared to their knowledge mean scores which indicate the need for further educational intervention and that should aim to increase the knowledge and improve the perception and practice of the students towards antibiotic use and its resistance. The results of this study indicate the need to further educate dental students regarding antibiotic use and the risk related to antibiotic misuse.

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How to cite this article: Lomi M, Jimsha V.K, Srinivasan S.V. et al. Assessment of knowledge, attitude and practice of antibiotic usage amongst undergraduate, intern and postgraduate dental students - a questionnaire based study. *International Journal of Science & Healthcare Research*. 2019; 4(2): 136-142.
