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KNOWLEDGE, ATTITUDE AND PRACTICE OF ANTIBIOTIC USAGE AND RESISTANCE AMONG THE MEDICAL STUDENTS: A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: Antibiotics play one of the most important roles in treatment of multiple infections. Because of their repeated use antibiotic resistance has become an important threat. One of the solutions for this menace is to develop adequate knowledge and rational drug prescription.

Aim: to assess the knowledge and attitude and awareness of antibiotic use in medical students who will be the future prescribers of these drugs.

Methods: This was a cross-sectional questionnaire-based study. Medical students of 1st and 2nd professional year were given the questionnaire. The questionnaire had sections to assess the knowledge, attitude and practice about antibiotic use and resistance. Each section has respective responses ranging from true/false to qualitative responses. The data was analysed by using simple descriptive statistics & Chi-square test was used to determine any significant difference.

Results: Majority of participants have adequate to good knowledge of antibiotic usage & resistance in bacterial infections. MBBS Phase-II students have significantly better knowledge towards efficacy of newer and costly antibiotics, inadequate and unnecessary antibiotic usage contributing to antibiotic resistance. Most of the participants were aware that antibiotics should not be used commonly. In context to irrational antibiotic practice and choice of higher antibiotics, group-II participants (i.e. MBBS Phase-II students) had significantly better attitude than the group-I participants (i.e. MBBS Phase-I students). Both the study groups revealed good practice strategies. Comparatively group-II subjects show significantly better practicing principles in the present study.

Conclusion: Majority of study participants have moderate to high level of knowledge, attitude & practice principles in our study. Educational programmes should be enhanced to increase the knowledge and also to practice the evidence-based medicine in the curriculum.

Keywords: knowledge, attitude, practice, antibiotic, resistance, undergraduates.

INTRODUCTION

Antibiotics were considered as the miracle drugs since their discovery, and also justify these accolades by acting as the backbone in management & prevention of many diseases. Antibiotic resistance is inability of the drug to kill (bactericidal) or inhibit the growth (bacteriostatic) of the organisms. It refers to unresponsiveness of a microorganism to an antimicrobial agent.[1] Antibiotic resistance usually occurs from the selective pressure exerted by use of antibiotic, either through genetic mutations or the acquisition of genetic material via plasmid transfer from a bacterium that has developed resistance.[2] Anti-microbial resistance not only reduces the effect of the antibiotics but leads to emergence of more fatal infections. The major cause of misuse of antibiotics is inadequate knowledge about antibiotics among prescribers.[3] WHO has included antimicrobial resistance amongst the top ten public threat.[4] World Health Assembly (WHA) has adopted the Global Action Plan to address the AMR, as a part this "National Action Plan on AMR was formed. The 1st strategic priority in this guideline was training medical students in early phases.[5] The WHO steward ship guidelines also emphasis on the importance of education & awareness among medical students.[6,7] Hence the present study is selected to assess the knowledge, attitude and practice awareness about antibiotics in the medical students. This information can be used in educating & training these future doctors from the early years of their medical education. This will inculcate the idea of rational antibiotic prescription and hence helps in preventing the emergence of resistance in the future.

MATERIALS AND METHODS

This is a cross-sectional questionnaire-based study conducted in a tertiary care teaching hospital from January 2025 to April 2025. Informed consent from all the participants was obtained before start of the study.

Inclusion criteria: MBBS Phase-I (n=228) and MBBS Phase-II (n=231) were included into study.

Exclusion criteria: All those students who were absent on the day of survey, who have not given consent and those who filled the questionnaire incompletely were excluded from the study.

Study Procedure: The questionnaire used by Asharani et al. 2020[7] study was used in this study with necessary modifications from subject experts. A structured, pre-tested and validated questionnaire containing 9 knowledge, 8 attitude, and 4 practice items was given in the regular classes and anonymity was maintained. Group 1 i.e. MBBS Phase-I (batch of 250 students) and Group 2 i.e. MBBS Phase-II (batch of 250 students) undergraduate students were exposed to the questionnaires after two months of starting the course of respective MBBS phases. The responses for knowledge and attitude toward antibiotic usage and resistance were recorded on a 3 point Likert scale with three answerable options (disagree, neutral & agree)[8] and for practice items, responses were used in "Yes or No" format.

Statistical Analysis: Data was entered into Microsoft Excel Sheet and analysed using SPSS. Descriptive statistics (mean, percentage) were used to describe the data. The difference between the two groups was assessed using Chi Square test. P value less than 0.05 was considered significant.

RESULTS

Among the Group-1 i.e. MBBS Phase-I (250 batch) students 231 were present on the day of survey out of which 228 were included into study. Among the Group-2 i.e. MBBS Phase-II (250 batch) students 235 were present on the day of survey out of which 231 were included into study. 7 students were excluded from the study because of improper questionnaire data filling or consent not given. (Table-1)

Most of the participants had adequate to good knowledge of antibiotic usage & resistance in bacterial infections. Majority of participants know that they should send to culture sensitivity before starting antibiotics. They were also aware that antibiotics cause ill effects on body's own bacterial flora. Most of the study subjects were also aware of the factors contributing to antimicrobial resistance. MBBS Phase-II students have significantly better knowledge towards efficacy of newer and costly antibiotics, inadequate and unnecessary antibiotic usage contributing to antibiotic resistance. (Table-2)

Both the study groups had good attitude on antibiotic usage & resistance in bacterial infections. Most of the participants were aware that antibiotics shouldnot be used commonly. They were also aware of antibiotic resistance is one of the biggest problem in the world and measures to reduce the development of resistance in hospitals. In context to irrational antibiotic practice and choice of higher antibiotics, group-II participants (i.e. MBBS Phase-II students) had significantly better attitude than the group-I participants. (Table-3)

Both the study groups revealed good practice strategies in the present study. Approximately 96% of participants from both groups consult a doctor before starting antibiotic, >70% of participants from both groups prescribe the same antibiotics for relatives for similar illness. 85% of group-II subjects complete the full course of treatment in comparison to group-I subjects where only 63% complete full course of treatment. Also 74% of group-II subjects do not save the

remaining antibiotics for next time usage compared to group-I where only 47% subjects do not save the remaining antibiotics for next time usage showing significantly better practicing principles in MBBS Phase-II students. (Table-4)

DISCUSSION

In the present study, the knowledge, attitude & practice of 1st and 2nd phase MBBS students were assessed with regards to antibiotic usage and resistance and compared between the groups.

Majority of study subjects in both groups had moderate to good knowledge of antibiotic use and its ill effects on humans. The results are comparable to Sudhakar K et. al. 2023, Gupta MK et. al. 2019 and Marzan M et. al. 2021.[8,9,10] Most of the students in both the groups were aware that antibiotics are used to treat bacterial infections, clinical samples should be sent to culture and sensitivity before starting antibiotics, antibiotics cause negative effects on the body's own bacterial flora & antibiotics are not useful in all types of common cold. Most of the study subjects are also aware of the factors contributing to antimicrobial resistance. This is comparable to Asharani, et al. 2020, Chandan NG et al. 2016 & Huang Y et al. 2013. [7,11,12]

Most of the participants in both the groups were aware that antibiotics are not safe drugs, irrational antibiotic practice locally lead to global resistance, skipping 1 or 2 doses lead to antibiotic resistance, should adhere to antibiotic policies of the hospital & antibiotic resistance is one of the global problem. This is comparable to Khan AA et al 2013 and Huang Y et al. 2013. [12,13]

With regard to antibiotic practices and usage, it was observed that nearly 96% of students in both the groups consult a doctor before starting an antibiotic, 72% of students in both groups prescribe the same antibiotic for relatives/friends for similar illness before consulting doctor & donot pressurize the doctor to start antibiotic.

CONCLUSION

Majority of study participants in both the groups have moderate to high level of knowledge, attitude & practice principles in our study. There is a need for practical approach programmes for medical students & interns regarding antibiotic prescription pattern and antibiotic resistance. Educational programmes should be enhanced to increase the knowledge and also to practice the evidence based medicine in the curriculum.

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Groups	Study category	Total number of study participants present on the day of survey	Participants included into the study	Participants excluded from the study
Group - 1	MBBS 1st Phase	231	228	03
Group - 2	MBBS 2nd Phase	235	231	04
	Total	466	459	07

Table-1 Study groups, category & number of participants

SN	Question (correct response)	Groups	D %	N %	A %	P value
1	Antibiotics are used to treat bacterial infections: (A)	Group-1	12.28	27.19	60.52	0.14
		Group-2	6.92	29.87	63.20	
2	Antibiotics are useful against all types of common cold: (D)	Group-1	69.73	12.28	17.98	0.26
		Group-2	72.29	7.79	19.91	
3	Clinical samples should be sent to culture and sensitivity before starting antibiotics: (A)	Group-1	10.52	17.98	71.49	0.21
		Group-2	6.06	19.91	74.02	
4	The efficacy is better if the antibiotics are newer and more costly: (D)	Group-1	70.15	14.03	15.78	**0.044***
		Group-2	78.78	7.35	13.85	
5	Antibiotics cause negative effects on the body's own bacterial flora: (A)	Group-1	11.40	19.29	69.29	0.152
		Group-2	9.52	13.41	77.05	
6	Following factors contribute to antibiotic resistance:					
	i Incomplete antibiotic intake: (A)	Group-1	17.1	19.29	63.59	0.62
		Group-2	13.85	19.48	66.66	
	ii Inaccurate antibiotic: (A)	Group-1	16.22	20.17	63.59	**0.037***
		Group-2	10.38	15.15	74.45	
	iii Over-prescription: (A)	Group-1	22.8	28.94	48.24	0.55
		Group-2	22.94	24.67	52.38	
	iv Over-consumption: (A)	Group-1	18.42	35.52	46.05	0.59
		Group-2	16.01	33.33	50.64	
	v Nosocomial spread: (A)	Group-1	28.07	31.14	40.78	0.57
		Group-2	23.80	32.46	43.72	
	vi Self-medication: (A)	Group-1	20.61	24.12	55.26	0.558
		Group-2	19.91	20.34	59.74	
7	Frequently use of same antibiotic will reduce the efficacy of treatment: (A)	Group-1	11.84	19.73	68.42	0.77
		Group-2	12.98	17.31	69.69	
8	Unnecessary use of antibiotics can lead to antibiotic resistance: (A)	Group-1	10.96	20.61	68.42	**0.01***
		Group-2	9.21	11.40	80.70	
9	Antibiotic resistance can spread from animals to humans: (A)	Group-1	15.78	37.28	46.92	0.17
		Group-2	9.95	40.69	49.35	

(A-agree; D-disagree; N-neutral) [* represents P < 0.05] [Group-1= MBBS 1st Phase; Group-2 = MBBS 2nd Phase students]

Table-2 Questionnaires on knowledge of medical students regarding antimicrobial use and resistance:

SN	Question (correct response)	Groups	D %	N %	A %	P value
1	Antibiotics are safe drugs hence can be commonly used: (D)	Group-1	56.57	17.98	25.43	0.09
		Group-2	65.36	16.88	17.74	
2	Irrational antibiotic practice locally will not matter for global resistance: (D)	Group-1	53.77	3.62	12.38	**0.0005***
		Group-2	62.28	14.03	23.68	
3	Skipping one or two doses does not contribute to antibiotic resistance: (D)	Group-1	51.31	3.94	44.73	0.102
		Group-2	59.74	5.19	35.06	
4	Antibiotic resistance can be reduced using higher antibiotic in spite of lower antibiotics being sensitive**:** (D)	Group-1	22.80	50.43	26.75	**0.0001***
		Group-2	57.14	23.80	19.04	
5	Medical experts will solve the problem of antibiotic resistance before it becomes too serious: (D)	Group-1	36.84	32.89	30.26	0.83
		Group-2	38.52	33.76	27.70	

6	There is not much, people like me, can do to stop antibiotic resistance: (D)	Group-1	61.84	20.61	17.54	0.06
		Group-2	54.11	19.48	26.40	
7	Adhering to antibiotic policy of the hospital will reduce the development of antibiotic resistance**:** (A)	Group-1	28.50	21.05	66.22	0.72
		Group-2	32.03	19.48	52.32	
8	Antibiotic resistance is one of the biggest problem the world faces: (A)	Group-1	25	18.85	56.14	0.27
		Group-2	27.70	13.41	58.87	

(A-agree; D-disagree; N-neutral) [***** represents P < 0.05] [Group-1= MBBS 1st Phase; Group-2 = MBBS 2nd Phase students]

Table-3 Questionnaires on attitude of medical students towards antimicrobial use & resistance

SN	Question (correct response)	Groups	Correct %	Incorrect %	P value
1	Do you consult a doctor before starting an antibiotic? (Y)	Group-1	96.92	3.07	0.819
		Group-2	96.1	3.89	
2	Do you prescribe the same antibiotic for relatives/friends for similar illness before consulting doctor? (Y)	Group-1	72.36	27.63	0.067
		Group-2	78.78	21.21	
3	Do you pressurize the doctor to prescribe the antibiotics? (N)	Group-1	89.91	10.08	0.383
		Group-2	92.64	7.35	
4	The doctor prescribes the course of antibiotics for you, after taking 2-3 doses you start feeling better, then				
	i) Do you complete full course of treatment? (Y)	Group-1	63.59	36.40	**0.0001***
		Group-2	85.71	14.28	
	ii) Do you save the remaining antibiotics for the next time you get the sick? (N)	Group-1	47.80	52.19	**0.0001***
		Group-2	74.89	25.10	

[***** represents P < 0.05] [Group-1= MBBS 1st Phase; Group-2 = MBBS 2nd Phase students]

Table-4 Questionnaires to medical students on practice of antimicrobial use [yes (Y) / no (N) questions]