



IMPACT OF ANTIBIOTIC STEWARDSHIP LEARNING SESSION ON KNOWLEDGE AND ATTITUDE OF UNDERGRADUATE MEDICAL STUDENTS

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ABSTRACT

OBJECTIVE: To investigate the impact of antibiotic stewardship session on knowledge and attitude of 3rd year medical and allied health sciences students of Sheikh Zayed Medical College (SZMC) Rahim Yar Khan, Pakistan.

METHODS: This cross-sectional study was conducted on 3rd year undergraduate medical students of SZMC Rahim Yar Khan, Pakistan. Knowledge of antibiotic stewardship was given to them through lectures, tutorials and small group discussion from May 2019 to December 2020. A structured proforma with questionnaires about antibiotic stewardship was given to them to fill in before and after the learning session.

RESULTS: Out of 585, 500 students completed the proforma before and after the antibiotic stewardship session and the response rate was 85%. Although more than 80% of the students had significant knowledge pre- and post-antibiotic stewardship session but only 6% of students were familiar with term antibiotic stewardship pre-session as compared to 93% post-session ($p < 0.005$). After the learning session more than 85% of students significantly agreed that antibiotic stewardship improve patient care, reduce bacterial resistance, decrease hospital stay and cost ($p < 0.005$). Similarly, after session there was significant improvement regarding collaborative approaches for the appropriate use of antibiotics, work with inter professional team, role of each profession for appropriate use of antibiotics, collaboration with microbiologist and pharmacist ($p < 0.005$). There was significant improvement to use broad and narrow spectrum antibiotics on the basis of definite and provisional diagnosis after session ($p < 0.005$).

CONCLUSION: Antibiotic stewardship session has positive impact on knowledge and attitude of undergraduate medical students.

KEY WORDS: Students, Medical (MeSH); Antibiotic Stewardship (Non-MeSH); Learning Session (Non-MeSH); Attitude of Health Personnel (MeSH); Attitude (MeSH).

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INTRODUCTION

Antibiotics resistance is rising at an alarming rate all across globe due irrational use of antibiotics. Currently it is one of the biggest threat and challenge for health professionals. Although antibiotic resistance can occur naturally but most of the time it is due to misuse and overuse of antibiotics.¹ The main reasons is that standard treatment guidelines are not usually followed to treat infections. Moreover, wrong diagnosis, wrong dose, lack of source

control, poor drug quality, prolonged hospital stay, resistant organisms and co infections are important causes of antibiotic failure.² Inappropriate prescription practices, over the counter sale of antibiotics, wide spread use of antibiotics in animal industry, lack of proper functioning of drug regulatory authority and poor patient education about antibiotic use are others causes of antimicrobial resistance in developing countries.³

The main aim of antibiotic stewardship practice is to improve patient care and

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safety. In addition, rational use of antibiotics at various clinical setting reduces its resistance.⁴ A review study revealed very high prevalence (38.8%) of antibiotics self-medication practice in developing countries, which is one of the common causes of bacterial resistance. Infections caused by drug resistant bacteria are associated with high morbidity and mortality as compared to drug sensitive bacteria.⁵ Antibiotic stewardship practices is basically a systematic approach of collaborative work in order to reduce overuse and irrational selection of antibiotics. A cost effectiveness and reduce drug resistance are other key components. A systematic review of 145 unique studies revealed positive impact of antibiotic stewardship practice including 35% relative risk reduction of mortality.⁶

According to world health organization (WHO), there is strong need to trained medical doctors and others health professionals about rationale use of antibiotic and its stewardship practice as a part of their curriculum. However, knowledge about antibiotic stewardship practice is usually lacking in middle- and low-income countries. On the other hand antibiotic stewardship program practice is lacking even in most of the tertiary care hospitals of developing countries. Even there is very little awareness of antibiotic stewardship program to doctors at various teaching hospitals of developing countries like Pakistan. Health care professional also have poor awareness about ASP in Pakistan. If some are aware they are not practising it due to multiple barriers.⁷⁻¹¹

Antibiotics and bacteriology usually

taught to 3rd year medical students as a part of their curriculum. However antibiotic stewardship practice (ASP) is not included in their curriculum. The purpose of the study was to highlight the importance of antibiotic stewardship in our local setup and to familiarize the medical students with the important components and aspects of ASP. This study was conducted to assess the knowledge and attitude of 3rd year medical and allied health sciences students towards antibiotic stewardship before and after learning session.

METHODS

This cross-sectional study was conducted on 3rd year medical and allied health sciences students of Sheikh Zayed Medical College Rahim Yar Khan, Pakistan. An ethical approval was taken

from the institutional review board (IRB) and study perspectives were clearly explained to all undergraduate medical students before the start of study.

The knowledge of antibiotic stewardship was given to them through lectures, tutorials, small group discussion from May 2019 to December 2020. A structured proforma with questionnaires about antibiotic stewardship was given to them to fill in before and after the learning session. There were two parts of the structured questionnaire. The structured questionnaire proforma was made after extensive literature search of antibiotic stewardship practice from various articles. The validity of structured proforma was checked and confirmed by two pharmacology professor, two clinical pharmacists and one microbiologist. The first part comprised of

baseline characteristics of medical students. The second part of proforma comprised of questions about knowledge and attitude of antibiotic stewardship. A three-points Likert scale, a condensed form of five-points Likert scale was used to categorize answers in three categories agree/strongly agree (A), Neutral (B), disagree/ strongly disagree.¹²

The data was analyzed through SPSS 19. The numeric data presented as counts and percentages. Difference of changes in student knowledge and attitude before and after session was assessed through paired t-test. P value less than 0.05 was considered to be statistically significant.

RESULTS

A total of 585 third year medical and allied health science students participated in

TABLE I: KNOWLEDGE AND ATTITUDE OF ANTIBIOTIC STEWARDSHIP

Questions	Agree/Strongly Agree		P-value
	Before Learning Session n (%age)	After Learning Session n (%age)	
1. Familiar with term Antibiotic stewardship	30 (6%)	465 (93%)	0.003
2. Antibiotic resistance is a major issue all across world?	420 (84%)	470 (94%)	0.76
3. Strong knowledge of antibiotics is important in medical carrier	440 (88%)	485 (97%)	0.92
4. Prescribing broad spectrum antibiotics cause antibiotic resistance?	65 (13%)	465 (92%)	0.006
5. Patient's noncompliance is a major cause of bacterial resistance?	45 (9%)	456 (91%)	0.0042
6. Widespread and overuse of antibiotics leads to bacterial resistance	410 (85%)	440 (88%)	0.65
7. Poor infection control by health care causes bacterial resistance?	420 (84%)	445 (89%)	0.47
8. Knowledge of different antibiotics spectrum is very important in medical carrier	85 (17%)	480 (96%)	0.001
9. Inappropriate/irrational use of antibiotics causes antibiotic bacterial resistance?	39 (7.8%)	425 (85%)	0.82
10. Patients own demand is the important reason for antibiotic resistance that doctors prescribed unnecessary antibiotics	46 (9%)	432 (86%)	0.006
11. Use of antibiotics in animals & poultry field causes antibiotic resistance?	55 (11%)	410 (82%)	0.005
12. Antibiotic stewardship improves quality of patient care?	43 (8%)	405 (89%)	0.0026
13. Antibiotic stewardship reduces bacteria resistance?	88 (17%)	440 (88%)	0.0041
14. Antibiotic stewardship decrease hospital stay and cost?	44 (8.8%)	443 (88.6%)	0.0071
15. I would like more education on rationale use of antibiotic	460 (92%)	465 (93%)	0.66
16. I would like more education on antibiotics resistance?	440 (88%)	470 (94%)	0.92
17. I would like more education on mechanism of action and adverse effects of antibiotics?	450 (90%)	444 (89%)	0.73
18. I can explain collaborative approaches for the appropriate use of antibiotics	30 (6%)	422 (84)	0.003
19. I can understand how to work with interprofessional team	15 (3%)	405 (81%)	0.001
20. I can identify the potential role of each profession for appropriate use of antibiotics	19 (3.8%)	410 (82%)	0.005
21. I would prefer broad spectrum antibiotic on the basis of provisional diagnosis	22 (4.4%)	432 (86%)	0.006
22. I would prescribe narrow spectrum antibiotic when there is a definite diagnosis.	46 (9%)	447 (89.4%)	0.0017
23. I would prefer to contact microbiologist to know the common resistance organisms and antibiotic susceptibility pattern in hospital	105 (21%)	465 (93%)	0.0045
24. I would prefer to contact clinical pharmacist to see the availability of drugs according to their anti-bacterial spectrum in hospital	110 (22%)	430 (86%)	0.0021

this antibiotic stewardship session from May 2019 to December 2020. Out of 585 students, 500 students completed the pre and post antibiotic stewardship proforma with a response rate of 85%. Two hundred and fifty-four (50.8) students were from 2019 session and 246 (49.2%) from 2020 session.

Out of 500 students, 290 (58%) were males and 210 (42%) were females. Mean age of students was 19 ± 2.2 years. Three hundred and ninety (78%) students were from urban and 110 (22%) from rural background.

Before the learning session, only 6% students were familiar with term antibiotic stewardship. However after antibiotic stewardship session, there were significant improvement in antibiotic knowledge among medical students such as familiar with term antibiotic stewardship (93%), antibiotic resistance is a major issue across world 420(84%), knowledge of antibiotic is very important in medical carrier 440(88%), widespread use of antibiotic causes bacterial resistance 410(85%) and poor infection control by health care causes bacterial resistance 420(84%).

The knowledge for reason of antibiotic resistance was significantly improved after antibiotic stewardship session. More than 80% students knew the important causes of antibiotic resistance such as prescribing broad spectrum antibiotics, inappropriate/irrational use of antibiotics, patient's noncompliance with antibiotics, Patients own demand for antibiotics and use of antibiotics in animals' feeds after stewardship session (Table I).

After the learning session more than 85% of students significantly agreed that antibiotic stewardship improve patient care, reduce bacterial resistance, decrease hospital stay and cost (p-value <0.001).

More than 88% students agreed that they would like more education on antibiotic resistance, rational use of antibiotic, mechanisms of action of antibiotic and their important adverse effects with no significant difference before and after antibiotic session. There was significant improvement pre versus post antibiotic session in collaborative approaches for the

appropriate use of antibiotics, work with inter professional team, role of each profession for appropriate use of antibiotics, collaboration with microbiologist and collaboration with pharmacist (Table I). Similarly, after the learning session 432(86%) students were agreeing to use broad spectrum antibiotics on the basis of provisional diagnosis as compared to pre session versus 22(4.4%) and 447 (89.4%) students agree to use narrow spectrum antibiotic on the basis of definite diagnosis as compared to pre session 46 (9%) [p-value <0.001].

DISCUSSION

Antibiotic stewardship practice is an important health strategy to overcome the bacterial resistance, irrational use of antibiotics and prolonged hospital stay. This session was well participated by all learners. Our results showed that after interactive session, there was positive impact on knowledge and attitude about antibiotic stewardship among 3rd year medical students. Students were more concerned regarding collaborative approaches for the appropriate use of antibiotics, know how to work with inter professional team, know the role of each profession for appropriate use of antibiotics, collaboration with microbiologist and pharmacist to overcome the bacterial resistance. Similarly, they had good knowledge about antibiotics use and cause of its resistance after the session.

There is very limited literature on antibiotic stewardship education at the undergraduate level in Pakistan. The present study was conducted to highlights this important issue so that higher authorities should focus and recommends antibiotic stewardship practice as part of curriculum of third year medical students.

The purpose of this session was to identify any deficiency in knowledge and attitude of antibiotic use among undergraduate medical students. In the past various studies were conducted on medical students and other health professionals. These studies showed various deficiencies regarding knowledge, attitude and practice about appropriate antibiotic use. For instance, students were not aware of reducing MRSA

infections and prevention. They also overestimated the burden of resistant bacteria in clinical settings. Similarly, there was strong need for medical students to spend more time to discuss appropriate use of antibiotics during clinical rotation.¹³⁻¹⁴

The basic knowledge of antibiotic use is usually given to medical students during their 3rd year MBBS class. This knowledge is very important not to overcome the bacterial resistance but also for rationale drug therapy to treat infections in clinical settings. Moreover, some authorities strongly recommend that there should be more focus on antibiotic stewardship at their undergraduate level.¹⁵⁻¹⁶ The purpose is to give them up to date and sufficient knowledge of antibiotics so that they can apply during ward rotations. Moreover, make interactions and collaborations with patients, clinicians, pharmacist, microbiologists, nurses and postgraduate trainee to establish the antibiotic stewardship practice for the optimal benefits of patients and decrease antibiotic resistance.¹⁷

Although the topic of antibiotics usually taught in all medical colleges of Pakistan but unfortunately components of antibiotic stewardship are missing in curriculum of MBBS and allied health sciences. In comparison most of the United States and United Kingdom medical schools emphasize on various components of antibiotic stewardship to their medical undergraduates.¹⁸⁻¹⁹ However in these medical schools, content of antibiotic stewardship usually given by lectures. Only few medical schools teach antibiotic stewardship principle and interprofessional curriculum on stewardship.²⁰

Antibiotic Stewardship practice is a very vast subject for undergraduate students. The core elements of antibiotic stewardship mainly emphasize on seven important areas such as leadership, commitment, accountability, drug expertise, action, tracking, reporting and education. Moreover, it's a multi-disciplinary approach to implement policies and intervention to improve antibiotic use for optimal patient's benefits.²¹

LIMITATION AND FUTURE RECOMMENDATIONS

The present study was conducted to assess the knowledge and attitude of antibiotic stewardship practice. This was only a small single center study. Further studies with large sample size with interprofessional collaboration from different department are needed for better antibiotic stewardship practice in country.

CONCLUSION

Antibiotic stewardship session has positive impact on knowledge and attitude of medical students. Findings of this study provide important insights into the current knowledge of undergraduate medical students about antibiotic stewardship. There is a dire need of incorporating principles and practice of antibiotics stewardship in undergraduate curriculum by Pakistan Medical Commission to overcome the bacterial resistance in Pakistan.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

MH: Conception and study design, drafting the manuscript, approval of final version to be published

MAA: Acquisition of data, critical review, approval of final version to be published

LA: Analysis and interpretation of data, critical review, approval of final version to be published

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

CONFLICT OF INTEREST

Authors declared no conflict of interest

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DATA SHARING STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.



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