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Original Article

Knowledge, Attitudes and Practices of Resident Physicians About Antibiotic Resistance - A Comparative Study of Two Departments At A Tertiary Care Hospital

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ABSTRACT

Objective: To compare the knowledge, attitude, and practices of resident physicians from Department of Surgery with Department of Medicine, about antibiotic resistance (AER) and to determine if better knowledge leads to better attitudes and practices.

Study Design: Analytical cross-sectional study.

Place and Duration of Study: Departments of Surgery and Medicine, Pak Emirates Military Hospital (PEMH), Rawalpindi, Pakistan, from Jul to Dec 2021.

Methodology: A validated questionnaire exploring knowledge, attitudes and practices (KAP) regarding antibiotic resistance (AR) was administered to 61 resident physicians from Department of Medicine and 55 residents from Department of Surgery, at PEMH, Rawalpindi, Pakistan. All responses were collected and analyzed using Statistical Package for Social Sciences (SPSS) version 25.

Results: The average scores of physicians from Department of Medicine were 29.84±3.36, 28± 1.66 and 41.80±3.40 in the knowledge, attitude and practice domains respectively, while they were 26.5± 2.12, 25.42± 2.63 and 37.98±3.45 respectively in the domains of knowledge, attitude and practice for physicians from Department of Surgery. An association was found between the score of knowledge with attitude and practice with Pearson correlation coefficient of 0.31 and 0.33 respectively, however, no correlation was found between year of training and KAP scores.

Conclusion: Medicine residents outperformed Surgery residents in antibiotic resistance knowledge (29.84±3.36 vs. 26.5±2.12), attitude (28.00±1.66 vs. 25.42±2.63), and practice (41.80±3.40 vs. 37.98±3.45) scores. Higher knowledge correlated with better attitudes (r=0.31) and practices (r=0.33), independent of training year. Targeted training, especially for surgeons, is recommended to enhance stewardship.

Keywords: antibiotic resistance, attitudes, physicians, practices

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INTRODUCTION

Antibiotics are the most important resource in the management of infectious diseases but over time, bacteria have developed modifications to escape the action of antibiotics, leading to resistance with a global medical crisis emerging as antibiotics lose effectiveness against an increasing number of pathogens, with resistant infections predicted to kill 10 000 000 people per year.[1] especially in resource-constrained settings like Pakistan.[2,3] Evolution of bacteria towards resistance to antimicrobial agents is unavoidable with control of emergence and spread being the only means of dealing with this situation, of which the first step, is to analyze the current knowledge, attitudes and practices (KAP) of physicians, with similar studies done in other countries.[4-6] but very few studies conducted in Pakistan.[7,8] This study aims to compare the knowledge, attitudes and practices of young physicians of two major clinical departments i.e. Surgery and Medicine, regarding Antimicrobial Resistance (AR). An understanding of the beliefs of young physicians can help in fighting the menace of antibiotic resistance. This study also explored whether there was an effect of the knowledge about antibiotic resistance on the attitudes and practices displayed by physicians to determine if better education on the subject can translate into improved practices and patient care in the long run.

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METHODOLOGY

This analytical cross-sectional study was undertaken for a 6-month period from July to December 2021 at Pak Emirates Military Hospital (PEMH), Rawalpindi, Pakistan after being approved by the Ethics Review Board (IERB approval certificate no: Ee/2d/2020). Informed consent was obtained from all participants prior to participation. Since the study employed a universal sampling method, all resident physicians from the Departments of Medicine and Surgery at PEMH who met the inclusion criteria were enrolled, negating the need for a formal sample size calculation. However, to ensure adequate statistical power, the minimum required sample size was estimated using the WHO sample size formula for cross-sectional studies: $n = Z^2P(1-P)/d^2$, where $Z = 1.96$ (at 95% confidence interval), $p = 0.5$ (expected proportion, taken as 50% to maximize sample size in the absence of prior local data), and $d = 0.05$ (margin of error). This yielded a minimum required sample size of approximately 384; however, given the finite and relatively small target population of resident physicians at a single institution, universal sampling was deemed more appropriate to minimize sampling bias and maximize representativeness of the findings.

Inclusion Criteria: To be included, participants had to be aware of the term ''antibiotics'', were practicing physicians for at least the past 2 years and had worked in both indoor and outdoor departments.

Exclusion Criteria: Participants who were not resident physicians or who did not have the required number of years of experience were excluded from the study.

The validated, self-administered questionnaire was adapted from validated questionnaires from previously published studies[5-7], hence pilot study was not conducted. Data was collected by the principal researcher through electronic mail and response rate was 100%. The questionnaire comprised of four parts: part 1 consisted of demographic questions while the next three parts each covered one of the K, A and P domains with.[12,11] and 11 questions respectively. Responses were recorded according to a five-point Likert scale, with five possible answers: ''Strongly agree'', ''Agree'', ''Neutral'', ''Disagree'', and ''Strongly Disagree''. For analytic purposes, ''Strongly Agree'' and ''Agree'' were merged into ''Agree'', and ''Strongly Disagree'' and ''Disagree'' were merged into ''Disagree'' while ''Neutral'' remained the same for the K and A domains. For K and A domains correct, neutral and wrong answers were each awarded 3, 2 and 1 marks respectively. The answers in P domain were given 5 for correct answer, 4 for near to correct, 3 for neutral, 2 for near to wrong answer and 1 for wrong answer. Data was analyzed by using IBM SPSS version 23.00. Descriptive statistics were analyzed as mean ± standard deviation for continuous variables and percentages for nominal variables. The same was done for the questions about knowledge, attitudes and practices while Pearson's Correlation coefficient was used to check for a significant association between the binomial demographics and each knowledge level, attitude and practice category.

RESULTS

A total of 116 residents were included in the study with 61 participants from Department of Medicine and 55 participants from Department of Surgery, of whom, 42(36.00%) participants were males, and 74(63.00%) participants were females. Mean age of participants was 27.13±1.94 years. The gender and year of training distribution of the participants is shown in Table-I.

Table-I: Table showing the details of the study participants, (n=116)

Variable		values
Age in years (Mean± SD)		27.13 ±1.94
Gender	Females	74(63.79%)
	Males	42(36.20%)
Year of Training	1st	25(21.55%)
	2nd	52(44.82%)
	3rd	25(21.55%)
	4th	14(12.06%)
Department	Medicine	61(52.58%)
	Surgery	55(47.41%)
Mean Knowledge Score ± SD		28.28 ±3.27
Mean Attitude Score ± SD		26.70 ±2.48
Mean Practice Score ± SD		39.99 ±3.91
Mean Total Score ± SD		94.97 ±7.04

**SD: Standard Deviation*

The average total score on the KAP questionnaire was 99.49±5.35 for physicians from Department of Medicine which was higher than the score of 89.9±4.4 for participants from Department of Surgery. The average scores of physicians from Department of Medicine were also higher in each individual domains i.e. 29.84±3.36, 28±1.66 and 41.80±3.40 in the K, A and P domains respectively versus the scores of surgical residents in K, A and P domains i.e. 26.5± 2.12, 25.42± 2.63 and 37.98±3.45 respectively. These are listed in detail in Table-II.

Table-II: Average Scores in the Knowledge, Attitude and Practices Domains, (n=116).

Variable		Medicine Residents n(%)	Surgery Residents n(%)	*p* value
Age in years (Mean ± SD)		27.26 ±2.09	27 ±1.77	-
Gender	Females	49(80.32%)	25(45.45%)	-
	Males	12(19.67%)	30(54.54%)	
Year of Training	1st	10(16.39%)	15(27.27%)	-
	2nd	32(52.45%)	20(36.36%)	
	3rd	15(24.59%)	10(18.18%)	
	4th	4(6.55%)	10(18.18%)	
Mean Knowledge Score±SD		29.84 ±3.36	26.55 ±2.12	5.78
Mean Attitude Score±SD		28.00 ±1.66	25.42 ±2.63	7.13
Mean Practice Score±SD		41.80 ±3.40	37.98 ±3.45	2.53
Mean Total Score±SD		99.49 ±5.34	89.95 ±5.01	4.41

It was found that 111(95.69%) participants agreed that antibiotic resistance is a problem in their hospital and 102(87.90%) participants correctly said that no antibiotics were needed in cases of common cold, however, 77(66.37%) participants admitted they prescribe antibiotics for common cold and 57(49.14%) participants disagreed that they prescribed antibiotics for malaria. Only 29(25.00%) participants were familiar with the concept of antibiotic stewardship and 50 (43.00%) were aware of antibiogram. From the Department of Medicine, 19(16.38%) participants reported to having received teaching about antibiotic prescription while only 15(12.93%) participants from the Department of Surgery reported the same. From the Department of Medicine, 35(30.17%) participants and from Department of Surgery, 12(10.34%) participants, reported that they had consulted local guidelines for antibiotic prescription in the last month. Overall, 109(93.97%) participants identified the need for an antibiotic policy in the hospital and all 116 (100%) agreed on the need for educational programs on the subject. From the total number of participants, 37 (31.90%) agreed that their prescription of antibiotics is affected by availability while 98(84.48%) participants denied prescribing antibiotics on insistence of patients but only 39 (33.62%) reported that they sent cultures for febrile patients. There was an association found between the scores in the knowledge and attitude domains as analyzed by Pearson's correlation coefficient (r: 0.32) as shown in Figure -1.

Pearson's correlation coefficient was 0.34 between the areas of knowledge and practice which shows a correlation between the two domains, as shown in Figure-2.

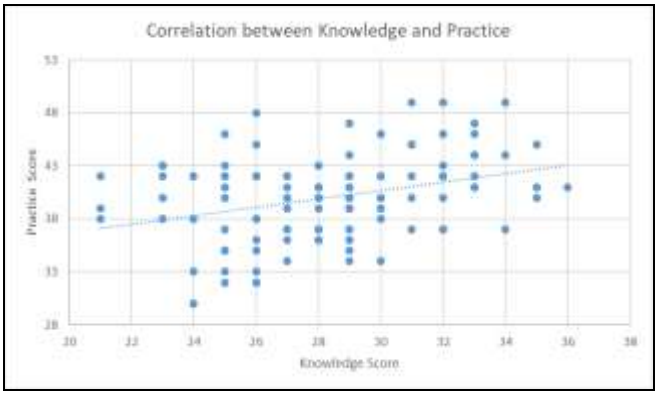

Figure -1: Correlation Between the Scores in Domains of Knowledge and Practice, (n=116)

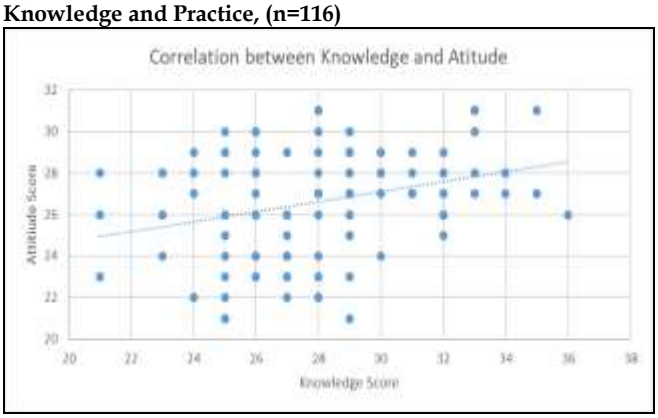

Figure -2: Correlation Between the Scores in Domains of Knowledge and Attitude, (n=116)

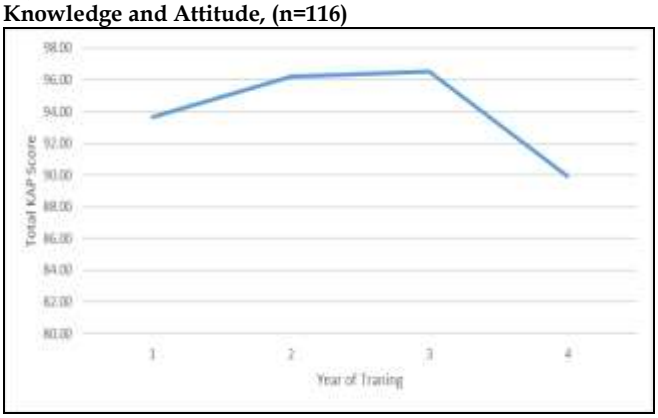

Figure-3: Correlation between Year of Training and Total KAP Score, (n=116)

The correlation coefficient between years of training and average scores in KAP domains was 0.01 as shown in Figure-3. This showed that there was no correlation found between the year of training and the scores in any of the K, A and P domains.

DISCUSSION

Only few studies have been conducted in Pakistan.[7,8] even though AR is one of the most serious global issues of concern today[9] especially as some strains of bacteria have acquired resistance to nearly all antibiotics, translating into a higher burden for our healthcare system. Misuse and overuse of antibiotics has contributed to the problem because of the weak regulation systems, inadequate educational programs and scant financial resources especially as physicians are the ones prescribing antibiotics, it is essential to understand how physicians perceive the problem of AR with several systematic reviews reporting that the prescription patterns of physicians are governed by both intrinsic factors, like knowledge and attitudes, and external factors, like organizational and systemic considerations[10,11]. In our study 87.9% participants responded that patients with common cold do not need antibiotics whereas in a study from a neighboring country, most physicians used antibiotics for two common illnesses such as uncomplicated bronchitis and common cold[12]. In our study, factors like insistence or request by patients, with cost and availability of drugs, influenced the prescription practices of physicians but to a lower extent than what was reported in a study from Lahore, where patients' socioeconomic status and demands affected physicians in their prescription[7] similar to other studies[12]. A study from Balochistan found that patients did not complete the required duration of antibiotic therapy due to financial restraints[13] while a study from Gujjar Khan noted that 78.70% (n=107) healthcare workers reported that patient demand was a factor contributing to AR14, similar to an international where study participants agreed that the patients' demands and socioeconomic status did influence their choices[15]. Nearly half of participants in our study said they prescribe antibiotics for malaria, comparable to study in Nigeria[16]. In our study, 33.62% participants reported sending cultures for patients with febrile illness, similar to the findings in another study, where one third respondents admitted to making a request for microbiological tests or test results to guide treatment with antibiotics in less than 25.00% of patients[17]. Our study found a weak albeit positive correlation between knowledge and each of attitudes and practices domains, with an r value 0.32 and 0.34 respectively, even though, in some studies, educational programs have been shown to improve knowledge of antimicrobial resistance among healthcare workers and instill appropriate prescription behavior [6,18,19]. Yet other studies also reported lack of association between prior training and good attitude, practice, and prescription, as well as the weak positive correlations between K, A and P, similar to our study.[20-22] This supports the role of multiplicity of factors in determining attitudes and practices antimicrobial resistance and prescription. It also reveals that the subject of KAP about AR is not straightforward as even though there is a correlation between the three domains, the correlation is not absolute.

LIMITATIONS OF STUDY

We did not include senior physicians in this study as we wanted to focus on resident physicians, who are most in contact with patients as first caregivers and manage the bulk of outpatient care. Furthermore, a small sample size was another limitation of our study, which relied on physicians' recall and may be subject to bias. We did not assess the relationship of reported attitudes to actual prescription practices. However, data from this study can be used to enhance education, antimicrobial surveillance, and antibiotic prescribing patterns among physicians in our setup.

CONCLUSION

Physicians from Department of Medicine exhibited superior knowledge (29.84±3.36), attitude (28±1.66), and practice (41.80±3.40) scores regarding antibiotic resistance compared to their Surgery counterparts (26.5±2.12, 25.42±2.63, 37.98±3.45, respectively). Notably, higher knowledge scores correlated modestly with improved attitudes (r=0.31) and practices (r=0.33), underscoring the value of targeted education, though training year showed no association.

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Authors' Contribution

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

SR & SN: Data acquisition, data analysis, critical review, approval of the final version to be published.

ARP & FS: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

ARA & MH: Conception, data acquisition, drafting the manuscript, approval of the 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.

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