International Journal of Biology, Pharmacy
and Allied Sciences (IJBPAS)
'A Bridge Between Laboratory and Reader'

www.ijbpas.com

ASSESSMENT OF KNOWLEDGE, ATTITUDE, AND PRACTICE TOWARDS THE USAGE OF ANTIBIOGRAM AMONGST PHYSICIANS: A CROSS-SECTIONAL STUDY

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ABSTRACT

Aim:

The main objective of our study was to assess the Knowledge, Attitude, and Practice (KAP) about antibiogram usage among physicians in a tertiary care hospital.

Methods:

This prospective cross-sectional study was carried out in a tertiary care hospital for a period of three months. KAP questionnaire was developed and it was cross verified by expert committee of members. Physicians of either gender who were willing to participate were included in the study. The relevant details of the physicians including the socio-demographic parameters were collected and recorded. The score of all three domains was evaluated. Statistical analysis of the data was performed by using SPSS version 24. Qualitative data were presented as frequency and percentage. Quantitative data were presented as mean and standard deviation. Pearson correlation coefficient test was used to find out the correlation between knowledge, attitude, and practice.

Results:

A total of 25 physicians satisfying the inclusion criteria were enrolled in the study. The overall score of the knowledge, attitude, and practice of the physicians were found to be 4.23±1.75, 5.76±0.99, and 2.47±1.28 respectively. A statistically significant positive correlation was observed between age and

experience, knowledge and attitude as well as between knowledge and practice and moderate positive correlation was found between attitude and practice.

Conclusion:

Our study revealed that physicians have a good level of knowledge, attitude, and moderate level of practice of antibiogram.

Keywords: Knowledge, Attitude, Practice, Physician, Antibiogram

INTRODUCTION

Antimicrobial resistance is increasing at an alarming rate worldwide. It poses a major threat to our patients, healthcare system, and global economy. The widespread use of antibiotics has resulted in the emergence of antimicrobial resistance (AMR) [1]. Main cause contributing to the spread of resistance incudes the inappropriate administration of antimicrobials in hospital, ineffective preventive measures against infections, and a shortage of new pharmacological agent [2]. Health care providers play a main role in facing antibiotic resistance because they have the authority to prescribe antibiotics during clinical practices. However, the inappropriate use (misuse and overuse) of antibiotics has been found to a problem [3]. It is estimated that by 2050, if nothing is done to halt the increasing trend of AMR, about 10 million people will die from AMR globally, including about 4 million people each from Asia and Africa. At the 68th World Health Assembly, which held in May 2015, member countries endorsed a Global Action Plan (GAP) against AMR. One of the parts of the action plan is to develop antibiogram to prevent antimicrobial resistance [4]. The hospital antibiogram is a periodic summary of antimicrobial susceptibilities of local bacterial isolates submitted to the hospital clinical microbiology laboratory [5]. Though the national treatment guidelines provide general information about the spectrum of antibiotic activity but lack institution specific epidemiology data [6]. The use of antibiogram will allow evidence based antimicrobial selection with consideration of local resistance pattern. Health care providers can use these data, along with their clinical expertise, and patient information to guide selection of initial therapy and reduce inappropriate prescriptions [4]. Antibiograms are therefore an essential component of Antimicrobial Stewardship Programs (AMSP). Though the antibiograms are readily available, their mere availability alone may not ensure appropriate use. Thus, education on antibiogram utilisation and accessibility can improve antimicrobial prescribing practices among practitioners [7]. There were no earlier studies conducted in India on knowledge, attitude, and practice on

Antibiogram usage. Hence, this is the first study in India carried out to analyse the Knowledge, Attitude, and Practice of physicians on antibiogram usage in a tertiary care hospital.

MATERIALS AND METHODS

Study design:

This prospective cross-sectional study was conducted in a tertiary care hospital for a duration of three months after obtaining permission from the Institutional Ethics Committee.

Development and validation of KAP questionnaire:

KAP questionnaire was developed by referring to various primary, secondary, and tertiary resources of information. Once the questionnaire was developed, it was cross verified by the research advisor and subjected to content validation by an expert committee of members, consisting of physicians, academic, and clinical pharmacists.

Inclusion and exclusion criteria:

- Physicians of both gender and who were willing to participate were included in the study.
- Physicians not willing to participate were excluded from the study.

Data collection:

The relevant details of the physicians including the socio-demographic parameters such as their gender, age, educational qualification, and years of experience were collected and recorded in a well-developed data collection form. Followed by which, KAP questionnaire was distributed to the physicians. The score of all three domains was evaluated based on the following formula:

Score = Total number of correct responses / Total number of actual responses × 100

Statistical analysis

Statistical analysis of the data was performed by using SPSS version 24 at 95% confidence interval. Qualitative data were presented as frequency and percentage. Quantitative data were presented as mean and standard deviation. Pearson correlation coefficient test was used to find out the correlation between knowledge, attitude and practice. A p-value <0.05 was considered statistically significant.

RESULTS

A total of 25 physicians satisfying the inclusion criteria were enrolled to assess the knowledge, attitude, and practice towards the usage of antibiogram in which 16(64%) were found to be male and 9(36%) were females. The highest number of physicians were found belonging to the age group of 21-30 years, 15(60%). The mean and SD of the physicians age was found to be 32±12.55 years and out of the total respondents, majority of physicians were MBBS graduates. The details are summarized in

Table 1.

The overall score of the knowledge, attitude, and practice scores of the total physicians enrolled in the study were found to be 4.23±1.75, 5.76±0.99, and 2.47±1.28 respectively. The responses to the questionnaire are shown in **Tables 2-4** and **Figures 1-3**.

Pearson correlation was used to assess the association between variables. A strong positive correlation was found between age and experience as shown in **Figure 4**. A significant positive correlation was found between knowledge and attitude, knowledge and practice as shown in **Figures 5 and 6**. A moderate positive association found between attitude and practice as shown in **Figure 7**.

Table 1: Demographic Details of the Physicians

Parameter	Frequency	Percentage
Age Interval (years)		
21-30	15	60
31-40	6	24
41-50	2	8
51-60	1	4
61-70	1	4
Gender		
Male	16	64
female	9	36
Qualification		
MBBS	16	64
MD	5	20
DNB	2	8
DCH	1	4
DGO	1	4
Experience (years)		
≤ 1	05	20
2-10	16	64
>10	04	16

MBBS-Bachelor of Medicine and Bachelor of Surgery; MD-Doctor of Medicine; DNB-Diplomate of National Board; DCH-Diploma in Child Health; DGO-Diploma in Gynecology and Obstetrics.

Table 2: Physicians Knowledge on Antibiogram

Question No.	Answer	
	Correct	Incorrect
1	20(80%)	5(20%)
2	15(60%)	10(40%)
3	6(24%)	19(76%)
4	13(52%)	12(48%)
5	10(40%)	15(60%)
6	24(96%)	1(4%)
7	4(16%)	21(84%)
8	14(56%)	11(44%)

Q1- Are you aware of the term antibiogram?
Q2- Does the traditional antibiogram includes site of infection and patient location?
Q3- Is an Antibiogram is useful in providing empiric therapy?
Q4- Do you consider 80 to 90% as a good susceptibility percentage?
Q5- Is levofloxacin a restricted antibiotic?
Q6-Would you recommend nitrofurantoin for treating cystitis?
Q7- Would you recommend amikacin for gram negative acinetobacter baumannii?
Q8- A patient was diagnosed with emphysema and pulmonary tuberculosis. The culture report showed gram negative K. pneumoniae. After culture report linezolid was stopped, and amoxicillin + clavulanic acid with metronidazole was started. Is the therapy appropriate for this patient?
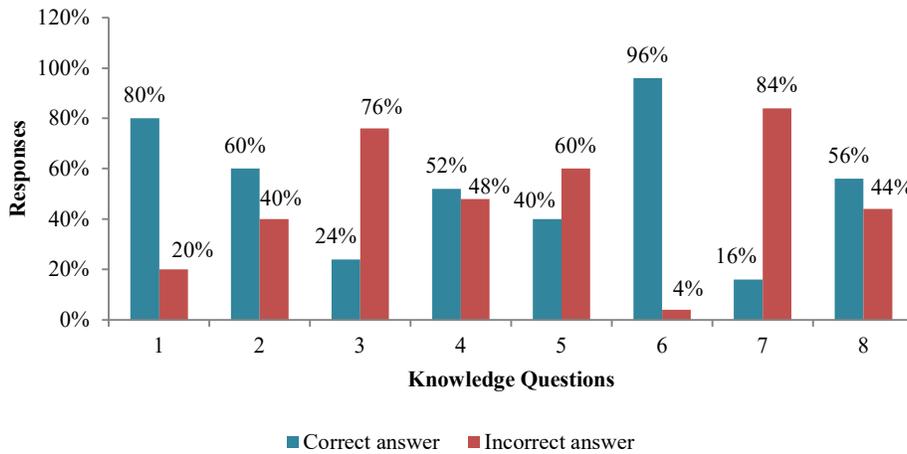
Figure 1: Knowledge on Antibiogram

Table 3: Physicians Attitude towards Antibiogram

Question No.	Response	
	Positive	**Negative**
1	25(100%)	0
2	25(100%)	0
3	21(84%)	4(16%)
4	18(72%)	7(28%)
5	23(92%)	2(8%)
6	24(96%)	1(4%)
7	8(32%)	17(68%)

Q1- Do you feel hospital antibiogram is necessary?
Q2- Do you feel antibiogram is useful in predicting and monitoring, the trend of AMR?
Q3- Do you feel antibiogram as a useful tool in selecting best empirical antibiotic therapy in the event of a pending culture report?
Q4-Do you think that antibiotic resistance is increasing, so there is a need to test the susceptibility of antibiotics against the most common pathogen to treat an infection?
Q5- Do you think AMSP should go beyond traditional antibiogram(TA)?
Q6- Do you think using broad spectrum antibiotics in clinical practice can lead to resistance over time?
Q7- Do you recommend to use restricted antibiotics, if the antibiogram shows high susceptibility for restricted antibiotics?
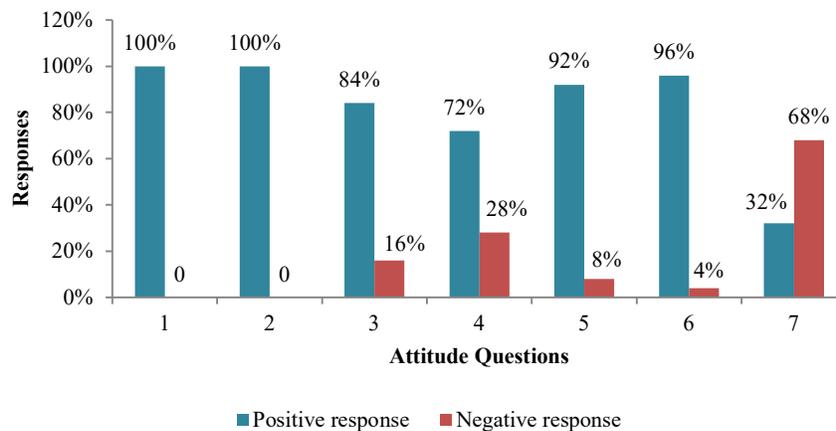

Figure 2: Attitude towards Antibiogram

Table 4: Physicians Practice of Antibiogram

Question No.	Response	
	Positive	Negative
1	14(56%)	11(44%)
2	7(28%)	18(72%)
3	17(68%)	8(32%)
4	15(60%)	10(40%)
5	8(32%)	17(68%)

Q1- Have you ever used an antibiogram?
Q2- Have you ever interpreted an antibiogram?
Q3- Have you ever faced any difficulties while using an antibiogram?
Q4- Have you read any article related to an antibiogram?
Q5- Have you thought that an antibiogram does not contain sufficient information to make clinical decision?
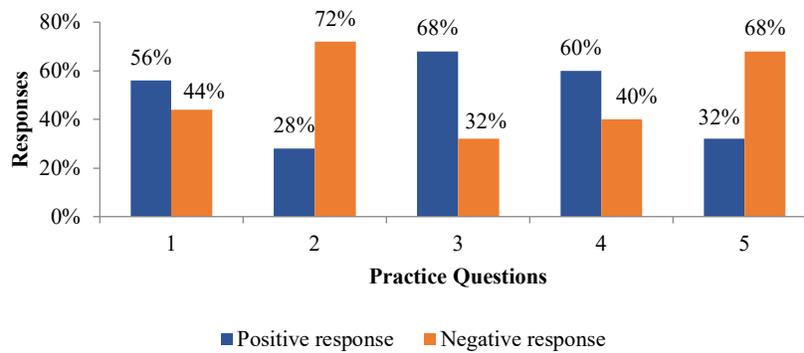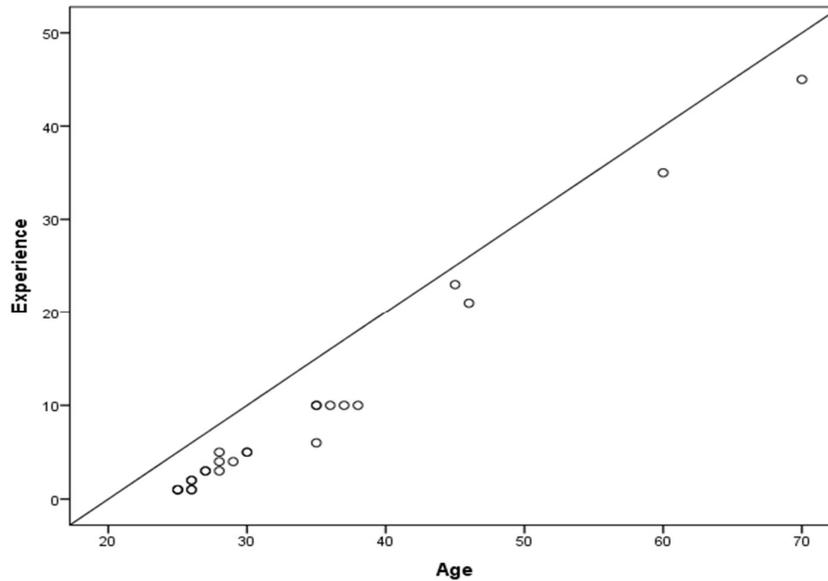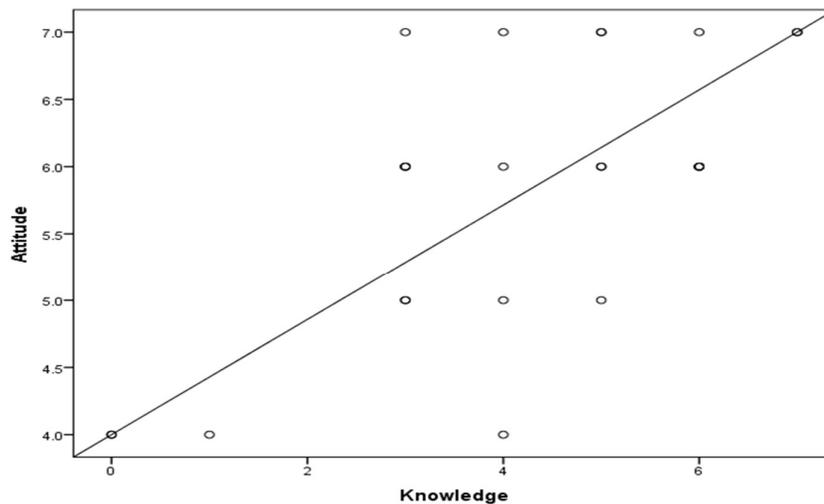

Figure 3: Practice of Antibiogram

r= 0.992, P<0.0001
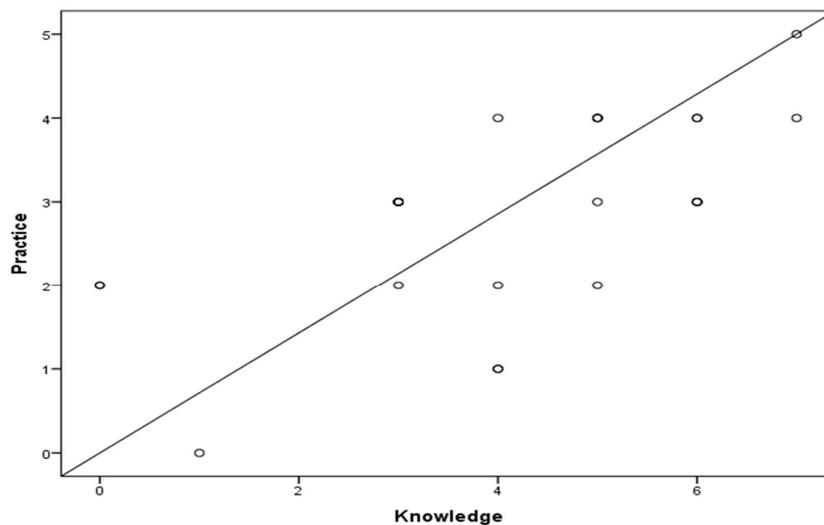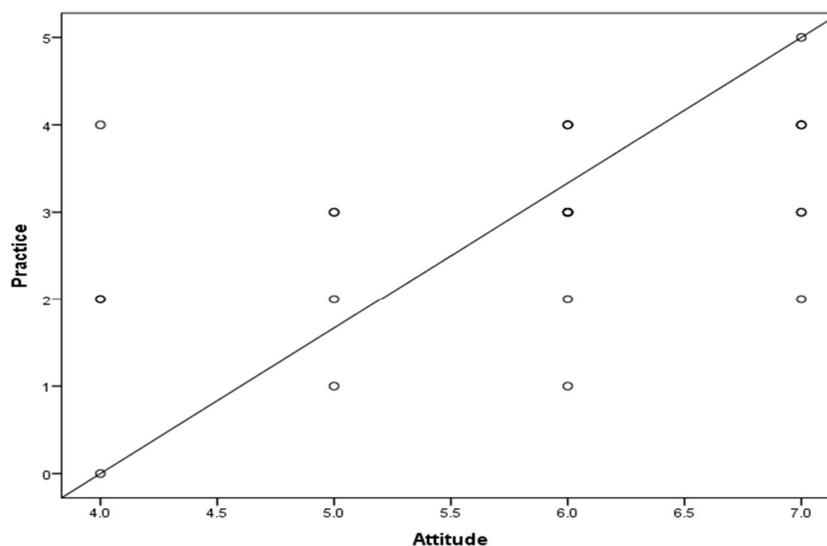**Figure 4: Correlation of Age with Experience**

r= 0.680, P= 0.001
Figure 5: Correlation of Knowledge with Attitude

r= 0.620, P= 0.003
Figure 6: Correlation of Knowledge with Practice

r= 0.494, P= 0.012
Figure 7: Correlation of Attitude with Practice

DISCUSSION

The rapid evolution of resistance particularly among gram negative bacteria requires appropriate empiric antimicrobial therapy [8]. To make appropriate use of antimicrobials many healthcare professionals are following national data base which serve as a general guide, particularly for empirical therapy before culture results are available. However, in many cases when patients have been treated with antimicrobial agents, the culture results would be negative. Following this practice for a long term may result in antibiotic resistance. Developing an antibiogram with local infection pattern in each hospital for the proper use of antimicrobial will reduce the occurrence of resistance [5]. Despite the recommendations that hospitals provide antibiograms to physicians on an annual basis, a number of studies revealed that laboratory and hospital compliance with antibiogram preparation and distribution is suboptimal. Prior studies have raised awareness that physicians are not receiving adequate education about antimicrobial resistance and antimicrobial prescribing. This study adds to these concerns by highlighting that antibiogram education is deficient. It has been reported that passive educational programs do not curtail antimicrobial prescribing as effectively as do antimicrobial stewardship programmes that incorporate active interventions. However, such active interventions may be more successful when physicians are knowledgeable about their local antibiogram [9]. Thus, the present study was carried out to evaluate the knowledge, attitude, and practice of physicians towards the use of antibiogram.

Physician's knowledge about antibiogram was evaluated by using eight questions regarding TA, antibiotic susceptibility, restricted antibiotics, appropriate therapy and case-based questions related to the selection of antibiotics against particular pathogens. The sixth knowledge question had the maximum response rate among all knowledge questions and 96% of the physicians gave correct response regarding the use of Nitrofurantoin for treating UTI patients with culture positive E. coli. The seventh knowledge question had a minimal response rate and only 16% of them were aware that amikacin will be effective against gram negative Acinetobacter baumanni. The physician's response rate to the remaining questions is shown in **Table 2**. Our study demonstrated that physicians lack adequate knowledge regarding antibiogram guiding empiric therapy and restricted antibiotics. In a study conducted by Salsgiver *et al* **[10]** 30 % of respondents lacked confidence in selecting empiric therapy using antibiogram and 24% of them in interpreting susceptibility results which is in accordance with our study.

Physician's Attitude towards antibiogram was evaluated using seven questions regarding AMR, Antimicrobial susceptibility (AMS), Antimicrobial Sensitivity Test (AST) and usage of restricted antibiotics. The first and second attitude questions had the maximum response rate and 100% of the physicians expressed that hospital antibiogram is necessary for predicting and monitoring the trend of AMR. A study conducted in Hong Kong reported that 78.1% of the respondents found antibiogram is useful in selecting antibiotics **[11]**. The seventh attitude question had a minimal response rate, only 32 % of them agreed to the restriction of usage of high-end antibiotics even if the antibiogram shows high susceptibility to them. Restriction of the high-end antibiotics is crucial to reduce multidrug resistance and is the key modality of AMSP. Thus, the usage of high-end antibiotics needs to be monitored. The physician's response rate to the remaining questions is shown in **Table 3**.

Physician's practice regarding antibiogram was evaluated by using five questions regarding the interpretation and use of antibiogram. The third practice question had the maximum response rate and 68% of physicians expressed that they had no difficulty while using antibiogram. This is supported by the study conducted by Stephen J *et al* **[12]** who concluded that residents had a significantly higher understanding and comfort with the utilization of antibiogram.

The findings of the present study would form the basis for all future implications including education intervention programmes to improve the physician's

knowledge and perceptions towards the use of antibiograms which ultimately results in better patient outcomes.

CONCLUSION

Since the frontline people associated with prescribing antibiotics are physicians, understanding the KAP of these physicians regarding antibiogram is a key step in formulating effective AMSP. Our study revealed that physicians have a good level of knowledge, attitude, and moderate level of practice of antibiogram. Most of the clinicians felt antibiogram as a useful tool in selecting best empiric antibiotic therapy in the event of pending culture report. However, they showed poor response in interpreting an antibiogram. Thus, healthcare institutions must ensure that physicians receive proper training and education on using antibiogram in their clinical practice.

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