

Knowledge and attitude of physicians about antimicrobial resistance and their prescribing practices in Services hospital, Lahore, Pakistan

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Abstract

A cross sectional study was conducted in Services Hospital, Lahore using a self administered questionnaire to test the knowledge, attitude and prescribing practices of residents and attending physicians using non-probability convenience sampling. A total of 116 questionnaires were filled (Response rate=77.3%). Knowledge was below average (mean score of 3.66 ± 1.1). Only 18 physicians (16%) could correctly estimate the rates of resistance of *Klebsiella pneumoniae* and *pseudomonas aeruginosa* to cephalosporin. Mostly physicians reviewed their decisions to prescribe an antibiotic by discussing with a senior colleague (n=93; 80%). When they did, the senior colleague sometimes recommended a different antibiotic (n=106; 91%). Seventy seven physicians (66%) reported that they prescribed more than one antibiotic per day. Physicians also stated that their decision of antimicrobial prescription was influenced by patient's socioeconomic status (n=108; 93.1%) and patients' demands (n=24; 20.7%).

This study highlighted the importance of Antimicrobial stewardship and revealed topics to address during future antimicrobial prescribing interventions such as dissemination of information about local resistance rates and encouraging knowledge about antimicrobials.

Keywords: Antimicrobial resistance, Pakistan, Lahore, KAP study.

Introduction

Irresponsible prescription of antimicrobials (AMs) is the driving factor for the growing antimicrobial resistance (AMR) crisis. Appropriate utilization of drugs necessitates optimal prescription habits. Prescriptive mishaps include inappropriate usage of drugs in the form of polypharmacy, inadequate dosage, failure to adhere to medical guidelines and inappropriate

selection of drugs.¹ Among the most commonly inappropriately prescribed drugs are antimicrobials with the problem of bacterial resistance to commonly used antibiotics becoming a world-wide burden.² Consequences of such resistance are grave, affecting both the economical and health sectors. These may take several forms including increased morbidity and mortality, reduction in quality of antibiotic therapy, increased treatment costs, and un-justified loss of resources. These effects are more prominent in developing countries like Pakistan suffering both economical challenges and weak institutional foundations.^{2,3}

Adherence to appropriate prescriptive habits necessitates following the rational steps for optimal prescription including defining the correct diagnosis, planning a safe and effective treatment plan, appropriate drug selection, choosing the effective dosage and duration, writing the prescription, conveying enough information to the patients and evaluation of the treatment procedures according to the patient's responses.⁴ In an effort to hinder antimicrobial resistance several parameters should be targeted including the inappropriate prescriptive practices. In order to achieve an improvement in this regard, an effective change in physician's behaviour should be sought. This requires a detailed understanding of the physician's knowledge about antibiotic resistance, factors influencing their decisions and their actual day to day prescriptive practices. This understanding is fundamental for development of optimal intervention strategies.⁵ KAP studies offer a great tool to investigate the driving forces behind the antibiotic prescriptive habits. They represent a valuable tool among other data collection methodologies including surveillance for actual antibiotic resistance and antibiotic consumption by patients providing the base-line for counter-interventions planning.² However, little KAP-information exists regarding prescribers in hospital settings compared to publications reporting from community settings (Table-1).

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Table-1: Knowledge, attitudes and practices (KAP)-studies about AMR in the hospital setting as reported in the English literature.

Author	Country	Participants	Main findings
Fathi et al., 2016 ⁹	Egypt	Residents and Practicing staff members	AMR was perceived as a global (95%), national (97%), and local (85%) problem
Abera et al., 2014 ¹¹	Ethiopia	175 Physicians and 210 Nurses	The two most important factors mentioned for AMR development were patients' poor adherence to prescribed antimicrobials (86%) and overuse of antibiotics (80.5%)
Garcia et al., 2011 ⁸	Peru	Residents and attending physicians (n = 256)	Participants strongly agreed that AMR is a problem worldwide (70%) and in Peru (65%), but less in their own practice (22%)
Pulcini et al., 2010 ¹²	Scotland, France	Junior doctors (n = 139)	95% agreed AMR is a national problem, 63% agreed so for their own clinical practice. Only 26% knew the correct local prevalence of methicillin-resistant <i>S. aureus</i>
Guerra et al., 2007 ¹³	Brazil	Mainly residents (n = 310)	95% agreed AMR is a problem and 87% that AMs are overprescribed
Giblin et al., 2004 ⁶	USA	Health care workers (n = 117)	95% agreed that AMR is a national problem, 65% agreed for in their own practice
Srinivasan et al., 2004 ¹⁴	USA	House-staff physicians (other than paediatricians) (n = 179)	88% agreed that AMs are overused in general, 72% agreed so for their own hospital

Methods and Results

One hundred and fifty self-administered KAP questionnaires, consisting of 34 questions were distributed among residents and attending physicians in 5 different wards in proportion to the volume of doctors in each ward. Of these 120 were returned, and 4 were discarded due to incomplete information. The study results are based on the analysis of data collected from 116 doctors. Questionnaires were distributed by non-probability convenience sampling on-site during working hours and the respondents were asked to fill and return it within 15 minutes after receiving informed consent from them. There was no incentive for subjects to participate. Participants were instructed to use no external sources to help them answer the questions. If there was a suspicion, that questionnaire was excluded from the study. The identity of the physicians was kept anonymous. The questionnaire content was based on a previous study described in the United States,⁶ Malaysia,⁷ Peru⁸ and Egypt⁹ and was adapted to the Pakistani system to maximize relevance. Prior to release, it was reviewed by community medicine physicians of services institute of medical sciences to assess the relevance and wording of the questions. The results section shows the different questions asked.

Data was entered and analyzed by using SPSS software version 23.0 for appropriate statistical analysis. T-test was used to assess if any association among variables of different questions had any statistical significance or not. P value of 0.05 or less was taken as significant.

Knowledge based questions were scored by giving a

correct answer 1 mark and a wrong answer was given 0 marks, there was no negative marking. Then the sum of the scores was added for each participant and mean and standard deviation was calculated. Similar scoring technique has been used in previous researches.^{7,8,10} Questions testing attitude used a 5-point Likert scale.

Professional profile of participants

Participants were grouped according to their specialty and position in the hospital. Unless otherwise stated, there were no significant differences between the participants belonging to different professional categories, levels or departments for the results presented below. All physicians agreed that knowledge of antibiotics is important for their medical career (currently and in the future). Of these, 112 (96.6%) acknowledged that antimicrobial resistance is a problem, 2 (1.7%) said it's not a problem while 2 (1.7%) said they did not know.

Knowledge

Out of the 7 questions that tested the knowledge of the physician, the highest score was 6/7 (n=4; 3.4%) and the lowest score was 1/7 (n=4; 3.4%). The mean score was 3.66±1.1. About one-sixth of the physicians (n=20; 17%) scored 5/7 and 45 physicians (39%) scored 4/7 in the knowledge section which was the mode.

As for the individual questions, there were 3 case-based questions, 1 question addressing safety of antimicrobials during pregnancy and 3 questions addressing the spectrum of antimicrobials and their ability to cross the blood-brain barrier.

Table-2 shows the mean score of residents and attending physicians to individual questions and the p-value as a

Table-2: Mean scores of Residents and Attending physicians to each individual knowledge question with P-values obtained via independent t-test to test for significance.

No.	Question and possible answers (correct answer in bold)	Overall N (%) answered correctly	N (%) of residents answered correctly	N (%) of attending physicians answered correctly	p-value	Comment
1	A 40-year-old woman has diarrhea for 4 days (3 stools/day). She has no fever at examination or during the last few days. Which treatment do you propose? a) Ciprofloxacin. b) TMP/SMX c) No antibiotic treatment, only oral rehydration.	82/116 (70.7%)	56/78 (71.8%)	26/38 (68.4%)	0.472	Not Significant
2	A 32 year-old male went to the clinic complaining of fever (39°C), nasal discharge and throat pain for 3 days. Which antibiotic will you recommend? a) Amoxicillin b) Clarithromycin c) TMP/SMX d) No need of antibiotic use	5/116 (4.3%)	3/78 (3.8%)	2/38 (5.3%)	0.487	Not Significant
3	You see two patients with impaired kidney function. Patient A is a 68 year-old male with cellulitis in the lower limb. He received clindamycin. Patient B is a 64 year-old woman with diabetes who received empirically treatment for sepsis with ceftriaxone and gentamicin. In which case you will need to adjust the antibiotic dose? a) Patient A b) Patient B c) Both Patient A and B d) Neither Patient A or B	18/116 (15.5%)	9/78 (11.5%)	9/38 (23.7%)	0.001	Significant
4	Which one of the following antibiotics is safe during pregnancy? a) Amoxicillin b) Ciprofloxacin c) Gentamicin	102/116 (87.9%)	67/78 (85.9%)	35/38 (92.1%)	0.048	Significant
5	Which one of the following antibiotics has the best activity against anaerobes? a) Ciprofloxacin b) Metronidazole c) TMP-SMX	100/116 (86.2%)	72/78 (92.3%)	28/38 (73.7%)	0.000	Significant
6	Methicillin resistant - Staphylococcus Aureus is susceptible to: a) Cefalotin b) Cefuroxime c) Ceftriaxone d) None of the above	70/116 (60.3%)	52/78 (66.7%)	18/38 (47.4%)	0.039	Significant
7	Which one of the following antibiotic most effectively crosses the blood-brain barrier? a) Clindamycin b) Ceftriaxone c) Vancomycin	48/116 (41.4%)	34/78 (43.6%)	14/38 (36.8%)	0.142	Not Significant

test of significance between the acquired results (obtained by the independent t-test).

Attitude

Confidence and seeking input

Most of the physicians (n=107; 92%) felt either very confident or at least somewhat confident about the optimal use of antibiotics. Only 9 physicians (7.8%) felt hesitant about the optimal use of antibiotics.

It was found out that majority of the respondents (n=93; 80%) review their decision to prescribe antibiotics with

their senior colleagues once or more than once a day. Seven physicians (6%) reported that they reviewed their decision less than once a week with a senior colleague.

Majority of the respondents (n=106; 91%) admitted that when they discuss their decision for an antimicrobial prescription with a senior colleague, occasionally, they recommend a different antibiotics.

Acceptability of potential interventions

Respondents were asked how many times they had received any teaching on antibiotics in the last year. Thirty

seven (31.9%) physicians responded that they had not received any teaching while 53 (45.7%) physicians said that they only received some guidance about 1-3 times in the previous year. Around 102 (96.6%) physicians desired educational programmes on use of antibiotics

Majority of participants agreed that general knowledge on AMR should be considered when antibiotics are prescribed to a patient (n=101; 95.7%) and that local guidelines would be more helpful than international ones (n=94, 81%).

Factors limiting optimal antimicrobial prescription

Sixty three (54%) physicians were of the opinion that prescribing antimicrobials to a patient who does not need it is harmful, 31 (27%) physicians said that was not harmful while 22 (19%) physicians were neutral on this issue.

The questionnaire had 2 questions which assessed the attitudes of physicians about the factors which limit the optimal prescription of antibiotics. It was found that 98 (84.5%) physicians thought that some antibiotics available in their hospital are of poor quality and for that reason they are not effective and 59 (50.9%) physicians did not know which antibiotics were available in their hospital because the formulary was always being altered.

Awareness about antimicrobial resistance

Most of the respondents agreed that antimicrobial resistance is a worldwide concern (n=114; 98%). One hundred twelve (95%) physicians agreed that antimicrobial resistance is a problem in Pakistan while 104 (90%) physicians admitted that it is a problem in their daily practice. Nine (8%) physicians were neutral on this aspect. Furthermore, 102 (88%) physicians believed that antibiotics are overused in the hospitals in Pakistan and a majority of the physicians (n=79; 68%) also agreed that antimicrobial resistance is a significant problem in their hospital.

Knowledge-based Awareness

The respondents of the study were asked 2 knowledge-based awareness questions on the burden of antimicrobial resistance in the community, and the rate of resistance of *Klebsiella pneumoniae* and *Pseudomonas aeruginosa* to cephalosporin in their hospital. Majority of them (68% and 73% respectively) responded that they did not know. Among the rest, the most popular answer for the rate of resistance of *Klebsiella pneumoniae* to cephalosporin (n=8; 16%) was "more than 50%" and the most frequent answer for the rate of resistance of *Pseudomonas aeruginosa* to cephalosporin (n=18; 16%) was "20%-50% both of which were the correct responses.

Prescribing Practice

Frequency of Antimicrobial Prescription

Physicians were asked about the frequency of their antimicrobial prescription and whether they felt it was difficult to select the correct antibiotic. The answer in the affirmative was stated by 46% (n=53). It was evident from the survey that majority of the physicians (n=76; 66%) prescribed antibiotics more than once a day.

Factors Influencing Antibiotic Prescription Practice

Three different factors which might influence the decision of a doctor in prescribing an antibiotic were assessed. Only 27 (23.3%) physicians said their selection of an antibiotic was based on the expiry date/availability than the causative pathogen. It was also found that a patient's socioeconomic status (n=108; 93.1%) and a patient's demands (n=24; 20.7%) also influence some physicians decisions of AM prescription.

Conclusions

This study highlights the requirement of Antimicrobial stewardship with decisive long-term objective of reduction in antimicrobial resistance by providing the baseline knowledge attitude and prescribing practices of physicians. The results of this study acknowledge the problem of the spread of antimicrobial resistance through the irresponsible prescribing practices and warrants interventions to solve this issue. This study has revealed facts which should be addressed in future antimicrobial prescribing interventions such as dissemination of information about local resistance rates, promoting confidence in the quality of locally available antibiotics and encouraging a good grasp of the basic pharmacology of antibiotics.

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