RESEARCH ARTICLE

PHYSICIANS' ANTIBIOTICS PRESCRIBING PATTERNS FOR COMMON DISEASES AND KNOWLEDGE ON ANTIMICROBIAL RESISTANCE: A DESCRIPTIVE CROSS-SECTIONAL STUDY

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ABSTRACT

PURPOSE:

This study was conducted to assess the Knowledge, Attitude, and Practice (KAP) of patients or their caregivers, and prescribers of antibiotics toward antimicrobial resistance in Bangladesh.

METHOD:

This was a mixed-method research study. Data were collected from pre-determined study areas using a sample survey of 583 respondents, 11 Focus Group Discussions (FGDs), 11 Key-Informant Interviews (KIIs), and 11 In-depth Interviews (IDIs). A scale of 11 points was used to measure attitudes.

RESULTS:

About 59% of the respondents (patients or carers) were between 1 to 20 years old. The difference of age of patients by sex was found statistically significant at .001 level ($x2 = 39.82$, def. = 8; Cramer's V = .49). About 25.7% of the respondents visited an MBBS doctor and 8.1% visited a BDS dentist, and 66.2% went to traditional healers and the pharmacy. Men take more antibiotics for treatment purposes compared to their female counterparts. The difference between men and women, with regard to the treatment of common diseases, was found to be statistically significant. ($X2= 29.82$; Cramer's V = .41, def. = 7; Sig; P= < .02). Usually, new graduate doctors and traditional healers prescribe antibiotics of longer duration. The duration of prescriptions for antibiotics and type of the physician was found statistically significant ($x2= 19.22$; Cramer's V= .28, def. = 8; Sig; P= < .02). Physicians prescribed common antibiotics for upper respiratory tract infections (26%), cold and fever (21%), diarrhea (12%), STDs (9%), HTN (8%), UTIs (7.5%), diabetes (5%), and lower respiratory infections (4%). Cephalosporin (31.4%), macrolides (27.6%), quinolones (17.8%), metronidazole (13%), and penicillin (10.10%) were used. About 65.8% of the caregivers did not have any knowledge about antimicrobial resistance and the negative effects of the overuse of antibiotics.

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CONCLUSION:

The majority of the respondents had poor knowledge of antimicrobial resistance and the negative effects of the overuse of antibiotics. A community-based awareness program was found important to create awareness of antimicrobial resistance and the negative effects of the overuse of antibiotics.

INTRODUCTION

The use of antibiotics is alarming as about 50% of the drugs are prescribed without following any health guidelines [1]. These unhealthy and inappropriate practices related to antibiotics have created a major public health threat to the healthcare system and overall development of the country [2]. The reasons for antimicrobial resistance relate to inappropriate antibiotic prescribing by traditional physicians and healers, self-medication and uncontrolled use of antibiotics in agriculture and livestock [3]. The use of antibiotics has become a serious public health issue in developing countries due to lack of knowledge of there use, the absence of healthcare facilities and doctor visits, and the lack of strong regulations to control use [4]. The World Health Organization has played a key role in initiating to aware its member countries of antimicrobial resistance and developing a global action plan on Antimicrobial Resistance [5]. The aim of the action plan has been to minimize the use of antibiotics and antimicrobial agents to build a healthy earth.

Bangladesh has made remarkable achievement in reducing the child and maternal mortality rates through vaccination [6] program but the country remains weak in regulating physicians and traditional healers to stop prescribing inappropriate antibiotics without proper clinical tests and other relevant examinations. Patients' poor socioeconomic condition, the high cost of clinical examination, and the distance of treatment facility locations are often assigned as the causes of prescribing antibiotics by physicians in Bangladesh. Since healthcare providers' and patients' behaviors strongly influences the use of antibiotics, we have considered it important to understand the associated factors related to this menacing condition to develop an effective strategy to minimize the inappropriate prescribing and using antibiotics in the densely populated mega-city of Dhaka, Bangladesh.

There are many unlicensed drug stores, drug sellers, and drug buyers in the country who do not care about the dosage and intake duration of antibiotics. These practices are assumed as contributing to the rise of antimicrobial resistance levels among the population despite the Bangladesh government's adoption of the World Health Organization's antimicrobial resistance global action plans to reduce the use of antibiotics. Therefore, we have tried to understand the KAP and behaviors of patients, prescribers, buyers, caregivers, and sellers about the antimicrobial resistance.

METHOD

The study used mixed-method techniques whose data were collected from pre-determined study areas. The detailed study methodology is set out in the following sections. Four data collection techniques- Sample Survey, Focused Group Discussion (FGD), Key-Informant Interviews (KII), and Informal Discussion (ID) were used for the study.

THE SURVEY:

Data Collection Tools, Locations of the Study, and Respondents:

A sample survey was conducted for collecting quantitative data. Based on the literature review, and objectives of the study, a structured interview schedule was developed. It had five focused areas, which were: a) socio-economic and demographic characteristics of respondents, b) KAP of patients or their caregivers, and physicians on antimicrobial resistance c) knowledge about antibiotics, d) knowledge of common diseases, and e) people's awareness of healthcare facilities of antimicrobial resistance. We had developed a well-designed open ended and closed ended questionnaire. Knowledge attitude and practice questionnaire were included in the questionnaire and scoring of KAP were done. The

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questionnaire was designed to capture five important aspects of KAP among the population in the study area. This includes respondents' attitude, knowledge about antimicrobial resistance and related to common diseases, risk factors, treatment by antibiotic and usual practices in daily life. To measure the levels of various aspects of Knowledge, Attitude and Practice (KAP), the questionnaire was divided into three distinct modules. In each module, relevant questions were asked from the respondents such as in Knowledge module the emphasis was given to assess the level of knowledge of respondents for antimicrobial resistance and common diseases. To assess knowledge, attitude and practices, 17, 10 and 16 questions were asked respectively. The interview schedule was pretested and revised on the recommendations of the patients, their caregivers, healthcare facilities personnel, and physicians. The study was conducted in 11 healthcare-providing locations of Dhaka city corporations. The respondents were patients (or guardians of those patients who could not talk or provide the correct information) or their caregivers who attend for treatment purposes in the healthcare facilities. All data collectors were trained for four days on interviewing techniques, rapport building with a respondent, and checking the consistency of responses. The principal investigator constantly monitored the field data collection.

The Sampling of Survey Respondents and Data Analyses:

The selection of samples was a difficult task, as there was no proper list of potential target populations. Hence, we decided to use systematic random sampling in 11 popular private hospitals or clinics in the Dhaka city corporation areas. The sample size of the study was determined using a formula [7]. According to this formula, the sample size should have been 384 but with the survey being conducted in different locations of the hospitals or clinics, the number of samples was increased by applying the 1.5 design effect. Thus, the final samples stood at 576. Since the samples required to be distributed equally among the 11 different locations, 7 more samples were added to 576 making it a total of 583. Therefore, 583 respondents were divided among the 11 sites with 53 respondents in each site.

All completed interview schedules were edited before inserting them into the computer. Data were analyzed with the help of the SPSS version 22 [8] statistical package. Univariate, bivariate, and multivariate analysis techniques were applied to the survey data. Efforts were made to go beyond simple descriptions to identify the factors affecting the antimicrobial resistance and the treatment of common diseases.

Qualitative Data Collection Techniques, Sampling of Respondents, Research Instruments, and Data Analyses:

Qualitative data were collected through three techniques—Focused Group Discussion (FGD), Key Informant Interview (KII), and Informal Discussion (ID). We conducted interviews with patients or their caregivers, allied health personnel, and policymakers. A total of 11 FGDs were conducted with patients or their caregivers, 11 IDs with allied health personnel, and 11 KIIs with health policymakers. Three separate interview guides were prepared for three qualitative data collection techniques, which were shared with public health and pharmacologist experts for their reviews. After getting back their feedbacks, the interview guides were finalized. Data collectors were oriented on the techniques of qualitative data collection and recording. All interviews were transcribed within 24 hours. Transcripts were read and coded on the basis of the objectives of the study by the principal researcher. Similar thematic codes were interpreted to link with the main objectives of the study. Qualitative data were analyzed manually by the principal researcher. Both quantitative and qualitative findings are presented together to supplement each other if need be.

METHOD OF DATA COLLECTION, QUALITY CONTROL, AND DATA MANAGEMENT:

The survey data were collected over a period of 30 days from January 2022 to February 2022. A total of 5% of the collected quantitative data was re-checked by the research team to ensure the quality and the accuracy of the survey data. The principal investigator was present in some qualitative interview sessions and double-checked the transcripts to ensure the quality of data.

ETHICAL CONSIDERATION:

Ethical clearance for the study was obtained from Ethical Review Committee (ERC) of Primeasia University (ERC no-2022/42). Written and verbal consent was obtained from each participant after explaining the purpose and the nature of the study. Participation in the study was on a voluntary basis and participants were informed of their right to quit/refuse their participation at any stage of the study if they did not want to participate.

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RESULTS

Results showed that 52.5% of the respondents are female. Certainly, many of them are heads of the family and caregivers of their children. It could be that the interview of the respondent female took place in hospitals or clinics when most of the male family heads were away from home for occupational purposes. Thus, many female family members substituted their male family members for giving treatment information. Since women are overrepresented as respondents, a question may arise about the accuracy of data as women are often considered less informed. In fact, women possibly know more about the health of the family members as they are the most important persons to give non-medical care to sick family members. Therefore, their inclusion may positively affect the quality of data as they know family matters no less than their male folks. The mean age of the respondents was 14±1.05 and nearly 59% of the respondents are between 0 to 20 years old, which means the overwhelming majority of the respondents are of middle or young age who are suffering from different diseases. The age structure indicates that young or middle-aged people use antibiotics from childhood for common diseases and this may lead to long term antimicrobial resistance in their bodies. This is an alarming condition for Bangladeshi young and middle-aged people because it may increase the risk of health problems among them for a long time. Also, the patients were mostly female.

TABLE-1: PERCENTAGE DISTRIBUTION OF AGE OF THE RESPONDENTS (RESPONDENTS OR THEIR CARERS) BY SEX

Age categories	Male (n=277)	Female (n= 306)	Total (n= 583)
	Percentage	Percentage	Percentage
0-5 years	23.80	-	23.80
6-10 years	16.0	-	16.00
11-20 years	7.70	3.30	11.00
21-30 years	-	8.10	8.10
31-40 years	-	3.90	3.90
41-50 years	-	6.00	6.00
51-60 years	-	9.90	9.90
61-70 years	-	15.10	15.10
71-80 years	-	6.20	6.20
Total	47.50	52.50	100.0
$x2= 39.82$; Cramer's V= .49, df = 8; Sig; P= < .001			

In response to the question of where the respondents sought treatment, 25.7% of the respondents opine to go to a graduate medical doctor, 8.1% attend graduate dental surgeons, and 66.2% go to traditional healers and pharmacies. Usually, the patients visit qualified doctors after getting the wrong treatment from traditional healers and pharmacies. This might be for lack of access to urban health facilities and the cost of treatment. Although common diseases are not extremely harmful to patients, about 33.8% of the patients seek treatment from qualified physicians while 66% go to the wrong persons like quacks and traditional healers. Sex-wise distribution of data reveals that the majority of female patients go to quacks, traditional healers, and informal healthcare persons like pharmacy salesman. This difference between men and women regarding the treatment of common diseases was found to be statistically significant. (X2= 29.82; Cramer's V= .41, df = 7; Sig; P= < .02). This means women do not get an equal opportunity of timely treatment from qualified physicians like men.

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TABLE-2: PERCENTAGE DISTRIBUTION OF DURATION OF PRESCRIPTION OF ANTIBIOTICS BY TYPES OF PHYSICIANS

Types of Physicians	5 days	7 days	10 days	12 days	14 days	20 days	Total
	%	%	%	%	%e	%	%
MBBS	1.9%	7.2%	4.8%	0.2%	11.2%	0.3%	25.6%
BDS	0.5%	1.2%	2.2%	0.0%	4.1%	0.0%	8.1%
Pharmacy man	3.3%	20.8%	16.7%	0.3%	25.1%	0.0%	66.3%
Total	5.7%	29.3%	23.8%	0.5%	40.4%	0.3%	100.0%
x^2= 19.22; Cramer's V= .28, df = 8; Sig; P= < .02							

Earlier we have mentioned that a significant percentage of female patients seek treatment from pharmacy salesmen. Financial constraints, distance of the health care facility centers, and lack of knowledge are found to be related to seeking treatment from traditional healers according to FGD data. The main concern here is that the traditional healers prescribe long duration antibiotics than do qualified physicians perhaps because of having no formal training on it. These kinds of practices are public health threats for poor the urban women, and thus it may create a permanent health hazard in society. A cross table between the duration of prescribed antibiotics and the types of physicians prescribed them are found statistically significant ($x2$= 19.22; Cramer's V= .28, def. = 8; Sig; P= < .02) (Table 2). The majority of the respondents use antibiotics primarily for upper respiratory tract infections (26%), followed by cold and fever (21%), diarrhea (12%), STDs (9%), HTN (8%), UTIs (7.5%), diabetes (5%), lower respiratory infections 4%), and other diseases (7%). The number of antibiotics and duration of the prescribed drug are found statistically significant ($x2$= 16.78; Cramer's V= .35, def. = 6; Sig; P= < .003).

FIGURE 1: ANTIBIOTIC GROUPS PRESCRIBED BY PHYSICIANS
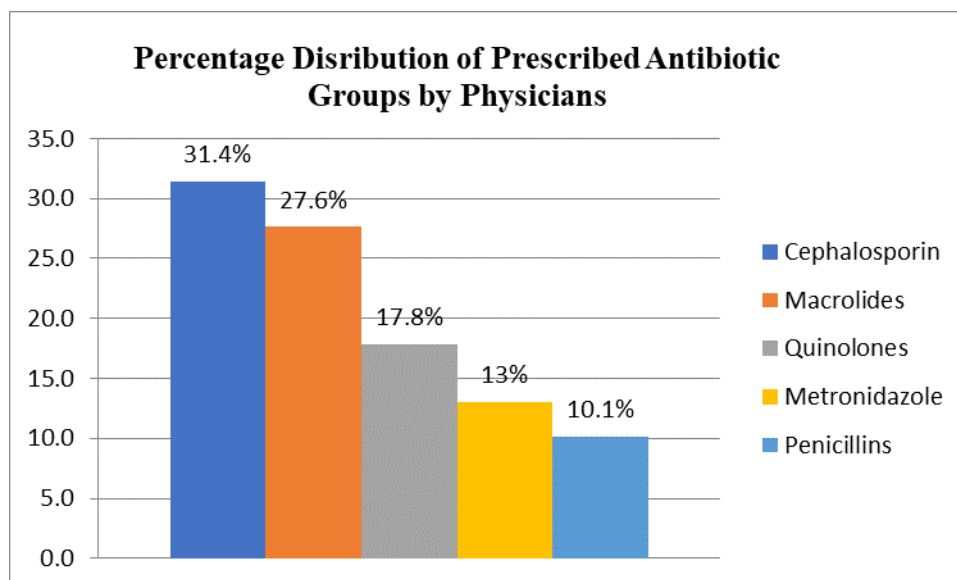
The highest prescribed antibiotic group is cephalosporin (31.4%), followed by macrolides (27.6%), quinolones (17.8%), metronidazole (13%), and penicillin (10.10%) (Figure-1). In order to make effective strategic planning, it is essential to know the level of respondents' knowledge of antimicrobial resistance and antibiotic use. About 34.2% of respondents know about antimicrobial resistance and its relationship with the use of antibiotics, but 65.8% do not have any knowledge about it. The above facts indicate that the majority of the respondents do not have adequate knowledge of the negative aspects of the overuse of antibiotics.

QUALITATIVE FINDINGS:

The majority of the FGD participants have opined that they do not know about antimicrobial resistance and for the first time they have heard about it in a FGD session. The KII participants have expressed their concerns about the poor level of knowledge of respondents about antimicrobial resistance and wrong attitudes toward the overuse of antibiotics. Therefore, most of the discussants feel that non-physicians shouldn't prescribe antibiotics based only on patients' oral statements. Participants of FGD and KII suggest antimicrobial resistance training for the health workers to help increase their knowledge about it and to change their attitudes toward prescribing antibiotics.

Assessment has been made through IDs to know what promotional activities would help changing health behaviors of people and motivate them to attend qualified doctors. Participants have suggested conducting awareness programs like courtyard meetings, disseminating information about negative health effects of antibiotic use, and hanging posters. Most of the participants of FGDs and IDs have said that they do not see antimicrobial resistance programs on TV or heard about them on the radio. Participants have also mentioned that service providers need specific training on antimicrobial resistance and the use of antibiotics to create awareness among the patient. The majority of FGD and ID participants do not have good knowledge of antibiotic drug and the duration of their use. Usually, they do not know about the regulation of antibiotics control and the community people are not aware of using antibiotics in the agriculture and animal husbandry sector.

Although the majority of FGD and ID participants believe that a long dose of antibiotics helps them to recover from their infection but do not know about its long-term side effects. Finally, they have opined that the awareness program on antimicrobial resistance and antibiotics at the community level should be multi-dimensional. The service recipients and community people believe that such an awareness campaign will improve the health status of the urban population, particularly the poor, women, and children.

DISCUSSIONS

Both quantitative and qualitative data was collected for the study. The majority of the respondents are young and middle-aged and a few are older. The primary goal of the study was to measure the KAP of the people about antimicrobial resistance and the trend of antibiotic use for the treatment of common diseases in Dhaka city. Nearly 59% of the respondents (or carers) are between 1 to 20 years old, which means the overwhelming majority of the respondents are children and young adults suffering from different diseases. The age structure further indicates that young or middle-aged people use antibiotics at their early ages for the treatment of common diseases and this may in the long run cause antimicrobial resistance in their bodies. It is a matter of serious concern for the vast majority of the patients (66%) as they easily collect antibiotic drugs from the pharmacies or local quacks. This could be for lack of access to urban health facilities and high cost of treatment. Similar findings are also reported by Palash et al., [9] who reveal that 65% of the women of Bangladesh seek treatment from the informal sector like pharmacy salesmen or quacks.

These results indicate that women even in urban locations are not free to select a qualified physician and primary health care professionals. The economic barriers, negative family attitude to quality treatment, distance of the health care facilities, and lack of knowledge are the causes of seeking services of a pharmacy salesman or a quack instead of qualified physicians. Since these groups of prescribers and traditional healers do not have any formal degree or training in antibiotic prescribing, they are probably causing serious health problems in society. This has been reflected in a cross table, which finds a significant relationship between types prescribed antibiotic drugs and kinds of physicians. The alarming fact is that the majority of the respondents use it for the cure of simple illnesses like upper respiratory tract infections, colds and fever, diarrhea, STDs, HTN, UTIs, diabetes, lower respiratory infections, and other diseases. Earlier similar findings were also reported by Noor et al., [10] which mean over the last 7 years no major change has taken place in the behaviors of patients in Bangladesh.

Our survey findings are consistent with our qualitative findings as both sets of data show that the majority of the respondents have demonstrated little or no knowledge of antimicrobial resistance. In fact, many have first time heard about it from some FGD and KII participants. However, having heard about it, they have expressed concerns for the poor knowledge of users of antimicrobial resistance and the consequences of the overuse of antibiotics.

Although most of the respondents know very little about the negative effects of indiscriminate use of antibiotics and regulations of antibiotic control, know the names of common antibiotic drugs, such as cephalosporin, macrolides, quinolones, metronidazole, and penicillin. Respondents know these names because these are common antibiotics that are prescribed by the physicians and others. The community people are also not aware of the negative effects of using antibiotics in the agriculture and animal husbandry sectors. The study findings based on qualitative and quantitative data suggest the need of developing an effective strategic plan for addressing the antimicrobial resistance and negative effect of the overuse of antibiotics. To implement the newly developed program, there should be campaigns to make people aware of the negative health effect of antibiotic use through courtyard meetings and hanging posters.

CONCLUSION

The study reveals that both qualified doctors and traditional healers prescribed antibiotics for common diseases in urban areas. Respondents have poor knowledge of antimicrobial resistance and the negative effect of the overuse of antibiotics. The study suggests a strong community-based awareness program to make people aware of negative effects of indiscriminate use of antibiotic drugs.

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