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Practice of Rational use of Antibiotics among General Practitioners, Khartoum locality, Sudan

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Abstract:-

- ***Background:***

This cross-sectional-based study was carried out at Khartoum locality, Khartoum. The impact of such a problem on health and the economy worldwide encouraged us to conduct this study. Prescribing antibiotics irrationally resulted in the development of antibacterial resistance, in a direct causation relationship. Health professionals carry the majority of the responsibility of the antibiotic resistance generation.

- ***Purpose:***

The study aimed to generate data that might help our health system policymakers, promoting them to set up a well-structured rational use of antibiotics models. One more goal is to improve the practice of the doctors, making them always satisfied with their antibiotics prescription.

- ***Methodology:***

The study was conducted by distributing questionnaires to 75 doctors who work at 15 different primary health centers. The practice of doctors was assessed using closed-ended statements. Statements used in this study addressed facts like supportive laboratory tests requested before prescription, antibiotics prescription during minor conditions, and factors influencing them to overprescribe antibacterial agents.

In the next phase, pharmacies that belong to health centers were included in the study. A well-structured checklist was used to obtain the data related to the rational use of antibiotics. Data obtained were the total number of prescriptions per day, number of prescriptions containing antibiotics, number of prescriptions with clear written diagnosis, and number of prescriptions with attached laboratories.

We gave scores for every statement choice, 2 points for the correct answer, 1 for the answer 'I don't know, and 0 for the incorrect answer. Total marks of each questionnaire collected, afterward, practice evaluated as good, moderate, or poor. In the final step, the findings of the questionnaires compared to the checklists findings obtained from the pharmacies.

- ***Results:***

The number of years spent in medical practice for the health professionals who participated in this study has been estimated. 92% have less than five years of medical experience, 6.7% have been practiced for 5-10 years, while 1.3% have been practiced for ten years. 33% of the total number of health professionals had 16-20 patients per day during the duration of the study.

After marking and analyzing statements addressing the practice, the final result showed the poor practice of rational use of antibiotics.

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➢ *Conclusion*

The practice of rational use of antibiotics in the Khartoum locality, Sudan, has shown to be poor.

Patient pressure or desire appeared to be the most common factors behind the rational use of antibiotics, in Khartoum locality, Sudan.

Keywords:- *Antibiotics; Practice; Factors; Khartoum; Sudan.*

I. INTRODUCTION

World health organization (WHO) defined the rational use of medicine as, "the medication received by the patients appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost to them and their community"[1].

The discovery of antibiotics has contributed to the massive decrease in mortality due to their therapeutic and preventive role. Such an invention led to the improvement of health. [2].

Antibacterial resistance increased mortality and morbidity. In addition, it put a huge financial burden worldwide in the race to find solutions for this problem. [3]. The increasing number of deaths related to antibacterial agent resistance is predicted to reach around 10 million deaths a year by 2050.[4]. Irrational use of antibiotics has resulted in this problem; such a type of practice has raised the ability of the organisms to resist the antibacterial agents. [5].

Some factors have been associated with antibiotic resistance, for example, the over counter prescription of antibiotics. [3, 5]. Antibacterial agents resistance may be worsened, especially with the lack of awareness toward this problem. [2]. Studies showed that patients' desire and pressure to get antibiotics agents are prominent factors that affect clinical judgment and prescription of doctors. [6].

The WHO expressed the term antimicrobial resistance as the development of a situation where the antibiotic becomes no longer effective against the organism, that once was competent toward the disease or epidemic caused by that organism. Consequently, the infection becomes more aggressive and contagious, increasing the death rate [7].

The fundamental step for reducing antibiotic resistance is to enhance the knowledge and attitude toward the proper practice. [8, 9]. WHO invented several strategies to combat the problem, reflecting the antimicrobial resistance impact on the health systems. In parallel with WHO efforts, many developed countries have implemented a strategy called: Stewardship, which has been recognized to inspire the rational use of antibiotics practice. [10].

Considering the seriousness of the situation, as evidenced by the facts mentioned earlier, we decided to carry out this study. The impact of such a problem on health and the economy worldwide encouraged us to conduct this study as well.

II. MATERIAL AND METHODS

A. Study design and sample size

It is an observational cross-sectional study conducted in the Khartoum locality. The study was carried out in the period between January and March 2015. Khartoum locality has been chosen for the fact it is the capital city of Sudan. Data carried out will be almost representative of the community due to its high population density compared to other localities. First of all, the Khartoum locality was divided into five geographical regions (North, East, West, South, and Centre). In the next step, three primary health centers were picked randomly within each area, making the total number of PHCs selected to be fifteen. Total coverage of health professionals working at primary health centers selected within Khartoum locality applied. The total number of health professionals working at the primary health centers during the study was 75. A questionnaire with closed-ended statements was given to each doctor separately. This procedure preceded with a stage of testing the validity of the questionnaire by using a pilot study, using 15 questionnaires. The data obtained from questionnaires represented the rational use of antibiotics practiced by the health professionals. Moreover, the practice has been followed through obtaining data from prescriptions received by the pharmacies that belong to the primary health centers (15 pharmacies). Data was collected using a checklist. Data retrieved from prescriptions were the total number of prescriptions per day, number of prescriptions containing antibiotics, number of prescriptions with clear written diagnosis, and number of prescriptions with attached laboratories. Both questionnaire and checklist have been reviewed by a clinical pharmacist and public health specialist.

B. Data Analysis

The data were entered and proceeded using Microsoft office excel version 2013. Descriptive frequency tables were analyzed using Statistical Package for Social Sciences (SPSS) version 23 software computer package.

C. Ethical consideration

Permission obtained from the health centers administration approved and signed, followed by consent taken at an individual level from health professionals.

III. RESULTS

Seventy-five health professionals have participated in this study. 92% of them had less than five years of clinical experience, 6.7% had 5-10 years of experience, and 1.3% practiced more than ten years of experience. Regarding patient frequency, 6.7% of the health professionals were seeing 5-10 patients per day, while 28% were taken care of 11-15 patients per day, at the same time, 33% looked after 16-20 patients per day while 32% were dealing with more than 20 patients per day. The practice has been assessed using the following domains.

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1/ Investigations requested before antibiotics prescription:

For the statement 'CBC should be requested before antibiotics prescription, 80% responded with AGREE, 14.7% responded were DISAGREE, while 5.3% were UNCERTAIN. 54.7% of doctors responded to the statement 'CRP should be requested before antibiotic initiation' with AGREE, 33.3% responded with DISAGREE, while 12% responded with UNCERTAIN. 80% of the doctors responded to the statement 'Culture and sensitivity should be requested before antibiotic initiation' with AGREE, 18.7% responded with DISAGREE, while 1.3% were UNCERTAIN. **Table 1**

Table (1): Investigations requested prior to antibiotics prescription

Knowledge domain	Frequency (percentage)		
	Yes	No	I do not know
1/ CBC should be requested	60 (80 %)	11 (14.7 %)	4 (5.3 %)
2/ CRP should be requested before antibiotic initiation	41 (54.7 %)	25 (33.3 %)	9 (12 %)
3/ Culture and sensitivity should be requested before antibiotic initiation	60 (80 %)	14 (18.7 %)	1 (1.3 %)

2/ Prescription of antibiotics during minor illnesses:

56% of the doctors responded with AGREE to the statement 'Antibiotics should be prescribed for URTI, on the other hand, 41.3% responded with DISAGREE, 2.7% responded with UNCERTAIN. 50.7% of health professionals responded to the statement 'Antibiotics should be prescribed for diarrhea' with AGREE, 45.3% responded with DISAGREE, 4% were UNCERTAIN. 20% of doctors responded to the statement 'Antibiotics should be prescribed for superficial wounds' with AGREE, 74.7% responded with DISAGREE, while 5.3% were UNCERTAIN. **Table 2**

3/ Factors influencing health professionals to prescribe antibiotics irrationally:

37.3 % of health professionals selected the choice 'patient pressure, as the most influencing factor. On the other hand, 25.3 % of doctors chose 'lack of knowledge, as the causative factor. 16 % of health professionals selected 'company pressure' as the most leading cause. 14.7 % of health professionals selected 'investigations are expensive' as the most influencing factor. The choice 'lack of time' has been selected by 4 % of health professionals, attributing it to be the possible leading cause of the problem. The choice 'for prophylaxis' has been selected by 2.7 % of health professionals. **Table 3**

Knowledge domain	Frequency (percentage)		
	Yes	No	I do not know
1/ Antibiotics should be prescribed for URTI	42 (56 %)	31 (41.3 %)	2 (2.7 %)
2/ Antibiotics should be prescribed for diarrhea	38 (50.7 %)	34 (45.3 %)	3 (4 %)
3/ Antibiotics should be prescribed for superficial wounds.	15 (20 %)	56 (74.7 %)	4 (5.3 %)

Table (2): Prescription of antibiotics during minor illnesses.

Data obtained from the checklist were: the total number of prescriptions per day, number of prescriptions containing antibiotics, number of prescriptions with clear written diagnosis, and number of prescriptions with attached laboratories.

1/ Number of prescriptions per day: 6.7% of pharmacies had 10 or less prescriptions per day, 20% 11-20 per day, 26.7% 21-30 per day, 26.7 % 31-40 per day and 20% 41-50 prescriptions per day. **Figure 1** 71% of the total number of prescriptions were containing antibiotics.

2/ Number of prescriptions with a specific written diagnosis: 57% of the prescriptions received by the pharmacies contained clear written diagnoses, while 43% were without a written diagnosis. **Figure 2**

3/ Number of prescriptions with attached laboratories: It has been observed that no prescription was received with the attached laboratories.

On the final step of evaluating the practice, points were given for every single statement on the following pattern: 2 points for the correct answer, 1 point for the 'UNCERTAIN' answer, 0 marks for the wrong answer. Then the total points of the knowledge about antibiotics were calculated. We used the scale of poor, moderate, and good evaluations. Doctors who got 80 or more were evaluated as good. Others who got between 60-80 got moderate evaluation. While doctors who got less than 60 got poor evaluation.

Analysis of the statements and the scoring system followed showed poor evaluation (65%), regarding the rational use of antibiotics practice. Furthermore, analysis of the checklist data coincides with that of the questionnaires.

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Table (3): Factors influencing health professionals to irrationally prescribe antibiotics

Q:in your opinion what is the most common factor that make doctors prescribe antibiotics unnecessarily?	Frequency	Percent
patient pressure	28	37.3 %
lack of knowledge	19	25.3 %
Company pressure	12	16 %
expensive investigations	11	14.7 %
Lack of time	3	4 %
prophylaxis	2	2.7 %

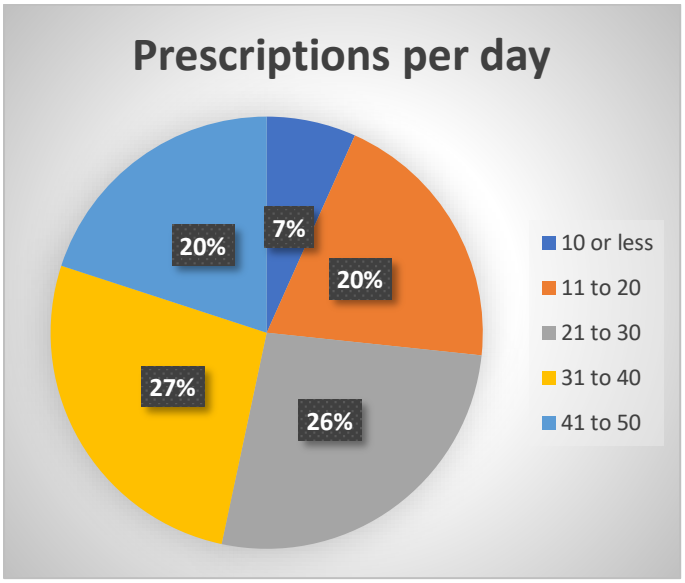

Figure (1): Number of prescriptions received per day by the pharmacies that belong to primary health centers in Khartoum locality, Sudan, 2015.

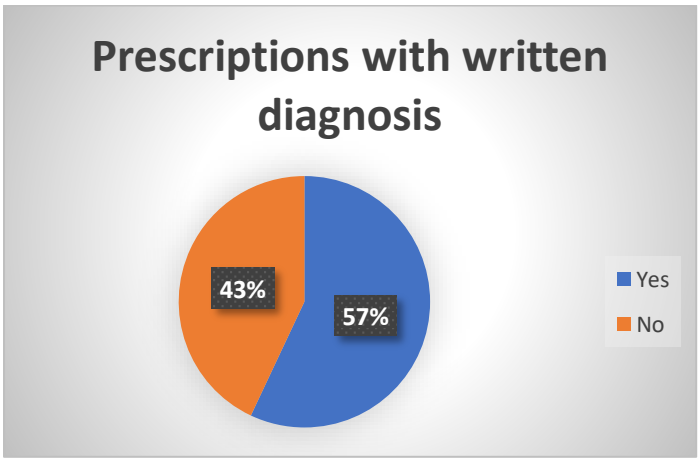

Figure (2): Number of prescriptions with clear written diagnosis received by pharmacies that belong to primary health centers in Khartoum locality, Sudan, 2015.

IV. DISCUSSION

This study aimed to evaluate the rational use of antibiotics practice, among the general practitioners, in Khartoum, locality, Sudan. Regarding the rational use of antibiotics was evaluated in this study as poor, as 65% of health professionals who participated in this study were in this category of this assessment when the questionnaires were analyzed. Furthermore, the results obtained from the questionnaires compared to the data written in the prescriptions, this evaluation step has been done in the pharmacies that belong to the health centers.

In a study done in a nearby country like Egypt, the prescription rate was estimated to be once daily or more. This rate has been seen in the majority of health professionals (55%). Only 15.6% of the health professionals included in the study were assessed as practicing antibiotics prescription accurately. In another study in the same country, but a different situation, this time was a student-based study. This study showed that 62% of students included took antibiotics for common cold symptoms, 48% of them stopped antibiotics when they improved. Such findings are slightly similar to ours. [11, 12]

65% of the participants used antibiotics with self-medication in a study carried out in a neighboring country like Ethiopia. [2] Furthermore, in Mozambique, most of the non-prescribed antibiotics were taken from pharmacies although it is legally prohibited.[4]

Similar findings in the given examples of countries across the African continent might reflect the same problem. Such a problem may result from our almost similar circumstances and our knowledge and awareness toward the rational use of antibiotics.

Regarding the most common factors that influence doctors to overprescribe antibacterial agents, our study showed patient pressure or desire comes first, followed by lack of knowledge and then company pressure. Patient pressure or desire is a powerful factor in the doctor's decision making, this point has been highlighted and discussed in a study published in 2018.[6]

Taking a look at the findings regarding the rational use of antibiotics practice make us somehow confident to provide our country with some recommendation. Firstly, we recommend following antibiotics prescription international guidelines to reduce the risk of developing antimicrobial resistance. Furthermore, by offering microbiology-oriented training for infectious disease physicians and clinical pharmacists, such intervention could be a problem-solving strategy, especially within hospitals settings. Educational intervention strategies directed toward prescribers would yield an additive effect upon the successful application of the rational use of antibiotics. Educational campaigns directed toward huge sectors of the community, might make us closer in our race to create solutions and easily implement the concept of rational use of antibiotics. On the national level, policy changing step is recommended. It will provide control

over antibiotic prescription, at least controlling the over counter use of the antibiotics. In addition to that, such policies would facilitate antibiotics prescription guidelines and protocols implementation.

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SOURCE OF INFORMATION

Most of the medical information (90%) used to create close-ended statements in this study was obtained from pharmacology textbooks. Books used were:

- Duncan Richards and Jeffrey Aronson, Oxford handbook of practical drug therapy, first edition.
- Francis O'Grady, Antibiotics and Chemotherapy, seventh edition.
- W.B. Hugo, Pharmaceutical microbiology, sixth edition.

The minority of medical information (10%) used to build close-ended statements of this study were obtained from:

- Rational medicine organization website (https://www.rationalmedicine.org/2017/12/13/rational-use-of-antimicrobials/)
- WHO-funded program in Thailand, which is called Antibiotic Smart Use (ASU).

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