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Population Knowledge about Rational use of Antibiotics and Antibiotics Resistance in Basrah, Iraq (AbstractView.aspx?PID=2021-14-12-80)

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Population Knowledge about Rational use of Antibiotics and Antibiotics Resistance in Basrah, Iraq

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ABSTRACT:

Background: antibiotic abuse and resistance is worrisome issues worldwide especially in Iraq due to irrational use and self-medication use. This study aimed to assess the degree of Knowledge and practices of populations in Basra, southern of Iraq about their proper use of antibiotics. **Method:** community based cross-sectional study. Well-designed questionnaire was electronically distributed via social media. The data collected from April 2020 to May 2020 and analyzed statistically by using SPSS program. **Results:** About 1075 participants responded to the questionnaire. About 70.28 % of participants, who use antibiotic in last two months before the study, took them directly from the pharmacies without prescriptions. Only half of the participants (51.53 %) depend on healthcare professionals as information sources regarding antibiotics use. The Majority of responders have appropriate knowledge relating to identifications of antibiotic among other types of medication. However, only 44.8 % identified the target organism that antibiotics used. Similarly, a very large percentage of participants (68 %) have the wrong idea about the effectiveness of antibiotics by thinking that injectable antibiotics are more effective than oral. On the other hand, high knowledge is regarding side effects of antibiotics and antibiotic resistance. Despite the apparently good knowledge, there was a generally wrong practice. Most participants are using antibiotics once they feel with flu and common cold symptoms 42.3 % stop the antibiotic once they feel better. Regarding antibiotic resistance, there was a general understanding of the role they would play to decrease these problems and were ready to participate effectively (69.2 %). Finally, the correlation was found to be positive and its value was equal to 0.425. This indicates that knowledge accounts for 42.5% of participants practice regarding antibiotics **Conclusion:** there is generally appropriate knowledge about antibiotic, however there is widespread wrong practices in antibiotic administration and uses. Therefore, immediate attention is required from health care organization in Iraq to prevent antibiotic administration without prescription also there is a need for more awareness campaigns to reduce antibiotic misuse and antibiotic resistance.

KEYWORDS: Population Knowledge, Antibiotic abuse, Antibiotic resistance, Basra, Iraq.

INTRODUCTION:

The discovery of antibiotics as medications with a high degree of safety and potency is considered to be the greatest innovation in healthcare history. This discovery significantly reduced the mortality and morbidity of a large number of previously considered fetal diseases ¹.

Unfortunately, Bacteria can develop resistance to antibiotics by innate or acquired means ². The World Health Organization (WHO) declared that the antimicrobial resistance crisis is becoming horrific in 2014. This will lead to an infection treatment process to be more aggressive, take more time with low levels of success³. Pursuance antimicrobial consumption modality over countries in recent time will collect information to policies helping antimicrobial resistance crisis minimization by compelling individual consumption of antibiotics, improving antibiotics dispensing and encouraging investment in finding antibiotics alternatives ⁴.

Self-medication, prescribing antibiotics incorrectly, consuming antibiotics inappropriately and using such drugs excessively might be the impact factors for the crisis of resistance to antibiotics. Besides, other social and educational factors might have an equal effect to the factors mentioned above⁵.

Resistance to antibiotics is highly impacted by the patients and the general population⁶. So several studies were conducted to evaluate the knowledge, practice and attitude of the general population or healthcare professionals regarding antibiotic resistance. In a study conducted in Al-najaf city during 2019, the attitude of Iraqi doctors towards antibiotic prescription was evaluated. more than 96 % of the participant physicians tend to prescribe antibiotics in their prescriptions as only one (more than 72%), two (more than 21%) and three (2%)⁷. Also, evaluation the knowledge and awareness of 5th stage students of Pharmacy College in Baghdad resulted in poor knowledge and awareness about antibiotic resistance⁸.

A recent study in 2020 highlighted the knowledge and attitude towards antibiotics use and resistance among patients attending the outpatient department of teaching hospital in Baghdad. It was concluded that the population was not well aware about emergence of antibiotic resistance, correct indications and uses of antibiotics and the consequences of their over or misuse⁹.

Because of the importance of using antibiotics rationally and it's significant appliance to reduce the expansion in antimicrobial resistance^{10, 11}, The current study is aimed to investigate the knowledge and practice of the general population in Basra governorate towards antibiotic use and resistance through a questionnaire. The responses are aimed to be analyzed to address the defects and discuss the appropriate measures to resolve them.

METHOD:

Questionnaire:

This is a cross-sectional study consisted of a survey based on a questionnaire which was – experts to provide its validation and relevance. The questionnaire consisted of two main domains, knowledge and practices. Each section consisted of 8 questions aimed to assess Knowledge and practice respectively. Each correct answer in the knowledge and practice section was marked with 1 while wrong answers carried 0 marks. This gave a total score in the range of 0 – 8 for the knowledge and practice section.

The electronic copy of the questionnaire was sent through what's app mobile application to the participants because of corona pandemic and in order to guaranty its reach to wide and different parts of Basra population. All participants were told enough information about the aim of the survey and that all of their responses were secret. All research data were saved in a secure setting within Google forms. The study was carried out between April 2020 and May 2020 in Basra governorate of Iraq, a region in the southern of Iraq.

Statistical analysis:

The demographic data and responses of the participants were coded according to the requirement of each section. The coded responses related to the demographic data were analyzed by descriptive tools in terms of frequency and percentages. Respondent answers were analyzed for both descriptive and inferential tests. cronbach alpha coefficient was used for assessing the reliability of the questionnaire data^{12, 13}. The appropriate inferential statistical test was evaluated after examining the distribution of the responses in the domains of the questionnaire using Kolmogorov-Smirnov test¹⁴. Parametric Chi- square test and non- parametric tests, Mann-Whitney test^{15, 16} and Kruskal Wallis H test¹⁷ were used for analyzing the significance of each demographic characteristic on each domain in the questionnaire. For each test, a p-value of less than 0.05 was considered statistically significant. Data analysis was performed by SPSS program version 17.0¹⁸.

RESULTS:

A total number of 1075 participants responded to the questionnaire. The demographic data of the participants are shown in table-1. The Cronbach Alpha coefficient was used to assess the reliability of the questionnaire and its value was (0.71) which is considered to be acceptable¹⁵. The majority of participants were females (62.6% vs 37.4 % of males) and live in the center of the city (64.5% vs. 35.5 %). Regarding the academic qualification, most participants were college graduates 70.4% followed by secondary school (13.6%) then higher study graduates (10.9 %), the minority had a primary or intermediate school degree 5.1 %. The marital state can be represented by 58.3 % married and 41.7 % single. Also different age groups responded to the questionnaire, the majority (53.8%) were between 18-29 while a minor number (2.5 %) were above 60.

Table 1: Demographic data of the Participants

| Frequency No (%) | Parameter |
|------------------|---------------------|
| | Age Range |
| 578(53.8%) | 18-29 |
| 238(22.1%) | 30-39 |
| 150(14.0%) | 40-49 |
| 82 (7.6%) | 50-59 |
| 27 (2.5 %) | >60 |
| | Gender |
| 402(37.4%) | Male |
| 673(62.6%) | Female |
| | Social State |
| 448(41.7%) | Single |
| 627(58.3%) | Married |

| | Academic Qualification |
|------------|-------------------------|
| 55(5.1%) | primary or intermediate |
| 146(13.6%) | Secondary |
| 757(70.4%) | College |
| 117(10.9%) | Higher study |
| | Location |
| 693(64.5%) | Center of the city |
| 382(35.5%) | Countryside |

Prior to the Knowledge and practice sections, the participants were asked to respond to several questions related to their use of antibiotics. The results are summarized in table -2.

It can be seen that 45.39 % of the participants used antibiotics in the previous two months and only 29.71 % of the previous percentages obtained the antibiotic by a prescription while the remaining 70.28 % took the drugs as (over the counter) OTC medications directly by buying them from the pharmacies. Regarding antibiotic use in the previous year, the highest responses were to the choice of more than 3 times a year of about 39.62 %. Answers of once and 2-3 times per year represent 24.46% and 35.9 % of the respondents.

More than half of the participants (51.53 % vs 48.46 %) rely on information obtained from healthcare professionals regarding the use of antibiotics. Regarding the sufficiency of information related to antibiotic use, 56.09 % confirmed that pharmacists provided clear instruction while 68.37% said that doctors explained the use and treatment issues related to the prescribed antibiotic.

Table 2: Questions that describe health care attitude of the participants.

| Questions | Responses No(%) |
|---|-----------------|
| Did you used (antibiotic) Ab during the past 2 months | |
| Yes | 488 (45.39 %) |
| No | 587 (54.61 %) |
| If the previous question is Yes (prescription) Rx (over the counter) OTC = without prescription | |
| | 145 (29.71 %) |
| | 343 (70.28 %) |
| Number of uses/ year | |
| Once | 263 (24.46%) |
| 2 to 3 | 386 (35.9 %) |
| More than 3 | 426 (39.62 %) |
| Source of information | |
| Healthcare Professional | 554 (51.53 %) |
| Others | 521 (48.46 %) |
| Sufficient Information from the pharmacist | |
| Yes | 603 (56.09 %) |
| No | 472 (43.9 %) |
| Sufficient Information from the Doctor | |
| Yes | 735 (68.37 %) |
| No | 340 (31.62 %) |

Population Knowledge regarding Antibiotic Use and Resistance:

The knowledge of the participants regarding antibiotics was evaluated by eight questions. The responses to this section are summarized in a table (3). The majority of respondents correctly answered the questions K1 and K2 which were related to identifying the antibiotic among other choices and the indication of antibiotics, respectively. However, k3 was mainly incorrectly answered and only 44.8 % identified the target organism to be which antibiotics are used. Similarly, a very large percentage of participants (68 % versus 32 %) have the wrong idea about the effectiveness of antibiotics by thinking that injectable antibiotics are more effective than oral. On the other hand, the majority of participants (70.8 % vs. 29.2 %) are well aware regarding the side effects resulting from antibiotic use. The last three questions from K6 to K8 are related to antibiotic resistance. It can be seen that a very high knowledge is represented by correct answers 95.8 %, 84.1 % and 72.8 % to questions K6, K7 and K8 respectively.

Table (3): Frequency of Various Responses to Questions in knowledge Section

| | Question | √ | X |
|------------|--|--------------|-------------|
| K1 | Which of the following drugs considered as an antibiotic? | 869 (80.8%) | 206 (19.2%) |
| K2 | To which condition the antibiotics can be used? | 700 (65.1%) | 375 (34.9%) |
| K3 | Antibiotics are effective against? | 482 (44.8%) | 593 (55.2%) |
| K6 | Did you think using parenteral antibiotics are better than oral? | 344(32%) | 731 (68.0%) |
| K7 | Did you think antibiotics have side effects? | 761 (70.8%) | 314 (29.2%) |
| K8 | Did you think there is a misuse of antibiotics in Iraq? | 1030 (95.8%) | 45 (4.2%) |
| K9 | Did you think bacteria can resist antibiotics when used frequently and unnecessarily? | 904 (84.1%) | 171 (15.9%) |
| K10 | Did you know that failure to complete the course of antibiotic treatment and stopping its use as soon as the symptoms improved, is one of the main causes of | 783(72.8%) | 292 (27.2%) |

| | | |
|-------------------------|--|--|
| antibiotics resistance? | | |
|-------------------------|--|--|

Practice Variables:

The Practice of the participants regarding antibiotics was evaluated by eight questions. The responses to this section are summarized in a table (4). There was a generally wrong practice in P1 and P2 questions represented by 72.7 % and 67.1 % incorrect answers, respectively. It can be seen that most participants are using antibiotics once they feel with flu and common cold symptoms. Also they are repeating the same antibiotics once symptoms reoccur again. Regarding the storage of antibiotic liquid dosage forms in P4, It is noticed that very high percent 85.1 % of the participants correctly maintain the preparation in the refrigerator after opening and reconstitution. Similarly, in P5 more than half of the participants (66.9 % VS 33.1 %) were practicing disposal of antibiotics after use and not keeping the remaining for other use. In P2, more than half of the participants 57.7 % responded that they would complete the course of antibiotic even though symptoms are improved while only 42.3 % stop the antibiotic use once they feel better. Interestingly, In P6 there was a very popular practice of incorrect behavior (59.1% vs. 40.9%). It was represented by prescribing antibiotics to their relatives and friends based on their previous experience of similar symptoms and obtained recovery from certain antibiotic use. On the other hand, a very high percent of the participants said that they would commit with the orders of the prescribing physician if he refused to prescribe antibiotic to them (86.5 % vs. 13.5 %). Regarding antibiotic resistance, there was a general understanding of the role they would play to decrease these problems and were ready to participate effectively (69.2 % vs. 30.8%).

Table 4: Frequency of Responses to the Practice (P) Section.

| | Question | √ (correct answer) | X (incorrect answer) |
|----|---|--------------------------|----------------------------|
| P1 | Have you ever used an antibiotic when feeling symptoms of flu and cold? | 294 (27.3%) | 781 (72.7%) |
| P3 | Would you reuse your remaining antibiotic if symptoms recur? | 354 (32.9%) | 721 (67.1%) |
| P4 | Do you keep the antibiotic package (in suspension form) after reconstitution in the refrigerator? | 915 (85.1%) | 160 (14.9%) |
| P5 | Do you keep the rest of antibiotic suspension to reuse again after the end of treatment course? | 719 (66.9%) | 356 (33.1%) |
| P2 | Do you stop antibiotic use as soon as symptoms improvement, even if you do not complete the treatment course? | 620 (57.7%) | 455 (42.3%) |
| P6 | Have you ever advised others to take an antibiotic to treat condition that you had previously? | 440 (40.9%) | 635 (59.1%) |
| P8 | Do you stick to the advice of the doctor or the pharmacist when refusing to administer the antibiotic to you or any of your family members? | 930 (86.5%) | 145 (13.5%) |
| P9 | Do you think that you can reduce or stop the problem of bacterial resistance to antibiotics? | 744 (69.2%) | 331 (30.8%) |

Table (5): The average scores of knowledge (K) and practice (P) domains according to demographic data.

| | K- Score | | P- Score | |
|---------------------------------|--------------------|-------------|--------------------|--------------|
| | 0.6829± 0.19728 | p- value | 0.5641± 0.21565 | p- value |
| Age** | | 0.83 | | 0.608 |
| 18-29 | 540.32 | | 546.72 | |
| 30-39 | 539.59 | | 519.77 | |
| 40-49 | 521.57 | | 516.3 | |
| 50-59 | 528.5 | | 561.6 | |
| >60 | 594.48 | | 560.78 | |
| Gender* | | | | |
| Male | 515.97 | 0.067 | 500.89 | 0.002 |
| Female | 551.16 | | 560.16 | |
| Social state* | | | | |
| Single | 534.46 | 0.748 | 552.65 | 0.185 |
| Married | 540.53 | | 527.53 | |
| Academic Qualification** | | | | |
| primary or intermediate | 487.25 | 0.21 | 557.95 | 0.526 |
| secondary | 549.51 | | 546.85 | |
| College | 546.04 | | 540.74 | |
| Higher study | 495.49 | | 499.88 | |
| Location* | | | | |
| Center of the city | 532.51 | 0.427 | 531.92 | 0.38 |
| Countryside | 547.96 | | 549.03 | |

P-value < 0.05 is statistically significant; * Mann-Whitney U test **Kruskal Wallis H test

Note: K-score = average knowledge score; P-score = average Practice score;

Correlation between population Knowledge and Practice:

The correlation between the knowledge and Practice was estimated by calculation of Spearman correlation coefficient (18, 19). The correlation was found to be positive and its value was equal to 0.425. This indicates that knowledge accounts for 42.5% of participants practice regarding antibiotics (20). The value of the correlation coefficient was statistically significant as the p-value was less than 0.05 according to table (7) below.

Table 6: Spearman Correlation Coefficient between Knowledge and Practice

| Variable | rho | p-value |
|---------------------|--------|---------|
| Knowledge, Practice | 0.425* | 0.000 |

*Statistically significant at $p < 0.0$

DISCUSSION:

Antibiotic abuse and antibiotic resistance are increasing widespread problems especially in developing countries. Lack of proper knowledge and low medical education are the main causes of this problem. The present study shed a light on percentage of wrong thoughts that predisposed to malpractices in antibiotics dispensing and intake in Iraq and specifically in Basra.

Responses from randomly selected people who answer the electronic questionnaire in the results above shows that those with high age group (>50 years old) showed highest knowledge and practice scores compared to other age groups. This can be related to their relative experience in handling medication. This result not agree with the study in Malaysia (21) that showed low Knowledge score in older people due to different in population and society. In addition, the last study focus in the elderly people as sole participant.

Females showed statistically significant better knowledge and practices against use of antibiotics and antibiotic resistance compared to males, this may be simply due to that most responders were female (about 62.6%), however this result may refer to higher commitment of the females in our society responding to research questioners as well as females specially mothers deal more with antibiotics when given them to treat various infections of their children. This result parallel with previous studies in which males showed less knowledge and practices than females²¹.

Regarding marital state married participants showed more knowledge score compared to single one but less practices degree. These results agree with two studies from Saudi Arabia showed that married people have good Knowledge about antibiotics^{23, 24}. This may be due to more responsibilities of married people regarding care of their children and family. Their better Knowledge unfortunately not result in good practices of using antibiotics possibly due to unperfected health education they received in our community.

Those with secondary school or college qualifications showed higher average knowledge and practice score towards antibiotics and antibiotic resistance. Similar result were found by study in Qatar²⁵. Many other studies focus on educated people in medical college show that they possessed good knowledge score but not necessary associated with actual real-life attitude or practices regarding antibiotic use and their resistance^{26, 27}. Surprisingly, group of participants who qualify primary or intermediate school showed high average practices towards antibiotics and antibiotics resistance in spite of their lower knowledge degree.

Participants who lives in country sides showed more knowledge and practices average scores compared to those living in the city center, similar result seen in study in Turkey²⁸. This might be due to low educational and economic status in rural areas compare with urban cities.

Approximately (40%) of the participants had used antibiotics more than 3 times per the last year. This indicate there is an overuse of antibiotics among Basra population. This percent is parallel and higher than with the result of a study conducted in Jordan²⁹. Another worrisome issue is the antibiotics self-medication, antibiotics used to treat self-diagnosed symptoms, which is very common in among residents in Iraq^{30, 31}. In Basra city higher percentage of the participants who used antibiotics in the last two months before the questionnaire (70.28%) obtained them as OTC medications. This percent is very high compared to the results of studies carried out in other middle east countries like UAE³², Jordan²⁹ and Saudi study³³. The wide use of antibiotic as self-medication should prohibited by applying further restrictions on dispensing antibiotics directly from community pharmacies to avoid the growing risk of antibiotic resistance in our society.

In spite of high percentages of antibiotic use in the participants, their Knowledge about antibiotic actions were different. Approximately 55% of the participants did not recognize the microorganism that an antibiotic used to kill, this result is the opposite to that of a study conducted in Sweden(34). In addition, approximately 73% of the participants used antibiotics once they felt colds or flu which is still high compare to other studies like in Bahrain study (about 32.6%)³⁵.

Approximately 58% of the participants stop using antibiotics once symptoms disappear, this is the opposite of that study in Brunei²⁶, higher than that in Kuwait study³⁶ and less than that of Saudi study³³. Besides, high percentage approximately 67% reuse the remaining antibiotic if common symptoms appear, this percent is higher than that of Jordan study²⁹.

And since approximately equal percent (52 and 48%) of the participants rely on health care professionals as information sources in line with the other sources like (television and social media). So conducting awareness campaigns urging health care

sources in line with the other sources like (television and social media). So conducting awareness campaigns urging health care professionals to provide patients with sufficient information on the proper use of antibiotics to ensure the reduction of resistance crisis. The above awareness campaigns should be done side by side with other campaigns in the social media and television urging people to demand and abide by the information from health care professionals about the proper use of antibiotics.

Both, physicians and pharmacists considered as powerful agents that influence society behavior regarding antibiotics use. So, it is very important to activate national health programs to educate people while prescribing or dispensing antibiotics about its proper use. Moreover, huge attention should be paid by the academic institutions to provide future health care professionals good knowledge and information about proper antibiotics use and effective skills in patients' consultation. The above results is in line with the results of³⁷.

The same awareness campaigns can be used to encourage people and alert them to the importance of their role in reducing resistance crisis by proper use of antibiotics. Because of that high percent (69.2%) of the participants said that they can play a role in reducing or stopping antibiotic resistance problem. However, this percent still lower than that of Pimpri-Chinchwad, India society³⁸.

Since very high percent of participants (86.5%) agreed with that they stick the advice of doctors or pharmacists when refusing dispensing antibiotics, so imposing local, Arab or international policies regarding dispensing antibiotics by the doctors or the pharmacists may play a great role in decreasing wrong practices toward antibiotic use. This result is on the opposite of the results of a study conducting in Nepal serving the same purpose³⁹ and higher than that in Jordan study²⁹.

CONFLICT OF INTEREST:

The author declares no conflict of interest.

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