

ANTIBIOTICS APPARENT OVERUSE IN THE TREATMENT OF ACUTE DIARRHEA AMONG CHILDREN LESS THAN TEN ATTENDING EMERGENCY DEPARTMENT IN AL KHANSA'A TEACHING HOSPITAL.

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ABSTRACT

Background: The overuse of antibiotics by doctors has drawn a lot of attention in the medical community. One major contributing factor to the fast emergence of antimicrobial resistance has been the prescription of antibiotics for conditions for which they are unlikely to be useful. **Objectives:** To show the prevalence of inappropriate antibiotic prescription for children with acute diarrhea and to determine factors associated with antibiotic overuse and underuse in the treatment of such cases at Al Khansa'a Teaching Hospital in Mosul between 1st of May 2024 to the end of June 2024. **Methods:** An observational, descriptive, cross-sectional study was adopted in order to achieve the objectives of the present study. All patients aged less than 10 years with acute watery diarrhea who attend emergency department of Al-Khansa'a Teaching Hospital were included in the study. The Questionnaire was composed of two parts, the first included demographic information of the patients and the second covered specific acute watery diarrhea information. **Results:** The study sample was 140 patients, the median (interquartile range) age of 2 (1-7) years, with 72 (51.4%) males and 68 (48.6%) females. Out of 140 subjects, 48 (34.3%) did not receive antibiotics, while 92 (65.7%) received antibiotics. Out of those 92 who received antibiotics, 69 (75%) had appropriate indications for the antibiotics, while 23 (25%) had inappropriate antibiotic usage. The antibiotics given were mainly ceftriaxone in 35%, followed by Metronidazole and 14.5%. There was no significant difference between the study groups who had inappropriate antibiotics, and those who were not prescribed antibiotics in the terms of age, gender, residency and parents' education. Moreover; fever and vomiting shown to be statistically significant differences between the study groups. On the other hand, both groups were similar in terms of frequency of bowel motions, diarrhea duration, presence of bloody diarrhea, degree of the fever, presence of abdominal pain, as well as dehydration level. **Conclusion:** Antibiotic resistance represents a major worldwide health concern. A variety of researches, policy, and implementation strategies must be used to fight these phenomena. These strategies include educating healthcare workers about treatment guidelines and the consequences of nonadherence, disseminating local antibiotic susceptibility data in a way that helps make treatment decisions.

KEYWORDS: Acute diarrhea, Antibiotics, Overuse, Mosul city.

INTRODUCTION

The overuse of antibiotics by doctors has drawn a lot of attention in the medical community.^[1] One major contributing factor to the fast emergence of antimicrobial resistance has been the prescription of antibiotics for conditions for which they are unlikely to be useful^[2] Antibiotic prescriptions written carelessly put patients at unnecessary danger and cost a lot of money.^[3] Doctors frequently write antibiotic prescriptions in response to patient demand and in an effort to meet patients' expectations.^[4]

Exploring factors contributing to inappropriate antibiotic use in emergency department generally, different from primary care settings. Patients attending emergency department, might be sicker or have different expectations for therapy by their parents.^[5-5]

Iraq is ruled by tribal society rules, despite its almost beneficial, but sometimes it isn't.^[7] Medical staff working at the emergency setting always face problems regarding favoritism, tribal belonge, which is affect the application of triage system, follow treatment protocols

and convince the patient family about the correct management should be taken.

Antibiotics most of the time prescribe just for avoiding troubles with patient relatives. As most the society believes that antibiotic injection is mandatory for all type of infection and their patient will not be fine without using of it.

Additionally, 70% of Mosul hospitals were destroyed by the events of ISIS war and its liberation.^[8] This fact but the directorate of health under further pressure to find substitutional suitable buildings. Patchwork solutions, from the other hand; make the patients and their relative anger and unsatisfied with doctors prescriptions.

Reduced stool consistency, higher water content, and more evacuations per day are the three characteristics of diarrhea.^[9-11] Both acute and chronic diarrhea is caused by a wide variety of pathophysiological processes.^[12] The differential diagnosis may be reduced by taking into account the patient's medical history, physical examination, stool evaluation, and the stool characteristic, is it bloody, watery, or fatty in nature.^[13-14] Acute diarrhea can be caused by a wide variety of infectious agents, such as bacteria, viruses, and protozoa.^[15]

Misuse of antibiotics include the prescription of unneeded antibiotics, the inaccurate prescription of antibiotics, and the failure to prescribe antibiotics when necessary, which is poses a serious threat to public health.^[16-17] The World Health Assembly approved a global action plans to address the urgent public health threat of antibiotic resistance.^[18] One essential step is to encourage careful application of antibiotics and to increase adherence to WHO treatment guidelines.^[19]

The WHO guidelines for the Integrated Management of Childhood Illness (IMCI) suggest empirical use of antibiotics just for bloody diarrhea and cholera. The most common cause of bloody diarrhea in children is shigellosis, which is treated with ciprofloxacin.^[20-21]

Since viral infections are the most prevalent cause of watery diarrhea in children, oral rehydration and zinc supplementation are advised only.^[22]

Al Khansa'a teaching hospital had been destroyed during war, but it restarted to work after liberation at Al Sukar PHCC near the old building. Emergency department which is located in undestroyed part of old hospital building, consisted from 15 beds, its open 24 hours per day with usual patient flow about 250 patients daily.

The purpose of the study was to show the prevalence of inappropriate antibiotic prescription for children with acute watery diarrhea and to determine factors associated with antibiotic overuse and underuse in the treatment of

such cases at Al Khansa'a Teaching Hospital in Mosul between 1st of May 2024 to the end of June 2024.

PATIENT AND METHODS

The survey was confidential and did not include any information that might be used to identify a specific individual. Ethical approval was given by Nineveh Health Directorate.

The current study is an observational, descriptive, cross sectional study was adopted in order to achieve the objectives of the present study. All patients aged less than 10 years with acute watery diarrhea who attend emergency department of Al-Khansa'a Teaching Hospital between 10th of May 2024 to the end of June 2024 had been included. The patients case sheets were reviewed to acquire the mandatory information. This information was used to fill the checklists that been made especially for this purpose. Demographic data (gender, age, place of residence, and educational level of the parents), detailed information about child suffering from diarrhea, duration of diarrhea, frequency of bowel motion, associated symptoms such as vomiting and fever, specific finding if its present at the examination, dehydration level, information regarding whether the child was received treatment before or after coming to the emergency department and by whom it was described, which is the antibiotic which is given. Patients with parenteral diarrhea were excluded from the study.

Data analysis was done using SPSS (Statistical Package for Social Sciences) software version 26 (IBM Corporation, USA). Median (with interquartile range (IQR)) was used to present the numerical data, as appropriate. Differences in demographic and clinical characteristics were compared between two groups. Univariate analysis on categorical data was performed using chi test or Fischer exact test. Wilcoxon-Mann-Whitney was used to compare numerical variables due to non-normal distribution. A p value of <0.05 was considered statistically significant for all statistical tests.

RESULTS

The study included 140 subjects, Median (interquartile range) age of 2 (1-7) years, with 72 (51.4%) males and 68 (48.6%) females. Out of 140 subjects, 48 (34.3%) did not receive antibiotics, while 92 (65.7%) received antibiotics. Out of those 92 who received antibiotics, 69 (75%) had appropriate indications for the antibiotics, while 23 (25%) had no indications for the antibiotic (inappropriate antibiotic usage). As shown in figure 1.

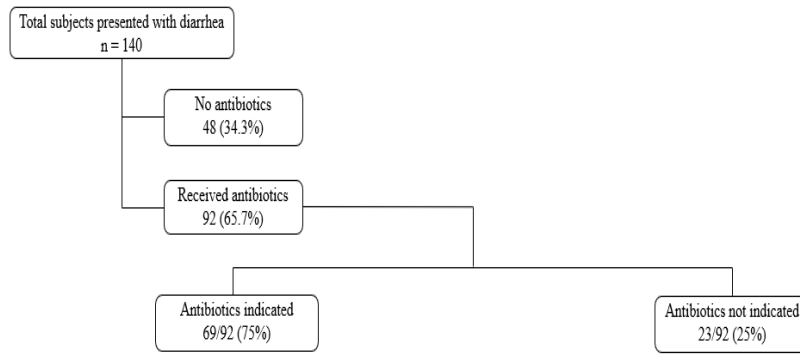


Figure 1: Flowchart of the study population.

The antibiotics given were mainly ceftriaxone in 35%, followed by Metronidazole and 14.5%. Other antibiotics

given are shown in Table 1.

Antibiotics given:	Number	Percentage
Ceftriaxone	25	35.1
Metronidazole	10	14.5
Cetriaxone + metronidazole	8	11.6
Amikacin	3	4.3
Nystatin	1	1.4
Ampicillin + claforan + metronidazole	1	1.4
Amikacin + metronidazole	1	1.4
Amikacin + metronidazole + azithromycin	1	1.4

The distribution of providers prescribing antibiotics among all subjects included 29% were given before arrival to ER. While in ER; antibiotics was given as the following: 32% given by a specialist senior, 20% given by a permanent, 19% given by a rotator. Moreover; of those 23 who had inappropriate antibiotics, they were given by a specialist in 7 out of 23 (30.4%), by a permanent in 3 out of 23 (13%), and by a rotator in 6 out of 23 (26.1%), while they were given before coming to ER in 7 out of 23 (30.4%).

To find out any reason suggesting the prescription of inappropriate antibiotics, the study compared between the group who had inappropriate antibiotics, and those who were not prescribed antibiotics (control group). Table 2 shows the comparison in demographic parameters between the two groups. There was no significant difference in age, gender, rural / urban residency, or parents' education level (p > 0.05 in all).

Table 2: Comparison of demographic between subjects with inappropriate Antibiotic use and those with no antibiotics used.

Variable	Inappropriate Antibiotic use (n = 23)	No antibiotics (n=48)	P value
Current age in years, Median (IQR)	2 (1-8)	1.8 (0.8-5.7)	0.730
Male, n (%)	12 (52.2%)	26 (54.2%)	0.875
Residency: - Rural	13 (56.5%)	18 (37.5%)	0.130
- Urban	10 (43.5%)	30 (62.5%)	
Education level: - Illiterate	4 (17.4%)	6 (12.5%)	0.413
- Primary	6 (26.1%)	10 (20.8%)	0.605
- Secondary	7 (30.4%)	13 (27.1%)	0.850
- University / high education	6 (26%)	19 (39.6%)	0.265

Table 3 illustrates the comparison in clinical parameters between subjects with inappropriate Antibiotic use and those with no antibiotics used. There was significantly less subjects with fever in the group of inappropriate antibiotics use (0%), compared to the group with no antibiotic used (33.3%), with p value 0.002. In addition, there was significantly less subjects with vomiting in the

group of inappropriate antibiotics use (39.1%), compared to the group with no antibiotic used (68.8%), with p value 0.017. On the other hand, both groups were similar in terms of frequency of bowel motions, diarrhea duration, presence of bloody diarrhea, degree of the fever, presence of abdominal pain, as well as dehydration level (p value > 0.05 in all).

Table 3: Comparison of clinical parameters between subjects with inappropriate Antibiotic use and those with no antibiotics used.

Variable	Inappropriate Antibiotic use (n = 23)	No antibiotics (n=48)	P value
Frequency of bowel motions	6 (5-7)	5 (5-7)	0.605
Diarrhea duration	3 (1-3)	2 (1-3)	0.410
Bloody diarrhea	0 (0%)	2 (4.2%)	1.000
Fever	0 (0%)	16 (33.3%)	0.002
Fever degree	38 (38-38)	38.5 (38-39)	0.486
Vomiting	9 (39.1%)	33 (68.8%)	0.017
Abdominal pain	9 (39.1%)	11 (22.9%)	0.155
Dehydration level: - Mild	10 (43.5%)	20 (41.7%)	0.905
- Moderate	11 (47.8%)	25 (52.1%)	0.730
- Severe	2 (8.7%)	3 (6.3%)	0.875

DISCUSSION

In Iraq, like in many other countries where diarrhea-related mortality is a significant problem, it is evident that the majority of cases are not caused by bacterial infections but rather by viral infections and some by protozoan infections, despite the inherent flaws in such estimations. Healthcare personnel can benefit from the World Health Organization's (WHO) treatment guidelines for diarrhea, which were produced since the resources required to identify diarrheal agents are frequently insufficient in the most needing countries. Low-cost supportive interventions and community-based strategies for management by parents/guardians are among the recommended practices. This study was conducted at emergency room department of major teaching hospital of pediatrics in Mosul city (400 kilometers at north of Baghdad) with mild male predominance (51.4%) with median age of 2 years among the 140 subjects participate at the study comparable results was obtained by Hindum Lanyero et al.^[23] According to recent WHO guidelines of treatment of acute diarrhea the study distribute the participants to different groups^[24] No antibiotics use was shown among about one third of the study participants while two third of study participants were received antibiotics. Quarter of those who received antibiotics are wrongly received it which is runs with Ruili Li et al study findings at China.^[25] Depending on availability of antibiotics, Ceftriaxone and metronidazole founded to be the most prevalent misues antibiotics, however; Atnafu Mekonnen Tekleab et al from Ethiopia found that Cotrimoxazol, amoxicillin and cephalosporines were the three most commonly prescribed antibiotics.^[26] Moreover; most of antibiotics misused were prescribed by senior doctors, as patients' parents insist on receiving such treatment which is consistent with Seksit Osatakul et al findings.^[27] The study depends patients who not received antibiotics as a control group and compares it with group of patients who wrongly received antibiotics. With regards to the sociodemographic terms, there was no significant difference in age, gender, residency and educational levels, which indicated that antibiotics are routinely prescribed regardless of different cultural differences in Mosul city. Anyhow; Hindum Lanyero et al^[23] and

Akinwale M. Efunshile et al^[28] had comparable findings but in contrast to Ruili Li et al findings.^[25] From the other hand comparing the clinical characteristics of the study groups. The study shows surprising results; as the patients with fever and vomiting were less likely received antibiotics with statistically significant differences, moreover; comparing the study groups regarding frequent bowel motion, diarrhea duration, bloody diarrhea, fever degree, abdominal pain and different dehydration levels were not statistically different. Irratic antibiotics prescription and strict health control protocols can explain these results which run with Atnafu Mekonnen Tekleab et al findings.^[29] The study primary limitation is that it was not intended to assess the decision-making process involved in prescribing antibiotics, which may have led to some instances being incorrectly classified as not need antibiotics. Significant aspects of the prescribers' knowledge, attitudes, and rationale for prescribing antibiotics, as well as barriers in complying with recommendations such drug availability or cost, were not examined in this study. The study was unable to evaluate aspects such as the children's nutritional state, which may have also played a role in the rise in the number of antibiotic prescriptions. The names of the medications that some respondents had given their kids were also unknown; this was resolved by asking the respondents to provide a description of the medication, including its color, dosage frequency, taste, and whether it was syrup, a pill or a capsule. The major or secondary medicine packets, as well as any unfinished medication, were also asked of the responders.

CONCLUSIONS AND RECOMMENDATIONS

Antibiotic resistance represents a major worldwide health concern. The high rate of prescriptions for antibiotics that are both unnecessary and ineffective highlights the urgent need to study the process of fighting these phenomena in Iraqi hospitals and implementing effective interventions that could influence a clinician's choice to provide a recommended antibiotic in these circumstances. To create robust antibiotic stewardship, a variety of researches, policy, and implementation strategies must be used. These strategies

include educating healthcare workers about treatment guidelines and the consequences of nonadherence, disseminating local antibiotic susceptibility data in a way that helps make treatment decisions, boosting access to reasonably priced first-line antibiotics at health centres while restricting access to antibiotic dispensing by untrained individuals, educating the public about prudent antibiotic use, and providing ongoing oversight.

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Conflict of interest

The authors report no conflict of interest concerning this study.

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