Research Article

Al-Iraqia Medical College Journal (AIMCJ)
ISSN (Online): 3104-4565
ISSN (Print): 3104-4557

ARTICLE INFO
Received: 26/ 4 / 2025
Revised: 10/ 6 / 2025
Accepted: 17/ 6/ 2025
Publish online: 15 /08 / 2025

*Corresponding Author: Suha A. Muneam
Email: suha.a.muneem@aliraqia.edu.iq

CITATION
Salih MMM, Muneam SA, Muneam NA. Study the relation between mothers' knowledge and practice with the misuse of diarrheal medication treatment among children under 5 years of age study. *AIMCJ*. 2025;2(2):1-14.

DOI: https://doi.org/10.58564/AIMCJ2.2.2025.222

Study the relation between mothers' knowledge and practice with the misuse of diarrheal medication treatment among children under 5 years of age

Maryam Moaid Mohamed Salih[1*], Suha A. Muneam [2], Nada A. Muneam[3]

[1] M.B.Ch.B in Al-Adl Health Centre for Primary Health Care, Baghdad, Iraq.
[2]Department of Chemistry and Biochemistry, Al-Iraqia University/ College of Medicine -Baghdad, Iraq.
[3]Department of Physiology, Al-Iraqia University/ College of Medicine -Baghdad, Iraq.

Abstract

Diarrhea is still one of the leading causes of morbidity and mortality among the very young, especially in developing countries. When used with high frequency, antibiotics are a significant part of the problem and a driving force behind the rise of antimicrobial resistance worldwide.

The present investigation concerns the extent of drug misuse in treating diarrhea among children under five years of age and mothers' knowledge and practices regarding diarrhea management.

A cross-sectional study was conducted in five Baghdad health facilities over a year, interviewing mothers of 300 under-5 children with acute diarrheal diseases. A structured questionnaire was used to collect both quantitative and qualitative data. The study involved face-to-face interviews, ensuring participants understood the questions and provided informed consent.

Diarrhea mostly onsets suddenly (77.33). Fever is the most common symptom (32.33%), and only diarrhea is the most reported condition (40.67%). The majority of cases last less than 5 days (56%), 50% relied on artificial feeding. The most common reason for medication misuse is lack of awareness, with 50.67% of respondents citing it. Challenges in accessing healthcare also contribute to medication misuse. Most individuals rely on ORS for managing diarrhea, with 40% using antibiotics and 30% using anti-diarrheal medications as part of their treatment approach. The majority of cases reported no noticeable adverse effects, 77 cases suffered from dehydration due to improper treatment, 21 cases experienced the development of antibiotic resistance, and 27 cases showed a worsening of diarrhea symptoms. Suggestions by mothers regarding healthcare improvements include increasing awareness programs as most common, improving access to healthcare services, providing clearer guidelines on drug use, and reducing the cost of prescribed medications.

Most important factors contribute to drug misuse are lack of awareness, difficulty accessing healthcare, low of education, Misconceptions about the effectiveness of non-prescribed drugs, difficulties in accessing healthcare services and recurrent infection due to inadequate hygiene practices with over half of cases attributed to lack of awareness. Antibiotic misuse is particularly prevalent among types of drugs misuse with many administering antibiotics without a prescription.

Keywords: diarrhea, drug Misuse, Antibiotics, Children under five, Healthcare Accessibility.

Introduction

The fact that diarrhea is a significant public health threat is especially true for children younger than five years. Research shows that diarrheal diseases are the leading causes of child mortality rates in many parts of the world, with the average number of deaths being 525,000 yearly, which makes diarrhea one of the leading causes of death in under-five age groups, particularly in low - middle-income countries (1).

Diarrhea occurs when people have to pass at least three or more loose or watery stools daily, and it is principally caused by various infectious agents such as viruses, bacteria, and parasites. And among them, Rotavirus is the most frequently identified agent in infants and toddlers worldwide (2, 3). Most diarrhea management requires adequate rehydration with Oral Rehydration Solution (ORS), zinc, and a proper diet (4).

Notwithstanding appropriate clinical guidance from the World Health Organization (WHO), inappropriate medication' including the misuse of antibiotics and anti-diarrheal drugs as serious public health challenges, thereby leading to problems such as the rise of antimicrobial resistance, longer illness duration, and illnesses caused by drugs (5, 6). Antibiotics seem to be the most mistreated drugs by caregivers who give these drugs without getting a physician's prescription, or they stop the treatment before the entire course. Thus, they significantly contribute to the global antibiotics problem (7). In Iraq, as such, medication misuse for the treatment of child diarrhea has been a severe problem, and the root causes are said to be factors like the unavailability of proper caregiver education, poor healthcare access, and socio-economic and cultural aspects (8). Some of the available research findings have shown the considerable void in the knowledge of Iraqi women regarding the leading causes of diarrhea and the treatment that should be applied. Hence, convincing educational programs and more accessible healthcare facilities are essential (9, 10).

This study is devoted to examining the magnitude and changing patterns of drug abuse in cases of diarrhea among 0 to 5-year-old children. It also investigates the mother's beliefs, attitudes, and practices concerning diarrhea treatment in primary health care centers located in Baghdad. The findings of the research can be helpful in the future in creating programs aimed at raising awareness and improving access to healthcare. Caregivers will then follow the given guidelines.

Subjects and methods:

Study Setting and Design: In a simultaneous section, IN five health centers of Baghdad, Sept. 14, 2024, raters visited (Al-Aamriyah Primary Health Care Center, Al-Khadhra health center, Al Adel health center, Hittin Health Center, and Al-Jamiea health center during a period from January to July 2024).

The caregivers of 300 children under 5 years who visited the primary health care centers (As having acute diarrheal diseases) were interviewed through a structured questionnaire that was developed based on relevant literatures. Questionnaire Structure: Organize the questionnaire in a logical manner, starting with demographic data, general questions and gradually moving towards more specific and detailed ones. Use a combination of closed-ended (multiple-choice, Likert scale, etc.) and open-ended questions to capture both quantitative and qualitative data.

Data Collection:

Administer the questionnaire to the selected participants through face-to-face interviews, depending on the feasibility and scope of the study. Ensure participants understand the questions and provide informed consent for participation.

Statistical Analysis:

Once the data collection is complete, analyze the collected data using a chi-square test or a Pearson correlation, depending on the data type. Given that the p-value is already stated as significant (<0.05), it confirms that there is a statistically significant relationship between the variables.

Inclusion criteria

Children less than 5 years who have been: diagnosed as having diarrhea by the health care provider. Mothers who are the primary caregivers. Have been treated with different types of antibiotics including both prescription and over-the-counter medications to treat their child's diarrhea.

Exclusion criteria

Children older than 5 years. Children with other GIT disorders that causes increase bowel motion. Children whose mothers are not their primary caregiver. Chronic diarrhea. Mothers of children who refused to participate.

Ethical considerations could include:

Ensuring that the study is conducted in a way that respects the rights and dignity of the study participants, including obtaining informed consent and ensuring confidentiality. Formal approvals were obtained from the Scientific Committee of the Arab Board of Health & specializations. Limitations of the study the accuracy and completeness of the data collected may be influenced by factors such as mothers' recall of their drug use and their willingness to report on their behaviors.

Results

Most children are between 6 months and one year (55.67%); the least represented age group is 4-5 years (7.67%). Most mothers are between 20-30 years (53%), and the youngest group (less than 18 years) forms 10%. A higher percentage of mothers are housewives (62.67%) compared to those employed (37.33%). In secondary education (53%), a small percentage have postgraduate education (9.67%). More families live in rural areas (57%) compared to urban areas (43%). Diarrhea mostly onset suddenly (77.33%). More than four times a day in 59.33% of cases.

Fever is the most common symptom (32.33%). Only diarrhea is the most reported condition (40.67%). The majority of cases last less than 5 days (56%). 44% of Children with other family members who suffer from similar pattern of diarrhea 55.67% were vaccinated against Rotavirus. The first figure described whether children have a family member who suffers from a similar pattern of diarrhea. 43.67% of their mother reported that a family member also suffers from a similar pattern of diarrhea. In comparison, 56.33% of them reported that no other family member suffers from a similar pattern of diarrhea.

Table 2" provides a comprehensive overview of the history of the present illness related to cases of diarrhea, including factors such as onset, frequency, associated clinical symptoms, duration of symptoms, history of similar attacks, and vaccination status against Rotavirus. Diarrhea frequency varied, with 59.33% experiencing episodes more than four times a day. Clinical symptoms like fever and poor feeding were commonly associated with diarrhea.

Table 1: Demographic data of children and mothers

Demographic data		**Frequency**	**Percent**
Age of child	Under 6 months	28	9.33%
	6- 1 year	167	55.67%
	1-3 years	82	27.33%
	4-5 years	23	7.67%
Age of Mothers	Less than 18 years	30	10%
	20-30 years	159	53%
	31-40 years	97	32.33%
	More than 40	14	4.67%
Education Level of mothers	No formal education	40	13.33%
	Primary education	72	24%
	Secondary education	159	53%
	Postgraduate education	29	9.67%
Residence	Urban	129	43%
	Rural	171	57%

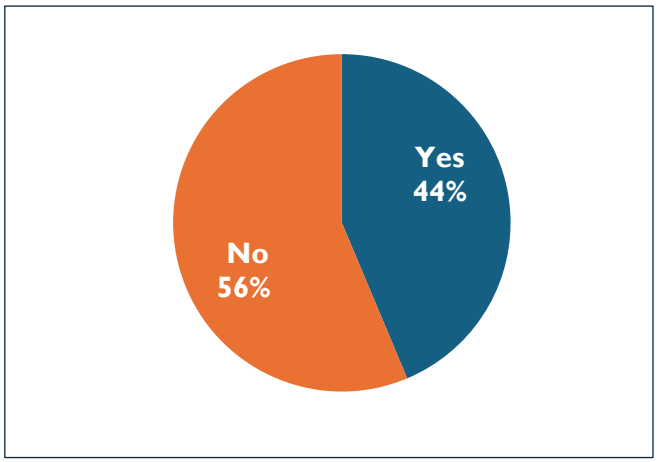
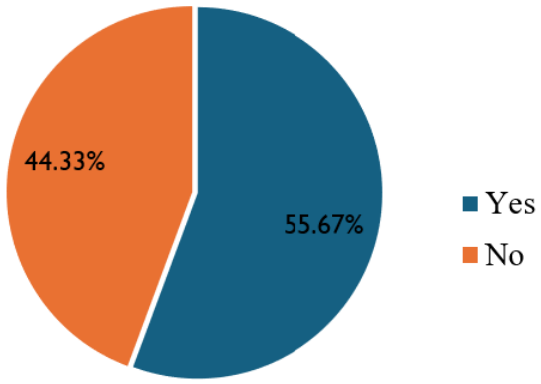


Figure 1: Children who had other family member who suffer from similar pattern of diarrhea

Table 2: Clinical symptoms associated with diarrhea

Clinical symptoms associated with diarrhea	Frequency	Percent
Vomiting	28	9.33%
Fever	97	32.33%
Poor feeding	51	17.00%
Only diarrhea	122	40.67%

Figure 2 Vaccinated against Rota virus



The second figure shows that 167 of 300 children had been vaccinated against Rotavirus while 133 didn't.

Figure 3 illustrates the distribution of feeding methods among the surveyed population. The data indicates that 30% of individuals reported

breastfeeding as their primary feeding method, while 50% relied on artificial feeding. Additionally, 20% of respondents reported utilizing breastfeeding and artificial feeding methods. The correlation between infected with diarrhea and the type of feeding, based on the given information, is 0.5.

Table 3 reveals the reasons behind medication misuse in a population. The most common cause is lack of awareness, with 50.67% of respondents citing it. Challenges in accessing healthcare also contribute to medication misuse, with 30% reporting difficulties. The perceived effectiveness of non-prescribed drugs is also a significant factor, with 11.67% believing in their effectiveness. Financial constraints account for a smaller percentage, with 7.67% attributed to financial limitations. These factors highlight the diverse factors influencing medication misuse, emphasizing knowledge gaps, healthcare access barriers, perceptions of non-prescribed drugs, and economic constraints.

The p-value of 0.000001, indicating that the percentage differences are statistically significant. The R-value is 0.626. This means a strong relationship exists between a person's awareness of the causes of diarrhea and the likelihood of them experiencing diarrhea.

This figure offers insights into the diverse range of medications and remedies the population employs for diarrhea management, showcasing varying preferences and approaches in addressing diarrhea in children under 5 years. 60% of individuals relied on ORS for managing diarrhea, indicating a significant preference for this established treatment method; 40% of the population used antibiotics for diarrhea management, and 30% of respondents utilized anti-diarrheal medications as part of their treatment approach, 25% of individuals turned to home remedies or herbal treatments for managing diarrhea, indicating a notable reliance on traditional or alternative methods. This indicates a moderate to strong correlation between the two variables.

Table 3: Reasons for Misuse

Reasons for Misuse	Frequency	Percent
Lack of awareness/knowledge	152	50.67%
Difficulty accessing healthcare	90	30%
Perceived effectiveness of non-prescribed drugs	35	11.67%
Financial constraints	23	7.67%

Table 4 reveals the frequency of drug misuse among different education levels, categorized into no formal education, primary education, secondary education, and high education. Only 5% of individuals without formal education reported frequent misuse, while 95% reported occasional misuse. Primary education had a high percentage of frequent misuse, while 4.17% reported occasional misuse. Secondary education showed a split in misuse patterns, with 36.48%

reporting occasional misuse and 63.52% reporting rare misuse. In high education, 72.41% of individuals reported occasional misuse, while 27.59% reported never misuse. No cases of frequent or rare misuse were reported in this group.

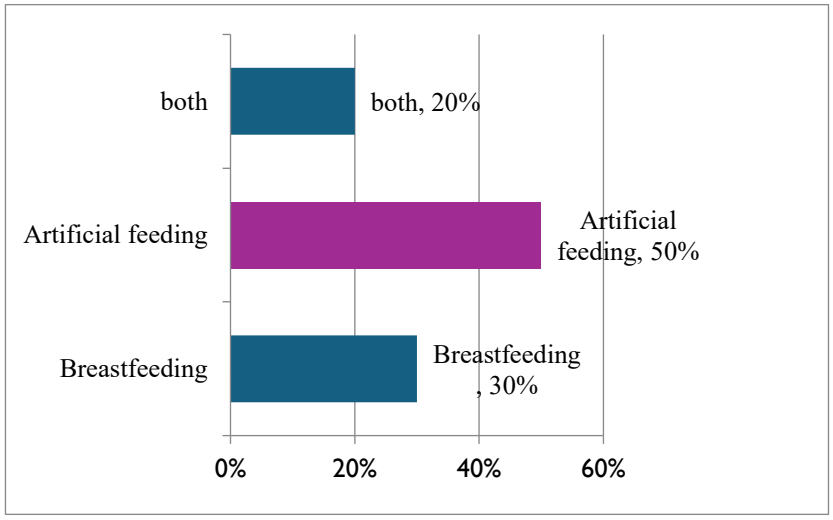


Figure 3: shows some children with diarrhea and Types of feeding

The p-value will be extremely small (typically < 0.0001). The very small p-value indicates a significant association between the level of education and drug misuse, suggesting that the level of education has a strong correlation with the frequency of drug misuse.

Individuals with lower levels of education are more likely to have a higher frequency of misuse compared to those with higher levels of education. The p-value of 0.000001, indicating that the differences in the percentages are statistically significant.

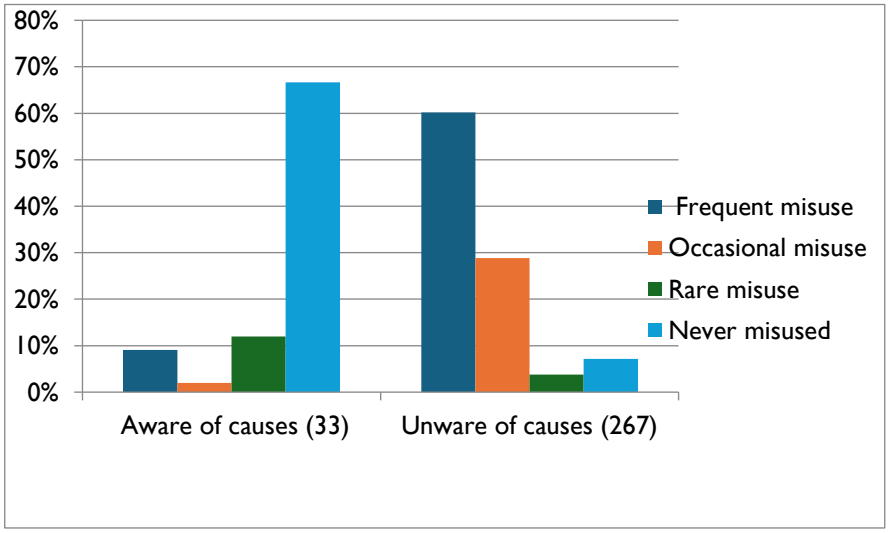


Figure4: Shows correlation between awareness of diarrhea causes and drug misuse

Table 4: Education Level vs. Misuse Frequency

		Frequency	Percent	P value
No formal education	Frequent misuse	2	5%	
	Occasional misuse	38	95%	
	Rare misuse	0	0	
	Never misused	0	0	
Primary education	Frequent misuse	69	95.83%	
	Occasional misuse	3	4.17%	
	Rare misuse	0	0	
	Never misused	0	0	
Secondary education	Frequent misuse	0	0	
	Occasional misuse	58	36.48%	
	Rare misuse	101	63.52%	
	Never misused	0	0	
Postgraduate education	Frequent misuse	0	0	
	Occasional misuse	21	72.41%	
	Rare misuse	0	0	
	Never misused	8	27.59%	

The research can reject the null hypothesis that the variables are independent. The R-value (Phi coefficient) of 0.618 suggests a strong correlation between the frequency of misuse and diarrhea. This means a strong relationship exists between the frequency of misuse and the likelihood of experiencing diarrhea.

Table 5 outlines patterns of misuse related to antibiotics, ORS, and anti-diarrheal medications. Among the reported cases, 96.33% involved administering antibiotics without a prescription, while a smaller percentage (3.67%) involved prematurely stopping the antibiotic course. There were no reported instances of ORS misuse based on the provided data. This category includes incorrect preparation, inconsistent administration, and replacing ORS with sugary drinks. In terms of anti-diarrheal medications, 5% of cases involved the inappropriate use of these drugs for children under 2 years old. There were no reported cases of exceeding the recommended dosage or combining anti-diarrheal multiple medicines.

Table 5: Detailed Misuse Patterns

	Patterns of misuse	Frequency	Percent
Antibiotic Misuse	Administering without prescription	289	96.33%
	Stopping course prematurely	11	3.67%
ORS Misuse	Incorrect preparation (wrong water-to-powder ratio)	0	
	Inconsistent administration (not following dosage frequency)	0	
	Replacing ORS with sugary drinks	0	
Anti-diarrheal medications	Using anti-diarrheal drugs for children under 2 years old	15	5%
	Exceeding recommended dosage	0	
	Combining multiple anti-diarrheal drugs	0	

F

Figure7: show frequency of misuse

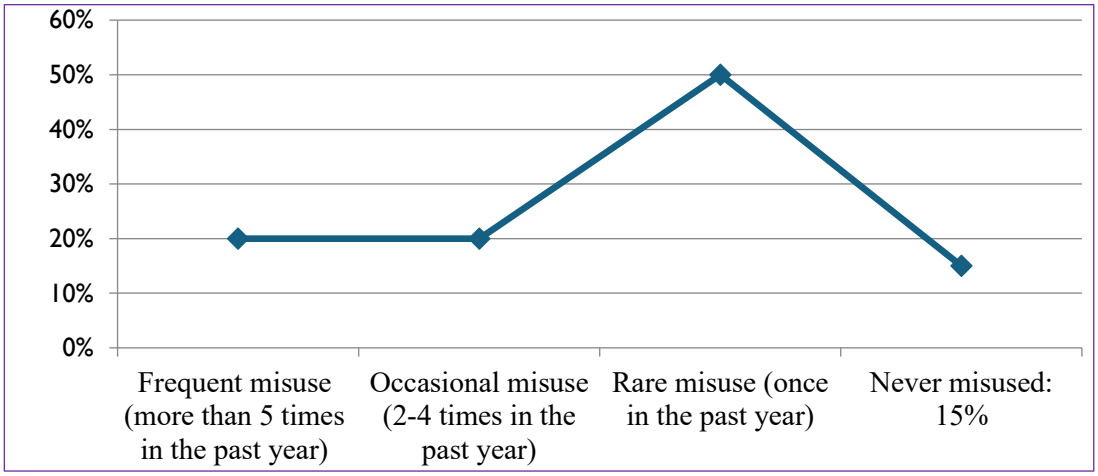


Table 6 illustrates the relationship between access to healthcare and drug misuse. Among those with easy access, none reported frequent misuse, 21.43% reported occasional misuse, 71.43% reported rare misuse, and 7.14% reported never misusing drugs. In a group with moderate access to healthcare, the majority (93.81%) reported frequent misuse, while occasional and rare misuse were reported at lower percentages (5.15% and 1.03%, respectively). None reported ever misusing drugs. Most (93.72%) of individuals with

difficult access reported frequent misuse, while occasional and rare misuse were reported at much lower rates (3.43% and 2.29%, respectively). A small percentage (0.57%) reported never misusing drugs. Chi-Square Value: ≈65.60≈65.60.

Table 6: Access to Healthcare vs. Drug Misuse

Easy access to healthcare 28 (9.33%)		**Frequency**	**Percent**
	Frequent misuse	**0**	**0**
	Occasional misuse	**6**	**21.43%**
	Rare misuse	**20**	**71.43%**
	Never misused	**2**	**7.14%**
Moderate access to healthcare 97 (32.33%)	**Frequent misuse**	**91**	**93.81%**
	Occasional misuse	**5**	**5.15%**
	Rare misuse	**1**	**1.03%**
	Never misused	**0**	**0**
Difficult access to healthcare 175 (58.33%)	**Frequent misuse**	**164**	**93.72%**
	Occasional misuse	**6**	**3.43%**
	Rare misuse	**4**	**2.29%**
	Never misused	**1**	**0.57%**

P-value for $\chi 2=65.60$\chi^2 = 65.60$\chi 2=65.60$ with 6 degrees of freedom less than 0.0001). So, the analysis shows a statistically significant and robust correlation between access to healthcare and drug misuse; the R-value (Phi coefficient) is 0.832, indicating a strong correlation between access to healthcare and drug misuse. The p-value is less than the commonly used significance level of 0.05 (5%).

The figure 8 illustrates different consequences and outcomes associated with drug misuse related to the treatment of diarrhea. The majority, with 175 instances, reported no noticeable adverse effects; 77 cases suffered from dehydration due to improper treatment, 21 cases experienced the development of antibiotic resistance, and 27 cases showed a worsening of diarrhea symptoms.

Table 7 presents suggestions by mothers regarding healthcare improvements. The table displays the frequency and percentage of responses for four specific suggestions. Most mothers (77.33%) suggested increasing awareness programs and improving access to healthcare services (55.67%). A smaller percentage suggested providing more precise guidelines on drug use (4.33%).

Figure8: Figure show consequences observed

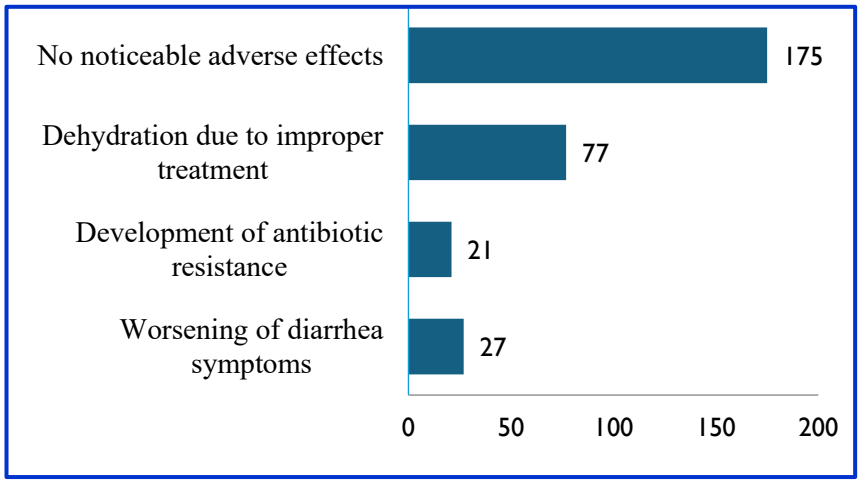


Table 7: Suggestions by Mothers for healthcare improvements

suggestions by Mothers	Frequency	Percent
Increase awareness programs	232	77.33%
Improve access to healthcare services	167	55.67%
Provide more precise guidelines on drug use	13	4.33%

Discussion

The current retrospective study has been administered as a questionnaire to 300 mothers. It brings to the fore the demographic characteristics of mothers, their health, and the health of children regarding gastroenteritis-related diarrhea among children under five years old.

The main results of the study point to a significant health problem—the high frequency of diarrhea and the extensive lack of medicine used in dealing with this particular health affair. Similar to the results of earlier studies (11, 12), the majority of diarrhea cases (55.67%) occurred in infants between six months and one year.

This is nearly the same as the conclusions that found that this age is considerably more vulnerable to diarrhea due to reasons like food changes, mainly weaning practices (13, 14). In addition, the immobility and unhygienic behaviors typical of this age group make them more prone to get affected. Clinically, diarrhea mostly appeared as sudden inception (77.33%) and was frequent, with most cases (59.33%) having more than four diarrhea episodes daily. The clinical picture was often complicated by

the associated symptoms, mostly fever (32.33%) and poor appetite (17%).

Interestingly, in 40.67% of the cases, diarrhea was the only symptom, which correlates with different grade severity and various clinical presentations. Demographic analyses show that caregiver education and living environment substantially influence child health outcomes. The majority (53%) of mothers had only secondary education, and the rural areas were home to more families (57%) than urban settings (43%). These demographic characteristics are very well correlated with medication misuse, which is one of the key findings of this research supported by previous studies (15).

Antibiotic misuse was particularly alarming at the staggeringly high rate of 96.33%, with caregivers often administering antibiotics without a prescription, which highlighted major gaps in public health knowledge and healthcare accessibility. Analysis of reasons behind medication misuse shows lack of awareness or knowledge was cited most often (50.67%), followed by difficulty accessing healthcare services (30%).

The economic constraints and misconceptions about drug efficacy also played a role, though to a lesser extent (7.67% and 11.67%, respectively). The data evidently imply a need for caregivers to be educated about the proper use of medications, targeting the right audience and increasing their awareness. The striking thing learned from the study was the connection between caregiver education level and the prevalence of drug misuse. Statistical analysis (Chi-square = 174.84, p-value < 0.0001) clearly demonstrated that lower educational levels are positively associated with higher medication misuse. For example, the rate of misuse was astoundingly higher among caregivers who had primary education only than among those who had secondary and postgraduate education.

Furthermore, the study has shown that healthcare access was an important factor in determining drug misuse patterns. The discovery of a clear, statistically significant relationship (Chi-square = 65.60, p-value < 0.0001, Phi coefficient = 0.832) that showed caregivers with moderate or hard healthcare access were more likely to misuse medications often than those with easy access genuinely reveals the problem's depth. The revelation of this fact is further evidence that the healthcare infrastructure urgently needs improvement, and the general public should get easier access to valid medical advice, especially in rural locations. The research also showed a moderate to strong correlation (Phi coefficient = 0.5, p-value = 0.00001) between feeding practices and diarrhea prevalence.

Children who were artificially fed were at a greater risk of diarrhea as compared to those who were breastfed, in line with the already established evidence of breastfeeding being protective against gastrointestinal infections (17-19).

More than half (55.67%) of the children received the rotavirus vaccine, which is the current coverage. Even though the vaccination has previously considerably decreased diarrhea morbidity (20-23), the current rate is still substandard and may reflect caregiver education, economic hindrances, or logistical constraints. Identified medication misuse consequences were dehydration (77 cases), antibiotic resistance (21 cases), and aggravation of diarrhea symptoms (27 cases), which confirm the serious health risks that are there due to wrong treatment practices. Even though these

cases have had negative results, there was a considerable percentage (175 cases) without any immediate adverse effects; thus, this might cause the misuse to continue due to the perception of short-term safety.

Conclusion:

The study's global conclusions highlight the pressing need for specific educational outreach to raise caregivers' awareness about appropriate medication use, the associated risks of misuse, and adherence to healthcare guidelines.

Moreover, it is of great necessity to boost healthcare access, essentially in rural and underserved populations. The caregivers' recommendations strongly emphasize the need for increasing awareness programs (77.33%) and enhancing healthcare service accessibility (55.67%), which they believe are crucial measures in tackling diarrhea-associated morbidity and medication misuse among youngsters under five years.

Recommendation

Civics and larger-scale studies with a more diverse participant pool and a sustained follow-up period to more likely obtain generalizable insights regarding medication misuse among mothers treating diarrhea in children under five years of age. Conduct as far into the future as possible. Some potential recommendations for future research could include:

• Conducting a larger, more comprehensive study to explore the misuse of drugs by mothers in the treatment of diarrhea in children less than 5 years, including a wider range of participants and a longer follow-up period.

• Exploring the use of alternative treatments for diarrhea in children less than 5 years

• Increasing educational programs, enhancing health services, providing clearer drug use guidelines, and making medications more affordable.

Conflict of Interest: None

Funding: Nil

References:

1. World Health Organization (WHO). *Diarrhoeal disease*. WHO; 2023. Available from: https://www.who.int/news-room/fact-sheets/detail/diarrhoeal-disease
2. Muneam SA, Muneam NA, Muayed A. Biofactors' impact on diabetes prognosis. *J Biosci Appl Res*. 2024;10(4):816-25.
3. Centers for Disease Control and Prevention (CDC). Rotavirus vaccination. CDC; 2022. Available from: https://www.cdc.gov/vaccines/vpd/rotavirus/index.html
4. Guandalini S. Diarrhea treatment & management: medical care, consultations, diet. *Medscape*; 2023. Available from: https://www.medscape.com/article/1131291-overview
5. Douglas and Bennett principles and practice of infectious diseases. Mandell, Dolin R, Mandell National Institute on Drug Abuse (NIDA). Over-the-counter medicines drug facts. NIDA; 2022. Available from: https://nida.nih.gov/publications/drugfacts/over-counter-medicines
6. GL. Principles and practice of infectious diseases. *Churchill Livingstone*; 1995.
7. Dereje B, Yibabie S, Keno Z, Megersa A. Antibiotic utilization pattern in treatment of acute diarrheal diseases: the case of Hiwot Fana Specialized University Hospital, Harar, Ethiopia. *Journal of Pharmaceutical Policy and Practice*. 2023 May 10;16(1):62.

8. Alaa H, Shah SA, Khan AR. Prevalence of diarrhoea and its associated factors in children under five years of age in Baghdad, Iraq. *Open Journal of Preventive Medicine*. 2014 Jan 8;4(1):17-21.
9. Harb A, Abraham S, Rusdi B, Laird T, O'dea M, Habib I. Molecular detection and epidemiological features of selected bacterial, viral, and parasitic enteropathogens in stool specimens from children with acute diarrhea in Thi-Qar Governorate, Iraq. *International journal of environmental research and public health*. 2019 May 6;16(9):1573.
10. Birhan TA, Bitew BD, Dagne H, Amare DE, Azanaw J, et al. Prevalence of diarrheal disease and associated factors among under-five children in flood-prone settlements of Northwest Ethiopia: A cross-sectional community-based study. *Frontiers in pediatrics.* 2023 Jan 23;11:1056129.
11. Platts-Mills JA, Liu J, Rogawski ET, Kabir F, Lertsethtakarn P, et al. Use of quantitative molecular diagnostic methods to assess the aetiology, burden, and clinical characteristics of diarrhoea in children in low-resource settings: a reanalysis of the MAL-ED cohort study. *The Lancet Global Health*. 2018 Dec 1;6(12):e1309-18.
12. Lakew G, Yirsaw AN, Bogale EK, Andarge GA, Getachew D, Getachew E, Tareke AA. Diarrhea and its associated factors among children aged under five years in Madagascar, 2024: a multilevel logistic regression analysis. *BMC Public Health*. 2024 Oct 21;24(1):2910.
13. Martín-Rodríguez A, Bustamante-Sánchez Á, Martínez-Guardado I, Navarro-Jiménez E, Plata-SanJuan E, Tornero-Aguilera JF, Clemente-Suárez VJ. Infancy dietary patterns, development, and health: an extensive narrative review. *Children*. 2022 Jul 18;9(7):1072.
14. Kattula D, Francis MR, Kulinkina A, Sarkar R, et al. Environmental predictors of diarrhoeal infection for rural and urban communities in south India in children and adults. *Epidemiology & Infection.* 2015 Oct;143(14):3036-47.
15. Cunha CB, editor. Schlossberg's Clinical Infectious Disease. *Oxford University Press*; 2022 Feb 4.
16. Binns C, Lee M, Low WY. The long-term public health benefits of breastfeeding. *Asia Pacific Journal of Public Health*. 2016 Jan;28(1):7-14.
17. Ali FH, Wahid HS, Hussein EA. Effectiveness of Preventive Health Behaviors-Oriented Education Program on Pregnant Adolescents' Knowledge in Al-Diwanyiah City: Follow-up Study. *Annals of RSCB*. 2021;25(6):14774-80.
18. Dhalaria P, Kapur S, Singh AK, Verma A, Priyadarshini P, Taneja G. Potential impact of rotavirus vaccination on reduction of childhood diarrheal disease in India: an analysis of National Family Health Survey-5. *Vaccine: X*. 2023 Aug 1;14:100319.
19. Dhamad GD, Mahmood WT, Kareem NG, Jafar AK. Association between diabetes mellitus type-1 and celiac disease in growth retardation iraqi patients. Indian Journal of Forensic *Medicine & Toxicology*. 2022;16(1):1375-9.
20. Abu-Shana JH, Abdulkareem NG, Jasim AO, Abbood YH. Effect of Diabetes Mellitus Type 2 on the Correlation of Vitamin D with Lipid Profile in Iraqi Patients. *Iraqi Journal of Science*. 2024 Sep 30:4881-9.
21. Haddad RA, Muneam NA, Muneam SA. Knowledge, attitudes, and practice regarding medication use in pregnant women. *AIMCJ*. 2025;1(2):22-32.
22. Farhan RM, Rashid ED, Shanshal A. Multivitamin and Mineral Supplements Knowledge, Attitude, and Use in Iraq. *AIMCJ*. 2025 Apr 15;2(1):15-21.
23. Parashar UD, Tate JE. The control of diarrhea, the case of a rotavirus vaccine. *salud pública de méxico*. 2022 Mar 14;62:1-5.