

Common mistakes in the treatment of acute diarrhea among children less than five years in Mosul city

Dr. Mohammed Esmael Khaleel¹, Dr. Zakaria Abdul Khalik AL Shiekh Abdal²

F.I.C.M.S (F.M)¹, M.B.Ch.B²

ABSTRACT

This descriptive study is designed to describe certain factor's effect such as age, educational level and residency of the mother regarding the drug mistakes, it also includes observation of the medical staff activity regarding prescription practices, education and counseling processes. Male to female ratio was (1.44:1). While (66.19%) of the total children; had received at least one drug. The nurses were the major source of drug misuse with (34.54%). There is a significant difference between mothers of different educational levels; while other factors such as mother age, type of diarrhea and dehydration status of the child showed no effect. In conclusion the current acute diarrhea cases management involved a considerable high proportion of drugs misuse, improper educational and counseling activities and the practices didn't follow the WHO guidelines nor what is taught about such conditions in academic setting.

Keywords: Acute, Common, Diarrhea, Less than five, Mistakes.

INTRODUCTION

Diarrhea starts at home, so early and appropriate treatment by care givers before the child is brought to hospital will greatly contribute towards reducing the morbidity and mortality ⁽¹⁾. Most of these results are due to dehydration and mismanagement or delayed management of the disease ⁽²⁾. The treatment practices at health centers vary, sometimes with inappropriate use of antibiotics and intravenous fluids which observed commonly, while ORS is less frequently used ⁽³⁾.

Recommendations on use of drugs in the management of acute watery diarrhea should be followed strictly, since indiscriminate use of antibiotics results in development of resistance ⁽⁴⁾.

Definition of diarrhea:

Diarrhea is defined as an increased number of stool passages (three or more) or decreased consistency of stools (soft or liquid) during a 24-hour period ⁽⁵⁾. They may also contain blood, in which case the diarrhea is called dysentery ⁽⁶⁾.

Types of Acute diarrhea:

Diarrhea could be classified into four general types, based on the causative mechanism, these including: ⁽⁷⁾

1- Osmotic diarrhea 2- Secretory diarrhea. 3- Exudative diarrhea. 4- Motility disorder diarrhea ⁽⁸⁾.

Also it can be classified into four types, based on clinical syndromes, each reflecting a different pathogenesis, these including:

Acute watery diarrhea, Dysentery, Persistent diarrhea, Chronic diarrhea ⁽⁹⁾.

Risk Factors for diarrhea:

A-Demographic factors. B-Socio-economic factors.

C-Water-related factors. D-Sanitation factors. E-Hygiene practices.

F-Bottle feeding. G-Malnutrition. H-Immunodeficiency.

I-Seasonal distribution ⁽¹⁰⁾. J-Consumption of food sold by street vendors.

K-Eating habits ⁽¹¹⁻¹²⁾.

Management of diarrhea:. ORS or similar commercially available solutions containing appropriate amounts of electrolytes may be used.

- An age-appropriate, unrestricted diet is recommended.
- For breastfed infants, nursing should be continued.
- Antimicrobial therapy should be made on a patient-by-patient basis⁽¹³⁾.
- Care-takers should be counseled in appropriate hand hygiene practices⁽¹⁴⁾.
- Anti-emetic medications and anti-motility agents should generally be avoided⁽¹⁵⁾.
- Probiotics contain healthy bacteria (*lactobacilli*) that can replace unhealthy bacteria in the gastrointestinal tract. Yogurt is the easiest source of probiotics⁽¹⁶⁻¹⁸⁾.

Antimicrobial used for the treatment of acute infectious diarrhea:

There are plenty of antibiotics currently available for the treatment of acute infectious diarrhea in children. It must always be kept in mind that antimicrobial therapy should be reserved for severe, prolonged or potentially complicated cases⁽¹⁹⁾.

The impacts of wrong antibiotics prescription:

Antibiotic resistance is a complex and serious public health problem, which is increasing at alarming rates worldwide. Resistant bacteria are highly transmittable and spread rapidly through inadequacies in public health infrastructure and infection control practices.⁽²⁰⁾

Poverty and lack of health care resources exacerbate the resistance. Physicians who are overworked, under informed, or feeling other pressures to over prescribe are also contributing to the spread of resistance.⁽²¹⁾ A lack of proper diagnostic facilities and laboratories is another serious issue,^(22,23).

Prevention of diarrhea:

- Food hygiene (storage, handling, cooking)..Hand washing.
- Appropriate exclusion of children with diarrhea, .Vaccination⁽²⁴⁾.

Aim of study:

To evaluate the common mistakes in the treatment of acute diarrhea among children under five in two of family care centers and four of primary care units in Mosul city.

PATIENTS & METHODS

Study settings:

Permission for conducting this study was obtained from the Directorate of health during the early stage of the study. The information was collected by specifically designed questionnaire from 2 Family Health care centers and 4 Primary Health Centers; in Mosul city which is a city of about 3,524,348 inhabitants⁽²⁶⁾.

Collection of the information from the 2 FHC and 4 PHC was done by the investigator by dividing the time between them throughout the week.

Study design:

An observational, descriptive, cross sectional study was adopted in order to achieve the objectives of the present study.

The study Period:

Data collection was done during six months period from the 1st of January 2015 to the 31st of June 2015.

Study sample:

The total studied patients were 630 children. All available children less than 5 years of age attending the PHC/FHC suffering from acute diarrhea.

Case definition:

children aged less than 5 five years who attended any of the study setting places suffering from diarrhea with duration of less than 14 days.

Collection and Source of data:

The interview with the child's companion was conducted by the investigator after the diagnosis and management of the condition by the family physicians or general practitioners. 76.19% of the companions were children's mothers and 23.81% of them were either fathers, sisters or other relative. All companions were included in the study.

All companions have been personally interviewed by the investigator, the objected of the study were explained to every companion and it is based on the standards of acute diarrhea case management guidelines putted by the WHO.

RESULTS

The study population:

Table (3.1) Distribution of studied sample by Age & Gender.

Age (months)	Female		Male		Total	
	No.	%	No.	%	No.	%
<2	10	3.87	10	2.68	20	3.17
2 ≤ 12	82	31.78	125	33.61	207	32.86
12 ≤ 60	166	64.35	237	63.71	403	63.97
Total	258	100.0	372	100.0	630	100.0

Overall chi-square statistic is 0.84. DF = 2. The P-Value is 0.657052. The result is not significant at $p < 0.05$.

Misuse of drugs:

Table (3.2) Misuse of drugs according to the educational level of the mothers.

Misuse of the drugs	Illiterate, Primary & Secondary*		Intermediate & higher*		Total	
	No.	%	No.	%	No.	%
Yes	237	66.38	109	40.82	346	55.45
No	120	33.62	158	59.18	278	44.55
Total	357	100.0	267	100.0	624	100.0

The chi-square statistic is 40.4066. DF = 1. The P-Value is < 0.00001 . The result is significant at $p < 0.05$.

Table (3.3) Misuse of drug according to the age of mother.

Misuse of the drugs	<25 Years		>25Years		Total	
	No.	%	No.	%	No.	%
Yes	136	47.55	178	52.66	314	50.32
No	150	52.45	160	47.34	310	49.68
Total	286	45.83	338	54.17	624*	100.0

The chi-square statistic is 1.6183. DF = 1. The P-Value is 0.203326. The result is not significant at $p < 0.05$.

Table (3.4) Misuse of drugs according to the place of residence

place of residence	Urban		Rural		Total	
	No.	%	No.	%	No.	%
Yes	281	62.03	94	74.61	375	64.77

No	172	37.97	32	25.39	204	35.33
Total	453	100.0	126	100.0	579	100.0

The chi-square statistic is 6.8283. DF = 1. The P-Value is 0.008972. The result is significant at $p < 0.05$.

Table (3.5) source of prescription according to the frequency.

Source of Prescription	Children attending the PCU/FHC	
	No.	%
Nurse	143	34.54
Mother	87	21.03
Other relatives	62	14.97
Pharmacy	59	14.25
Private clinic	40	9.66
Other	23	5.55
Total	414	100.0

Table (3.6) drugs prescription according to the degree of fever.

Duration of diarrhea in (days)	drugs prescription				Total	
	Yes	%	No	%	No.	%
< 1 day	11	45.83	13	54.17	24	4.14
< 2 days	153	67.10	75	32.90	228	39.37
< 3 days	142	68.93	64	31.07	206	35.57
< 4 days	42	57.53	31	52.47	73	12.60
> 5 days	38	79.16	10	20.84	48	8.32
Total	386	66.67	193	33.33	579	100.0

Overall, the chi-square statistic is 11.2977. DF = 4. The P-Value is 0.023414. The result is significant at $p < 0.05$.

Table (3.7) Antibiotics prescription at the PHC/FHC according to the frequency.

Antibiotics	Prescription after coming to PHC/FHC	
	No.	%
Metronidazole (Flagyl)	124	33.15
Co-Trimoxazole (Methprim)	71	18.98

Cefotaxime (Claforan)	43	11.49
Erythromycin	29	7.75
Amoxicillin (Amoxil)	22	5.88
Cefixime (Suprax)	20	5.34
Keflex (Cephalexin)	14	3.74
Ceftriaxone	13	3.47
Nalidixic Acid (Negram)	9	2.40
Amikacin	7	1.87
Gentamycin	6	1.66
Others	16	4.27
Total	374	100.0

Table (3.8) Misuse of Antidiarrheal drugs received after coming to the hospital according to the frequency.

Antidiarrheal drugs	Antidiarrheal misused after Coming to PCU/FHC	
	No.	%
Loperamide (vacontil)	121	39.67
Diphenoxylate (Entrostop)	84	27.54
Kaolin and Pectin (Pecto-Kaolin)	52	17.04
Antispasmodics	48	15.75
Total	305	100.0

DISCUSSION

This descriptive study was designed to evaluate the common mistakes in the practice of diarrhea management among children less than five years attending two family care centers and four primary care Centers in Mosul city. Although data from physician interviews allowing detailed questioning about the management of each specific clinical situation, it may not accurately reflect physician's practices owing to the participation bias and potential to idealize treatment practices. On the other hand patients records of all kinds probably underestimate the extend of the medication use, because records may be incomplete or inaccurate and drugs are available in many countries without prescription ⁽³⁰⁾.

Taking into account these limitation, this study was based on interviewing the companions & examining of the children after they have been diagnosed and treated by the physician in the outpatient department, this provide an ascertainment of the condition under treatment, satisfactory measuring the extend of the drug use, in addition to that, reflecting the actual physician's practice ⁽³¹⁾.

The male to female ratio of patients with acute diarrhea in this study was about (1.44:1). This is closed to that obtained by Al-Ghadanphary in Mosul city in 1990 where she found that ratio was (1.6:1) ⁽³²⁾.

This study showed that antibiotics were prescribed in (69.26%) of the total children attending the PHC/FHC, (48.41%) of the patients had received antispasmodic and antidiarrheal drugs, this is consistent with a thesis conducted by dr. Rakan A. Hamed in two of Mosul teaching hospitals in 2006; which showed that antibiotics were prescribed in (60.9%) of the patients while antidiarrheals were prescribed in (19.1%) of the patients ⁽³³⁾.

Analysis of data showed that metronidazole (Flagyl) was the most frequent antibiotic used with (33.15%) followed by Cotrimoxazole (methoprim) with (18.98%). loperamide (vacontil) was the most frequent prescribed antidiarrheal drug for the children after coming to the PCH/ FHC in (39.67%) followed by diphenoxylate (entrostop) with (27.54%), and this is consistent with across sectional study conducted in various clinics and wards of the Pediatric Department of the University of Nigeria Teaching Hospital (UNTH), Enugu, between October 2006 and February 2007, aimed to estimate the prevalence of appropriate antimicrobial and antidiarrheal prescription for treating childhood diarrhea, the study shows that Loperamide (vacontil) was prescribed in (44.47%) and diphenoxylate (entrostop) with (24.11%) ⁽³⁴⁾.

According to the WHO criteria for treatment of acute diarrhea, only (13.55%) of those who received drugs were in real need of it, i.e. (86.45%) of the all drug prescription were not indicated. These finding are consistent with the findings of a community based survey by Alam *et al* in 2015 in Bangladesh which shows that (26.7%) of the patients of acute watery diarrhea received WHO recommended treatment and (73.3%) of the patients received treatment other than WHO recommendation ⁽³⁵⁾.

The problem of unwanted and unwarranted drug prescription in diarrhea is not restricted to developing nations or to pockets of illiteracy alone. For instance, in the Lille region of France in (2005); of 326 infants admitted to various hospitals with diarrhea, almost three fourths had already visited a physician; however, At least one drug had been prescribed in 94% children with a mean of 2.6 drugs per infant ⁽³⁶⁾. Similarly, in the United States a survey also revealed that health care providers do not follow recommended procedures for managing childhood watery diarrhea ⁽³⁷⁾.

In this study ORS was prescribed in about (53.33%) of the patients and it prescribed in all of the patients with antibiotics, and it is prescribed alone only in (27.30%) of the patients, this is consistent with the result of study in Pakistan in 2007 were it shows that ORS was prescribed with some drug (61%) of the patients, and it is prescribed alone in (19%) ⁽³⁸⁾.

Indiscriminate use of antibiotics results in unnecessarily increased expense and also development of resistance ⁽³⁹⁾. Addition of 'harmless' but unnecessary drugs under pressure from business shifts the emphasis from the standard management of acute childhood diarrhea ⁽⁴⁰⁾.

Regarding the age and type of diarrhea, this study showed that the younger the age of the child the least the percentage of prescribing drug, i.e. the chance that child will be admitted to the hospital for intravenous fluid therapy and further management is high, this might be attributed to the reason that the younger the child the more quickly he/she might become dehydrated ⁽⁴¹⁾.

CONCLUSIONS

1. Treatment practices are still improper because of lack of knowledge of practitioners in the National Guidelines and Programs related to acute diarrhea management for e.g. WHO guidelines for acute diarrhea management.
2. The prescriptions of antibiotics were still too frequent and ant diarrheal drugs of no therapeutic value were still widely used, moreover, ant diarrheal drugs may be dangerous to the health of the child.
3. Educated mothers showed less percentage of drug misuse than mothers with lower education, other factors such as age, residency of the mothers have no effect on the misuse of the drugs in acute diarrhea.
4. There is a wide gap between teaching about acute diarrhea management in academic settings and what is actually practiced by doctors who are dealing with such condition.

Recommendations:

1. A much more detailed diagnosed sheet should be made available for the management of the disease.
2. The cause of diarrhea should be determined before treatment is begun and specific therapy be chosen for each of the causes.
3. The WHO guidelines should be followed as expected of prescribers.

REFERENCES

- [1]. Haroun HM, Mahfouz MS, El Mukhtar M, Salah A. Assessment of the effect of health education on mothers in Al Maki area, Gezira state, to improve homecare for children under five with diarrhea. *J Family Community Med.* 2010; 17(3):141-6.
- [2]. UNICEF – Progress for Children 2007: Diarrheal diseases at: http://www.unicef.org/progressforchildren/2007n6/index_41805.htm(accessed 27 December 2007).
- [3]. Gouwse William B, Dye C. Estimate of Worldwide distribution of child deaths. *Lancet.* 2012; 2:25–32.
- [4]. Alam NH, Ashraf H, Khan WA, Karim MM, Fuchs GJ. Efficacy and tolerability of racecadotril in the treatment of cholera in adults: A double blind, randomized, controlled clinical trial. *Gut* 2014; 52: 1419-1423.
- [5]. Armon K, Stephenson T, MacFaul R, Eccleston P, Werneke U. An evidence and consensus based guideline for acute diarrhea management. *Arch Dis Child*; 2011; 85:132-42.
- [6]. Abram SB, editor. Control of Communicable diseases Manual. 16th ed. Am Public Health Assoc. 2014: 250-4.

- [7]. Vesikari T and Torun B. Diarrheal Diseases. In: Kari SL, Staffan B, Makela PH, Miikka P, editors. Health and Disease in developing countries. Macmillan Education Ltd. *London and Oxford*, 2006. p.136-46.
- [8]. Woldemicael G. Diarrheal morbidity among children in Eritrea: environmental and socio-economic determinants. *J Health Popul Nutr*; 2011; 19 (2): 83-90.
- [9]. Yassin K. Morbidity and risk factors of diarrheal disease among under-five children in rural upper Egypt. *J Trop Pediatr*; 2012; 46 (5): 282-7.
- [10]. Karim AS, Akhter S, Rahman MA, Nazir MF. Risk factors of persistent diarrhea in children below five years of age. *Indian J Gastroenterol*. 2011; 20(2):59-61.
- [11]. Etiler N, Velipasoglu S, Aktekin M. Risk factors for overall and persistent diarrhea in infancy in Antalya, Turkey. *Public Health*, 2006; 118 (1): 62-9.
- [12]. Tumwine JK, Thompson J, Katua-Katua M, Mujwajuzi M, Johnstone N, Porras I. Diarrhea and effects of different water sources, sanitation and hygiene behavior in East Africa. *Trop Med Int Health*. 2014; 7(9):750-6.
- [13]. Sobel J, Gomes TA, Ramos RT, Hoekstra M, Rodrigue D, Rassi V, Griffin PM. Pathogen-Specific Risk Factors and Protective Factors for Acute Diarrheal Illness in Children Aged 12–59 Months in Sao Paulo, Brazil. *Clin Infect Dis*. 2008; 38 (11): 1545-51.
- [14]. Gascon J, Vargas M, Schellenberg D, Urassa H, Casals C, Kahigva E, Aponte JJ, Mshinda H, Vila J. Diarrhea in Children under 5 Years of Age from Ifakara, Tanzania. *J Clin Microbiol*. 2010; 38 (12): 4459–62.
- [15]. Jensen PK, Jayasinghe G, van der Hoek W, Cairncross S, Dalsgaard A. Is there an association between bacteriological drinking water quality and childhood diarrhea in developing countries? *Trop Med Int Health*; 2014; 9 (11): 1210–15.
- [16]. Brooks JT et al. Epidemiology of sporadic bloody diarrhea in rural western Kenya. *Am J Trop Med Hyg*. 2013; 68 (6): 671–7.
- [17]. Ghosh S, Sengupta PG, Mondal SK, Banu MK, Gupta DN, Sircar BK. Risk behavioral practices of rural mothers as determinants of childhood diarrhea. *J Commun Dis*. 2011; 29(1):7-14.
- [18]. Gorter AC, Sandiford P, Pauw J, Morales P, Perez RM, Alberts H. Hygiene behavior in rural Nicaragua in relation to diarrhea. *Int J Epidemiol*. 2011; 27(6):1090-100.
- [19]. Curtis V, Cairncross S, Yonli R. Review: Domestic hygiene and diarrhea – pinpointing the problem. *Trop Med Int Health*; 2011; 5 (1): 26–30.
- [20]. Johns Hopkins University. Exclusive Breastfeeding Training For Mothers Helps Reduce Diarrheal Disease Among Infants. *Public Health News Center*. 2005.
- [21]. Brown KH. Diarrhea and Malnutrition. *J Nutr*. 2013; 133 (1): 328S-332S.
- [22]. Rice AL, Sacco L, Hyder A, Black RE. Malnutrition as an underlying cause of childhood deaths associated with infectious diseases in developing countries. *Bull World Health Organ*. 2005; 78(10):1207-21.
- [23]. Urrio EM, Collison EK, Gashe BA, Sebunya TK and Mpuchane S. Shigella and Salmonella strains isolated from children under 5 years in Gaborone, Botswana, and their antibiotic susceptibility patterns. *Trop Med Int Health*; 2014; 6(1): 55–9.
- [24]. Kosek M, Bern C, Guerrant RL. The global burden of diarrheal disease, as estimated from studies published between 1992 and 2000. *Bull World Health Organ* 2013; 81 (3): 197-204.
- [25]. National Medical Society, USA. Diarrhea in HIV-Infected Patients. Available from URL: <http://www.medical-library.org>. March 2008
- [26]. <http://www.alnoornews.net/index.php/2013-02-13-20-11-13/item/8910-ministry-of-plan-iraqi-population-statistical-estimation-2014>
- [27]. Howteerakul N, Higinbotham N, Dibliy MJ. Antimicrobial use in children under five years with diarrhea in a central region province, Thailand. *Southeast Asian J Trop Med* 2004 Mar; 35(1):181-7.
- [28]. Alam S, Bhatnagar S. Current status of anti-diarrheal and anti-secretory drugs in the management of acute childhood diarrhea. *Indian J Pediatr* 2006; 73: 693-696.
- [29]. Bhutta TI, Tahir KI. Loperamide poisoning in children. *Lancet* 2010; 335:363.
- [30]. Canadian Paediatric Society. Treatment of diarrheal disease Paediatr Child Health Vol 8 No 7 September 2003.
- [31]. Ozuah PO, Avner JR, Stein R. Oral rehydration, emergency physicians, and practice parameters: a national survey. *Pediatrics* 2010;109 :259-261.
- [32]. Al- Ghadanphary R M. The size of diarrheal problem and factors affecting it among children less than 5 years of age in Mosul. M.Sc. Thesis 1990; *Mosul university*: P.69-78.
- [33]. Rakan Ahmed Hamed, Drug Misuse in the Management Of Acute Diarrhea Among Children Under Five, *Mosul university, Department of community Medicine*; 2006: P. 42.
- [34]. Mittal L. Regulating the Use of Drugs in Diarrhea. *Journal of pediatric Gastroenterology and Nutrition* 33:S26-S30. October 2015.
- [35]. World Health Organization. Guidelines for the control of shigellosis, including epidemics due to *Shigella dysenteriae* type 1. 2005. <http://whqlibdoc.who.int/publications/2005/9241592330.pdf> (accessed 10 October 2009).
- [36]. Sarkar K, Ghosh S, Niyogi SK, Bhattacharya SK. Shigella dysenteriae type 1 with reduced susceptibility to fluoroquinolones. *Lancet* 2007; 361:785.
- [37]. Sur D, Niyogi SK, Sur S, et al. Multidrug-resistant Shigella dysenteriae type 1: forerunners of a new epidemic strain in eastern India. *J Emerg Infect Dis* 2005; 9: 404-405.
- [38]. Alam MB, Ahmed FU, Rahman ME. Misuse of drugs in acute diarrhea in under-five children. *Bangladesh Med Res Counc Bull*. 2015 Feb; 24(2):27-31.
- [39]. Bruneton C, Maritoux J, Topuz B. Analysis of information to the attention of prescribers and patients concerning the treatment of diarrhea in children in France. WHO Essential Medicines and Policy Department (EDM) International Conferences on Improving Use of Medicines (ICIUM). <http://www.icium.org/index.htm> (accessed 27 December 2007).
- [40]. Choudhry AJ, Mubasher M. factors influencing the prescribing patterns in acute watery diarrhea. *J Pak Med Assoc* 2007 Jan; 47(1):32-5.
- [41]. Connors G, Barker W, Mushlin A, Goepf J. Oral versus intravenous: rehydration preferences of pediatric emergency medicine fellowship directors. *Pediatr Emerg Care* 2011; 16: 335-338.