

Chronic diarrhea in under 2 year aged children, a ten year retrospective analysis

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Summary:

Background: Diarrheal diseases are still a major public health problem especially in developing countries, due to their high morbidity & mortality rates, moreover the largest number of deaths with diarrheal diseases are due to persistent diarrheal states. We attempted to evaluate the size of the problem in our infants, and assess risk factors & outcome.

Methods: A retrospective study was performed in Al-Kadhemya teaching hospital, to evaluate diarrheal cases in under 2 years of age children, admitted to hospital during the period (Dec. 1991- Dec. 2001), from a total of 863, chronic diarrheal cases formed 286 (33.14%) that were evaluated for certain variables; epidemiology & risk factors etiology, complications and the final outcome.

Results & Conclusion: We concluded that: chronic diarrhea formed more than 33% of admitted diarrheal cases to the hospital, of the important risk factors for diarrhea both acute & chronic types were bottle feeding, young age. Lactose intolerance, parasitic infestations and UTI were the common etiologies. Malnutrition was common in cases of chronic diarrhea together with multiple clinical and lab derangements. The mortality rate was 4%.

Key words: chronic diarrhea, risk factors, etiology, complications, mortality.

Abbreviations: CNS: central nervous system, GFD: gluten free diet, Hb: hemoglobin, ORT: oral rehydration therapy, PD: protracted diarrhea, PCM: protein-calorie malnutrition, UTI: urinary tract infection.

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Introduction:

Diarrhea is a leading cause of illness and death in developing countries, in 1990 the WHO estimates that the yearly global infant mortality due to diarrhea were 3.2 millions, this represented 24.8% of the infant annual mortality. (1). More recent reviews indicate that although global mortality has decreased, the incidence remains unchanged at >3.2 episodes per child-year (2), indicating a continuing need to focus on prevention and management of diarrheal diseases in children especially in developing countries.

Most diarrheal episodes resolve within the first week, however those failing to resolve after 2 weeks are named as persistent diarrhea that carries a substantial diarrhea-related morbidity and accounts for between 36% and 54% of all diarrhea-

related deaths (3). In developing countries infants and toddlers may have frequent recurrent episodes of acute diarrhea or PD, resulting in nutritional compromise and/or predisposing to PD (4).

During the nineties (sanction years), with the financial limitations imposed to the public and the deterioration in the general level of sanitation, diarrheal diseases appeared as a major problem in Iraqi children, and there were always impressions about the increment in the tendency for chronicity.

We attempted to review the problem of diarrhea as a whole, and precisely the story of the chronic ones.

Aims:

1. Evaluation of some of the epidemiological features of cases with chronic diarrhea and possible risk factors for chronicity.
2. Assessing the clinical course, and the outcome of chronic diarrheal cases.

Patients and methods:

A retrospective analysis was done of the records of children < 2 yr of age admitted to Al-Kadhemya teaching hospital complaining of diarrhea during the period from Dec. 1991 - Dec. 2000.

A total of 863 records of cases with diarrhea, of these 286 cases were designed as chronic diarrhea, {since it is known that the term

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persistant diarrhea should not include specific diseases as Celiac disease , hereditary syndromes ... etc (3)} and were compared with the remaining 577 (66.85%) cases with acute diarrhea for their age incidence and feeding patterns.

Chronic cases were also evaluated regarding their:

- nutritional status,
- type and frequency of clinical complications
- derrangments in their lab. results

1.Abnormal stool findings, in the general examination or in culture study. 2.The presence of urinary tract infection: considered in the presence of at least 2 positive cultures from a urine bag sample or a single growth from a suprpubic aspirate. 3.Anemia.

Other diagnostic modalities: gluten hypersensitivity was dignosed through a jejunal biopsy taken by Crosby capsul, or a deudenal biopsy through endoscopy, while lactose intolerance by an acidic stool PH and a therpeutic response to lactose free formula, and finally studying the outcome of the patients with chronic diarrhea.

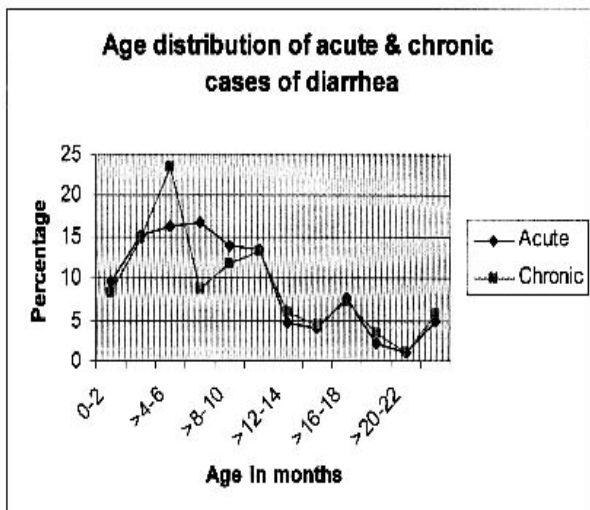
Some of the records missed particular data especially the lab investigations, due to unavailability, they were deduced from the calculations accordingly

Results:

Diarrheal admissions (acute & chronic cases):

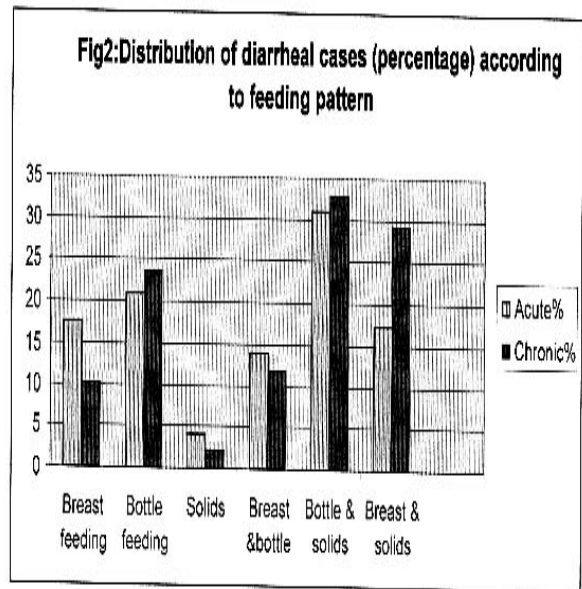
A total of 863 records of diarrheal diseases (for the <2yr of age) were collected, of those acute cases formed 577 (66.85%), while cases of chronic diarrhea were 286 (33.14%), with a ratio of -2:1.

Figure (1) show the age distribution of both the acute and chronic cases,the highest incidence of both types was in the age from >2mo-6mo, a peak was noted in chronich cases at 4-6mo, the incidence of both declined at the end of the first year.



Feedind paterns (acute & chronic cases):

Figure (2) show the feeding patterns among the two groups. The highest incidence among both types of diarrhea was in the group of mixed feeding; 333 cases (62% of the acute cases), and 183 (64% of the chronic cases).While those relying on breast feeding formed only (17.7%) of the acute cases, and 10% of the chronic ones .



Other observations on patients with chronic diarrhea:

Nutritional parameters in cases with chronic diarrhea:

Most of the patients were under weight, 153 cases (53.5%) were below 3rd centile. Only about 25% of the atients had a wei ht >5th centile, as in table (1).

Weight centile	No.	%
> 5 th	74	25.8
3 rd - 5 th	59	20.6
< 3 rd	153	53.5
Total	286	100

Table (1) Nutritional status of children with chronic diarrhea

Recorded signs of malnutrition were ; wasting seen in 110 cases (38.5%),while features suggestive of PCM occured in 12 case (4.2%) , significant anemia with the hemoglobin <9gm/dl was found in 23.6%, while rickets was recognized in 1.7% only.

Documented aetiologies of chronic diarrhea:

1. Enteric infections : 49 cases (17.1%) showed parasitic infestation, and 21 cases with positive bacterial stool culture as in table (2) , the organisms grown were enteropathogenic E. Coli and S. typhi .

Enteric infections&infestations	No.	%
E. Histolytica	41	14.3
G. Lamblia	8	2.7
Culture	21	Enteropathogenic E.coli 20(6.9%)
		S. typhi 1(0.3%)
Total	70	24.4

Table (2) Cases with documented enteric infections

2. Thirty-nine cases (13.6%) with urinary tract infection , the micro -organisms involved were shown in table (3) .

Type of growth	No.	%
E.coli	27	15.7
Klebsiella	4	2.3
Pseudomonas spp.	4	2.3
Proteus spp.	4	2.3

Table (3) Cases of UTI

3. Lactose intolerance was seen in 77 (26.9%) patients , while gluten hypersensitivity was diagnosed in 4 (1.4%) other patients, their ages were (9mo , 18mo , 20mo and 24mo)

Complications:

Different complications were recorded in patients with chronic diarrhea as shown in table (4) . The most common was diarrhea persistant for > 7 days after admission in 42 cases (14.68), followed by abdominal distention ± features of frank paralytic ileus in 37 case (12.93). Neurological complications in 27 cases (9.44%) while the other complications are listed in the table .

Complications	No./286	%
Persistent diarrhea >7days After admission	42	14.7
Abdominal distention±paralytic ileus	37	12.9
CNS complications(seizure,coma...)	27	9.4
Anuria	1	0.3
Heart failure	6	2.1
Septicemia	12	4.2
Rectal prolapse	1	0.3

Table(4) Observed complications in patients of ch. Diarrhea

State on discharge:

173 cases (60.48%)were discharged with

complete recovery,while 76 cases (26.57%) had only partial recovery and 12 cases (4.14%) died all these cases were with low body weight <5th centile, their ages ranged from [3wks to 15mo.].The causes of death were, as in table (5) uncontrolled diarrhea in 6 cases ,renal failure heart failure,sudden death occurred in 2 cases for each Twentyfive patients (0.87%)were taken off hospital by their families against medical advice.

Cause of death	No. of patients	Age of patients
Uncontrolled diarrhea	6	2mo(2cases),3mo, 4mo, 1mo, 16mo
Renal failure	2	5mo, 15mo
Heart failure	2	3mo, 1yr
Sudden death	2	3wk, 6mo

Table (5) Causes of death of patients with chronic diarrhea

Discussion:

Diarrheal diseases being a leading cause of death in under five year children in developing countries (1) , it has become evident during the last decade that acute dehydrating diarrhea accounts for only 40% of diarrheal mortality, the remaining deaths are associated with persistent diarrhea and dysentery(8) . ORT is an effective tool in preventing morbidity in acute diarrhea, but it may not prevent the higher case fatality rate and the more serious impact on nutritional status associated with chronic Diarrheal problems(6). We have evaluated the problem in under 2yr patients, being the most affected age sector.About 33.4% of admitted diarrheal cases were chronic, in a Bolivian study (7) 1994, chronic diarrhea formed only 12% of admitted cases and according to the WHO about 10% of acute diarrheal episodes become persistant(8), chronicity was quite prevalent in our survey and the problem seems to be still going on.

Risk factors for diarrhea & chronicity: Behaviors that promote the exposure of young children to enteric pathogens , increases the risks of acute and persistent diarrhea but what favors persistence of the problem:

-Age: Both types of diarrhea affected young infants more, between 2-6mo, with a prominent peak of chronicity at 4-6mo, the latter is probably related to the time of introduction of solids and contaminated drinking water, in addition to it's relation to the young age. Khalidi (Tunisia) (9), and Karim (Dhaka) (10) approved that diarrheal chronicity was more in young

infants, Guraine (11) from Italy found that early onset of persistent diarrhea is one of its risk factors and as the age advanced an inverse relation is seen with the number of cases .

b- Feeding :Babies kept on breastmilk only, formed a limited group only in both types and even less in the chronic (10.13% of the chronic cases, and 17.72% of the acute cases). Breast feeding, in addition to shielding the infant from exposure to possible contamination of bottle feeding(12), it is also associated with improved growth,enhances nutritional recovery and reduces the risk of severe and persistent diarrhea (13,14,15). On the other hand bottle feeders had the highest incidence of both types of diarrhea in our patients (actually bottle & solid feeders were the highest). Several previous studies have confirmed this finding(16,17).There is evidence that feeding of non-human milk as the sole or predominant nutrient source during acute diarrhea may increase the episode's severity and duration.(18)

The tendency for chronicity was remarkable in bottle feeders, but the addition of solids seemed to play an even greater role (bottle+solids formed 32.9%, breast+solids 29.2% of the chronic cases while pure bottle feeders 23.8%), pointing clearly to the role of enviromental and probably water contamination as a predisposing factor of chronicity, a point confirmed also by Tmng (19) and Karim (10) , that unsafe (unboiled) drinking water and lack of exclusive breastfeeding early in life correlated highly with the risk of chronic diarrhea. .

c-Body weight & nutritional state: Chronic diarrhea effects the body weight negatively and low body weight is a risk factor for chronic diarrhea.Most of our patients (75%) were under weight. Significant anemia was documented in 23.6% of the cases, and (46.85 %) of chronic cases showed various other manifestations of malnutrition. Failure to thrive & anemia were common findings in children with chronic diarrhea also according to Abdulah (20) Akinbami (21). Karim(10) has observed that, grade III malnutrition was among risk factors for persistance of diarrhea.

Etiology of chronic diarrhea

More than 17% of the patients showed evidence of parasitic infestation and amebiasis was the most common , supporting the importance of food and water contamination. The incidence may be even much higher, since the diagnosis was microscopical only, in addition to the tendancy for self medication in our society, which may affect negatively microscopical results. This is truly contrasting the WHO report stating that *E.Histolytica* rarely affects under 5yr. old.(22)

Enteric bacterial infection formed about 7.3% of the chronic cases, largely due to enteropathogenic E-coli, only one case of Salmonella-typhi, no Shigella infection was documented, while Sagaro-E from Peru, showed the most common bacteria is Salmonella, followed by enteropathogenic E-coli (23).Failure to diagnose Shigella is possibly related to the age of our studied sample, since it is thought to affect older children more than infants(24).

UTI with positive urine culture occurred in 13.6% of the chronic cases, while Thapa(25) who found only 3.3% of intractable diarrhea cases with U.T.I., it shows that there should be abetter orientation for this problem especially at primary health care level to insure early diagnosis.

As for the etiology of chronic diarrhea, in our studied cases, infective causes (documented) formed about 37%, due to the poor general level of sanitation and possibly deficient primary health care services &diagnostic facilities, supporting the impression that in developing countries chronic bacterial, and parasitic infections are the most common cause, while functional disorders, secondary disacchridase defeciany, milk protein intolerance, cystic fibrosis, celiac disease, and inflammatory bowel diseases dominated the list in developed countries (26,27). Table (6), compares both our Iraqi study sample and an Italian one, while the Saudian figures were approaching the European lists.(the 3 studies were nearly during the same time period). In a recent study in USA, no bacterial nor parasitic agents were identified among cases with persistent diarrhea, while only novovirus & Rotavirus infections were demonstrated (28).

Al-Kathemya hosp.	Saudi study,1994 (20)	Italian study,1995 (24)
Lactose intolerance 27%	Post G.E. syndrome 33%	No defined diagnosis 45%
Enteric infection 24%	Celiac disease 21%	Autoimmune enteropathy 25%
U.T.I. 13%	Cong. Chloride deficiency 10%	Congenital microvillus atrophy 15%
Gluten intolerance 1.4%	Glucose-galactose intolerance 6%	Congenital pseudo-obstruction 10%
Undiagnosed 35%	Acrodermatitis enteropathica 6%	Multiple food intolerance 5%
	Ulcerative colitis 4%	
	Intestinal lymphangiectasia 4%	
	Cow milk intolerance 4%	
	Ataxia telangiectasia 4%	
	Giardiasis 2%	
	Immune def. & cystic fibrosis 2%	

Table (6) Causes of chronic diarrhea

C OMPLICATIONS AND MORTALITY of chronic diarrhea cases:

Partial improvement was faced in about 26% of our studied cases, mostly due to lack of diagnostic facilities and proper nutritional support wether through enteral or parenteral routes. Variable other grave complications were noted : paralytic ileus anemia, renal and neurological complications, Thapa (24) observed a nearly similar list of complications paralytic ileus anemia and leg edema in 9%,70% and 3% respectively. Pelletier (29) (Brazil) stated that diarrhea reduces the increase in weight and height by average of 13.4g and 0.13 cm /day , a finding supports the idea that control of diarrhea can improve nutritional status in developing countries .

Mortality in our studied group was 4.2%. Khalidi's in Tunisia (9) reported 4% mortality, 10.4 % in Abdulla's report from Saudia Arabia(21), the WHO reports reaches up to 15%(8), and a recent study in Muscat it was 1.5% All the deaths in our patients occurred in children that were malnourished on admission , however Pelletier (28) have stated that 56% of children's death were attributed to malnutrition but 83% of these were due to mild -moderate as apposed to severe

Conclusions:

- 1- Diarrheal diseases were in general a disease of the young, and breastfeeders formed the least in both types of diarrhea.
- 2- Chronicity was prominent in the studied sample. Young age , bottle feeding and solid food introduction (probably unsafe drinking water) were common risk factors for chronicity, in addition to malnutrition that seemed to be a cause

and a result, infections associated with chronicity were parasitic bowl ifestation, next was enteropathogenic E-coli,and UTI.

3- The dominance of infective causes (enteric & UTI) in the list of etiology of chronic diarrhea, contrasted with that of developing countries , in which immune & congenital disorders dominate.

4- Chronic diarrhea associated mortality was 4.2%, all were malnourished, and about half of them were due to intractable diarrhea.

Recomendations:

- 1- Continous enhancement and support of breastfeeding programes, and additional emphasis on proper, clean solid food introduction and safe water supply.
- 2- Enhacing primary care centers for early detection of nutritional problems and their treatment, & enforcing the role of good nutritional support during diarrhea] episodes.
- 3- Establishing access for parenteral nutrition to help dealing with chronic & intractable formes of diarrhea.

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