Ministry of Higher Education

and Scientific Research

University of Diyala

College of Medicine

Factors affect the incidence of diarrhea in children under five years who attend Al-Batool teaching hospital in Diyala, Iraq

Submitted to the Council of the College of Medicine, Diyala University, In Partial Fulfillment of Requirements for the Bachelor Degree in medicine and general surgery.

Submitted by

Assal Mahmoud Mohammed

Supervised by

Prof.Dr. Mehdi Shemkhi Jebr

2022-2023

Abstract

Background: Diarrhea among children is defined as a disease with loose or watery stool three or more times during a 24-hour period, or a change in the consistency of the stool from that which is normal for the patient. Though most episodes of childhood diarrhea are not always severe, acute cases can lead to significant fluid loss and dehydration. Consequently, deaths or other severe consequences can arise if fluids are not replaced at the first sign of diarrhea.

Aims of study: We conducted this study to identify the factors affecting the incidence diarrhea in children under 5 years of age in Diyala.

Patients and methods: A sample of 100 patients with acute diarrhea and 100 children without diarrhea as a control group were collected from Al-batool teaching hospital during the period from July 2022 to January 2023. Factors that may affect the incidence of diarrhea were studied using a questionnaire.

Results: Their mean age of study sample were 19.68±15.5 months and their mean weight was 9.9±3.6 kilograms. 47% of the sample were males & 53% was females**.** The paternal age for the case group was 32.48±6.9 years and the maternal mean age was 26.98±5.6 years. that 42% of the cases had urban residency & 58% of them had rural residency, while 58% of control had urban residency & 42% of them had rural residency. that 11% were breast feeding , 45% of cases artificial feeding , 44% mixed feeding .

Conclusion: there is association between the socioeconomic status and the educational status and the incidence of diarrhea and this is important because it can be modified.

Keywords: diarrhea, children, Diyala.

Introduction

Diarrhea among children is defined as a disease with loose or watery stool three or more times during a 24-hour period, or a decrease in the consistency of the stool from that which is normal for the patient. Though most episodes of childhood diarrhea are not always severe, acute cases can lead to significant fluid loss and dehydration. Consequently, deaths or other severe consequences can arise if fluids are not replaced at the first sign of diarrhea. Diarrhea is a disease caused by a wide range of pathogens, including, viruses, protozoa and bacteria [1]

Diarrhea is one of the most important causes of death in the world. Globally, more than 10 million children die each year, of which about 1.5 million die from diarrhea. Diarrheal diseases are the leading causes of mortality and morbidity in children under the age of 5 years in developing countries and definitely threaten the attainment of Millennium Development Goal 4. Worldwide, acute diarrhea causes 16% of deaths in children under 5 years. Most of these deaths occur in low- and middle-income countries; these deaths are avoidable by the existing interventions [2,3].

Socioeconomic factors such as overcrowding, poor sanitation, low maternal education, low body weight, and failure to breast feed exclusively for the first 6 months of life were associated with a higher incidence of diarrheal diseases in early infancy as shown in several previous studies [4].

Despite that diarrheal mortality has been declined over the last two and half decades (1990–2015), with tremendous reduction of nearly 40% between 2008 and 2010, the associated deaths remain unacceptably high. In 2015, diarrheal disease was ranked as the second cause of childhood mortality, accounting for 8.6% of 5.9 million deaths among children under 5 years old globally; and 88% of all deaths occurred in sub-Saharan Africa and South Asia [5].

There are several most life-threatening viral and bacterial pathogens affecting individuals in developing countries among them is rotavirus which is the leading cause of acute diarrhea, and is responsible for about 40 per cent of all hospital admissions due to diarrhea among children under five worldwide. Major bacterial pathogens are E. coli, Shigella, Campylobacter and Salmonella [6].

Previous studies on viral etiology of acute gastroenteritis in Iraq reported rotavirus and enteric adenovirus were most frequently associated with acute gastroenteritis in children in Iraq. An early diagnosis of rotavirus infection for the physician could affect patients' care management in that the unnecessary administration of antibiotics could be avoided, and unnecessary hospitalization with the concomitant risk of nosocomial spread of rotavirus could be prevented. Laboratories attached to small hospitals and outlying clinics catering to the needs of rural communities would also benefit from a rapid and easy-to-perform test for the detection of rotavirus [7].

Males are twice as likely to be admitted to hospital as females. In temperate areas, rotavirus infections occur primarily in the winter, but in the tropics they occur throughout the year probably due to seasonal changes in temperature and humidity. Outbreaks of rotavirus A diarrhea are common among hospitalized infants, young children and elderly people in nursing homes [8].

This study aimed to demonstrate the main factors that affect the incidence of acute diarrhea in children under 5 years old in Diyala governorate.

Patients and methods

This is a case-control study that were conducted in the period from July 2022 to January 2023. A sample of 100 patients with acute diarrhea and 100 patients without diarrhea as control was collected from the children attending Al-Batool teaching hospital. Information were collected about gender, parents age, weight, mode of feeding, educational state, socioeconomic state and residency. using prepared written questionnaire and by direct interview with the mothers of the patients. Diarrhea is defined as a change in the frequency and consistency of stool . We preserved the privacy and we coded the patients for the reasons of confidentiality and risk of bias.

Statistical analysis

Statistical analysis was done by using SPSS Version 25 for the description of the data and to calculate the odd ratio. We expressed the quantitative data by arithmetic mean, standard deviation and mode and the qualitative data by frequencies. Chi square was used to identify the association between the variables when P value less than 0.05 considered significant.

Results

100 children with acute diarrhea were enrolled in this study and another 100 children without diarrhea was enrolled as control. Their mean age was 19.68±15.5 months and their mean weight was 9.9±3.6 kilograms. 47% of the sample was males & 53% was females, as shown in tables (1).

Table (1). Gender percentage of the study group.

Gender	Frequency	Percent%
Male	94	47.0
Female	106	53.0
Total	200	100.0

The paternal age for the case group was 32.48±6.9 years and the maternal mean age was 26.98±5.6 years while the mean paternal age for the control group was 33.32±7.3 years and the maternal mean age was 29.1±6.8 years which is slightly higher but not significant (P>0.05), as shown in table (2)

Table (2) . Parental age of the study group.

Cases	Fathers	mothers
With diarrhea	32.48	26.98
Without diarrhea	33.32	29.1
Total	107	93

This study revealed that 42% of the cases had urban residency & 58% of them had rural residency, while 58% of control had urban residency & 42% of them had rural residency. There was statically no significant difference between them, (odd ratio was 0.524).s shown in table (3)

Table (3). Residency distribution in study group

No.		Residency		
		Urban	Rural	Total
With diarrhea	Frequency	42	58	100
	Percentage	42.0%	58.0%	100.0%
Without diarrhea	Frequency	58	42	100
	Percentage	58.0%	42.0%	100.0%
Total	Frequency	100	100	200
	Percentage	50.0%	50.0%	100.0%

There was slightly increased risk among the 2 groups (odd ratio was 0.524).

This study showed that incidence of diarrhea among the low educated mothers was more common than the highly educated with statistically significant association between them with ($P < 0.007$) as showed in table 4

Table (4). Maternal educational level in study group

Groups		Educational level				
		Illiterate	Primary level	Secondary level	Academic	Total
With diarrhea	Frequency	31	28	19	22	100
	Percentage	31.0%	28.0%	19.0%	22.0%	100.0%
Without diarrhea	Frequency	13	26	25	36	100
	Percentage	13.0%	26.0%	25.0%	36.0%	100.0%
Total	Frequency	44	54	44	58	200
	Percentage	22.0%	27.0%	22.0%	29.0%	100.0%

There were significant differences between both the paternal educational levels and the incidence of diarrhea which was more common among low educated fathers ($P = 0.002$).

Table (5). Paternal educational level in the study group

Groups		Educational level				
		Illiterate	Primary level	secondary level	Academic	Total
With diarrhea	Frequency	21	25	24	30	100
	Percentage	21.0%	25.0%	24.0%	30.0%	100.0%
Without diarrhea	Frequency	8	23	21	48	100
	Percentage	8.0%	23.0%	21.0%	48.0%	100.0%
Total	Frequency	29	48	45	78	200
	Percentage	14.5%	24.0%	22.5%	39.0%	100.0%

54% of the case group is taken vitamin D on daily basis and 61% of the control group also taking vitamin D as shown in table 6. the odd ratio was 0.545.

Table (6) vitamin D intake

Cases	Vitamin D status		
	Yes	NO	Total
With diarrhea	46	54	100
Without diarrhea	61	39	100
Total	107	93	200

There were slightly increase risk of developing diarrhea in children who don't take vitamin D on daily regular basis , the odd ratio was 0.545.

The type of feeding is demonstrated in table 7 . This study revealed that 11% were breast feeding , 45% of cases artificial feeding , 44% mixed feeding .

Table (7). Type of feeding

Groups		Type of feeding			
		Breastfeeding	Artificial feeding	Mixed feeding	Total
With diarrhea	Frequency	11	45	44	100
	Percentage	11.0%	45.0%	44.0%	100.0%
Without diarrhea	Frequency	13	46	41	100
	Percentage	13.0%	46.0%	41.0%	100.0%
Total	Frequency	24	91	85	200
	Percentage	12.0%	45.5%	42.5%	100.0%

The mode of feeding was almost similar with no significant difference (P > 0.05).

This study revealed that 26% of cases are good economic state , 35% were moderate economic state and 39% of cases were poor economic state as shown in table 8 .

Table(8). Economic state of the study group

Groups		Economic state			
		Good	Moderate	Poor	Total
With diarrhea	Count	26	35	39	100
	% within Groups	26.0%	35.0%	39.0%	100.0%
Without diarrhea	Count	41	45	14	100
	% within Groups	41.0%	45.0%	14.0%	100.0%
Total	Count	67	80	53	200
	% within Groups	33.5%	40.0%	26.5%	100.0%

There were statistical differences between the socioeconomic state and the incidence of diarrhea among the case group (P<0.001).

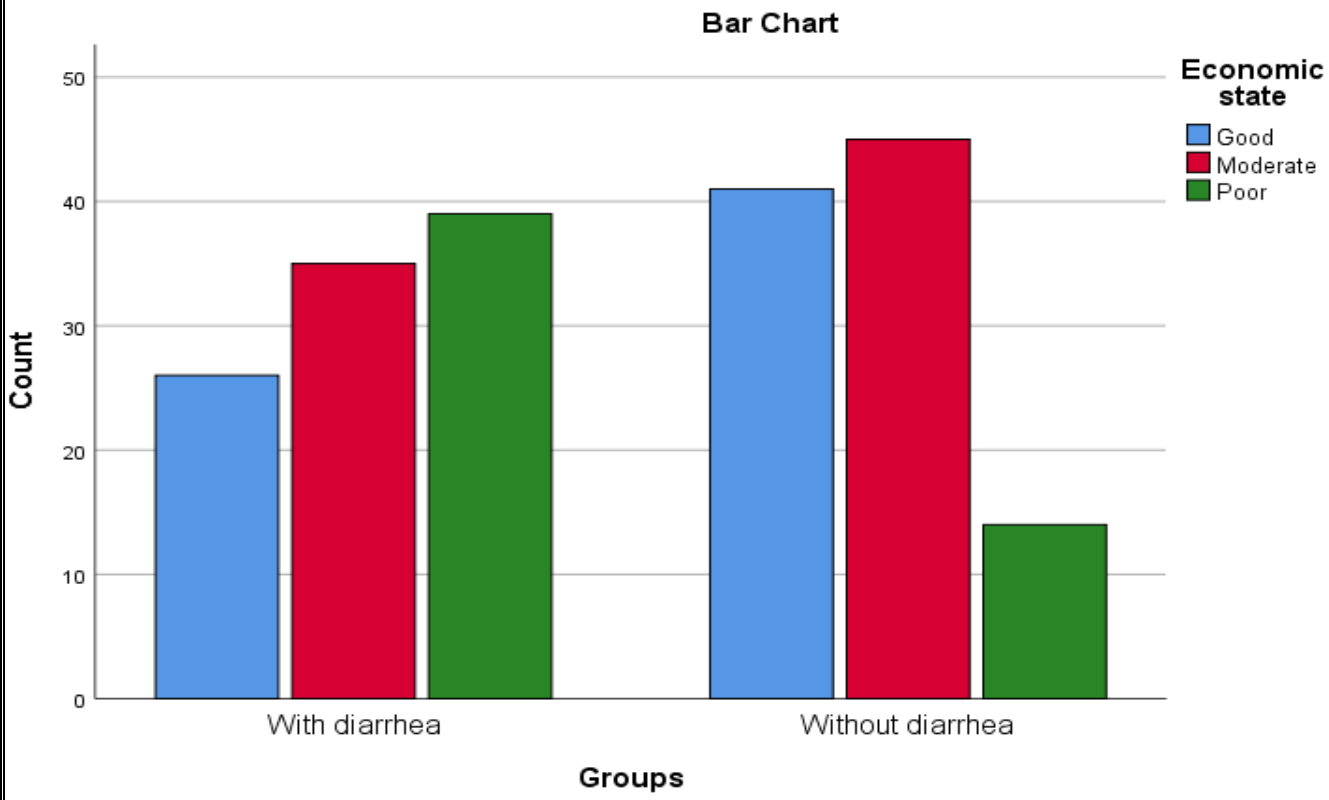

Figure (1). bar chart about the association between socioeconomic status and incidence of diarrhea.

Discussion

The present study was carried out because of the importance of acute diarrhea as a manifestation of acute gastroenteritis among infants and children, beside the lack of such previous study in Diyala province. Study samples were collected from Al-Batool Hospital.

Our results revealed that there is slightly increased risk in children living in rural areas by 0.524 times the children living in urban areas which agree with the findings of Kalakheti et al [9].

The study found that there was a strong association between the educational level and the incidence of diarrhea especially in children with illiterate parents ($P < 0.05$) which is because of the lack of orientation about the children's health situation. and this is consistent with the findings from India that showed a relatively higher prevalence of diarrhea among children whose mothers had no education. This might be an educated mother's will have a positive influence on hygienic practice, child feeding, weaning [10]. This was also consistent with findings of Fabrianti et al [11] who found a correlation between education of mothers with an incidence of diarrhea in children under five years old.

The study recommended a strong association between the socioeconomic status and the incidence of diarrhea and this mainly due depravity and poverty that prevents them from taking their children to health care providers. improving of family's socioeconomic conditions would reduce the risk of diarrhea in infants and young children. Various studies are in accordance with the results of this study [12,13]. They found a positive correlation between economic state and the incidence of diarrhea.

The study revealed no significant difference between the two groups regarding the mode of feeding. And this disagree with the findings of Feleke et al [14] .

This study showed that there was an increased risk of developing diarrhea in children who don't take Vitamin D on daily regular basis (odd ratio = 0.545), and this contradicts with the findings of *Hassam et al* [15].

Conclusion .

The study concluded that the educational status and the socioeconomic status are important factors related to the incidence of diarrhea and this may be due to that they are relatively easy modified factors and can have huge impact on the incidence of diarrhea.

Recommendations .

1-We recommend improving the general condition of the families through improving educational & economic status.

2- Further study on this topic with larger sample size .

References

1. Mohammed S, Tilahun M, Tamiru D. Morbidity and associated factors of diarrheal diseases among under five children in Arba-Minch district, Southern Ethiopia, 2012. Sci J Public Health. 2013 Jun 10;1(2):102-6.
2. Black RE, Morris SS, Bryce J. Where and why are 10 million children dying every year?. The lancet. 2003 Jun 28;361(9376):2226-34.
3. Bbaale E. Determinants of diarrhoea and acute respiratory infection among under-fives in Uganda. The Australasian medical journal. 2011;4(7):400.
4. World Health Organization. WHO vaccine-preventable diseases: monitoring system: 2009 global summary. World Health Organization; 2009.
5. Liu L, Oza S, Hogan D, Chu Y, Perin J, Zhu J, Lawn JE, Cousens S, Mathers C, Black RE. Global, regional, and national causes of under-5 mortality in 2000–15: an updated systematic analysis with implications for the Sustainable Development Goals. The Lancet. 2016 Dec 17;388(10063):3027-35.
6. Parashar UD, Gibson CJ, Bresee JS, Glass RI. Rotavirus and severe childhood diarrhea. Emerging infectious diseases. 2006 Feb;12(2):304.
7. Ali GI, Abdullah HI, Younis HM. Rotavirus infection in children suffering from gastroenteritis in Kirkuk province. Tikrit Journal of Pure Science. 2010;15(1):174-9.
8. Hasan AR, Al-Duliami AA, AL-Zuheiry MS, Al-Azawi AK. The prevalence of rotavirus infection in Baquba-Diyala province. Diyala Journal For Pure Science. 2010;6(3).

9. Kalakheti B, Panthee K, Jain KC. Risk factors of diarrhea in children under five years in urban slums. Journal of Lumbini medical college. 2016 Dec 30;4(2):94-8.
10. Suri S, Kumar D, Mail ID. Diarrhoeal diseases and its associated factors among children 1-5 years of age in a rural area of Jammu. Health. 2015 Jul;3(3).
11. Febrianti A. The Relationship between Socio-Economic Factors, Mother's Knowledge of Healthy Environment and Diarrhea with the Incidence of Diarrhea in Toddlers Aged 1-5 Years at Puskesmas Pembina Palembang. Science Midwifery. 2018 Oct 1;7(1, October):32-7.
12. Ottay RI, Sumampouw OJ, Nelwan JE, Cahyo HC. Coastal area public health problem (a case study in the city of Manado North Sulawesi Indonesia). Food and Public Health. 2015;5(2):29-37.
13. Feleke Y, Legesse A, Abebe M. Prevalence of Diarrhea, Feeding Practice, and Associated Factors among Children under Five Years in Bereh District, Oromia, Ethiopia. Infectious Diseases in Obstetrics and Gynecology. 2022 Jun 17;2022.
14. Sumampouw OJ, Nelwan JE, Rumayar AA. Socioeconomic factors associated with diarrhea among under-five children in Manado Coastal Area, Indonesia. Journal of global infectious diseases. 2019 Oct;11(4):140.
15. Hassam I, Kisenge R, Aboud S, Manji K. Association of vitamin D and diarrhoea in children aged less than five years at Muhimbili national hospital, Dar es Salaam: an unmatched case control study. BMC pediatrics. 2019 Dec;19(1):1-9.