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Caregiver Knowledge Regarding Pediatric Gastroenteritis: Insights from Diyala Province, Iraq

A graduation project
submitted to College of Medicine - University of Diyala
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requirements for the degree of
Bachelor of Medicine, Bachelor of Surgery (MBChB)

By

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(بِسْمِ ٱللَّهِ ٱلرَّحْمَٰنِ ٱلرَّحِيمِ)

﴿يَرْفَعِ اللَّهُ الَّذِينَ آمَنُوا مِنكم والَّذِينَ أُوتُوا العِلْمَ دَرَجاتٍ واللَّهُ بِما تَعْمَلُونَ خَبِيرٌ﴾

[المجادلة ١١]

Supervisor Certification

I hereby certify that this graduation project entitled (**Caregiver Knowledge Regarding Pediatric Gastroenteritis: Insights from Diyala Province, Iraq**) by (**Zahraa Hamid Majeed Mohammed**) was prepared under my supervision at Department of Family and Community Medicine, College of Medicine, University of Diyala, in partial fulfillment of the requirements for the degree of Bachelor of Medicine, Bachelor of Surgery (MBChB).

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Summary

Gastroenteritis is a very common disease in the pediatric population that may be fatal. It is responsible for approximately 10% of deaths in children under 5 years of age and sets out 70 million deaths per annum globally, rendering it the second leading cause of death on earth. In infants younger than 2 years of age, rotavirus is the leading cause, although by age of 24 months shigella becomes the second most common cause replacing rotavirus.

The primary objective of this study is to assess the knowledge of caregivers regarding various aspects of gastroenteritis among children under five years of age.

A cross-sectional study was conducted among caregivers of children (3 months - 5 years of age) diagnosed with gastroenteritis at Al-Batool Teaching Hospital, Diyala, Iraq over two and a half months (October 29, 2024 to January 15, 2025), with the goal of exploring the knowledge of caregivers concerning signs of dehydration, oral rehydration therapy (ORT), feeding practices, and health-seeking behavior of participants (n = 150). Data were collected by conducting direct interviews using a structured questionnaire, and knowledge was categorized into “good” (≥ 19/38) or “poor” (< 19/38). There were limitations to this study including selection bias and possible inaccuracies in self-reporting.

69.3% of caregivers were moms with a mean age of 29.6 ± 7.5 years. Education was moderate; 36% literate; 12.7% illiterate; 7.3% received a postgraduate education. The most caregivers lived in urban areas (58.7%) and the remainder (41.3%) lived in rural areas, and the knowledge level was

lower in rural caregivers. Scores were lowest for knowledge of medication use (2.71 ± 1.089) and signs of dehydration (2.84 ± 1.030) and only 66.7% of participants correctly identified fatigue as a sign of dehydration. The awareness of oral rehydration therapy (ORT) was moderate (4.93 ± 1.627), and 50.7% of participants knew its proper way of administration. Feeding misconceptions were prevalent: 57.3% of parents believed that eating was beneficial during diarrhea and 59.3% of them considered that mild gastroenteritis necessitates hospitalization. In multivariate logistic regression analysis, higher education was a significant predictor of good knowledge score ($p = 0.080$), while the income and residence did not play a significant role. Prior intravenous (IV) rehydration experience was associated with better knowledge. Although 91.3% of caregivers felt their child's diarrhea was well managed, there were gaps in knowledge.

Our study demonstrates important knowledge gaps among caregivers when treating pediatric gastroenteritis, especially in recognizing the clinical features of dehydration, appropriate use of ORT, and feeding practices.

Introduction

Gastroenteritis is a very common disease in the pediatric population that may be fatal. It is responsible for approximately 10% of deaths in children under 5 years of age and sets out 70 million deaths per annum globally, rendering it the second leading cause of death on earth. In infants younger than 2 years of age, rotavirus is the leading cause, although by age of 24 months shigella becomes the second most common cause replacing rotavirus [1-3].

Transmission is by fecal-oral route, ingestion of contaminated water or food, and person to person transmission. A transmission route for foodborne illness is most commonly responsible for norovirus and shigella outbreaks. It is a disease of filthy living conditions and poverty [4].

Rotavirus and noroviruses (which account for almost 58% of all cases) are the most common viral agents responsible for causing diarrhea in the United States, followed by enteric adenoviruses, sapovirus, and astroviruses.

The ontogenetic factors of gastroenteritis are environmental, seasonal, and demographic, with children being more vulnerable. Other diseases such as measles and immunodeficiencies predispose the patient to a higher risk of gastrointestinal (GI) infection. Another important background risk factor is malnutrition, mainly vitamin A deficiency and zinc deficiency [5].

The majority of episodes are acute diarrheas lasting less than one week. When diarrhea persists for greater than 14 days it is considered persistent diarrhea and occurs in 3% to 19% of episodes. Half of deaths due to dehydration.

Children younger than 5 years represent the most affected population, and the diarrheal episodes are more frequent in Asia and Africa, with 80% of global incidence being reported there annually [6].

The pathophysiology usually depends on the organism causing the disease. It can be due to a toxin such as *Staphylococcus aureus*, while others stimulate secretion to the point of causing a dehydrating diarrhea, such as salmonella. Shigella and *Clostridium difficile* cytotoxins invade the more susceptible tissue and induce inflammatory diarrhea. Enterotoxin-producing agents produce noninflammatory diarrhea; the virus often destroys the surface of the villi and parasites attach to mucosa.

Inflammatory diarrhea is characterized by more fluids, some proteins, and some leukocytes entering the interstitial lumen. Adenovirus, for example, can lead to the loss of absorptive ability by invading microvillus directly or via calcium-dependent endocytosis. At the level of molecules, their ability to activate enterocyte intracellular signal transduction alters the cytoskeleton of the host cells and affects the interstitial lumen. This will change the water and electrolyte fluxes across the enterocytes. There is cAMP increase and inhibition of NaCl abortion in toxic diarrhea. If infiltration takes place, histologic damage will cause reductions also in glucose-, stimulated Na-, and electroneutral NaCl absorption.

Clinical manifestations would be pathogen dependent. Ingested toxins (*S. aureus*) may result in a relatively expeditious onset of nausea and vomiting within 6 hours of consumption. Within 8 to 72 hours, patients may experience fever, cramps and diarrhea.

Enterotoxins such as those of *Clostridium perfringens* and *Bacillus cereus* produce watery diarrhea 8 to 16 hours following ingestion. Viral infections cause cramps and watery diarrhea 16 to 48 hours later. Some pathogens are associated with bloody diarrhea. These agents may produce symptoms as late as 120 hours after ingestion. Some agents can produce manifestations within minutes: for example, copper, shellfish toxins, tin, and other seafood (pufferfish) by way of tetrodotoxin or scombride by histamine liberation.

Overall, symptomatology is a poor filter for determining a potential etiology. Fever is not always there; but that doesn't necessarily mean that it is not an infection. Similarly, the positive predictive value of dysentery is diminished. Acute gastroenteritis with suspicion might require appropriate laboratory testing if the healthcare professional wishes to confirm the causative agent. For each disease a proper clinical history followed by a careful evaluation is required. A history of contact, child-care attendance, travel, and exposure is specific to a gastroenteritis episode. When the symptoms are not specific, the doctors are able to analyze the symptoms correctly and narrow their choice. For instance, nausea and vomiting point to the upper intestine; fever implies inflammation (tissue invasion, dehydration, or coinfection). Epicenter of large intestine involves severe abdominal pain and tenesmus. Small intestine infection usually presents with abdominal fullness, nausea, vomiting without fever, pain in the umbilical region, and watery diarrhea is present [7-9].

Patients with diarrhea are at risk of dehydration; the primary examination is to assess whether or not the patient is experiencing

dehydration, as well as its level. Worsening acidosis can help clarify if and how much of fluid resuscitation is needed (oral/intravenous).

Microscopic examination of stool and culture can help determine the causative agent. Mucus, blood, or leukocytes may suggest the agent. The downside of this method is the potential for false negatives in the initial stage of the disease. Thus, an XTAG GPP panel (FDA approved) using multiplex nucleic acid technology can detect *C. difficile*, toxin A/B, campylobacter, *Escherichia coli*, shigella, and shiga-like toxins, salmonella, rotavirus, norovirus, giardia, and cryptosporidium.

Cultures ought to be performed as early as possible in kids that have leukocytosis in a microscopic evaluation and have bloody diarrhea. Patients that are immunosuppressed get a culture as well. This is now done with polymerase chain reaction (PCR).

The primary treatment and management of those children with acute gastroenteritis include rehydration therapy (oral/IV) and diet selection and zinc supplementation, as well as additional treatments, including probiotics.

In babies younger than 6 months with a fever over 38 °C (100.4 °F), if younger than 3 months, or between 3 months and 36 months if a temperature of more than 39 °C (102.2 °F) IV rehydration is required. In toddlers, IV rehydration is required in chronic illness, prematurity, etc. Persistent vomiting, bloody diarrhea, altered mental status (consciousness), sunken eyes, and decreased urine output are also red flags that may alert the clinician that the patient needs IV fluids [11-13].

A low-osmolarity fluid, containing 75 mEq of Na, 64 mEq of Cl, 20 mEq of K, and 75 mmol of glucose per liter & total osmolarity of 245 mOsm/L, is

the treatment of choice; ondansetron (4 mg for children 4 to 11 years of age or double the doses for older children) for mild to moderate emesis is often given for the best oral rehydration. IV rehydration is performed with lactated Ringer's solution or normal saline at 20 mL/Kg body weight.

Some situations involve the consideration of antibiotics. They can attenuate severity and duration, even prevent some complications in fast spread infection. Ciprofloxacin, TMP-SMX, erythromycin, and metronidazole are among the most commonly used antibiotics. Nevertheless, antibiotics should not be used if the causative agent is known to be *Bacillus cereus*, clostridium or some salmonella species.

The scientific literature has yet to support the use of probiotics to help recover from the infection or with the symptomatology; some studies have found no benefit. When the disease is caused by *C. difficile*, probiotics are believed to be able to prevent diarrhea. Antibiotics could lead to a reduction in diarrheal duration in rotavirus case. Antispasmodic agents (eg, loperamide) are contraindicated in children presenting with dysentery.

Aims of the Study

To assess the knowledge of caregivers regarding various aspects of gastroenteritis among children under five years of age, and to figure out the impact of numerous demographic characteristics on the level of such knowledge.

Subjects and Methods

This is an observational cross-sectional study performed at Al-Batool Teaching Hospital, Diyala Province, Iraq for a period of two and a half months (from 29th of October 2024 to 15th of January 2025). A total of 150 caregivers of children aged 3 months to 5 years who presented to the emergency department with gastroenteritis were included in this study. The study objective was to assess caregiver knowledge related to recognition of dehydration symptoms, ORT use, feeding practices and health-seeking behaviour. A preconstructed questionnaire was used to collect data through direct interviews. The study was approved by the Ethical Committee in the College of Medicine, University of Diyala with informed consent obtained from all participants' parents or legal guardians.

Inclusion Criteria:

I. Caregivers of children aged 3 months to 5 years of age who had been diagnosed with gastroenteritis.
II. Caregivers of children presenting to the emergency department with dehydration or acute diarrhea.

III. Caregivers who were willing to participate and provided informed consent.

Exclusion Criteria:

I. Parents of children with chronic gastrointestinal diseases.
II. Caregivers who cannot complete the interview process because of their language barriers or medical condition.
III. Children with very severe comorbidities who are dependent on medical care.

Questionnaire:

The questionnaire included a statement confirming the participants' right to freely participate and withdraw from the study, and the confidentiality of their information. The following information were gathered:

a. Child's age and gender.
b. Demographic information of caregiver (age, gender, education, area of residence).
c. Knowledge of signs of dehydration (e.g., dry mouth, lethargy, sunken eyes).
d. Knowledge and utilization of oral rehydration therapy (ORT).
e. Feeding practices during diarrhea (breastfeeding during diarrhea, solid food intake).
f. Healthcare-seeking behaviour, including visits to the emergency department and sources of information about gastroenteritis.

g. Use and attitudes concerning medications, including misunderstandings about antibiotics.
h. Parental experience and confidence in managing gastroenteritis at home.

Limitations:

The main limitation of this study was the possible selection bias, as only caregivers of hospitalized children were interviewed, omitting those who were able to manage gastroenteritis effectively in their homes. Also, self-reported data may introduce recall bias, as some of those caregivers may have overstated their knowledge or adherence to best practices. The generalizability of the study to non-hospitalized gastroenteritis cases may also be limited.

Statistical analysis

Descriptive statistical analysis was carried out to display the qualitative variables in terms of frequency and percentage, and the quantitative variables in terms of mean, standard deviation (SD), range, median, and interquartile range.

The questionnaire included a total of 38 questions involving 6 knowledge domains regarding pediatric gastroenteritis. A score of one was given for each question answered correctly, and a score of zero was given for each question answered incorrectly, summing to a maximum possible score of 38. In knowledge assessment studies, the cut-off points used to categorize the scores varied. In this study, the knowledge scores were dichotomized into "good" and "poor" based on a 50% cut-off point, in line

with several previous studies [14,15]. The scores ≥19 and <19 indicated good and poor knowledge, respectively.

Construct validity, which is present when a measurement scale is related to other measures predicted by theory, was assessed by comparing the mean scores between groups by analysis of variance (ANOVA). As part of the validation process, we had the final version of the questionnaire completed by 30 pediatricians and 30 emergency department (E.D.) nurses. We anticipated that pediatricians would have the highest scores and caregivers the lowest. A further measure that was employed is the item difficulty index, which enables one to gauge whether an item is too easy or difficult for the study population. Between 20% and 80% of the sample should answer items correctly.

Regression analysis was employed to evaluate the association between the various variables and the knowledge score. A p-value of less than or equal to 0.05 was considered to be statistically significant. All statistical analyses were carried out using SPSS-28 (Statistical Package for the Social Sciences, version 28).

Results

A total of 150 caregivers were enrolled in the study, additionally, 30 E.D. nurses and pediatricians answered the questionnaire. The children's mean age ± SD was 2.34 ± 1.34 years (ranging from 39 days to 4.83 years), and 59 (39.3%) of them were males and the rest (91, 60.7%) were females.

Caregiver's characteristics are displayed in Table 1. The mean age ± SD was 29.60 ± 7.50 years, ranging from 19.81 to 59.16 years. Regarding relationship to child, all caregivers interviewed in this study fell into one of two categories: mothers (104, 69.3%) or fathers (46, 30.7%). Literacy was the predominant highest level of education achieved by caregivers (54, 36.0%). Residence wise, 88 (58.7%) lived in urban areas, as opposed to the remaining 62 (41.3%) who lived in rural areas. Most caregivers had occupations outside the education and medical field (132, 88.0%). Sixty-nine (64%) of the children enrolled in the study have had visited the emergency department for gastroenteritis at least once prior to their current visit. Social media was the most preferred source of information about gastroenteritis for caregivers in this study (46, 30.7%), followed by news media (38, 25.3%).

Table 1: Characteristics of caregivers (n = 150).

Characteristic	Value
Caregiver age (year), mean ± SD	29.6 ± 7.5
Caregiver sex, male, n (%)	46 (30.7)
Level of education, n (%)	
Illiterate	19 (12.7)
Literate	54 (36.0)
Primary school	33 (22.0)
Middle school	17 (11.3)
High school	11 (7.3)
College / institute	5 (3.3)
Postgraduate	11 (7.3)
Residence, n (%)	
Rural	62 (41.3)
Urban	88 (58.7)
Occupation, n (%)	
Education field	8 (5.3)
Medical field	10 (6.7)
Others	132 (88.0)
Relationship to child, n (%)	
Mother	104 (69.3)
Father	46 (30.7)
Number of children in the household, median (interquartile range)	3 (2-4)
Income, n (%)	
Doesn't cover necessary expenses	41 (27.3)
Barely covers necessary expenses	73 (48.7)
Easily covers necessary expenses	36 (24.0)
Previous emergency department visits for gastroenteritis for the same child, n (%)	
0	54 (36.0)
1	57 (38.0)
≥2	39 (26.0)
Previous IV rehydration for gastroenteritis, yes, n (%)	83 (55.3)
Vomiting episodes in the past 24 hours, median (interquartile range)	3 (2-4)
Diarrhea episodes in the past 24 hours, median (interquartile range)	6 (5-8)
IV fluid administration in the current visit, yes, n (%)	94 (62.7)
Admission to hospital in the current visit, yes, n (%)	80 (53.3)
Source of information about gastroenteritis, n (%)	
Family and friends	31 (20.7)
Social media	46 (30.7)
News media	38 (25.3)
Healthcare professionals	20 (13.3)
Official health organizations	15 (10.0)

Questionnaire content validity was demonstrated as the mean total scores improved incrementally among caregivers, nurses, and pediatricians (Table 2). One-way ANOVA test was used to show the content validity by comparing the mean total scores among the three groups yielding a statistically significant difference ($F(2,207) = 338.294$, $p < .001$). A Tukey post hoc test revealed that the mean scores were statistically significantly higher among nurses (31.70 ± 1.685, $p < .001$) and pediatricians (33.53 ± 2.360, $p < .001$) compared to caregivers (20.84 ± 3.267). Moreover, the mean scores were statistically significantly higher among pediatricians ($p = .047$) compared to nurses. In item difficulty index (Table 3), the questionnaire performed very well with all questions answered correctly by no less than 20%, and no more than 80% of participants, indicating that all questions were not too easy nor too hard to answer.

Table 2: Performance characteristics of the gastroenteritis knowledge questionnaire by domain and mean scores by group.

Domain	Number of questions	Caregiver score (n = 150), mean ± SD	Nurses score (n = 30), mean ± SD	Pediatricians score (n = 30), mean ± SD
Signs of dehydration	5	2.84 ± 1.030	3.70 ± .702	4.47 ± .629
Indications to see a physician	6	3.33 ± 1.201	4.87 ± .860	5.33 ± .884
Oral rehydration therapy (ORT)	9	4.93 ± 1.627	7.70 ± 1.236	8.03 ± .850
Solid intake / refeeding	6	3.21 ± 1.251	5.00 ± .871	5.37 ± .718
Medication use	5	2.71 ± 1.089	4.43 ± .774	4.27 ± .691
Disease transmission	7	3.82 ± 1.326	6.00 ± .830	6.07 ± 1.081
Total Score	38	20.84 ± 3.267	31.70 ± 1.685	33.53 ± 2.360

Table 3: Item analysis for the gastroenteritis knowledge questionnaire, caregiver responses (n = 150).

Domain	Item	Item difficulty (caregivers answering correctly)	
		No.	%
Signs of dehydration	Child is fatigued or restless	100	66.7
	Child has increased urination	85	56.7
	Child has bulging eyes	81	54.0
	Child has fast deep breathing	79	52.7
	Child has moist mouth and salivates a lot	81	54.0
Indications to see a physician	Diarrhea 3-5 times a day, no abdominal pain	81	54.0
	Dark green vomit	84	56.0
	Warm hands and feet	84	56.0
	Excessive sleepiness or drowsiness	82	54.7
	Child age <6 months or weight <8 kg	79	52.7
	Mild uncomplicated gastroenteritis can be managed at home	89	59.3
Oral rehydration therapy (ORT)	ORS is made of water, sugar, and electrolytes	84	56.0
	Intravenous rehydration is more effective than ORT	78	52.0
	Importance of salt-sugar ratio	93	62.0
	Administer as much as the child can drink	76	50.7
	Homemade solutions should never be used even when commercial preparations are not available	78	52.0
	Diarrhea will not stop immediately	80	53.3
	Reduces need for intravenous rehydration	92	61.3
	Less diarrhea compared with juice	83	55.3
	Should not be administered in cases of bloody diarrhea (dysentery)	75	50.0
Solid intake / refeeding	Eating is beneficial	86	57.3
	Prioritize foods high in simple sugars (such as desserts and commercial juices)	82	54.7
	Supplementing with ORT prevents dehydration	76	50.7
	Continue breast feeding	82	54.7
	Ongoing breast feeding reduces dehydration risk	75	50.0
	Use diluted formula	81	54.0
Medication use	Antidiarrheal medications (e.g., adsorbents such as kaolin-pectin) are not routinely required	83	55.3
	Lactose avoidance is usually necessary	79	52.7
	Antimotility agents (e.g., loperamide) are not routinely required	86	57.3
	Antibiotics are routinely required	78	52.0
	Antibiotic overuse results in resistance	81	54.0
Disease transmission	Antibiotic administration prevents transmission	85	56.7
	Acute diarrhea is predominantly bacterial	88	58.7
	Gastroenteritis is highly contagious	80	53.3
	Handwashing does not reduce transmission	77	51.3
	Contact with infected individuals does not promote transmission	76	50.7
	Outbreaks occur in childcare and schools	84	56.0
	Vaccines (such as rotavirus vaccine) can prevent catching gastroenteritis	83	55.3

When it comes to the knowledge domains, one-was ANOVA test revealed that caregivers performed equally well across all 6 domains, indicating that the questionnaire was well tailored to consistently and equally cover all domains with equal difficulty index, as the test result failed to show statistically significant difference among the mean score percentage of all 6 domains ($F(5,894) = 0.465$, $p = .803$), as illustrated in Figure 1.

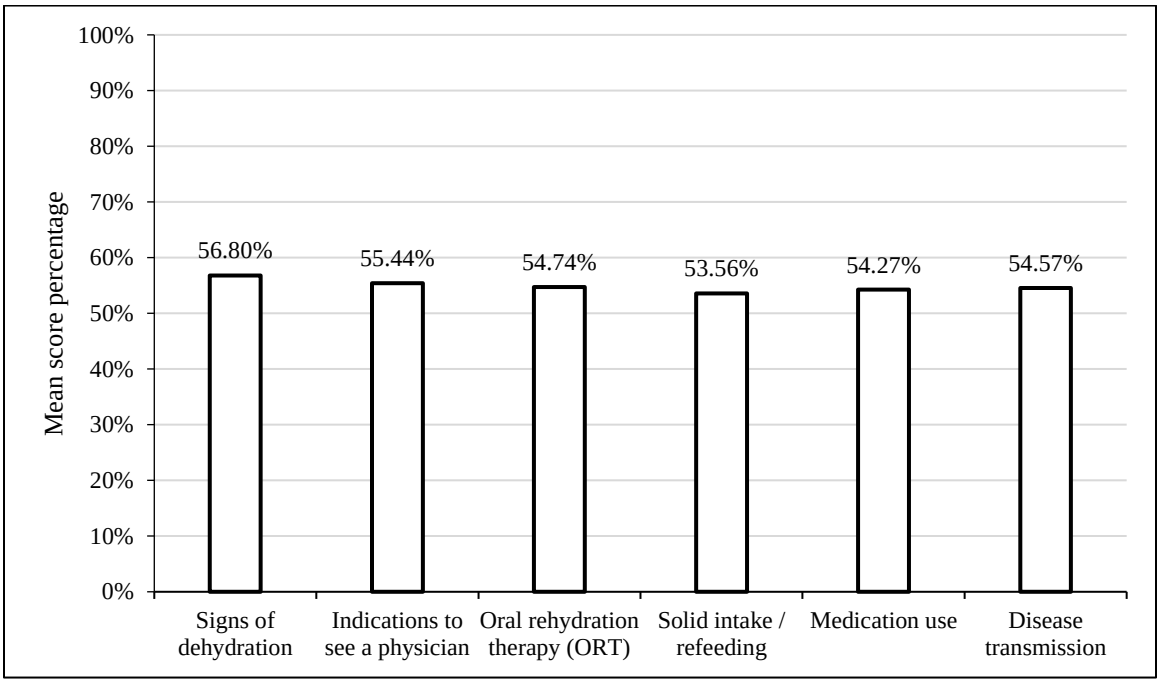


Figure 1: Caregivers' mean score percentage by knowledge domains.

Regarding the total knowledge score, 113 (75.3%) had a "good" score and 37 (24.7%) had a "poor" score. A logistic regression analysis (demonstrated in Table 4) shows that there is an influence, however insignificant, of caregiver age group, sex, level of education, residence, occupation, number of children in the household, income, previous emergency department visits for gastroenteritis for the same child, previous I.V. rehydration for gastroenteritis, vomiting and diarrhea episodes in the past 24 hours, I.V. fluid administration and admission to hospital in the current visit, and source of information about gastroenteritis on caregivers' total knowledge score (χ^2 (26) = 20.590, $p = 0.763$). The model explained 19.1% of variability in knowledge score (Nagelkerke R^2) and was able to identify 77.3% of cases accurately. The sensitivity of the model was 96.5%

and specificity was 18.9%. The results show that the odds of having a good knowledge score are 1.780 times for caregivers 36 years of age or older compared to those aged 16 to 25 years, 1.355 times for females compared to males, 1.585 times for postgraduates compared to illiterates, 1.534 times for caregivers living in urban areas compared to those living in rural areas, and 2.318 times for those working in the education field compared to other occupations.

Table 4: Results of the logistic regression analysis of the association of socio-demographic variables with caregivers' knowledge about gastroenteritis (n = 150).

Variable	Category	Knowledge			Odds ratio (95% C.I.)	p-value
		Poor	Good	Total		
Caregiver age group (year)	16-25	15	43	58	1	1
	26-35	18	52	70	1.163 (.468, 2.892)	.745
	≥36	4	18	22	1.780 (.427, 7.419)	.429
Caregiver sex	Male	13	33	46	1	1
	Female	24	80	104	1.335 (.498, 3.582)	.566
Level of education	Illiterate	3	16	19	1	1
	Literate	16	38	54	.240 (.048, 1.189)	.080
	Primary school	7	26	33	.464 (.086, 2.504)	.372
	Middle school	2	15	17	1.227 (.139, 10.875)	.854
	High school	5	6	11	.136 (.017, 1.092)	.061
	College / institute	1	4	5	.919 (.008, 105.686)	.972
	Postgraduate	3	8	11	1.585 (.019, 131.453)	.838
Residence	Rural	16	46	62	1	1
	Urban	21	67	88	1.534 (.631, 3.729)	.346
Occupation	Others	32	100	132	1	1
	Education field	1	7	8	2.318 (.043, 124.390)	.679
	Medical field	4	6	10	.189 (.003, 10.871)	.420
No. of children					.869 (.618, 1.221)	.417
Income	Doesn't cover necessary expenses	10	31	41	1	1
	Barely covers necessary expenses	19	54	73	1.506 (.508, 4.470)	.461
	Easily covers necessary expenses	8	28	36	1.192 (.342, 4.147)	.783
Previous E.D. visits	0	15	39	54	1	1
	1	13	44	57	1.133 (.416, 3.085)	.807
	≥2	9	30	39	1.402 (.450, 4.370)	.561
Previous I.V. rehydration	No	19	48	67	1	1
	Yes	18	65	83	1.881 (.771, 4.587)	.165
Vomiting episodes					.797 (.571, 1.110)	.180
Diarrhea episodes					.840 (.651, 1.084)	.181
I.V. fluid in the current visit	No	12	44	56	1	1
	Yes	25	69	94	.603 (.241, 1.509)	.280
Admission to hospital	No	16	54	70	1	1
	Yes	21	59	80	.707 (.298, 1.677)	.432
Source of information	Family and friends	7	24	31	1	1
	Social media	10	36	46	1.054 (.301, 3.690)	.934
	News media	9	29	38	.699 (.189, 2.590)	.592
	Healthcare professionals	5	15	20	.750 (.168, 3.354)	.707
	Official health organizations	6	9	15	.207 (.042, 1.014)	.052

Omnibus χ^2 (26) = 20.590, p = 0.763, R^2 = 0.128 (Cox & Snell), 0.191 (Nagelkerke).

Discussion

The current study was conducted to assess caregivers' knowledge towards pediatric gastroenteritis in Diyala Province, Iraq, and compare the results with previous studies. As for caregivers, 69.3% were females and the mean age of caregivers was 29.6 ± 7.5 years. This is consistent with reports that women are the principal children's health caregivers [16]. Moreover, the fact that the majority of participant lived in urban areas (58.7%) and 41.3% resided in rural areas was consistent with the evidence which documented the inequality in accessing health care services between urban and rural settings [17]. Educational level appeared to be another important factor, with 69.3% with secondary education or below, and 30.7% with higher education, confirming previous claims that higher education is associated with better knowledge about the disease management [18]. In terms of employment, 36.7% of caregivers were employed and 63.3% were homemakers or unemployed, similar to findings from other studies where unemployed caregivers utilized homemade remedies more [19].

Caregivers had different healthcare-seeking behaviors. In this study, 36% had never taken their child to the emergency department for gastroenteritis, while 64% recorded that at least one emergency visit had been made, analogous to studies that found that caregiver perception of the severity of the disease impacts the decision to visit the emergency department for gastroenteritis [20]. Moreover, 62.7% of children received IV fluids which might represent severe dehydration; previous studies also showed that delayed healthcare leads to severe dehydration [17]. Additionally, 74% of caregivers consulted a healthcare provider, and 26%

preferred home treatment; this confirms other studies where self-sufficient caregivers home treatments alleviated the need for medical care [18].

The caregiver knowledge assessment showed diverse awareness regarding several domains. The mean score for recognizing symptoms of dehydration was 2.84 ± 1.03, slightly lower than the scores reported in studies where caregivers had a higher awareness of dehydration from ongoing health campaigns [19]. Caregiver knowledge of ORT was moderate (mean = 4.93 ± 1.63), consistent with earlier findings where caregivers widely consider ORT as effective treatment [16]. Most caregivers understood transmission routes (mean = 3.47 ± 1.22), but misperceptions remained, akin to reports of misunderstanding regarding the role of contaminated water in disease dissemination [20]. The mean score for knowledge of prevention strategies was moderate (mean = 3.81 ± 1.45), which supports previous studies showing that although most participants reported awareness of handwashing, awareness of other preventive measures was lower [17]. The lowest scores were found in home-based management (Mean = 2.65 ± 1.17) which is in accordance with studies showing that caregivers were unaware of useful home treatments [18].

75% percent of caregivers continued to feed their children during diarrheal episodes, while 43% restricted food intake, which is consistent with findings that misconceptions about diet and diarrhea persist among caregivers [19]. More than two-thirds of the caregivers (68%) used ORT, while 32% depended on herbal preparations or other fluids, reinforcing findings from studies where cultural beliefs paved the way to guide treatment [18]. Of these caregivers, 49% consulted medical services during the first 24 hours of symptom onset, and 51% postponed consulting medical

services, consistent with other reports demonstrating that caregivers often wait for the symptoms to worsen before requesting medical attention [20].

The study also found a close relationship between child health outcomes and caregiver knowledge. Caregivers who had high knowledge scores were less likely to report hospital visits for gastroenteritis, and were more likely to correctly use ORT and recognize early dehydration signs. These results are consistent with studies showing that higher caregiver education is associated with better health outcomes [17]. On the contrary, children whose caregivers had poor knowledge scores developed more severe dehydration and took longer to recover relative to those with high knowledge scores, as previously reported [16].

These results underline knowledge gaps among caregivers, especially identification of dehydration, its home management, and timely health care-seeking behavior. This is in agreement with previous studies [18, 19], emphasizing the importance of targeted educational interventions. Future interventions should include community-based awareness initiatives, integration of gastroenteritis information within the standard curriculum given in pediatric out-patient departments, and greater accessibility to trusted health information resources, particularly in rural settings. As demonstrated in previous studies [20], effective management of the disease can lead to decreased hospitalization rates, and ultimately it can improve the health of the child.

Conclusions and Recommendations

Conclusions

The current study demonstrates important knowledge gaps among caregivers when treating pediatric gastroenteritis, especially in recognizing the clinical features of dehydration, appropriate use of ORT, and feeding practices. The strongest predictor of caregiver knowledge was the level of education, and neither income nor place of residence had a significant effect. Despite caregivers treating their child's diarrhea on a daily basis, 91.3% of them were satisfied with their medical care, yet misperceptions remained and resulted in unnecessary visits to health facilities and incorrect home care. To improve the health of children with gastroenteritis, these findings indicate an urgent need for targeted educational interventions to increase caregiver knowledge.

Recommendations

1. **Community-based health education programs:** Provide more structured health education to improve caregivers' knowledge of dehydration signs, ORT administration, and feeding practices.
2. **Incorporation of ORT awareness in pediatric visits:** Ensure that health care providers regularly discuss ORT use and home-based management strategies at pediatric visits.
3. **Implementation of targeted interventions for populations in rural and low-education areas**: For those involving lower levels of literacy among caregivers, we recommend creating educational approaches for promoting gastroenteritis management with culturally appropriate content.

4. **Use of social media and digital platforms**: Utilize social media and mobile health platforms to reach a larger audience to provide accurate information on diarrhea management.
5. **Train health care workers**: Improve the training provided to nurses and primary care physicians so they can better communicate and advise caregivers regarding gastroenteritis prevention, detection, and management.
6. **Policy implications**: Institute national health policies to address gastroenteritis and strengthen the awareness campaign as well as focus on providing education about gastroenteritis to the caregivers as a core component of the child healthcare policy initiatives.

References

1. Yang WC, Chang YJ, Lin YC, Chen CY, Peng YC, Wu HP. Survey of nil per os duration of patients admitted to the emergency department due to vomiting. Medicine (Baltimore). 2019 Apr;98(14):e15087.
2. Muhsen K, Kassem E, Rubenstein U, Goren S, Ephros M, Shulman LM, Cohen D. No evidence of an increase in the incidence of norovirus gastroenteritis hospitalizations in young children after the introduction of universal rotavirus immunization in Israel. Hum Vaccin Immunother. 2019;15(6):1284-1293.
3. Koutri E, Papadopoulou A. Eosinophilic Gastrointestinal Diseases in Childhood. Ann Nutr Metab. 2018;73 Suppl 4:18-28.
4. Jeffs E, Williman J, Martin N, Brunton C, Walls T. The epidemiology of non-viral gastroenteritis in New Zealand children from 1997 to 2015: an observational study. BMC Public Health. 2019 Jan 05;19(1):18.
5. Neu J, Pammi M. Necrotizing enterocolitis: The intestinal microbiome, metabolome and inflammatory mediators. Semin Fetal Neonatal Med. 2018 Dec;23(6):400-405.
6. Simwaka JC, Mpabalwani EM, Seheri M, Peenze I, Monze M, Matapo B, Parashar UD, Mufunda J, Mphahlele JM, Tate JE, Mwenda JM. Diversity of rotavirus strains circulating in children under five years of age who presented with acute gastroenteritis before and after rotavirus vaccine introduction, University Teaching Hospital, Lusaka, Zambia, 2008-2015. Vaccine. 2018 Nov 12;36(47):7243-7247
7. Lo Vecchio A, Buccigrossi V, Fedele MC, Guarino A. Acute Infectious Diarrhea. Adv Exp Med Biol. 2019;1125:109-120.

8. Raval MV, Kwan AB, Travers CD, Heiss KF. Importance of Compliance Audits for a Pediatric Complicated Appendicitis Clinical Practice Guideline. J Med Syst. 2018 Nov 07;42(12):257.
9. Guarino A, Lo Vecchio A, Dias JA, Berkley JA, Boey C, Bruzzese D, Cohen MB, Cruchet S, Liguoro I, Salazar-Lindo E, Sandhu B, Sherman PM, Shimizu T. Universal Recommendations for the Management of Acute Diarrhea in Nonmalnourished Children. J Pediatr Gastroenterol Nutr. 2018 Nov;67(5):586-593.
10. Cohen R, Raymond J, Gendrel D. Antimicrobial treatment of diarrhea/acute gastroenteritis in children. Arch Pediatr. 2017 Dec;24(12S):S26-S29
11. Grigsby A, Herron J, Hunter BR. Does the addition of dextrose to IV crystalloid therapy provide clinical benefit in acute dehydration? A systematic review and meta-analysis. CJEM. 2019 Sep;21(5):638-645.
12. Romano C, Dipasquale V, Scarpignato C. Antiemetic Drug Use in Children: What the Clinician Needs to Know. J Pediatr Gastroenterol Nutr. 2019 Apr;68(4):466-471
13. Freedman SB, Williamson-Urquhart S, Farion KJ, Gouin S, Willan AR, Poonai N, Hurley K, Sherman PM, Finkelstein Y, Lee BE, Pang XL, Chui L, Schnadower D, Xie J, Gorelick M, Schuh S., PERC PROGUT Trial Group. Multicenter Trial of a Combination Probiotic for Children with Gastroenteritis. N Engl J Med. 2018 Nov 22;379(21):2015-2026.
14. Dorji T, Tshering T, Wangdi K. Assessment of knowledge, attitude and practice on tuberculosis among teacher trainees of Samtse College of Education, Bhutan. PLoS ONE. 2020;15(11): e0241923. https://doi.org/10.1371/journal.pone.0241923

15. J S D, Gupta AK, Veeri RB, Garapati P, Kumar R, Dhingra S, Murti K, Ravichandiran V, Pandey K. Knowledge, attitude and practices towards visceral leishmaniasis among HIV patients: a cross-sectional study from Bihar, India. PLoS One. 2021;16(8):e0256239. https://doi.org/10.1371/journal.pone.0256239
16. Bachrach, L. R., & Gardner, J. M. (2002). Caregiver knowledge, attitudes, and practices regarding childhood diarrhea and dehydration in Kingston, Jamaica. Pan American Journal of Public Health, 12(1), 37-43.
17. Saguda, N., Msisiri, L. S., Masika, G. M., & Masanja, P. P. (2024). Caregiver's Knowledge of Childhood Diarrhea Disease Prevention Strategies and Their Associated Factors in Dodoma, Tanzania. SAGE Open Nursing, 10, 1–9.
18. Mekonnen, G. K., Mengistie, B., Sahilu, G., Mulat, W., & Kloos, H. (2018). Caregivers' knowledge and attitudes about childhood diarrhea among refugee and host communities in Gambella Region, Ethiopia. Journal of Health, Population and Nutrition, 37:24.
19. Ndou, A., Lebese, R. T., Tshitangano, T. G., & Damian, J. U. (2021). A Descriptive Cross-Sectional Assessment of Caregivers' Knowledge and Practices Regarding the Prevention and Management of Diarrhea among Children under the Age of Five in Thulamela B Clinics, South Africa. International Journal of Environmental Research and Public Health, 18(18), 9452
20. Albrecht, L., Hartling, L., & Scott, S. D. (2017). Pediatric acute gastroenteritis: Understanding caregivers' experiences and information needs. Canadian Journal of Emergency Medicine, 19(3), 198-206.

الخلاصة

التهاب المعدة والأمعاء هو مرض شائع جدًا في فئة الأطفال وقد يكون قاتلاً. وهو مسؤول عن حوالي ١٠٪ من وفيات الأطفال تحت سن الخامسة، ويؤدي إلى وفاة ٧٠ مليون شخص سنويًا على مستوى العالم، مما يجعله ثاني سبب رئيسي للوفاة على الأرض. بالنسبة للرضع الذين تقل أعمارهم عن سنتين، يُعتبر الفيروس العجلي (الروتا فيروس) السبب الرئيسي، بينما يصبح الشيغيلا السبب الثاني الأكثر شيوعًا بحلول عمر ٢٤ شهرًا، مزيحًا الفيروس العجلي.

الهدف الأساسي لهذه الدراسة هو تقييم معرفة مقدمي الرعاية بمختلف جوانب التهاب المعدة والأمعاء لدى الأطفال تحت سن الخامسة.

أُجريت دراسة مقطعية بين مقدمي الرعاية للأطفال (من عمر ٣ أشهر إلى ٥ سنوات) الذين تم تشخيصهم بالتهاب المعدة والأمعاء في مستشفى البتول التعليمي، ديالى، العراق، على مدار شهرين ونصف (من ٢٩ أكتوبر ٢٠٢٤ إلى ١٥ يناير ٢٠٢٥). وكان الهدف هو استكشاف معرفة مقدمي الرعاية بعلامات الجفاف، والعلاج بالإماهة الفموية(ORT) ، والممارسات الغذائية، وسلوكيات البحث عن الرعاية الصحية لدى المشاركين .(n = 150) تم جمع البيانات من خلال إجراء مقابلات مباشرة باستخدام استبيان مُهيكل، وتم تصنيف المعرفة إلى "جيدة" (≤ ٣٨/١٩) أو "ضعيفة" (< ٣٨/١٩). وقد تضمنت قيود الدراسة التحيز في الاختيار واحتمال وجود أخطاء في التقارير الذاتية.

كان ٦٩,٣٪ من مقدمي الرعاية أمهات، بمتوسط عمر ٢٩,٦ ± ٧,٥ سنة. كان التعليم متوسطًا؛ حيث كان ٣٦٪ متعلمين؛ و١٢,٧٪ أميين؛ و٧,٣٪ تلقوا تعليمًا بعد التخرج. عاشت أغلب الأسر في المناطق الحضرية (٥٨,٧٪) بينما عاشت النسبة المتبقية (٤١,٣٪) في المناطق الريفية، وكان مستوى المعرفة أقل لدى مقدمي الرعاية في المناطق الريفية. وكانت أقل الدرجات مرتبطة بالمعرفة باستخدام الأدوية (٢,٧١ ± ١,٠٨٩) وعلامات الجفاف (٢,٨٤ ± ١,٠٣٠)، و٦٦,٧٪ فقط من المشاركين تعرفوا على الإجهاد كعلامة على الجفاف. كان الوعي بالعلاج بالإماهة الفموية (ORT) متوسطًا (٤,٩٣ ± ١,٦٢٧)، و٥٠,٧٪ من المشاركين عرفوا الطريقة الصحيحة لتطبيقه. كانت هناك مفاهيم خاطئة منتشرة حول التغذية؛ حيث اعتقد ٥٧,٣٪ من الآباء أن الأكل مفيد أثناء الإسهال، و٥٩,٣٪ منهم اعتقدوا أن التهاب المعدة والأمعاء الخفيف يستدعي الدخول إلى المستشفى.

في تحليل الانحدار اللوجستي متعدد المتغيرات، كان التعليم العالي مؤشرًا مهمًا للحصول على درجة معرفة جيدة($p = 0.080$) ، في حين لم يلعب الدخل والموقع دورًا كبيرًا. وارتبطت تجربة الإماهة الوريدية السابقة بمعرفة أفضل. وعلى الرغم من أن ٩١,٣٪ من مقدمي الرعاية شعروا أن إسهال طفلهم تم التعامل معه بشكل جيد، إلا أن هناك فجوات في المعرفة.

تُظهر دراستنا فجوات معرفية مهمة بين مقدمي الرعاية في معالجة التهاب المعدة والأمعاء عند الأطفال، خصوصًا في التعرف على الخصائص السريرية للجفاف، والاستخدام المناسب للعلاج بالإماهة الفموية (ORT)، والممارسات الغذائية.

بسم الله الرحمن الرحيم

جمهورية العراق

وزارة التعليم العالي و البحث العلمي

جامعة ديالى - كلية الطب

معرفة مقدمي الرعاية فيما يتعلق بالتهاب المعدة والأمعاء عند الأطفال: رؤى من محافظة ديالى، العراق

بحث تخرج مقدم الى كلية الطب - جامعة ديالى

كجزء من متطلبات نيل درجة البكالوريوس في الطب والجراحة العامة

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