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Research Article

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Diarrhea and Associated Factors among Iranian Young Children: A Cross-Sectional Study

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ABSTRACT

Introduction: Acute diarrhoeal diseases remain a leading cause of global morbidity and mortality particularly among young children in resource-limited countries.

Objective: The aim of this study was to evaluate the effect of several variables as risk factor of diarrhea among children.

Patients and methods: A descriptive cross-sectional study that includes 250 patients who admitted to bandarabbas Children's Hospital in September 2017 to March 2018. They were divided into two groups with and without (as control group) diarrhea. We used a checklist to collect data about them.

Results: Of the 250 people who participated in the survey, 50% were males and 50% were female. The diarrheal cases occurred mostly in the winter, attending kindergarten, and in children 1 to 3 years (3.26 times higher than above 3 years old patients).

Conclusions: According to this study, there are significant relationship between age, maternal level of education, attending Kindergarten,preterm delivery, raw fruit and vegetables consumption with incidence of Diarrhea.

Keywords: Diarrhea, Children, Prognosis

Introduction

Although there has been a significant decline (39%) in global mortality caused by diarrheal diseases in the past 20 years, the current level remains unacceptably high. Diarrheal disease is the second leading cause of death among children under the age of five, with 370,000 children losing their lives to it in 2019 [1].

Every year, there are nearly 1.7 billion cases of childhood diarrheal disease worldwide. Diarrhoea is a major contributor to malnutrition in children under the age of five. The decrease in diarrheal mortality, despite no significant changes in incidence, can be attributed to the introduction of rotavirus vaccination and improved management of diarrhoea cases, along with better nutrition for infants and children. Apart from the risk of death, high rates of diarrhoea can lead to long-term negative outcomes. Recurrent, prolonged, or persistent episodes of diarrhoea, especially among young children, can result in malnutrition, stunting, deficiencies in essential nutrients, and significant impairments in psychomotor and cognitive development [2].

Previous studies have identified several risk factors associated with diarrhoea, such as younger age, male gender, early weaning, seasonal patterns, low maternal education, absence of piped water supply, improper water storage practices, younger maternal age, lack of hand washing with soap by caregivers, poor sanitation, presence of visible feces in the yard, indiscriminate disposal of child feces, inadequate garbage disposal, insufficient boiling time, utilization of water from cistern trucks, and failure

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to treat water in the home [2-13]. It is worth noting that exclusive breastfeeding has a protective effect and can prevent diarrhoea in young children, as well as reduce its severity.

Objectives: Given the considerable prevalence of diarrhea and its substantial impact on morbidity and mortality, particularly in young children, the primary aim of this study was to evaluate the risk factors associated with diarrhea among young children in southern Iran.

Materials and Methods:

Participants

This is a descriptive cross-sectional study on 250 young children with (125 cases) and without (125 cases) diarrhea who admitted to bandarabbas Children's Hospital in September 2017 to March 2018.

Study Design

We conducted an evaluation on a total of 250 cases in order to compare 125 cases with diarrhea and 125 cases without diarrhea. These cases were diagnosed and confirmed. The study obtained ethics approval from the Ethics Committee of Hormozgan University of Medical Sciences. We utilized a prepared questionnaire to gather demographic data and disease laboratory information. In addition, we collected various variables, including age, gender, maternal age, season, maternal level of education, attendance at Kindergarten, preterm/term delivery, early weaning, family size, breastfeeding/formula feeding, piped water supply, hand washing with soap by caregiver, maternal disease, vaccination, and consumption of raw fruits and vegetables.

For the purpose of data analysis, we employed SPSS software version 23 (SPSS Inc., Chicago, IL, USA) to conduct statistical analysis. This included employing Mann-Whitney tests, logistic regression, chi-square tests, and T-tests.

Results

Of the patients, 134 individuals (53.6%) were male, while 116 individuals (46.4%) were female. Moreover, 58 patients (23.2%) were below 1 year old, 142 patients (56.8%) were between 1 and 3 years old, and 58 patients (20%) fell in the 3 to 5 years old age group. The demographic findings are summarized in Table 1. Among all the patients, 233 individuals [111 (88.8%) in the diarrhea group and 122 (97.6%) in the control group] were observed during the winter season, whereas 17 individuals [14 (11.2%) in the diarrhea group and 3 (2.4%) in the control group] were observed during autumn.

The results of the variables and the logistic regression model using the Forward Stepwise method are presented in Table 2, and Tables 3 and 4, respectively. Based on these analyses, a significant relationship is found between diarrhea and factors such as age, maternal level of education, attendance at kindergarten, preterm delivery, and consumption of raw fruits and vegetables (Table 3).

Table 1: Demographic findings

		Diarrhea		Without Diarreah		P.Value	Min	Max
		No	%	No	%			
Age	<1Y	23	18.4	35	28	<0.001	0.631 1.649	3.088 6.460
	1-3Y	86	68.8	56	44.8			
	3-5Y	16	12.8	34	27.2			
Gender	Male	65	52	69	55.2	0.612	0.535	1.446
	Female	60	48	56	44.6			
Maternal Age(Y)	Mean	26.01		26.10		0.838	0.929	1.062
	SD	3.70		3.73				
	Min	17		20				
	Max	37		38				
Family size	>5	22	17.6	29	23.2	0.272	0.380	1.314
	<5	103	82.4	96	76.8			
sibling	Yes	95	76	88	70.4	0.318	0.759	2.336
	No	30	24	37	29.6			
Degree sibling	1	73	76.8	59	67	0.140	0.850	3.130
	>2	22	23.2	29	33			
GA	Preterm	55	44	37	29.6	0.018	1.109	3.149
	Term	70	56	88	70.4			
Maternal Education	less than diploma	28	22.4	22	17.6	0.042	Ref.	---
	diploma	79	63.2	69	55.2		0.583	2.119
	collegiate	18	14.4	34	27.2		1.081	5.344

Table 2: Comparison of risk factors

		GROUP				P-value	Min	Max
		DIARRHEA		CONTROL				
		No	%	No	%			
season	AUTUMN	14	11.2	3	2.4	0.006	1.436	18.322
	WINTER	111	88.8	122	97.6			
Milk	Breastfeed	82	65.5	68	64.4	0.112	Ref 0.255 0.408	Ref 0.969 1.444
	Formula	18	14.4	30	24			
	Mixed	25	20	27	21.6			
Kindergarden	Yes	103	82.4	88	70.4	0.025	1.081	3.585
	No	22	17.6	37	29.6			
Handwashing	Yes	103	82.4	88	70.4	0.025	1.081	3.585
	No	22	17.6	37	29.6			
Early Weaning	Yes	125	100	123	98.4	0.498	--	--
	No	0	0	2	1.6			
Mother's Sickness	Yes	55	44	49	39.2	0.441	0.736	2.017
	No	70	56	76	60.8			
Mother's Drug use	Yes	48	38.4	42	33.6	0.429	0.734	2.067
	No	77	61.6	83	46.4			
Father's Sickness	Yes	48	38.4	53	42.4	0.519	0.511	1.404
	No	77	61.6	72	57.6			
Vaccination	Yes	125	100	125	100	--	--	--
	No	0	0	0	0			
piped water supply	Yes	125	100	125	100	--	--	--
	No	0	0	0	0			
veg raw fruit and vegetables	Yes	97	77.6	82	65.6	0.035	1.038	3.179
	No	28	22.4	43	34.4			
Fever	Yes	60	48	91	72.8	<0.001	0.203	0.585
	No	65	52	34	27.2			
Vomiting	Yes	45	36	23	18.4	0.002	1.395	4.462
	No	80	64	102	81.6			
hand washing with soap by caregiver	Yes	110	88	113	90.4	0.541		
	No	15	12	12	9.6			

Table 3: Variables entered into the logistic regression model in the Forward Stepwise method

Forward Stepwise (Conditional)	P-value	OR	95% C.I.for EXP(B)	
			lower	upper
Age P(>3Year) – Ref.	<0.001*	---	---	---
Age P(<1 Year)	0.040*	2.763	1.049	7.280
Age P(1-3 Year)	<0.001*	5.491	2.450	12.308
season(AUTUMN/ WINTER)	0.005*	8.767	1.934	39.737
GA(Preterm/Term)	0.002*	2.607	1.428	4.758
veg(Y/N)	0.007*	2.580	5.124	5.124
fever(Y/N)	<0.001*	0.329	0.180	0.601
vomit(Y/N)	<0.001*	3.407	1.721	6.743
Fixed coefficient	0.060	0.348	---	---

Discussion

Diarrhoeal disease is the second leading cause of death among children under five years old, resulting in the deaths of 370,000 children in 2019 [1]. Additionally, it is a major contributor to malnutrition in this age group. Previous research has identified several factors that increase the risk of diarrhoea, including younger age, male gender, early weaning, seasonal variations, low maternal education, absence of piped water supply, inadequate water storage practices, younger maternal age, lack of caregiver hand washing with soap, poor sanitation, presence of visible feces in the yard, improper disposal of child feces, unsatisfactory waste management, shorter boiling duration, use of water from cistern trucks, and failure to treat water at home [2-13]. Exclusive breastfeeding serves as a protective measure against diarrhoea in young children and can mitigate its severity [13].

This study aimed to examine various socio-economic factors (such as maternal education, number of children, maternal education level, preterm delivery), environmental factors (drinking water sources, kindergarten attendance), and behavioral factors (bottle feeding, consumption of raw fruits and vegetables, hand washing with soap) as potential risk factors for diarrheal disease in young children. The findings of this study revealed that age, maternal education level, kindergarten attendance, preterm delivery, and consumption of raw fruits and vegetables were significant risk factors for diarrheal disease in children under the age of 5.

There was a significant correlation found in this study between age and the prevalence of diarrhea. These findings align with numerous studies that have demonstrated that increasing age (as opposed to gender) has a protective effect on the development of diarrhea in children, except during infancy where breastfeeding provides protection [13].

In this study, a significant relationship was observed between the winter season and the prevalence of diarrhea, which is consistent with previous studies. Various studies have indicated that certain pathogens exhibit seasonal patterns, with peaks occurring at different times of the year [14,15]. Often, the seasonality of diarrheal diseases is attributed to weather conditions, which can drive incidence through various mechanisms. Weather has been statistically linked to the occurrence of infectious diseases, including diarrhea caused by pathogens like rotavirus [16]. Rotavirus has been identified as one of the leading enteric infections in children under the age of 3-5 years. Unfortunately, rotavirus vaccination is not currently implemented in our country. Future research should assess the impact of rotavirus vaccination on risk factors for diarrhea in low-income countries.

A significant association was found in this study between the maternal level of education and the prevalence of diarrhea, which is in line with other studies [7,17]. It is important to note that a majority of the mothers in our study were employed and their children mostly attended kindergarten.

The significant relationship between kindergarten attendance and diarrhea may be attributed to the fact that children of working mothers are more likely to attend kindergarten, leading to a higher prevalence of diarrhea in this group. The role of kindergarten in this relationship may be confounded [7-19]. The findings from this study revealed a significant correlation between the consumption of raw fruits and vegetables and the prevalence of diarrhea, which is consistent with previous studies [20,21].

Our study demonstrated a significant association between preterm delivery and the prevalence of diarrhea, which aligns with previous studies [22].

Our study has several limitations: firstly, the age range of the study population was limited, and we recommend conducting a study with a larger population; secondly, we did not measure underlying factors such as zinc or vitamin A deficiencies in children, which may impact the incidence of infections; and finally, this study was only conducted during autumn and winter. Although rotavirus is prevalent throughout the year, its peak in our region occurs during winter.

Conclusions

According to the findings of this study, a significant relationship can be observed between several factors, namely age, maternal education level, Kindergarten attendance, preterm delivery, and consumption of raw fruits and vegetables, and the incidence of diarrhea.

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Data Availability: The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

Ethical Approval: HUMS.REC.1396.101.

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Informed Consent: In this study, the target population was the children with diarrhea. After consulting parents and obtaining consent from them, the present study does not include legally authorized representatives for children under 18 years old.

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