

Knowledge Related to Causes, Symptoms, Prevention Practices of Acute Diarrhea and its Management among attending Parents of under Fifteen children in a Tertiary Care Hospital in West Bengal-A Cross Sectional Analytical Study

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Abstract: ***Objective:** To estimate the level of knowledge related to causes, symptoms, prevention and management about acute diarrhea and to identify the factors associated with it. **Method:** This cross-sectional study was conducted among attending parents (N=150) of children who were admitted in the Pediatric Medicine department of SSKM medical college in West Bengal from August 1st to September 30th in the year 2022. We used a structured questionnaire to assess the knowledge related to causes, symptoms, prevention and management of Diarrhea. Assessment was done through in-person interview with the participants after taking informed consent form them. **Result:** The study found that contaminated food (62.66%) and water (59.33%) were perceived as the main causes of diarrhea by most participants. About half of the participants (49.33%) were able to identify the symptom of diarrhea as having more than three loose stools with blood in the last 24 hours. The majority (61.33%) believed that washing hands before food preparation was an effective way of preventing diarrhea, and almost all (95.3%) had knowledge of Oral Rehydration Solution (ORS). Religion, number of children, educational status, and place of residence were significantly associated ($p < 0.05$) with the knowledge score of participants. Additionally, the study revealed a moderate correlation (0.38) between educational status and knowledge score. **Conclusion:** The current study demonstrates, despite the fact that the majority of parents were aware with the ORS, there is still a knowledge gap. Utilizing health education as a vehicle to spread information and encourage good practice to prevent Diarrhea is the need of the hour.*

Keywords: Diarrhea, Knowledge, Under-fifteen children, Parents, Home management

1. Introduction

According to WHO, Diarrhea is defined as the passage of three or more loose or liquid stools per day (or more frequent passage than normal for the individual). There are three clinical types of Diarrhea: Acute watery Diarrhea – lasts several hours or days, and includes cholera; Acute bloody Diarrhea – also called Dysentery; and Persistent Diarrhea – lasts 14 days or longer. (1) Diarrhea is a sign of several bacterial, viral, and parasitic illnesses, the majority of which are spread by feces-contaminated water. The two most frequent etiological agents of moderate-to-severe Diarrhea in low-income countries are rotavirus and Escherichia coli. The risk factors for diarrheal illness include environmental variables such as poor sanitation, inadequate hand washing, and air pollution, behavioral factors such as inadequate breastfeeding, malnutrition, and vitamin-A deficiency. (2) Diarrheal illness is the second largest cause of death in children under the age of five. (1) An estimated 2 billion instances of Diarrhea are reported worldwide each year, and 1.9 million children under the age of five die from Diarrhea, predominantly in Low and Middle Income Countries (LMICs). (3) Around 52% of under-five mortality in the South-East Asian region is attributable to neonatal fatalities. Prematurity-related problems are the most frequent causes of under-five mortality in the region, followed by Pneumonia and Diarrhea. (4) Not only children Diarrhea is very fatal for every age group. It has been demonstrated that the Diarrhea related mortality rates are 32.31 (95%

confidence interval: 20.01-67.64) and 59.31 (95% confidence interval: 24.53-117.11) for men and women, respectively in 2019. In India, 2019 the under-5 mortality due to Diarrhea was 47.24 (95% C. I: 34.06-62.88). (2) According to NFHS-5, in the state of West Bengal the prevalence of Diarrhea was 6.5% (Urban-5.9% and Rural-6.7%) which was lower than the country's prevalence (7.3% with Urban-6.2% and Rural 7.7%). (5) One of the most significant interventions in the management of diarrheal illnesses is the care of young children at home. It significantly lowers infant and child mortality and morbidity. A study conducted by Haroun et al (6) showed that the relevance of home Diarrhea management stems from the fact that Diarrhea begins at home and persists at home after being examined at a health institution. A significant amount of fluid is lost in diarrheal stools, and dehydration may frequently be avoided if appropriate fluids are provided in enough amounts immediately after the beginning of Diarrhea. When supplied in big quantities, the fluids must fulfill specific characteristics. They are simple to prepare, but they must be familiar and appealing to the children, as well as effective. (6) Terefe et al conducted a study which showed that Health education and awareness programs for caregivers on diarrhea control, proper use of oral rehydration solution, home-based fluid preparation are critical for diarrhea prevention. (7)

The Government of India (GOI) in collaboration with Non-Governmental Organizations (NGOs) has taken many initiatives to combat Diarrhea, including the Intensified

Volume 12 Issue 5, May 2023

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Diarrhea Control Fortnight (IDCF) (2017), Stop Diarrhea Initiative (SDI). The objective was raising awareness, establishing ORS corners at all sub-centers, distributing ORS packets to all households with children under the age of five, and holding community demonstrations of ORS preparation in every village and urban community. (8) However, few studies have been conducted so far to assess the knowledge and factors associated with Diarrhea related cause and management in West Bengal. In line with this evidence, this study aims to find the level of knowledge related to causes, symptoms, prevention practices and management about acute diarrhea and to identify the factors associated with knowledge and management of acute diarrhea.

2. Methodology

Study design and study setting: This study was a cross sectional analytical study which was conducted from 1st July 2022 to 30th September 2022 in SSKM Medical College and Hospital, West Bengal. The participants were the attending parents of children who were admitted to the Pediatrics department of the hospital during study period. The department consists of 129 Pediatric beds with 4 SNCU beds, 16 NICU and 16 PICU beds.

Inclusion criteria: Attending parents in the Pediatric medicine department who have at least one child of under fifteen years of age.

Exclusion criteria: Not willing parents and parents who are resident of <1 year in Kolkata.

Sample size and sampling: Considering the prevalence of knowledge about diarrhea management as 45% from previous study (9) in West Bengal, precision rate of 8% with 95 % of Confidence Interval (C. I) we have calculated sample size of 149. A consecutive sampling technique was used to recruit participants. Participants meeting inclusion criteria included until required sample size achieved.

Study tool: The tool was a structured questionnaire based on knowledge related to causes, symptoms, prevention and management of Diarrhea. The validity was determined by expert advice, and changes were made according to the suggestion. A qualified individual determined the language validity. Reliability of the questionnaire was checked and a test-retest reliability of 0.80 revealed that the questionnaire was reliable. The pre-testing confirmed that the study was feasible and that the items were understandable. The length of each interview was between 15 and 20 minutes. After making a change to a question, the tool was ready for data collection. Questionnaire consist of 3 parts covering socio-demographic details, knowledge about diarrhea (Causes of Diarrhea, Sign and symptoms of Diarrhea, Prevention of Diarrhea), and practices for Diarrhea management.

Data Collection: A single investigator was involved in data collection from 1st August to 31st August 2022 using Epi-collect software (v4.1.5.). The assessment was done after describing the study procedure, objective, outcomes and consent was taken from the participant.

Operational definitions: Score was calculated as median and Inter Quartile Range. Participant whose score came in the range of first quartile classified as “Low”, second quartile classified as “Moderate”, third quartile classified as “Good” and fourth quartile “High”.

Statistical analysis: Analysis was done using SPSS (Statistical Package for Social Science) software, version 22). Continuous variables such as age were expressed as mean (SD). Categorical variables such as socio-demographic characteristics, knowledge level of participants etc. were expressed as frequency and percentage. Factors associated with knowledge score was achieved by Mann-Whitney U and Kruskal Wallis test according to the level of category and normality. A post-hoc analysis test was done to find out the intragroup association based on knowledge score. A Spearman correlation test was done to find out the correlation between knowledge score and socio-demographic variables. In the analysis, p-value of <0.05 considered statistically significant.

3. Results

In this study, the mean age of participants was 26.86 (\pm 4.86) years; a majority (67.3%) of the population were Hindu and almost half of the participants (49.3%) had single child followed by two (41.3%) and more than two children (9.3%). Among the participants almost one-third (29.3%) were Primary (1-5) educated. Among the participants, the highest prevalence (30%) for occupation of the head of the family was “skilled Agricultural & fishery worker” followed by “skilled workers and shop & market sales workers” (24.7%). In this study, almost 6 out of 10 participants were in lower middle class (59.3%) category by revised B. G. Prasad scale (2021) (10) and a quarter of the participants were in low income category (25.3%). Majority of the participants were resided in rural area (86.7%). Almost nine out of ten participants had revealed that knowledge about Diarrhea they have received from their family members (94.7%). (Table 1)

Table1: Socio-demographic characteristics of participants (N=150) from the tertiary care hospital, West Bengal, 2022

Variables		
Age (in years)	Mean	SD
	26.86	4.86
Religion	Frequency (n)	Percentage (%)
Hindu	101	67.3
Muslim	49	32.7
No of children		
1	74	49.3
2	62	41.3
>2	14	9.3
Relationship with child		
Mother	146	97.3
Father		
Other	4	2.7
Educational status of caregiver		
No formal education	30	20
Primary (1-5)	44	29.3
Middle (6-8)	39	26
High School (9-12)	30	20
Graduate or above	7	4.7

Occupation of head of family		
Professionals	2	1.3
Technicians and Associate Professionals	16	10.7
Clerks	4	2.7
Skilled Workers and Shop & Market Sales Workers	37	24.7
Skilled Agricultural & Fishery Workers	45	30
Craft & Related Trade Workers	24	16
Plant & Machine Operators and Assemblers	17	11.3
Elementary Occupation	2	1.3
Unemployed	3	2
Family type		
Nuclear	51	34
Joint	99	66
Socio economic status		
Upper (I)	1	0.7
Upper middle (II)	3	2
Middle (III)	19	12.7
Lower middle (IV)	89	59.3
Lower (V)	38	25.3
Place of residence		
Rural	130	86.7
Urban	20	13.3
Source of knowledge		
Family members	142	94.7
Family member, Print media-Newspaper	1	0.7
Family members, TV Radio-Mass media	3	2
TV Radio and Mass media, Family members	4	2.6

To assess the knowledge level of caregivers we have assigned a score of one for each right answer. Based on normality the median score for participant’s knowledge was five with an inter-quartile range 3-7. The maximum score was 13 and minimum score was zero. Almost one out of three participants scored as ‘Low’ (28%) followed by ‘Good’ (24.7%), ‘Moderate’ (24%) and ‘High’ (23.3%). (Table 2)

Table2: Knowledge level of participants (N=150) about Diarrhea from the tertiary care hospital, West Bengal, 2022

Median Score	IQR	Maximum Score	Minimum Score
5	3-7	13	0
Knowledge Level	Frequency (n)	Percentage (%)	
Low (1 st quartile)	42	28	
Moderate (2 nd quartile)	36	24	
Good (3 rd quartile)	37	24.7	
High (4 th quartile)	35	23.3	

Among the participants surveyed almost six out of ten (62.66%) reported contaminated food and contaminated water (59.33%) as causes of Diarrhea, which was followed by flies (28%), dirty utensil (16%), not properly washing hands before taking food (10%) and open disposal of feces (0.66%) and almost two out of ten people (16%) have replied with “I don’t know”. Among the participant surveyed almost half of them (49.33%) reported that “>3 loose stools with blood in last 24 hours” is the main symptom of Diarrhea. One out of three (30%) participant reported thirsty and dry mouth as symptom of Diarrhea,

which was followed by unconsciousness (28%), irritability (24.66%) and sunken eyes (6%). Among the participants surveyed almost six out of ten (61.33%) reported washing hands before food preparation and four out ten people found that washing hands before eating (44%) were the main procedure for prevention of Diarrhea. It was followed by drinking clean water (42.66%), washing hands before feeding a child (16.66%), using latrine for defecation (2%), disposing children’s faeces into toilet (1.33%) and treating water with chemicals/chlorine (0.66%). (Table 3)

Table 3: Knowledge related to causes, Symptoms and Prevention of Diarrhea reported by participants (n=150) from the tertiary care hospital, West Bengal, 2022

	Frequency (n)	Percentage (%)
A. Causes of Diarrhea		
Contaminated food	94	62.66
Contaminated water	89	59.33
Flies	42	28
Dirty utensil	24	16
I don’t know	24	16
Not properly washing hands before taking food	15	10
Open disposal of faeces	1	0.66
B. Symptoms of Diarrhea		
>3 loose stools with blood in last 24 hours	74	49.33
Thirsty and dry mouth	45	30
Lethargy / unconsciousness	42	28
Restlessness/ Irritability	37	24.66
I don’t know	10	6.66
Sunken eyes	9	6
C. Prevention of Diarrhea		
Washing hands before food preparation	92	61.33
Wash hands before eating	66	44
Drinking clean water	64	42.66
I do not know	32	21.33
Wash hands before feeding a child	25	16.66
Using latrine for defecation	3	2
Disposing children’s faeces into toilet	2	1.33
Treating water with chemicals/chlorine	1	0.66
Store water in clean container	0	0

Among the participants surveyed regarding Diarrhea related management almost half (48%) of them reported that during Diarrhea they provide breast milk more than usual and very low number (2.7%) of participants replied they provide less breast milk than usual to their child. Among the participant surveyed almost half (45.3%) of them reported that during Diarrhea they provide more water than usual to their child and very less number of participants (2.7%) replied that they provide less water to their child. Among the participants, surveyed majority (40.7%) replied that they provide same quantity of food to their child during Diarrhea episode, which was followed by “Less than usual” (38%). Almost all of the participants (95.3%) knew the use of Oral Rehydration Solution (ORS) and majority of the participants (85.3%) have ever prepared salt and sugar solution at home. (Table 4).

Table 4: Reported methods of Diarrhea related management among participants (n=150) from the tertiary care hospital, West Bengal, 2022

Various aspect of management of Diarrhea	Frequency (n)	Percentage (%)
1. Quantity of breast milk fed to child during Diarrhea episode		
a. Less than usual	4	2.7
b. Same as usual	45	30
c. More than usual	72	48
d. Child doesn't breast feed	8	5.3
e. I don't know	21	14
2. Quantity of water given to child during Diarrhea episode		
a. Less than usual	4	2.7
b. Same as usual	63	42
c. More than usual	68	45.3
d. I don't know	15	10
3. Quantity of food given to child during Diarrhea episode		
a. Less than usual	57	38
b. Same as usual	61	40.7
c. More than usual	9	6
d. Nothing to eat	1	7
e. I don't know	22	14.7
4. Oral Rehydration Solution used		
a. Yes	143	95.3
b. No	7	4.7
5. Ever prepared salt and sugar solution at home		
a. Yes	128	85.3
b. No	22	14.7

Among the participants interviewed, the difference in the median score was statistically significant between religions (p-value 0.03), number of children (p-value 0.012), educational status of caregiver (p-value <0.01) and place of residence (p-value 0.03). Table 5 (a).

Table 5 (a): Factors associated with the median score of knowledge among participants (N=150) from the tertiary care hospital, West Bengal, 2022

Variables	Median (IQR)	p-value
Religion		
Hindu	3 (2-4)	0.03*
Muslim	2 (1-3)	
No of children		
1	2 (1-3)	0.01**
2	3 (2-4)	
>2	2 (1-4)	
Educational status of caregiver		
No formal education	2 (1-3)	.000**
Primary (1-5)	2 (1-3)	
Middle (6-8)	3 (2-4)	
High School (9-12)	3 (2-4)	
Graduate or above	4 (3-4)	
Occupation of head of family		
Professionals	8.5 (7-10)	0.39
Technicians and Associate Professionals	6 (4.5-7)	
Clerks	7.5 (6.5-9)	
Skilled Workers and Shop & Market Sales Workers	5 (4-7)	
Skilled Agricultural & Fishery Workers	5 (2-7)	
Craft & Related Trade Workers	4.5 (3-8)	
Plant & Machine Operators and Assemblers	5 (3-7)	
Elementary Occupation	7.5 (3-12)	
Unemployed	6 (5.5-6)	
Family type		
Nuclear	5 (3-7)	0.83
Joint	5 (3-7)	
Socio economic status		

Upper (I)		0.08
Upper middle (II)	8 (7.5-9.5)	
Middle (III)	6 (3.5-9)	
Lower middle (IV)	5 (3-7)	
Lower (V)	4.5 (3-6)	
Place of residence		
Rural	5 (3-7)	0.03*
Urban	7 (5.25-8)	

*p-value calculated by Mann-Whitney U test. **p-value calculated by Kruskal-wallis test. p-value <0.05 statistically significant

A post hoc Kruskal-Wallis test i.e. (Dunn's test) was done to compare among the groups with 0.05 significance level. It showed there was a statistical significance between the educational level Primary (1-5)-Middle (6-8) (p-value 0.005), Primary (1-5)-Graduate or above (p-value 0.023), Primary (1-5)-High School (9-12) (p-value 0.026), No formal education & Middle (6-8) (p-value 0.029) and No formal education-High School (9-12) (p-value 0.043) and the variable No of children 1-2 ((p-value 0.02) Table 5 (b)

Table 5 (b): Post hoc analysis (Dunn's test) for the comparison of groups for educational status and number of children

Sample1-Sample2	p-value
Educational status of caregiver	
Primary (1-5)-Middle (6-8)	0.005
Primary (1-5)-Graduate or above	0.023
Primary (1-5)-High School (9-12)	0.026
No formal education-Middle (6-8)	0.029
No formal education-High School (9-12)	0.043
No of children	
1-2	0.02

A spearman correlation examined the relationship between total knowledge score of participants and educational status. The relationship was positive, moderate in strength and

statistically significant at 0.01 level ($r(150) = 0.38, p = 0.00$). Similarly, the relationship between number of children and total score was examined. That relationship was positive,

weak in strength and statistically significant ($r(150) = 0.27, p = 0.03$) at 0.05 level. (Table 6)

Table 6: Spearman correlation of total knowledge score and sociodemographic variable

Variables	Educational Status				Number of children			
	r value	Relationship	Significant value	Direction of relationship	r value	Relationship	Significant value	Direction of relationship
Total score	0.38*	Moderate	0.00	Positive	0.176**	Weak	0.03	Positive

*Correlation is significant at the 0.01 level **Correlation is significant at the 0.05 level

4. Discussion

In this study, the median score for participants about knowledge of Diarrhea was five with an IQR of 5-7. The maximum score was 13 and minimum was zero. Among the participants almost half (48%) were included into medium to high category of knowledge score. According to participants, contaminated food (62.66%) and water (59.33%) were two main reasons for Diarrhea. Almost half (49.33%) of the participants could recognize that >3 loose stools in 24 hours is the main symptom of Diarrhea. Six out of ten people can recognize that washing hands before food preparation (61.33%) and four out of ten people reported that drinking clean water (42.66%) is the way of preventing Diarrhea. We have also found that knowledge score is statistically significant with Religion (p value 0.03), Place of residence (p value 0.03), Educational status ($p < 0.01$) and Number of children (p value 0.01).

A study conducted in Madhya Pradesh (11) reported only 6.7% and 12.6% of mothers identified that contaminated food and contaminated water were the causes of Diarrhea respectively, which was much lower than our study results. Comparably better result in our study indicated that various Diarrhea related government activities with the help of many NGOs have been implemented in the state to create awareness about Diarrhea and its management.

A study conducted in Moradabad, Uttar Pradesh (12) found that 72% of mothers do not know about the symptoms of Diarrhea, which is comparably much lower than our study results. Concerningly low compliance in that area is a serious matter, which should be looked upon by the Uttar Pradesh government authority to improve in this matter. A Study conducted in Nigeria (13) showed that there is about 60% of mothers have good knowledge about Diarrhea, which is almost similar to our study results.

A study conducted in Western Ethiopia (14) revealed that only 16% of the mothers know that hand washing after visiting latrine could prevent the occurrence of Diarrhea. In our study, we have found that almost 44% of participants have knowledge of the same. Study conducted in Madhya Pradesh (11) revealed that 70.5% of participants know that hand washing prevent Diarrheal disease. Another study conducted in West Bengal (15) showed that 53.2% of participants have the idea that proper hand washing can prevent Diarrhea. The differences in study results showed that LMICs till now lacking of knowledge of Diarrheal prevention. Previous studies from our country showing that much better knowledge of Diarrheal prevention than other

LMIC, which is proving that in our country people, are much knowledgeable regarding Diarrheal prevention.

Study conducted in Nigeria (13) showed that 46.9% of mothers gave breast milk more than usual to their children, 48.9% of mothers give more water than usual to their children during Diarrheal episodes and 34.2% mothers gave less food than normal to their children for Diarrheal episodes. A study from Telangana (16) showed that 46.6% of mothers do not provide breast milk to their children during Diarrhea. In our study, we found that almost 50% of mothers know that more quantity of breast milk, more quantity of water should give to their children in Diarrhea. Almost similar results across LMICs suggest more robust steps should be taken by the Government as well as NGOs to increase the perception and knowledge regarding Diarrhea.

A study from Telangana (16) reported that 73% of mothers are aware about ORS and its usefulness in preventing Diarrhea. Study from Punjab (17) showed 53.2% of mothers know about ORS and its use. Study from Tanzania (18) reported that 68.90% of mothers have the knowledge of ORS for management of Diarrhea. There is a huge difference found in our study that 95.3% of participants have the knowledge of ORS. The overall knowledge about ORS in LMICs including India is average. More knowledge and awareness needed in our country for preventing Diarrhea. Govt. with collaboration of stakeholders should take effective steps for awareness generation about the menace so that morbidity and mortality will come down.

In our study we have found association of knowledge score between level of education (p value < 0.01), place of residence (p value 0.03). With high level of education the knowledge related to Diarrhea was increasing and participants from urban area are more knowledgeable than their counterparts. A moderate ($r(150) = 0.38, p = 0.00$) level of correlation also support this association from our study. Study from Tanzania (18) also found education level is significantly associated with the knowledge of participants about Diarrhea. Another study from West Bengal (9) also have reported that mother's education is associated with the knowledge of Diarrhea. These evidences highlight the need of health education about basic care procedure for both caregivers as well other members of family.

5. Conclusions

Participants' overall understanding of the causes, symptoms, and prevention of Diarrhea is moderate comparing to the other parts of the country. There is awareness about Diarrhea

noticed but participants are lacking the prevention part for controlling the menace. Despite the fact that diarrheal infections are a major public health problem, the condition is readily avoidable, curable, and typically self-limiting. In fact, diarrhea-related mortality and morbidity owing to dehydration and malnutrition can be avoided in a large percentage of patients by administering ORS and managing nutrition. More crucially, the World Health Organization does not encourage the routine use of antimicrobials or antidiarrheal medications, particularly in youngsters. These findings serve as a reminder that special attention should be emphasized over the importance of health educational interventions on Diarrhea, particularly for illiterates and in rural areas. The public health facility should train to orient the community about the management as well prevention and symptoms of Diarrhea so that quick responses could have been taken by caregivers of children and lower the morbidity and death.

6. Future Scope

Despite the importance of education and awareness in avoiding and controlling severe diarrhoea, there is always room for improvement. Future studies might concentrate on creating interactive and multimedia parenting education programmes that are more potent. Additionally, it can investigate the impact of cultural and socioeconomic variables on parental practises and knowledge related to severe diarrhoea and develops treatments appropriately. Future studies might also look at the use of mHealth strategies like text messaging and mobile applications to help parents better comprehend the effects of severe diarrhoea. Finally, it's important to assess how well parental knowledge and practices around acute diarrhoea have improved as a result of educational initiatives, including mobile health.

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