Original Research Article

Diarrhoea, nutrition and oral rehydration therapy: awareness, attitude and practices among mothers of children under five years

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ABSTRACT

Background: Lack of knowledge about the preventive and therapeutic measures pose a barrier in the management of diarrhoea in children.

Methods: This study was conducted to assess awareness and attitude among mothers of children <5 years, towards diarrhea, feeding practices during diarrhoea, awareness and use of oral rehydration therapy (ORT). A standard questionnaire including handwashing practice, sanitation, personal hygiene, feeding practice, knowledge about disease was the assessment tool.

Results: Of 300 mothers, 190 (62.60%) were in 20-30 years age group. Mean±SD age was 24.5±2.47 years. Literates were 78.67%; majority belonged to class III (37.69%) and IV (23.32%) socioeconomic class. Disease awareness was low (71.86%) and 68.03% were unaware of complications. Teething (32.64%), contaminated food and water (29.32%) were the main causes. Rice based food considered best (45.96%) followed by fruit juices (21.98%), boiled saboo daana (20.65%). Breast feed continued in 73.93%, solid food in 27.30%. Bottle feeding (92%) was preferred for top feeding and cleaning the bottle with boiling water was the most practiced (68.0%) method. Knowledge on oral rehydrating fluids was adequate (Home made salt and sugar solution (66.0%) and oral hydration solution (80.0%)); knowledge on correct preparation was inadequate. Not practicing proper hand wash (50.55%), wrong dilution (69.50%) and use of unsafe water (29.49%) were correctable factors. There was insufficient knowledge (89.50%) about quantity of fluid to be restored.

Conclusions: There is an urgent need to educate mothers on initial fluid replacement and hygienic practices to be followed during diarrhoea apart from improving handwashing practice, sanitation, feeding practice, knowledge about disease.

Keywords: Awareness, Diarrhoea, Feeding practices, Hand washing, Oral rehydrating therapy

INTRODUCTION

Diarrhoea is one of the major cause of mortality among children < 5 years in India, contributing to 10% infantile death and 14% death among those under <5 years.¹ Significant mortality due to diarrhoea compelled the authorities to undertake extensive measures to implement policies and programmes (immunization, program for

control of diarrhoeal diseases and respiratory diseases) to reduce the mortality rate that yielded satisfactory result. There has been significant decrease in the mortality due to diarrhoeal diseases in children <5 years in the past decade from 2.5 million (2001) to 1.5 million (2012).²

Approximately 300,000 children falling prey to diarrhoeal death trap every year, signifying the

requirement of further measures to strengthen preventive measures.³

Younger the age more proneness for diarrhoea; presence of under-five sibling in the family, birth weight are also factors to be considered while evaluating a child with diarrhoea. A positive association between low socioeconomic status, poor maternal literacy, inadequate breastfeeding, malnutrition, poor sanitation and hygiene practices of the mother are associated with a higher incidence of diarrheal diseases in young children.⁴

Diarrhoeal diseases are one of the commonest risk factor for malnutrition in younger children. Inadequate food intake is an important cause for growth flattening in diarrhoeal diseases. Poor appetite, vomiting, common practice of withholding or diluting the food are few reasons for poor nutritional intake during an episode of diarrhoea.

Available data indicate that diarrhoea is the most prevalent preventable and treatable cause of malnutrition particularly in low-income countries. As the nutritional requirement in children is high, each episode of diarrhoea results in deprivation of essential nutrition for growth, resulting in malnutrition. A vicious diarrhoea-malnutrition cycle is responsible for infection, increased morbidity and mortality, particularly in young children. The relative risk of diarrhoeal mortality significantly increases for malnourished children in 1st year of life with greatest risk during 6-11 years of age.

Management of diarrhoea is based on replenishing the lost body fluid; Oral rehydration therapy (ORT) is a simplest, affordable, and effective preventive and therapeutic medical intervention contributing significantly in reducing diarrhoea related mortality and morbidity, particularly in developing countries. Lack of knowledge about the preventive and therapeutic measures including ORT, sanitation, poor access to medical treatment pose a barrier in the management, hence, it is still a major public health concern. In addition, wrong practices such as Stopping solid food and breast feeds, decreasing semisolid food, that are prevalent remain unnoticed and unaddressed. There is also a poor knowledge about the disease, initial management, identification of signs among the mothers of these children.

It can be expected that with better understanding of the disease and preventive measures, complications can be minimised. Therefore, we attempted to assess the awareness and attitude among mothers of children aged < 5 years towards diarrhoea, feeding practices during diarrhoea, awareness and use of oral rehydration therapy.

METHODS

This academic, prospective, observational study was conducted by the department of Pediatrics of a medical

college hospital, a tertiary care centre catering mainly to the middle and lower middle class population. We initiated the study after obtaining approval from Institutional Ethics Committee (IEC).

The primary objective was to assess the maternal awareness, attitude, practices towards diarrhoea and nutritional practices during an episode of diarrhoea in their children aged <5 years. Secondary objective was to assess maternal knowledge, use and practices of usage of ORT.

We included mothers of children aged <5 years with diarrhoea. We interviewed the parents of these children after obtaining a written informed consent from them. We used a questionnaire comprising 24 questions as an assessment tool. Questionnaire included handwashing practice, sanitation, personal hygiene, feeding practice, knowledge about disease. Modified Kuppaswami's scale was used to assess the socioeconomic status of the parent.

Study protocol defined diarrhoea as the passage of ≥ 3 loose watery stool within 24 hours; a loose stool being the one that could take the shape of a container.

A single reviewer (pediatrician) interviewed the mothers after providing the questionnaire to them. At the end of the interview, mother was provided with health education to improve their knowledge of diarrhoea, nutrition during diarrhea and ORT with practical demonstration of correct oral rehydration solution preparation. An educational material containing information about the diarrhoea and ORT to improve their knowledge and management prior seeking medical help.

Statistical analysis

This was a descriptive study. Data captured on the proforma was transferred to Microsoft Excel 2007 worksheets and analysed after verifying for accuracy and completeness. Result was expressed as frequency, percentage (%), range; tables and figures were used for representing the data.

RESULTS

We interviewed 300 mothers of children < 5 years old. Each session lasted for 30 minutes and in a day not more than 5 interviews were carried out. One hundred and ninety (62.60%) mothers belonged to 20-30 years of age, 92 (30.64%) were aged > 30 years and 20 (5.94%) were below 20 years. Mean $\pm$ SD age of the participants was 24.5 $\pm$ 2.47 years.

There were 224 (74.59%) home makers, 52 (7.32%) daily workers, 20 (6.66%) professionals and four (1.33%) with unspecified occupation. Of literate mothers (n=236, 78.67%), only 16 (5.33%) were postgraduates. Sixty four (21.33%) were illiterates (Table1).

Table 1: Educational status of parents.

Education	Father n (%)	Mother n (%)
Professional degree/postgraduate	36 (12.06)	16 (5.33)
Bachelor degree holders	64 (21.44)	40 (13.33)
Intermediate/post high school certificate	80 (26.80)	34 (11.34)
High school certificate (10 th std)	26 (8.70)	80 (26.64)
Middle School (8 th std)	18 (6.03)	26 (8.66)
Primary school (5 th std)	22 (7.36)	40 (13.33)
Illiterate	54 (18.08)	64 (21.33)

N=300

Mothers belonging to socioeconomic class III and IV comprised 61.01% (n=184) and 34 (11.33%) belonged to class V (Table 2).

Table 2: Socio-economic class of participants.

Socioeconomic class	n (%)
Class I (Upper)	26 (8.69)
Class II (Upper middle)	56 (18.69)
Class III (Lower middle)	114 (37.69)
Class IV (Upper lower)	70 (23.32)
Class V (Lower)	34 (11.33)

All mothers knew the characteristics of loose stools but 288 (96.01%) did not know the exact definition of diarrhoea; 216 (71.86%) were unaware of the signs of diarrhoea. Only 94 (32.97%) were aware that diarrhoea can lead to dehydration. Knowledge of these mothers on the cause of diarrhoea was varied; teething (n=98, 32.64%), contaminated food and water (n=88, 29.32%) certain food (n=62, 20.67%) were the causes apart from solid food (n=38, 12.65%), breast milk (n=12, 3.99%). Two (0.66%) were unspecific.

Feeding during an episode of diarrhoea

Figure 1: Maternal knowledge on oral fluid replenishment.

Nearly half of the participants (n=138, 45.96%) considered rice water and rice based food as best, while

21.98% (n=66) opted for fruit juices and boiled saboo daana (n=62, 20.65%). Aerated drinks (Pepsi/cococola) were preferred by 22 (7.35%); twelve (3.40%) considered other foods as well-suited feed. We assessed mothers' knowledge on the amount of oral fluids to be given to the child during diarrhoea, only 106 (35.26%) considered increasing oral fluids was helpful (Figure 1).

Nutritional practices during diarrhoea

Approximately 3/4th of our study population (n=222, 73.93%) believed in continuing breast feeds, while only 82 (27.30%) continued solid food during diarrhoea (Figure 2).

Figure 2: Feeding practices during an episode of diarrhea.

During requirement of top feeding, 276 (92%) preferred bottle feeding over cup and spoon (n=24, 8.0%). Cleaning the bottles with boiling water was the most practiced method (n=204, 68.0%); 78 (26.0%) cleaned using only water; eighteen (6.0%) participants were not cleaning the feeding bottles. None opted for pallada feeding.

Oral replenishment

We collected information about participant's awareness about preparation of homemade salt and sugar solution (SSS) (n=198 66.0%) and oral hydration solution (ORS) (n=240, 80.0%).

Table 3: Reasons for not using ORT.

Reasons	n (%)
Did not know	60 (54.54%)
Did not feel effective	06 (5.45%)
Increase diarrhoea	04 (3.65%)
Refusal by the children	30 (27.27%)
Induce vomiting	10 (9.09%)

n=110

Correct concentration of homemade SSS was known to $\approx 1/5^{\text{th}}$ of participants (n=66, 22.0%); $4/5^{\text{th}}$ of mothers were unaware of the substance concentration to be prepared. Only 190 (63.37%) mothers used ORT; of 110

mothers who were not using ORT, lack of awareness was the major reason.

Use of oral rehydration therapy

Table 4: Use of oral rehydration therapy.

Parameters assessed	n (%)
Advised by	
Number of participants	190
Medical personnel	179 (59.98%)
Health care provider	29 (9.48%)
Relatives	13 (4.22%)
Print media	16 (5.25%)
TV/Radio	64 (21.03%)
Number of commercial brand(s) known (n=300)	
Nil	102 (34.0%)
One	186 (62.02%)
1-2	08 (2.67%)
>2	04 (1.32%)
Hand washing practice before preparing ORT	
No. of participants	190
Not washing	96 (50.55%)
With water only	38 (20.0%)
Soap and water	56 (29.45%)
Initiation of ORT with the onset of diarrhoea	
No. of participants	190
< 6 hours	38 (20.0%)
6-12 hours	114 (60.0%)
> 12 hours	38 (20.0%)

Table 5: Methods followed in the preparation of ORS.

Preparation of ORS	n (%)
Proper dilution with water	
Incorrect	112 (69.50%)
Correct	58 (30.50%)
Source of water	
Direct tap/Borewell water	56 (29.49%)
Boiled and cooled water	76 (40.01%)
Filtered water (home)	46 (24.20%)
Other sources	12 (6.30%)
Misconcept of other adjuvant commercial products as ORT	
Used	156 (82.0%)
Not used	34 (18.0%)
Awareness to estimate the quantity of ORS to be given with passage of loose stool everytime	
Known	20 (10.50%)
Not known	170 (89.50%)

A greater proportion of participants (59.98%) were advised by the medical personnel to use ORT; TV/Radio's were the source of information in 21.03%. Hand washing before preparing the ORT was not a priority for 50.55%. Table 4 summarises the practices followed with the use of ORT. We assessed the methods used in the preparation of ORS in 190 participants who used ORS; 112 (69.50%) followed wrong dilution, 56

(29.49%) used tap/borewell water without boiling or filtering (Table 5).

DISCUSSION

Synder and Merson (1982) gave the first estimate of global morbidity and mortality caused by diarrhoeal diseases.⁵ It is the second largest cause of mortality in children under five years of age. In 1992, 1000 million episodes of diarrhoea and 3.3 million deaths (1.5-5.1 million) each year in children <5 years age were reported.⁶ Continuous efforts to improve the sanitation, hygienic issues though contributed towards reducing the mortality, but offered little help in conquering the impact of diarrhoeal disease. WHO statistics indicate that 1.7 billion cases of childhood diarrhoeal diseases and around 525 000 children under five are succumbing to this preventable and treatable disease.⁷ Diarrhoeal morbidity is high in children from South Asia and Sub Saharan region. Data suggests that preventive measures have decreased the mortality by half among children aged<5, from >1.2 million (2010) to half a million (2015).⁸ However, many remain unreported, requiring proper registration of cases.

According to WHO statement, there is inadequate access to safe drinking water to 780 million people globally and 2.5 billion lack are in need of better sanitation. Diarrhoea due to infection is most prevalent in developed countries.

WHO and UNICEF have initiated diarrhoeal control programs, with greater focus on developing and under-developing countries, with a motto of providing safe drinking water and effective sanitary measures. This program is in place in many countries, including India, and helped in achieving reduction in the prevalence of diarrhoea in young children.⁹

Pillars of preventive management is providing safe drinking-water to the community, use of improved sanitation, hand washing with soap, exclusive breastfeeding for the first six months of life. In addition, good personal and food hygiene, health education about spread of infection and rotavirus vaccination.⁷

Most of the studies focussed on the influence of quality of water used for drinking and cooking, poor sanitation and hygienic measures and observed that improvement in these factors reduce the prevalence of diarrhoea.¹⁰ However, despite these measures and availability of treatment, diarrhoea is a major cause of mortality, accounting for 9% death among children aged <5 years.¹¹⁻¹² Wijewardene K et al (1992) identified the risk factors for acute diarrhoea in Srilankan children <5 years. Along with poor sanitation, waste disposal and hygienic measures, mother's education and knowledge on disease was considered as an important influencing factor.¹³ Similar observations were reported in 1997 by Mølbak K et al from Guinea Bissau.¹⁴ Ahmed M et al from Pakistan too report lack of proper sanitation facility, unavailability

of safe drinking water and inadequate breast feeding were the risk factors associated with diarrhoea in this age group.¹⁵ Mekasha A et al too observed the impact of these risk factors on diarrhoea and persistent diarrhoea in children under 5 years; in addition, incomplete immunization, attack of measles in the recent past had an effect.¹⁶ The impact of these factors have not changed much even in recent years particularly in low income countries.¹⁷⁻¹⁸

Our study population consisted of young mothers with a mean age of 24.5 ± 2.47 years, with 74.59% home makers, 78.67% were literates. Majority of these mothers belonged to lower middle and upper lower socioeconomic class.

Study participants were familiar with characteristics of loose stools but were unaware of signs of diarrhoea and 68.03% were unaware of complications. Mothers attributed diarrhoea to teething (32.64%) and contaminated food and water (29.32%). Preference of food also varied among study population with nearly half of study participants preferred rice water, Konji and rice based food (45.96%) as well suited food while 20.65% considered fruit juices and boiled saboo daana; surprisingly aerated drinks were also in the list (7.35%). Only 106 (35.26%) considered increasing oral fluids was helpful.

Breast feeding, one of the focus from WHO and UNICEF, is a proven and significant protective factor against morbidity and morbidity associated with diarrhoea, and minimizes malnutrition. Breast feeding during diarrhoea in small children was believed to be best practice among nearly $3/4^{\text{th}}$ of our study population (73.93%).

Our study showed that bottle feeding was preferred for top feeding (92%), but we noted insufficient cleaning practices (26%) and 6% used uncleaned bottles. Pallada is easy to clean but none opted or considered pallada feeding.

ORS was known to 80% of mothers while only 66% knew home made SSS but awareness about exact concentration was deficient. Lack of awareness was the major reason ($n=110$) for not using ORS of whom 60 did not know about it. Efficacy of ORS depends on correct concentration. Our study demonstrated that mothers need to be educated regarding the preparation of ORS as 69.50% followed wrong dilution, 29.49% used tap/borewell water without boiling or filtering.

Early administration ORS limits complications of diarrhoea; in our study, early administration (within 6 hrs of onset of diarrhoea) was seen in 20%, while 60.0% mothers gave ORS between 6-12 hours. A significantly greater proportion of our study population (89.50%) were not aware of the quantity of ORS to be given to their child. Another factor was misconception of adjuvant

therapy for ORT which was higher among our population.

Medical personnel played a significant role in imparting knowledge about the use of ORS (59.98%).

Importance of handwashing before preparation of food and feeding is well recognised and advocated by pediatrician to implement in daily practice. Evidences support that handwashing with water alone before preparation of food and feeding reduced the chance of diarrhoea in the child. Proper hand washing technique yielded better results.¹⁹ In the present study, hand washing before preparing ORT was not practiced by 50.55% mothers while 20.0% washed only with water.

Lakshminarayanan S et al analysed the current scenario of diarrhoeal disease among children in India and relate it to the lack of proper sanitation, lack of toilet facility. Handwashing after defaecation by caregivers and after handling children's faeces, a lesser practiced routine in rural areas can result in persistent diarrhoea. Handwashing practice among caregivers before preparation of food and feeding has a huge impact on the occurrence and outcome of diarrhoea. This study also suggests protection against rotavirus infection.²⁰

Mother's role in the management of diarrhoea in children has not received much attention. Few researchers focussed on mother's socioeconomic status, education, hygienic practices and feeding practices during the episode. The role of mother's knowledge on practicing hygienic measures, along with understanding role of ORS, administration of ORS, home made SSS contribute significantly in preventing complications such as dehydration, uncontrolled infection and death. But this factor is neglected in the management. No study has focussed solely on the role of caregiver or mother's awareness in the management of diarrhoeal disease. Ours is among the few studies assessing various aspect of mother's knowledge on diarrhoea and other related factors. Wamalwa PN report that nearly half of their study population had diarrhoea (prevalence of 46.9%); higher socioeconomic status, less bottle feeding, hand washing with soap, purified water consumption were associated with lesser prevalence of diarrhoea.²¹ Merga N et al assessed the disease knowledge of mothers of children <5 years and found that only 37.5% had adequate knowledge indicating greater proportion of the study population had insufficient knowledge. Emphasizing the importance of health education to mothers on diarrhoea in children and increasing their awareness would help in better disease management.²² Similar observations were reported by Godana W et al.²³

In Indian scenario, Shah et al studied home based management of acute diarrhoea. This study revealed a higher prevalence (30%) of diarrhoeal diseases in children above one year compared to infants (44%) with an overall prevalence of 36%. This study also assessed

caretaker's knowledge on disease, use of ORS, breast feeding practices. Symptoms of diarrhoea, including the danger sign of increased thirst and poor feeding was identified by 80% caregivers. However, knowledge regarding the use of ORS was limited to 46.5% of caregivers and of this, only 29.8% knew correct method of preparation. Knowledge on the preparation of home made solution was limited (38.7%), with SSS known to mothers (51.3%). Exclusive breast feeding was continued in infants aged 0-6 months (69.23%) and 62.20% of children aged 7 months – 5 years with an overall of 61.39%.²⁴

Knowledge of use of ORS among the mothers of children under five years has been satisfactory (73%) in India, but with a mismatch between knowledge and application.²⁵

Jousilahti P et al studied the feeding practices during diarrhoeal episode in children < 5 years of age in Egypt and use of ORS in them. ORS was given to 21.9% children with diarrhoea. Greater proportion (77.1%) of mothers knew to prepare ORS in correct dilution. Familiarity with ORS was higher (98.5%). Significant proportion of mothers (96.3%) continued breast feeding; semisolid/solid was continued in 69.8%. Fluid intake was increased only in 24.4% patients.²⁶

Muninjaya AA et al studied the management of diarrhoea at home; non-adherence to WHO Control of Diarrhoeal Diseases (CDD) Programme guidance on home case management was obvious feature. Awareness about use of ORS was good indicated by the observation that 68% mothers gave ORT to their children in the form of home made salt-sugar solution. However, majority were ignorant about correct method of preparation and dilution as only 12% knew the proper method. Use of bottle feed or solid food was restricted or stopped by over 2/3rd of mothers and 45% of breast feeding mothers increased the frequency. This study recognised the importance of mother's role in better disease management at home, identified this lacuna and recommended measures to improve implementation of health education to mothers.²⁷ These studies indicate that lack of awareness among mothers is prevalent globally.

Mother's education plays a significant role in child's wellbeing in better understanding of disease and preventive hygienic measures.²⁸ There is no exclusive study on the role of radio/television in imparted health education to public. A study in 1998 by Gorter AC et al reported that those who had radio in their house had better knowledge on hygienic measures.²⁸ This is a hospital based study, small sample study which doesn't represent all sections of the population is the limitation of present study. We did not compare level of parental education level, particularly that of mother with their knowledge on diarrhoea, use of ORT, and its effect on prevalence, severity and outcome; comparing socioeconomic status, per capita income and its impact on the timing of initiation of ORT during an episode of

diarrhoea was not correlated. We did not assess the role of family members and friends on the feeding practices and care giving during diarrhoeal episode.

We report that maternal knowledge and practices during diarrhoea in children were inadequate and grossly deficient in few areas. This could be due to more number of illiterates (21.33%) and lower level of education (13.33%). We found these practices are mainly due to social influence and cultural belief, without any scientific basis. Even those were literates, had less knowledge about diarrhoea and had little information on ORT.

Key measures in the management of diarrhoea include rehydration with oral rehydration solution to replenish the loss of fluid and electrolytes. In severe cases of dehydration, administration of intravenous fluids is recommended. Who recommends use of Zinc supplements along with ORS as it reduces the stool volume (30%) and duration of diarrhoeal episode (25%). Breaking the vicious circle of malnutrition and diarrhoea by giving nutrient-rich foods, continuing breast feeds during an episode, is another important factor to be adhered to. General health and well being of the children has to be maintained through nutritious diet, exclusive breastfeeding for the first six months of life when they are well. Importance of consulting a health professional, has to be conveyed to mothers, in particular for persistent diarrhoea or dysentery. Mothers should be educated to identify the early signs of dehydration and should be encouraged to seek medical help at the earliest. Identifying and correcting the wrong practices reduce the severity and help in better management.

CONCLUSION

There is an urgent need to train mothers on the initial fluid replacement and hygienic practices to be followed during an episode of diarrhoea. Mothers to be provided with proper health education on diarrhoea, proper sanitation habits, nutritional practices and correct method of preparation and use of oral rehydration therapy to reduce the morbidity. Programs should focus on the individual and community involvement in enforcing these.

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