Mothers' knowledge and perception of childhood diarrhea and its management with diet in north and east of Tehran

Original Article

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Abstract

Background: Different dietary practices are applied worldwide to treat diarrheal diseases. The aim of this study was to assess the mothers' knowledge and perception about childhood diarrhea and the way they manage it with diet.

Methods: This cross-sectional study was conducted on mothers who had at least one child (6 to 60 months) with diarrhea and needed home management. They were selected by multistage cluster sampling from health centers affiliated to Shahid Beheshti University of Medical Sciences. The data were collected using socio-demographic characteristics and the knowledge about the mothers' behavior related to nutritional factors during diarrhea questionnaires. The total knowledge score was 39. The classification of low, medium, high and excellent the knowledge scores was less than 20, 20-25, 25-31 and above 31, respectively. The data analysis using SPSS-18. P-value <0.05 was considered as significant level.

Results: The mean age of the mothers was 29.1 ± 4.9% years. The highest incidence of diarrhea was seen in children aged 6-24 months (52.2%). Acute diarrhea (duration < 14 days) was predominant (n = 379, 94.75%), while only 21 (5.25%) of the children reported persistent diarrhea (duration ≥14 days). The mean score of the mothers' knowledge was 23.75±4.41, ranging from 10 to 39. The mothers' knowledge score was significantly correlated with their education levels (p<0.001).

Conclusions: The mothers had little information on nutritional management of diarrhea. Therefore, the healthcare providers have a crucial role in increasing the mothers' awareness of appropriate and optimal use of a specific diet to control diarrhea.

Keywords: Diarrhea, Knowledge, Awareness, Diet, Child

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Introduction

Diarrheal disease is the second leading cause of the death among children<5 years old, and kills about 525000 children every year [1]. Roughly, 1.5 billion diarrhea cases occur annually around the world, accounting for 1.5 to 2.5 million deaths [2], involving more than 20% of total deaths [3]. According to the World Health Organization (WHO), the prevalence of diarrhea in an area indicates a poor water and sewerage system [4]. The incidence of diarrheal diseases largely depends on the seasons and a child's age. The most vulnerable group of children is the youngest one as diarrhea occurs highly in the first two years of life. However, the rate of occurrence decreases by the age [5]. In Iran, a study showed that overall 36.0% of the children aged 6-60 months had

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experienced at least one episode of acute diarrhea during the two weeks prior to the study [6]. Diarrhea is defined as the passage of three or more runny stools per day [7]. It is often a sign of an infection in the intestinal tract, which can be caused by different bacterial, viral and parasitic organisms. The infection is transmitted by polluted food or drinking-water, or from person-to-person due to the poor sanitation [8].

A variety of preventive interventions mentioned in the literature for diarrhea include drinking clean and refined water, employing modernized sanitary systems and washing the hands frequently with a soap or other disinfectants, which can decrease the risk of infection. Simple remedies such as fluid therapy with Oral Rehydration Solution (ORS) and other standard homemade solutions, female education, incessant feeding at the time of diarrhea and continued breastfeeding are the common treatments, which can reduce the mortality rate [9]. However, in developing countries, the suggested remedies have been prescribed for children with diarrhea in roughly 40% of the cases and the movement towards the extensive use of these methods has been so slow over the last 10 years [10]. Although the standard of living is promoted, public hygiene has improved, water purification has become widespread and food safety is universally recognized, diarrheal disease still inflicts a considerable loss on the economy and the society [11].

Many studies on diarrhea in children have shown that proper and prompt care is essential to reduce the negative consequences. Immediate simple interventions by mothers/caregivers for childhood diarrhea is the key to save the children's lives [12, 13]. Effective interventions can prevent most diarrhea-related casualties in children<5 years old [13]. The global coverage for most of these interventions is <50% [14]. Effective care is often insufficiently available, especially in the first 24 hours after the onset of illness and in areas where child mortality is high [15]. Sometimes, the diarrhea can be resolved by dietary promotion and/or simultaneous adoption of typical methods used for the management of diarrhea [16]. There has been a huge controversy about the best approach to dietary treatment of childhood diarrhea [17]. The mothers' or caregivers' knowledge and understanding of the types of food used in case of diarrhea may be effective in management of the disease [18]. Promoting the habits regarding food and personal hygiene is certainly a practical method to reduce the difficulty of illness in children with diarrhea [19].

In this regard, Akachi and Kaning (2010) argued that improving nutrition should serve as a key for developmental intervention, as child mortality is a serious predictor of future outcomes. In fact, people who experience high levels of complications in childhood have been shown to have reduced cognition, height and maturity, and to be at risk for further complications and mortality [20]. Poor maternal perception about diarrhea and delayed care can lead to morbidity and mortality [21].

A large number of studies conducted on mothers' knowledge of appropriate diet for childhood diarrhea indicate that mothers have no sufficient information on the etiologic factors, symptoms, treatments and caring methods of this disease [3, 9, 22]. The purpose of the present study was to assess the knowledge and understanding of mothers on childhood diarrhea and its management with diet before looking for medical care.

Methods

It was a descriptive cross-sectional study performed within 6 months (April to September 2012) using individual interviews guided by a questionnaire. First, the required permissions were received from the authorities at Shahid Beheshti University of Medical Sciences. After that, the municipal divisions covered by Shahid Beheshti University of Medical Sciences and Health Services were split into North, East and Shemiranat districts. Then, three healthcare centers were randomly chosen from each district using cluster sampling and allotted a portion to each healthcare center based on the study sample size, which was 400, and in proportion to the number of patients assigned to each center. Finally, the researchers went to the chosen centers and selected the eligible women who agreed to participate in our study and invited them for the interview.

This study was approved by the Research Ethics Committee of Shahid Beheshti University of Medical Sciences. Before completing the questionnaire, all of the participants were asked to sign an informed consent, stating that their participation in the study was voluntary. The content of the form was even read aloud to those participants who were not able to read. The participants were allowed to avoid answering any questions they liked or to leave the interview session anytime without being asked about it. All the information collected was kept strictly confidential.

The inclusion criteria were as follows: all mothers who had at least one child aged 6-60 months, and the

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child experienced at least one diarrheal episode in the 4 weeks preceding the interview. The exclusion criteria were an incomplete questionnaire or interview as well as children with chronic health conditions. The interview sessions were held at the healthcare centers by pre- trained researchers. In the end, a demographic questionnaire (including questions about age, education, job, number of children) and a researcher-made questionnaire about awareness of correct approach to childhood diarrhea were completed by each of the participants in face-to-face interviews in a private setting.

The questionnaire was designed based on mothers' awareness of diet at the time of childhood diarrhea. The mothers were also inquired about the conventional methods/treatments, meaning that they knew and adopted to manage diarrhea. In this study, acute diarrhea was defined as abnormally frequent discharge of liquid or semisolid feces from the bowel at least 3 times a day and continued for less than two weeks [7]. Moreover, the study evaluated the mothers' knowledge on how to manage diarrhea in regard to their levels of education.

The research questionnaire was written in Persian, based on a review of the relevant literature and the standardized questions from international guidelines (WHO and UNICEF Joint Statement on Diarrhea Management 2004, DHS, MICS). In addition, it was designed based on the knowledge about the mothers' behavior related to nutritional factors during diarrhea. The collection of the survey data was directly supervised by Dr. F. Imanzade, an Iranian pediatric gastroenterologist and experienced person in this field. The total score was 39 and the mean scores of the mothers' knowledge were divided into four categories: poor knowledge (a score of less than 20), moderate knowledge (a score between 20 and 25), good knowledge (a score between 26 and 31) and excellent knowledge (a score equal to or more than 32). After designing the questionnaire, the psychometric components of the preliminary questionnaire were evaluated. The validity of the questionnaire was established through content and face assessment, and its reliability was evaluated according to the value of internal consistency analysis. The standardized Cronbach's alpha reliability coefficient was 0.880.

Data analysis

First, the data cleansing was performed, meaning that the incorrect or irrelevant information was removed every day before coding and entering them into a database. The coded information was statistically analyzed for frequency, association and correlation using the Statistical Package for the Social Sciences software (SPSS 21.0) (SPSS Inc., Chicago, IL). Continuous variables were described by their means and standard deviations (SD) if they were normally distributed. Otherwise, they were described by their medians and interquartile ranges. In addition, chi-square and t-test were used. P value <0.05 was considered statistically as significant level.

Results

Overall, 426 mothers with at least one child aged 6-60 months who experienced at least one diarrheal episode for 4 weeks prior to the interview were examined. A number of 400 participants filled the questionnaire completely, leading to a response rate of 93.8%. The mean age of the participants (± SD) was 29.1 ± 4.9 years ranging from 18 to 46. The mean number of children per household (± SD) was 1.6±0.7 ranging from 1 to 6 children. The majority of respondents were housewives (n=344, 86.0%), while 56 of them (14.0%) were working in public or private sectors as well as less than one-third of them had diploma (n = 125, 31.3%). The relationship between the demographic and socio-economic characteristics of the mothers and their children who had gone through at least one episode of diarrhea and the mothers' levels of knowledge are presented in table 1. The results of the present study showed that the mothers' levels of knowledge were significantly correlated with their education levels (p<0.001) (Table 1).

There were 212 boys (53.0%) and 188 girls (47.0%) who suffered from diarrhea. However, this difference was not statistically significant. The highest incidence of diarrhea was seen in children aged 6-24 months (52.2%). Acute diarrhea (lasting less than 2 weeks) was prevalent (n = 379, 94.75%), whereas the number of the children who had persistent diarrhea (lasting more than or equal to 2 weeks) was only 21 (5.25%).

The mean score of the mother's knowledge was 23.75±4.41, ranging from 10 to 39. The percentage of mothers in each of the four categories related to their levels of knowledge was as follows: 29.9% of mothers had a low level of knowledge (score ≤20), 22.3% had a moderate level of knowledge (score 20-25), 25.8% had a good level of knowledge (score 25-31) and 21.9% had an excellent level of knowledge (score ≥32). Overall, 52.2% of the mothers had low and moderate levels of knowledge.

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The main sources of information for maternal knowledge associated with nutritional factors during diarrhea were the media (n= 184, 46%) including movies, radio, television and information received from the health system (n= 164, 41.0%). They also mentioned other people (n= 137, 34.3%), books and magazines (n= 133, 33.3%), internet (n= 17, 4.3%), kindergarten trainer (n= 10, 2.5%) and pharmacies (n= 4, 1%) as the other minor sources. Most of the mothers received the relevant information on ORS, zinc or diet from healthcare workers at public centers such as hospitals and health clinics. Overall, their major sources of information were the healthcare system and media.

Table 2 illustrates the distribution of responses to statements about maternal knowledge associated with nutritional factors during diarrhea (table 2).

Table 1. The relationship between the demographic and socio-economic characteristics of the mothers and their children who experienced at least one diarrheal episode, and the mothers' levels of knowledge (n= 400)

Variables	Group	N (%) or mean± SD	knowledge score	p-value
Mothers' age (year)	Total	29.1 ± 4.9%	Low: 28.1 ± 4.6 Moderate: 29.0 ± 4.9 Good: 29.7 ± 5.1 Excellent: 30.5 ± 4.1	P=0.117
Mothers' levels of education	Elementary	128(32.1)	Low: 61 (47.7) Moderate: 29(22.7) Good: 33(25.8) Excellent: 5(3.9)	P<0.001
	High school	169(42.3)	Low:23 (13.6) Moderate: 79(46.7) Good: 62(36.7) Excellent: 5(3.0)	
	Colleague	103 (25.6)	Low: 14 (13.6) Moderate: 44(42.7) Good: 41(39.8) Excellent: 4(3.9)	
Mothers' jobs	housewife	344 (86.0)	Low: 59 (17.2) Moderate: 164(47.7) Good: 109(31.7) Excellent: 12(3.5)	P=0.112
	Employee	56 (14.0)	Low: 7 (12.5) Moderate: 20(35.7) Good: 27 (48.2) Excellent: 2(3.6)	
The households' levels of income	Adequate	269 (67.25)	Low: 50 (16.9) Moderate: 131(48.6) Good: 78 (28.9) Excellent: 10 (3.7)	P=0.105
	Inadequate	131(32.75)	Low: 16 (12.2) Moderate: 45 (34.3) Good: 64(48.8) Excellent: 6(4.5)	
Number of children per household	Total	1.6 ± 0.7 (1-6 range)	Low: 1.5 ± 0.7 Moderate: 1.6 ± 0.8 Good: 1.6 ± 0.7 Excellent: 1.7 ± 0.7	P= 0.742

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Table 2. The distribution of responses to statements about maternal knowledge associated with nutritional factors during diarrhea (n= 400)

Items	Agree	Disagree	Correct answer
1. The child needs more fluids and water to drink during diarrhea.	390 (97.5)	10 (2.5)	390 (97.5)
2. For children with diarrhea, all kinds of fluids are useful.	133 (33.2)	267 (66.8)	267 (66.8)
3. Water should not be consumed with food and should be at intervals (e.g. half an hour).	273 (68.3)	127 (31.7)	273 (68.3)
4. Drinks containing high caffeine (such as tea and carbonated drinks) are useful for a child with diarrhea.	140 (35.0)	260 (65.0)	260 (65.0)
5. The child is allowed to continue his usual diet during diarrhea.	151 (37.8)	249 (62.2)	151 (37.8)
6. The use of high-fat food is helpful for a child with diarrhea	31 (7.7)	369(92.3)	369(92.3)
7. The use of smoked meats (such as sausages) is useful for a child with diarrhea.	23 (8.2)	367 (91.8)	367 (91.8)
8. The use of spicy foods is useful for a child with diarrhea.	40 (10.0)	360 (90.0)	360 (90.0)
9. Carbohydrates (such as rice, starch, pasta and potatoes) are useful for a child with diarrhea.	338 (84.5)	62 (14.5)	338 (84.5)
10. Very sweet foods should be removed from the diet of a child with diarrhea.	225 (56.3)	175 (43.7)	225 (56.3)
11- Fried foods should be removed from the diet of a child with diarrhea.	285 (71.3)	115 (28.7)	285 (71.3)
12. Sour foods or sour additives should be removed from the diet of a child with diarrhea.	225 (56.3)	175 (43.7)	225 (56.3)
13. Diet of a child with diarrhea should be high in calories.	203(50.8)	197 (40.2)	203(50.8)
14. Diet of a child with diarrhea should be high in protein.	239 (59.8)	161 (40.2)	239 (59.8)
15. Diet of a child with diarrhea should be numerous and low in volume.	337(84.3)	63 (25.7)	337(84.3)
16. Breast milk prevents diarrhea in children.	348 (87.0)	52 (23.0)	348 (87.0)
17. Animal milk (such as cattle and sheep) should be eliminated from the diet of a child with diarrhea.	303(75.7)	97(24.3)	97(24.3)
18. Cow's milk should be lactose-free for infants who have diarrhea.	243(86.7)	57(14.3)	57(14.3)
19. Breast milk should be discontinued during diarrhea.	44(19)	356(89)	356(89)
20. Yogurt is useful for the treatment of diarrhea in children.	384(96)	16(4.0)	384(96)
21. Probiotics (in the form of supplements or added to yogurt) are useful for treating diarrhea in children.	122(30.5)	278(96.5)	122(30.5)
22. A high-fiber diet (such as fruit and vegetables) is useful for treating baby diarrhea.	165(41.3)	235(58.7)	165(41.3)
23. Fiber should be added gradually to the baby's diet when the baby has diarrhea.	229(57.3)	71(42.7)	229(57.3)
24. Cooked vegetables should be used during diarrhea.	275(68.8)	125(31.2)	275(68.8)
25. Fresh fruit should be used during diarrhea.	305(76.3)	95(23.7)	305(76.3)
26. Peeled fruit should be used during diarrhea.	276(69)	124(31)	276(69)
27. Peaches are useful for a child with diarrhea.	134(33.5)	266(66.5)	266(66.5)
28. Pears are useful for a child with diarrhea.	144(36)	256(64)	256(64)
30. Bananas are useful for a child with diarrhea.	346(86.5)	54(14.5)	346(86.5)
31. Carrots are useful for a child with diarrhea.	232(58)	168(42)	232(58)
32. Yellow apple is useful for a child with diarrhea.	342(85.5)	58(15.5)	342(85.5)
33. Corn is useful for a child with diarrhea.	116(29)	284	116(29)
34. Soy is useful for a child with diarrhea.	123(30.8)	277(69.2)	123(30.8)
35. Honey is useful for a child with diarrhea.	140(35)	260(65)	140(35)
36. Peanut butter is useful for a child with diarrhea.	50(12.5)	350(87.5)	50(12.5)
37. Industrial fruit juice (such as Sandis) is useful for a child with diarrhea.	90(22.5)	310(77.5)	310(77.5)
38. Pretzel sticks and salted biscuits are useful for a child with diarrhea.	113(28.3)	287(71.7)	113(28.3)
39. Plums are useful for a child with diarrhea.	96(24)	304(76)	304(76)

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As shown in table 2, in some items of the questionnaire concerning the home cares and diet of children with diarrhea, less than half of the mothers answered the questions correctly, indicating the mothers' low levels of awareness in these cases.

Discussion

The most important finding of the present study was that the mothers' awareness about the diet of children with diarrhea was low and in some items very low. These results are consistent with other studies [9, 23, 24]. It is a sure thing that the majority of childhood diarrhea cases can be cured by simple approaches such as persistent feeding or drinking lots of fluids [25]. As a result, it is highly necessary to create useful educational programs to improve the regular approaches towards the management of childhood diarrhea in health-care settings [26]. Diarrhea is becoming a forgotten killer despite its high mortality rate (16%) in children <five years old. In addition, further efforts are required to educate the general public, especially the mothers, in the available prevention and management modalities [6].

The results of the present study indicated that the highest incidence of diarrhea was observed in children aged 6-24 months, which is consistent with the results of other studies [27, 28]. A multiple indicators survey performed by National Centre for health information and UNICEF (2000) reported that the prevalence rate of diarrhea in children <five years old was 27%, while it was 39.2% in children <two years old [29]. One of the reasons why the prevalence of diarrhea increases between the ages of 6 and 24 months can be the introduction of complementary food and the unsanitary preparation of weaning food [18].

Another finding of the present study was that compared to those mothers with lower levels of education, the ones who had higher levels of education pursued a higher level of care for their children. These mothers are usually able to employ health-related information and services in a better way and are efficiently prepared to make proper decisions in this regard. This finding is coherent with the findings of the study of Thiem et al [27].

There were three major limitations in this study that could be regarded in future researches. The first was that the present study was mainly focused on mothers of children <5 years old who had gone through a diarrheal episode for 4 weeks before beginning the study. The present study excluded the mothers whose children had no diarrhea which might have limited the analysis power of the study. The second limitation was caused by the potential misclassification of the clinically defined cases of diarrhea, which was highly dependent on the reports of watery stool and stool consistency provided by the mothers. There was no way to confirm the precision of these reports, and the etiology of the diarrheal cases reported in this way was not confirmed by any laboratory. Nevertheless, the application of these methods had been widely mentioned in the literature [27]. The third limitation lies in the cross-sectional nature of this study. Since the mothers were asked to recall the incidents that had occurred in the preceding 4 weeks, they presumably did not have a clear memory of what had happened and might have provided inaccurate data they might have over-stated the longer episodes or underreported the shorter episodes that had already been cured. Consequently, the conclusions made about the approaches toward the management of diarrheal cases might have totally been affected.

Regardless of these limitations, the most important strength of this study was that it was conducted in different centers with a large sample size and a diversified population.

The findings of this study, which are directly associated with the public health, suggested that the educational messages addressing diarrhea should be improved and become context-specific.

Moreover, it is recommended that the authorities should formulate and evaluate the role of the dietary habits and traditional rituals related to this issue in different ethnicities and languages, especially in places where several different people live together. Furthermore, developing and implementing educational programs about diarrhea that encourage mothers to give more fluids to their babies and provide proper nutrition for them instead of reducing their nutritional intake during diarrhea can be highly effective and yield positive results.

In conclusion, the current study indicated that the mothers' levels of knowledge about diarrhea and its dietary management were low, and less than half of the mothers (40%) had a good or excellent level of knowledge. It is necessary to enhance the improvement and execution of pertinent policies for control and management of diarrhea in Tehran and other parts of Iran. It is highly proposed that the mothers, especially those who do not currently use any public health

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services, should be included and addressed in the health education programs and mass media. Moreover, the healthcare workers play a critical role in increasing the mothers' awareness of the correct and efficient adoption of specific diets. If the mass media and health personnel work together, they can present the mothers with the required knowledge on the profits of using diets and other simple home remedies to manage diarrhea properly. Therefore, the only effective way to promote the management of diarrhea in younger children is achieved through increasing the mothers and caregivers' levels of knowledge.

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Author contributions: F.S and F.I contributed to the study design and execution, data analysis, manuscript drafting and critical discussion. F.N.A and A.S contributed to the data analysis, manuscript drafting and critical discussion. All authors were involved in the preparation of the manuscript and approved the final manuscript.

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