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Attitude of Mothers Toward Home Management of Acute Diarrhea in Children Under Five Years of Age

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Abstract

A descriptive study conducted in Hail city (north-western Saudi Arabia, has a population of 412.758 according to Ha'il Province in 2010). Study aim to assess knowledge of mother about acute diarrhea in children under five years in Hail city (north-western Saudi Arabia), and to assess the attitude of mothers of home management of acute diarrhea. A questionnaire was used to collect data from 522 mothers of children under five years old whom suffered from diarrhea during the last year were included in the study. Mothers whose children didn't have diarrhea during the last year were excluded. Questionnaires were distributed directly to the mothers and through social media. The data were statistically analyzed using SPSS 19 program for Windows. The study started from October 2015 to February 2016, that included 522 mothers, most of the mothers are educated, and half of them were between 21-30 years of age. 37.4% of mothers increase fluid during diarrhea, most of them gives artificial feeding only. Also, half of the children showed sign of dehydration. It's concluded that considerable number of mothers have unfavorable attitude towards the management of acute diarrhea at home. So, they need health education.

Key Words: *mothers, home management, acute diarrhea, children, five years*

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1.1. Introduction

Diarrhea is one of the most common diseases in the world. Although the majority of diarrhea episodes are not severe and may not require specific intervention, a large number are potentially fatal especially in children [1]. Diarrhea is defined by the World Health Organization (WHO) as three or more watery or loose bowel movements in a 24 hour [2].

1.2 Types of diarrhea

There are five types [2-5]:

1. Acute diarrhea is defined clinically as any sudden and significant increase in the frequency or decrease in the consistency of the stool lasting less than two weeks.

2. Chronic diarrhea lasting longer than two weeks, if resolved within a month ,it is known as persistent diarrhea.

3. Secretory diarrhea occurs when there is an increase in the amount of fluid being drawn into the lumen of the bowel such that the ability of the intestine to absorb is overwhelmed.

4. Osmotic diarrhea occurs when there is a dysfunction in the ability of the intestine to reabsorb fluid as it flows through the lumen.

5. Bloody diarrhea is a potentially critical condition in which there is blood mixed in with loose, watery stools. Bloody diarrhea is often a sign of gastrointestinal bleeding due to injury or disease. For examples ,the causes that cause bloody diarrhea are : (campylobacter ssp , shigellosis , salmonellosis , Enteric fever , enterohemorrhagic E. coli, Clostridium difficile) , and less common causes include (Yersinia, E. histolytica, Aeromonas species and Plesiomonasshigelloides).

6. There are two types of bloody diarrhea :Acute bloody diarrhea can last for a short time and disappear relatively quickly, such as when it is due to a gastrointestinal infection [5]. Chronic Bloody diarrhea can also recur over a longer period of time, such as when it is due to inflammatory bowel disease.

1.3. Epidemiology of acute diarrhea

It is estimated that three to five billion cases of gastroenteritis resulting in 1.4 million deaths occur globally on an annual basis[6,7], with children and those in the developing world being primarily affected [8]. In 1980, gastroenteritis from all causes caused 4.6 million deaths in children, with the majority occurring in the developing world [9]. Death rates were reduced significantly (to approximately 1.5 million deaths annually) by the year 2000, largely due to the introduction and widespread use of oral rehydration therapy [10]. In the US, infections causing gastroenteritis are the second most common infection (after the common cold), and they result in between 200 and 375 million cases of acute diarrhea and approximately ten thousand deaths annually[11,12], with 150 to 300 of these deaths in children less than five years of age[13]. In 2011, there were about 1.7 billion cases resulting in 0.7 million deaths [14] , with most of these occurring in the world's poorest nations [11]. More than 450,000 of these fatalities are due to rotavirus in children under 5 years of age [15,16]. In the developing world children less than two years of age frequently get six or more infections a year that result in clinically significant gastroenteritis [11]. It is less common in adults, partly due to the development of acquired immunity [12].

In Saudi Arabia, 7.9% male and 7.1% female children had diarrhea which constituted nearly two episodes (1.95) of diarrhea per child per year. The rates between the male and female were not significantly different except for a higher rate ($P<0.05$) in female children aged 18-23 months. The prevalence rate was higher in children aged from 6 to 23 months ($P<0.01$) than in children of other age groups. The youngest group of children (0-5m) had a lower rate than 6-23 month-old children ($P<0.005$). The Prevalence rate declined from 8.2% at two years of age to 3.6% at five years. The highest rate (14.3%) was in the age group 12-17 month-old children.[4]. There are no previous reports on etiology of pediatric gastroenteritis in Hail - which is located in north-west Saudi Arabia-. Knowledge of the etiology of diarrhea is not only important for implementation of appropriate public health measures to control these diseases but also, in many cases, for correct treatment [17].

1.4 Etiology

Diarrhea can be caused by infection and non-infection agent. Infectious diarrhea is a medical condition from inflammation of the gastrointestinal tract that involves both the stomach and small intestine . It causes some combination of diarrhea, vomiting, abdominal pain and

cramping. Non-infectious diarrhea causes like bacterial toxins, certain drugs (including chemotherapy), radiation therapy, poisoning and environmental toxins may also cause acute gastroenteritis. These cases of gastroenteritis may resolve once the causative factor is removed or expelled from the gut [2].

1.5. Causes and symptoms

1. Virus :Causes about 70% of episodes of infectious diarrhea in the pediatric age group , for examples: Rotavirus , Noroviruses (Norwalk-like viruses) , Enteric adenoviruses , Caliciviruses, Astroviruses ,Enteroviruses[18]. Rotavirus is the most common virus (50%) that cause severe diarrhea among infants and young children[19]. It is a genus of double-stranded RNA virus in the family Reoviridae[20] , and transmitted by the focal-oral route . It infects and damages the cells that line the small intestine and causes gastroenteritis [21]. The Symptoms will be fever, vomiting, watery diarrhea , abdominal pain may also occur, infected children may have profuse watery diarrhea up to several times per day. Symptoms generally persist for three to nine days [18].

2. Bacteria : Is the second most common cause of acute diarrhea (10-20 %) , for example : Campylobacter jejuni, Non-typhoid Salmonella spp, Enteropathogenic E. coli, Shigellaspp ,Yersinia enterocolitica, Shiga toxin producing E .coli, Salmonella typhi and S paratyphi, Vibrio cholerae. Most common bacterial cause acute diarrhea is Campylobacter jejuni and E.coli.

A. Campylobacter jejuni is a species of bacterium commonly found in animal feces. It is curved, helical-shaped, non-spore forming, Gram-negative, and microaerophilic. Some people who have a Campylobacter infection have mild symptoms such as a few loose stools per day, probably would not seek medical attention, since the symptoms would resolve on their own[18, 22]. When full-blown symptoms occur, they usually begin two to seven days after exposure to Campylobacter. At first, the patient have a 12- to 48-hour period of fever, headache, muscle aches, and malaise. These early symptoms are followed by cramp abdominal pain and diarrhea, sometimes with nausea and vomiting. There may be up to 10 loose , watery stools per day and some blood in the stool[23].

B. Escherichia coli is also known as E. coli is a Gram-negative, facultative anaerobic, rod-shaped bacterium of the genus Escherichia that is commonly found in the lower intestine of warm-blooded organisms (Endotherms)[24]. E. coli and other facultative anaerobes constitute about 0.1% of gut flora[25], and fecal–oral transmission is the major route[26]. Some patients are asymptomatic, and other patients may have at first watery diarrhea then becoming bloody, abdominal cramping, tenderness, Nausea and vomiting [27].

3. Parasitic : Is less common cause of acute diarrhea (less than 10 %) , example of parasites that cause acute diarrhea include Giardia lamblia, Entamoebahistolytica, and Cryptosporidium.

A. Giardia lamblia is most common causative agent of epidemic & endemic diarrhea throughout the world. It's a flagellated protozoan parasite that colonized and reproduces in the small intestine, causing giardiasis[28]. The etiologic agent is G.intestinalis exists in second stages –trophozoite& cyst- , and the most common sites are duodenum, jejunum & upper ileum. The infective stage is mature cyst passed in feces of man , and definitive host-Giardia infects humans, cats, dogs and birds. Mammalian hosts also include cattle, beavers, deer, and sheep[29]. The Routes of transmission is feco-oral , Person to person (poor hygiene)[30] , and patients may have diarrhea that lasts ten days or more (It's may be explosive and very foul smelling) ,abdominal pain , nausea , vomiting , fever , chills , bloating , gas and weight loss [31].

B. Amoebiasisis a cause of diarrhea among travelers to developing countries. Most commonly affects young to middle-aged adults. The types of amoebiasis are amoebic dysentery, extraintestinalamoebiasis, usually amoebic liver abscess; "anchovy sauce";

amoeba cutis; amoebic lung abscess ("liver-colored sputum").The most common site of entamba are colon and cecum . The infective stage is tetra-nucleated cyst and definitive host is human. The route of entry and transmitted by Ingestion of mature cyst through contaminated food or water , and the symptoms will be bloody diarrhea , abdominal pain , fever , nausea and vomiting[32,33,34].

4. Other causes [3]**:**

a. Anatomic defects:malrotation, short bowel syndrome.

b. Malabsorption:disaccharidase deficiencies, glucose-galactosemalabsorption.

c. Endocrinopathies :thyrotoxicosis, addison disease.

d. Food poisoning :heavy metals ,mushrooms.

e. Neoplasms :neuroblastomas , carcinoid.

f. Miscellaneous, milk allergy , immune deficiency disease.

1.6 Investigation [35]

1. Blood tests is full blood count (FBC), renal function and electrolytes for patients in the hospital setting. Perform a blood culture if giving antibiotic therapy. Children with E. coli O157 infection require specialist advice on monitoring for hemolytic uremic syndrome.

2. Stool samples for microscopy (include ova, cysts and parasites), culture and sensitivity , RBC to detect if bloody diarrhea or not , and to detect any bacteria. Usually use in outbreaks - e.g., in schools ,and **stool sample use if**: Figure 1 [36] shows how to collect stool sample.

1.When suspect blood and/or mucus in the stool.

2.The child is immune-compromised.

3.Or child has recently been abroad.

4.The diarrhea has not improved by day seven.

5.There is uncertainty about the diagnosis of gastroenteritis.

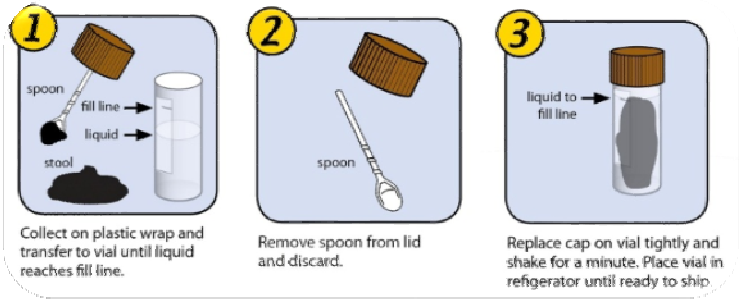

Figure (1) : Method of collecting stool sample

1.7 Complication

The list of complications in various sources for Gastroenteritis includes:

1. Dehydration and shock is an abnormal condition in which the body's cells are deprived of an adequate amount of water. It's due to diarrhea cause excessive loss of fluid especially in someone who don't drink enough water and fluids . It's can be mild, moderate or severe and life-threatening. Infants, children and athletes are particularly prone to dehydration and severe complications. Symptoms will be thirst, dry mouth and tongue, cold hands, fatigue and dark, small amount of urine[37]. **Types of dehydration :**[38] **a. Isotonic** is an equal loss of sodium and water results in hypovolemia. Laboratory findings indicating this type of dehydration include normal serum sodium 135-145 mEq/L, serum osmolality > 290 mOsm/L, and urine osmolality > 500 mOsm. **b. Hypertonic** occurs when water loss is greater than salt loss. Laboratory values reflecting this type of dehydration include serum sodium > 150 mEq/L, serum osmolality > 290 mOsm/L, and urine osmolality > 400 mOsm. **c. Hypotonic** istype of dehydration occurs when salt loss is greater than water loss. Laboratory findings consistent with hypotonic dehydration include serum sodium < 120 mEq/L, serum osmolality < 290 mOsm/L, and urine osmolality > 500 mOsm. **In severe dehydration** the patient will be in shock. So, the symptoms of shock include low blood pressure, rapid heart rate, difficulty breathing, pale skin, excessive sweating, excessive sleepiness, fainting, cool limbs, confusion, and coma.

2. Electrolyte imbalance is constantly shifting due to fluctuating fluid levels in the body, for example: when you sweat as a result of exercise, hot weather, or illness, some electrolyte levels may be low. Vomiting and diarrhea are other causes of electrolyte imbalances, as they result in excessive fluid loss. Patients must replenish these fluids and electrolytes in order to prevent dehydration, a potentially life-threatening condition. Electrolyte imbalances can be caused by a deficiency or an overabundance of minerals in the body, for example: hypokalemia, acidosis, hyponatermia or hypernatremia [39].

3. Pseudomembranous enterocolitisis colitis (inflammation of the large intestine)resulting from infection with Clostridium difficile , spore-forming bacterium. It causes an infectious diarrhea called C. difficile associated diarrhea (CDAD). Latent symptoms of Clostridium difficile infection (CDI) often mimic some flu-like symptoms and may mimic disease flare-ups in people with inflammatory bowel disease–associated colitis. C. difficile releases toxins that may cause bloating and diarrhea, with abdominal pain, which may become severe. It is thought to occur when this bacterium replaces normal gut flora that has been compromised, usually following antibiotic treatment for an unrelated infection. The disturbance of normal healthy bacteria may provide C. difficile an opportunity to overrun the intestinal microbiome. It is a type of antibiotic-associated diarrhea [40].

4. Hemolytic uremic syndrome is a condition that results from the abnormal premature destruction of red blood cells. Once this process begins, the damaged red blood cells start to clog the filtering system in the kidneys, which may eventually cause the life-threatening kidney failure. Most cases of HUS develop in children after two to 14 days of diarrhea -often bloody- due to infection with a certain strain of Escherichia coli (E. coli) [41].

5. Loss of weight is due to loss of nutrients in recurrent diarrhea.

1.8 Management of diarrhea

The management of acute diarrhea first it well be home management if the home management doesn't work or there is complication then have to take hospital management .

- **a. Home management** [42]**:** Acute-onset diarrhea is usually self-limited; however, mother's attitude and how they treat their children at home has it major effect on the outcome are three advised :

1. Give the child more fluids than usual, to prevent dehydration.

2. Give the child plenty of food, to prevent under-nutrition.

3. Take the child to a health facility if the diarrhea does not get better, or if signs of dehydration or another serious illness develop.

b. Hospital management :

Management is generally supportive: In most cases, the best option for treatment of acute-onset diarrhea is the early use of oral rehydration therapy (ORT). However , IV fluid replacement use in case of severe diarrhea especially in children and hospitalization . Antimicrobial and anti-parasitic agents may be used to treat diarrhea caused by specific organisms and/or clinical circumstances. Such medications include the following [43-45]:

1. **Sulfamethoxazole and trimethoprim** are active agonist to E.coli.
2. **Anti-diarrhea medicines** are used to reduce the number of trips that you need to make to the toilet when you have diarrhea. Two main types of anti-diarrhea medicines are used to treat diarrhea. These are called anti-motility medicines and bulk-forming agents. Anti-motility medicines are used to treat acute diarrhea. They include codeine phosphate, co-phenotrope, loperamide, and kaolin and morphine mixture. The most commonly used anti-motility medicine is loperamide. Kaolin and morphine mixture is very rarely used to treat diarrhea nowadays. Anti-motility medicines are not advised for children under the age of 12. Bulk-forming agents are used for people who have diarrhea because they have irritable bowel syndrome. They include ispaghula husk, methylcellulose and sterculia [44].
3. **Nitazoxanide**is used to treat diarrhea in adults and children caused by the protozoa Giardia lamblia. Nitazoxanide is also used to treat diarrhea caused by the protozoa Cryptosporidium parvum. These conditions are also sometimes referred to as travelers' diarrhea [45].

1.9 Prevention

Prevention will be in two steps first change in lifestyle, second gets vaccine:

1.9.1.Change in lifestyle:

- Personal measures (such as hand washing with soap) have been found to decrease rates of gastroenteritis as much as 30%[46].
- Alcohol-based gels may also be effective[46].
- Breastfeeding is important, especially in places with poor hygiene, as is improvement of hygiene generally" reduces both the frequency of infections and their duration "[8] .
- Avoiding contaminated food or drink should also be effective[47].

1.9.2.Vaccination:

The most important vaccine is rotavirus and WHO recommended that be included in routine vaccinations especially in areas where the disease is common. It is given by mouth and requires two doses[48]. It should be given first dose in two months of age and second dose in four months of age[49].*shown in figure 2.There are two types of rotavirus vaccine :

a. Rotarix : Is a monovalent, human, live attenuated rotavirus vaccine containing one rotavirus strain of G1P specificity [50]. *The vaccine type that use in KSA is Rotarix.(shown in figure 2: [49])

b. RotaTeq : Is a live, oral pentavalent vaccine that contains five rotavirus strains produced by reassortment [51].

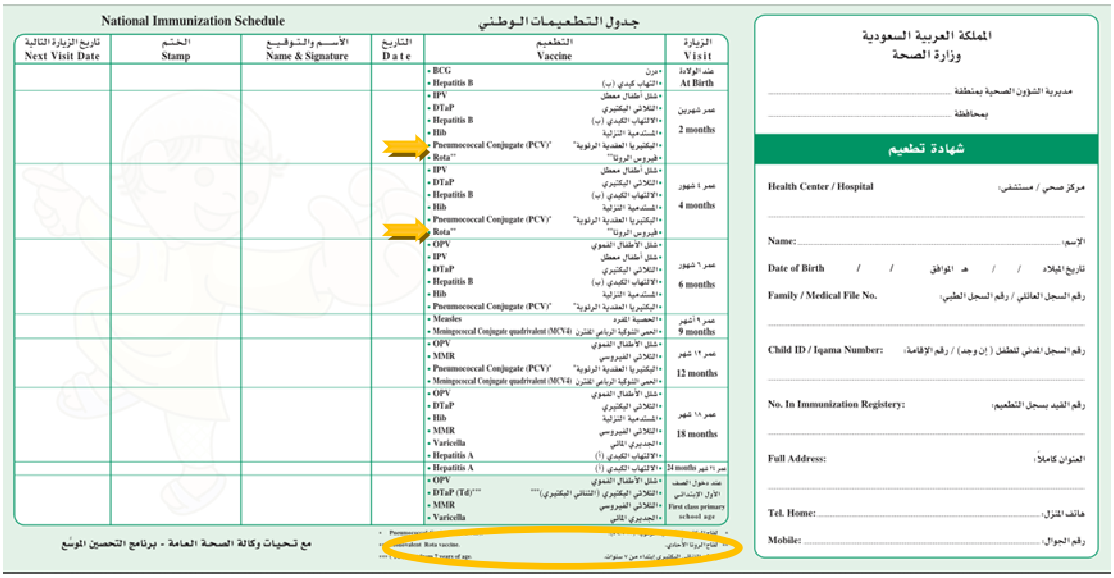

Figure (2) : Rotarix Vaccine use in KSA.

1.10. Objective

Study aimed to determine the knowledge of mother about acute diarrhea in children under five years in Hail city (north-western Saudi Arabia), and to assess the attitude of mothers of home management of acute diarrhea.

1.11. Justification

Diarrhea is one of the most common medical problems in children. Home management is an effective tool to reduce diarrhea complications and to decrease the hospital admission.

2. Methods

This is a descriptive cross sectional community based study done in Hail city (located in north-western Saudi Arabia and has a population of 412.758 according to Ha'il Province in 2010), The data were statistically analyzed using SPSS 19 program for Windows.522 of the mothers of children under five years old who have diarrhea during the last year were included in the study. Mothers whose children didn't have diarrhea during the last year were excluded. A questionnaire was used to collect data (attached) were distributed directly to the mothers and through social media.

3. Results

The current study was included 522 mothers who have one or more children less than five years of age who had at least one attack of acute diarrhea during the last year. Most of the mothers were between 21 and 30 years of age (52.3%) "table1" , and most of them are college graduates (66.7%) "Table 2" . The associated symptoms with diarrhea were vomiting (31.6%),fever (37.0%), and most of children showed symptom of dehydration (55.7%) " Table3".

The duration of diarrhea of most children was less than seven days (61.7%) "Table 4", and the type of diarrhea of most children was watery diarrhea (82.2%)"Table 5". (37.4%) of mothers give their children more fluid" Table 6", and the most type of fluid was artificial feeding (46.0%)"Table 7", and (37.0%) showed no special preference for any food during current attack of diarrhea "Table 8". (91.4%) of mothers took their children for health facility "Table 9", and (35.1%) of consultation were from government hospital "Table10". (33.0%) of children received antibiotic "Table 11", and in (24.0%) the prescription was from doctors "Table 12".

Table 1: Age of mothers

Age of mothers	Percent
<20 years	5.6
21-30	52.3
31-40	35.2
>41 years	6.9
Total	100

Table 2 : Education level of Mothers

Education level	Percent
Illiterate	3.4
Primary	3.1
Medium	5.4
High school	18.2
College graduate	66.7
Master	2.2
Doctorate	1.0
Total	100

Table 3 : Present Symptoms

Symptoms	Percent			
	Yes	No	I don't know	Total
Dehydration	55.7	23.0	21.3	100
Vomiting	31.6	59.8	8.6	100
Fever	37.0	57.5	5.5	100

Table 4 : Duration of diarrhea

Duration of diarrhea	Percent
Less than 7 days	61.7
One week to two weeks	28.7
More than two weeks	6.2
I don't know	3.4
Total	100

Table 5 : Type of diarrhea

Type of diarrhea	Percent
Watery	82.2
Bloody	2.5
I don't know	15.3
Total	100

Table 6 : Intake of fluids during diarrhea

Did you give your child fluid ?	Percent
Less	17.2
More	37.4
Same	31.4
I don't know	14.0
Total	100

Table 7 : Type of fluids consumed during diarrhea

Type of fluid was ?	Percent
Breastfeeding	11.1
Tea	8.2
Juice	5.0
Artificial feeding	46.0
Water	16.3
ORS	13.4
Total	100

Table 8 : Amount of food consumed during diarrhea

Did you give your child food ?	Percent
Less	38.7
More	19.5
Same	37.0
I don't know	4.8
Total	100

Table 9 : Asking for treatment of diarrhea

Did you ask for treatment of diarrhea ?	Percent
Yes	91.4
No	8.6
Total	100

Table 10 : Persons asked for treatment of diarrhea

Who you ask ?	Percent
Family	5.4
Pharmacy	2.1
Health clinical	3.6
Health center	15.3
Private hospital	34.7
Government hospital	35.1
Internet	3.8
Total	100

Table 11 : Treating diarrhea with antibiotics

Did you give your child antibiotic ?	Percent
Yes	33.0
No	67.0
Total	100

Table 12 : Source of antibiotics prescription

Who give you antibiotic ?	Percent
Family	2.9
Pharmacy	6.1
Doctor	24.0
Don’t take antibiotic	67.0
Total	100

4. Discussion

The mother is the key person. Her knowledge, practices and attitude is of great importance. In our study the age of mothers were between 21 to 30 years (52.3%) and were college graduate (66.7%). (31.6%) of children had vomiting , fever (37.0%), and (82.2%) were watery diarrhea, Where in study done in Najran in the year (2013)[17] (32.2%) of the mothers age were ≤ 25 years and (56.7%)were illiterate . (64.1%) of children had vomiting , fever (80.4%), and (58.3%) were watery diarrhea. In our study the children with acute diarrhea received antibiotics (33.0%), but in Najran the children with acute diarrhea received antibiotics (17.8%), in Egypt [50] which showed that (75.0%) of children had received antibiotics, and in Kashmir which showed that (77.0%) of children with diarrhea received antibiotics, although the percentage of children received antibiotics are less in our study than in other studies but it still high. Only(13.4%) of children received ORS in this study which considered low, but it is also low in other studies; Egypt (25.0%), and in Kashmir [42](8.7%) of children had received ORS. In this study only (37.0%) showed no special preference for any food during current attack of diarrhea and more than half of children showed symptom of dehydration (55.7%). But in Kashmir (48.0%) of mothers showed nonspecial preference for any food, and only (19.5%) children showed signs of dehydration.

5. Conclusion and Recommendations

The study showed unfavorable attitude of the mothers towards the management of acute diarrhea at home; that most of them did not increase fluid intake and breast feeding, few of them used ORS and many of them used antibiotics for the acute watery diarrhea. According to our study we suggest to universalized with the general population by educating the public and to train health workers about complication of acute diarrhea in children under five years , benefits of ORS , and breastfeeding via education in school, social media and mass media. Also, in health center.

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