

Factors Related to the Occurrence of Diarrheal Disease in Under-Five Children of IDP's in Bosaso, Puntland-Somalia

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Abstract: Globally about 4 million cases of diarrhea are recorded annually and this causes about 2.2 million deaths, mostly among children under the age five. About 50% of deaths are due to acute watery stool, 35% are due to persistent diarrhea and 15% are due to dysentery. A cross-sectional descriptive study was conducted in Bosaso, Puntland, Somalia to identify the factors (socio-demographic characteristics of caregivers, child characteristics, environmental and sanitation factors) related to the occurrence of diarrheal disease in under-five children in Bosaso district IDPs, Somalia. Data of 245 caregivers of the under-five children were collected from four IDPs, during the summer season (June-July, 2015). Data were collected by structured questionnaire and face-to-face interviews in all IDPs. Odds ratio was used to identify factors related to the occurrence of diarrheal disease. Most caregivers reported no diarrhea in their children in the month prior to the day of the interview, 7.34% reported one episode and only 2.85% reported two episodes and 0.4% reported 3 times. 89.7% had watery type of diarrhea. Diarrhea also occurred more often in children who were not exclusively breastfed. However, there was statistically significant association (O.R.= 3.3845). The other factors that were statistically significant associated with the occurrence of diarrheal disease included: unhygienic drinking water storage (O.R.= 1.2748) and unhygienic homes (O.R = 2.3652). Clean Storage of drinking water and hygienic drainage system should be encouraged to all caregivers. Exclusive breastfeeding should be encouraged for prevention of diarrhea for all infants.

Key words: Caregivers Children Bosaso Sanitation Diarrhea and IDP'

INTRODUCTION

Diarrhea is a major public health problem especially in developing countries where it is a leading cause of childhood morbidity and mortality [1]. Diarrhea becomes the major burden of all water and sanitation related diseases. Globally about 4 million cases of diarrhea are recorded annually and this causes about 2.2 million deaths, mostly among children under the age five [2]. About 50% of deaths are due to acute watery stool, 35% are due to persistent diarrhea and 15% are due to dysentery [3]. According to WHO, in developing countries, diarrhea is the major cause for child death when children are less than five years old [4]. Diarrhea mortality is mainly due to dehydration which is the first direct consequence [3]. Diarrhea morbidity is one of the major

health burdens among infants and young children in low income countries [5]. An incidence of 3.2 episodes of diarrhea per child per year among children below five years old was estimated between 1990 and 2000 within 20 countries [6]. The immediate impact of diarrheal infant diseases in terms of morbidity, hospitalization and death has been proved in several studies [3].

In developing countries, diarrheal diseases represent one third of the hospitalizations [6]. Children who were not looked after by their mothers and those were partially breastfed or weaned children are at risk for diarrheal morbidity [7]. The long term consequence is under nutrition when episodes are repeated and prolonged [8] Poor socio economic status, sanitation and living conditions, nutrition and hygiene behavior are the health determinants for diarrhea prevalence [7].

In Africa and especially Sub-Saharan Africa, diarrheal diseases account for over 90% of deaths in children below five years old [9]. This has been attributed to lack of safe drinking water, sanitation and hygiene as well as poor nutrition [10]. Accordingly, improved water sources reduce diarrhea morbidity by 21%, improved sanitation by 37.5% and hand washing by as much as 35% [11]. WHO/UNICEF, 2006 further observes that the regions with the lowest coverage of improved sanitation in 2006 were Sub-Saharan Africa (31%), Southern Asia (33%) and Eastern Asia (65%) [12].

In Somalia the first major outbreak of cholera in Somalia occurred in 1971 with *Vibrio cholerae* 01, biotype El Tor, serotype Ogawa. A second major outbreak in 1985 caused 6300 cases and 1150 deaths affecting Ethiopian refugee camps in Gannet, Hargeisa. In 2007, close to 8000 cases of acute watery diarrhoea were reported from Central and Southern Somalia over January to March. In 2011 number of reported cases of cholera in Somalia were 77636. It was the highest cases cases detected forever in Somalia (WHO) [12].

In Bosaso, 2011 was occurred about 5352 cases of all types of diarrheal diseases, 79% of these cases were occurred on children under the age of 5 years. In 2012, about 6518 cases of all types of diarrheal diseases occurred, 84% of these cases were occurred on children under the age of 5 years. In 2013, about 7632 cases of all types of diarrheal diseases occurred, 87% of these cases were occurred on children under the age of 5 years. In 2014, about 8183 cases of all types of diarrheal diseases occurred, 88% of these cases were occurred on children under the age of 5 years. In 2015, the first 3 months from January to March, about 2000 cases of all types of diarrheal diseases, 82% of these cases were occurred on children under the age of 5 years [13]. This shows that children under the age of 5 years are the most vulnerable group to these diseases.

The aim of this study was to determine factors that influence the occurrence of diarrheal diseases among under five children in Bosaso IDPs. Thus, this study will help the ministry of health, Somalia, Health Organizations and policymakers for intervention studies.

MATERIALS AND METHODS

Analytical cross-sectional study was conducted to identify factors related to the occurrence of diarrheal disease in children under the age of five years, in the IDPs of Bosaso district of Somalia.

4 IDPs were selected from 34 IDPs by systemic sampling. After getting approval the questionnaires were pre-tested for reliability by selecting 30 caregivers from Tawakal IDP in Bosaso. sample of 245 was collected through the structured questionnaire in Somali language, by face to face interview, from June to July, 2015.

The sample size were determined by using this formula:

The sample size will be 245 and will determine the formula below:

$$N = Z^2 x(P) x(1-P)/D^2$$
$$N = (1.96)^2 x(0.2)x(1-0.2)/(0.05)^2$$
$$N = 0.614656/0.0025 \quad N = 245$$

where

N= desired Sample size Z = 1.96, the factor from normal distribution

P = estimated period of prevalence D = absolute sampling error.

Mothers or caregivers having under five children in selected IDPs were interviewed. A structured questionnaire were used to collect data and it consisted of four parts, namely; socio-demographic factors, child factors and environment and sanitation factors.

Descriptive statistics were used to calculate frequency, percentage, mean, median, maximum, minimum, quartile deviation and standard deviation of the independent and dependent variables.

Crude odds ratio was used to show the strength of association with 95% confidence interval.

RESULTS

Socio-Demographic characteristics of Caregivers: The socio-demographic characteristics of caregivers included their age, gender, relation to the child, education, occupation, family income and time given for the child care.

Almost half (49.4%) of the caregivers were of age between 25-34 years. Mostly caregivers were female (98%) only (2%) were male caregivers and (90.6%) were mothers. Mostly (69.4%) of the caregivers were illiterate, (3.7%) finished secondary or higher secondary education (7-12) and only (26.9%) were primary level. Most of the caregivers were housewives about (75.5%), (15.9%) were employee and the rest (8.6%) were self employed.

Table 1: child characteristics (n=245)

Variable		Frequency	Percentage
Age Group	Less than 1 year	70	28.6%
	1-2	134	54.7%
	2-3	34	13.9%
	3-4	7	2.8%
Milk of first six months	Breast milk only	87	35.5%
	Others	158	64.5%
Diarrhea during past one month	Yes	26	11%
	No	219	89%
Episodes of diarrhea in the past one month	1 time	18	7.3%
	2-3 times	7	2.9%
	>3 times	1	0.4%
Types of Diarrhea	Acute watery Diarrhea	22	85%
	Bloody Diarrhea	4	15%

Majority (58.8%) belonged to the middle income group, (36.7%) were low income group and 4.5% were approximately high income group. The majority of the caregivers (46%) spent 8-15 hrs to take care of their children.

Child Characteristics: The child characteristics included age of the child in months, milk during first six months of life, diarrhea during the past one month, episodes of diarrhea in one month and types of diarrhea.

Table 1 shows that age of most children (54.7%) were Less than 1 year. Exclusive breastfeeding received by approximately half (35.5%) of the children, whereas more than half (64.5%) had received breast milk and others such as powdered milk during first six months of life. There was considerable prevalence (11%) of diarrhea, one episode of diarrhea in majority (7.3%) with mostly (85%) of watery type of diarrhea.

Relationship Between the Socio-Demographic Factors of Caregivers and Occurrence of Diarrhea: As shown in Table 2, children of caregivers with the age between 15-34 were in the risks of having diarrhea 2.0656 times compared to those of the caregivers with other ages, Children of their caregivers are males were 1.7520 times in the risks of having diarrhea compare to those of female caregivers, Children of their caregivers are others not their mothers were 3.4818 times in the risks of having diarrhea compared to those of mother caregivers. Children of caregivers who are illiterate had more cases of diarrhea and they were 1.5688 times in the risks of having diarrhea compare to those who are literate. Children of caregivers who are workers or employers who do not give enough time of caring their children had more cases of diarrhea and they were 5.3748times in the risk of having diarrhea compare to

those who are house wives who give enough time for caring their children . Children of caregivers with low income less than \$100 up to \$150 dollar had more cases of diarrhea and they were 1.5518 times in the risks of having diarrhea compare to those with enough income per month from \$150 up to \$250 or more. Children of caregivers who care their children less than 8 hours had more cases of diarrhea and they were 7.2762times in the risks of having diarrhea compare to those who care their children more than 8 hours.

Relationship Between Child Factors and Diarrhea Occurrences: As indicated in Table 3, Children in the age group between 1-2 years had more diarrhea and they were 5.8082 times in the risk of having diarrhea compared to other age groups. Children who received others milk during the first six months of life (not-exclusive) had more diarrhea cases with a risk of having diarrhea 3.3845 times more than exclusively breastfed children.

Similarly Children who didn't receive colostrums milk had more diarrhea cases with a risk of having diarrhea 3.7873 times more than those who feed colostrums.

Relationship Between Environmental and Sanitation Factors and Diarrheal Disease Occurrence: As shown in Table 4, Children living in unhygienic conditions had more cases of diarrhea with a risk of having diarrhea 2.3652 times more than compared to those living in hygienic conditions. those who have no latrines had more diarrhea cases with a risk of having diarrhea 1.0369 times more than compared to those having latrines. Similarly those who have no separated drinking water storage had more diarrhea cases with a risk of having diarrhea 1.2748 times more than to those having separated drinking water storage.

Table 2: Relationship between the socio-demographic factors of caregivers and diarrheal disease occurrence among under-five children (n=245)

Socio-demographic factors		Diarrheal disease occurrence (%)		Crude OR
		Yes	No	
Age (yrs)	15-34	9%	61%	2.0656
	35-54	2%	28%	
Gender	Male	0.4%	2%	1.7520
	Female	10%	87.6%	
Relation	Mother	8.2%	82.44%	3.4818
	Other	2.4%	6.93%	
Education	Illiterate	8.2%	61.2%	1.5688
	Literate	2.4	28.1%	
Occupation	House wife	4.5%	71%	5.3748
	Workers	6.2%	18.2%	
Family Income	>100-150 dollar	9.76%	79.2%	1.5518
	150- >250 dollar	0.81%	10.2%	
Time given for child care (hrs)	< 8 hours	6%	12.6%	7.2762
	8- >16 hours	4.8%	76.6%	

Table 3: Relationship between the child factors and diarrheal disease occurrence (n=245)

Child factors		Diarrheal disease occurrence (%)		Crude OR
		Yes	No	
Age of children	Less than 1-2 years	10.6%	73%	5.8082
	2-4 years	0.4%	16%	
Milk during first six month	Others (not exclusive)	6.5%	29%	3.3845
	Mother/Human milk (exclusive)	4%	60.4%	
Colostrums	Yes	2.4%	47%	3.7873
	No	8.2%	42.4%	

Table 4: Relationship between environmental and sanitation factors and diarrheal disease occurrence (n=245)

Environmental and Sanitation factors		Diarrheal disease occurrence (%)		Crude OR
		Yes	No	
Home	Unhygienic	8.5%	57.5%	2.3652
	Hygienic	2%	32%	
Latrine	Yes	3.3%	28.5%	1.0369
	No	7.3%	60.8%	
Separated drinking water storage	Yes	2.9%	29%	1.2748
	No	7.7%	60.4%	

DISCUSSION

The results revealed that the prevalence of diarrhea in under-five children was 11% (26 out of 245).

The care givers of these children with diarrhea mostly (10.2%) were female and of them were mothers, 1.6% Siblings and 0.4% grandmother. The age of these care givers mostly (6.1%) was between 25-35, (2.45%) was between 15-24, (1.23%) was 34-44 and (0.8%) between 45-54.

(8.2%) of these care givers were illiterate, (2.04%) primary school and (0.4%) secondary school, (4.5%) of the care givers were house wives, (3.7%) employee and (2.45%) was self employed. (4.5%) of the diseased children were from low income families.

(10.2%) of the children with diarrhea were 2 years and less than, (6.5%) of the children with diarrhea were given a bottle feeding, only (4.1%) children was given Breast milk. (8.6%) of the children with diarrhea were living in

unhygienic homes. (7.6%) had no these separated storages they same one on both drinking and domestic use water.

This study revealed that the age of caregivers/mothers between 15-34 have association with occurrence of diarrheal diseases among children under five years of age (OR 2.0656), another study made by Kung'u WN, Musau PM, Ochieng A, et al. younger age of caregiver/mother was associated with more diarrhea occurrence (OR 1.665) [14]. Caregivers who are not mothers of the children have association with occurrence of diarrheal diseases (OR 3.4818).

The education level of the care givers have association with the occurrence of diarrheal diseases, Illiterate caregivers/mothers have association with occurrence of diarrheal diseases among children under five years of age (OR 1.5688), another study made by Karki T, Srivanichakorn S, Chompikul J. states that Lower education level of mothers is associated with more diarrhea (2.68) [15] Caregivers who are workers who do not give enough time of caring their children had association with occurrence of diarrheal diseases (OR 5.3748).

Low family income per month had association with occurrence of diarrheal diseases (OR 1.5518) an other study made by Vaahtera M, Kulmala T, Maleta K, *et al.* in Malawi states that low economic status that has been significantly associated with diarrhea occurrence (1.428) [16].

Children in the age group between 1-2 years had association with occurrence of diarrheal diseases (OR 5.8082). Children who received other milk during the first six months of life (bottle feeding) had association with occurrence of diarrheal diseases (OR 3.3845), another study made by Yoon PW, Black RE, Moulton LH, *et al.* in Philipine states that lack of breast feeding associated with occurrence of diarrheal diseases (2.563) [17]. Similarly Children who didn't receive colostrums milk had association with occurrence of diarrheal diseases (OR 3.7873).

Children living in unhygienic conditions had more association with occurrence of diarrheal diseases (OR 2.3652). Those who have no latrines had association with occurrence of diarrheal diseases (OR 1.0369). Similarly those who have no separated drinking water storage had association with occurrence of diarrheal diseases (OR 1.2748). on the other hand similar researches made in Nepal states that Drinking water stored in unhygienic containers had a relation with the occurrence diarrheal diseases (OR 2.53), similarly Unhygienic houses had that relation (OR 2.12) [18].

Recommendations:

- Importantly mothers and caregivers should adhere to nutrition and hygiene promotions programmes and give priority to exclusive breastfeeding, safe disposal of faecal material and the adequate washing of hands before breastfeeding and after contact with adult and child stools.
- It would be much worthy for mothers to form support groups to share information about breast feeding and use of health information especially on the practice of hygiene behaviours.
- During an attack, mothers who visit health facilities should be taught about the preparation and use of ORS or its substitutes like, lemon- sugar-salt beverage, weak tea etc. at home as a way treating children having diarrhoea.
- Recognize the signs of dehydration and take the child to a health-care provider for ORS or intravenous electrolyte solution, as well as familiarize themselves with other symptoms requiring medical treatment (e.g., bloody diarrhoea).
- Separation of drinking and domestic use water is better to prevent contamination of drinking water and the spread of the diseases.
- Majority of caregivers still have false belief like “teeth eruption can cause diarrhea” and “medicine should be used to get better from diarrhea early”. Bosaso district health office (DHO) and all the health workers should give priority to disseminate these statements positively as an important health message to the community.

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