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Crosssectional Survey; Assessment Of Diarrheal Disease Prevalence and Associated Factors Among Children Under Five In Enemay District, Northwest Ethiopia

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Objective: To determine the prevalence of diarrheal disease and associated factors among under 5 children in Enemay rural district, East Gojjam zone.

Methods: Community based cross sectional study was conducted on a sample size of 634. A multistage sampling technique in which seven from 34 kebeles were selected by simple random sampling and then proportional samples were drawn through systematic random sampling technique using the list of households who have children under five. The dependent variable was measured in terms of the occurrence of loose/watery diarrhea for at least three times per day in the last two weeks before the survey. Data was collected through pretested structured questionnaire, and observation check list. It was collected by trained data collectors with the support of trained supervisors.

Keywords: *diarrhea, two week prevalence, ethiopia.*

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Crossectional Survey; Assessment Of Diarrheal Disease Prevalence and Associated Factors Among Children Under Five In Enemay District, Northwest Ethiopia

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Result: The two-week prevalence of diarrhea among under-five children was 18.6%. It was highly associated with educational status (AOR, 2.49; 95% CI (1.28,4.83)) and occupation of mother (AOR, 1.78; 95% CI 1.05,3.00); availability of proper waste disposal system in the household (AOR, 2.27; 95% CI (1.40-3.68)), Measles vaccination status (AOR, 0.20; 95% CI, 0.10-0.37) and vitamin A supplementation for children under 5 years (AOR, 3.98; 95% CI (2.42,6.53)).

Conclusion: In order to reduce the magnitude of the disease, efforts need to focus on giving health education for mothers, the community to prepare proper liquid waste disposal system and strengthening vitamin A supplementation for children under 5.

Keywords: diarrhea, two week prevalence, ethiopia.

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I. INTRODUCTION

Despite there is a decline in the trend, millions of children under five are still dying as a result of the preventable diarrheal disease characterized by the passage of loose or watery stool for three or more times during a 24-hour's period (Gerald T. Keusch, et al., 2001). It is responsible for 17% of all deaths (about 2.5 million deaths each year) among children under-five years in the world which is higher than AIDS, malaria, and measles combined (UNICEF/WHO, 2009).

The majority (42%) of this death is concentrated in the Sub-Saharan African countries including Ethiopia (88 per 1,000 live births) where hygiene and sanitation is poor (Bryce J, et al., 2005 and Central Statistical Agency [Ethiopia] and ICF International, 2011). Recent national estimates indicate that, the two week period prevalence is approximately 13% (Central Statistical Agency [Ethiopia] and ICF International, 2011). Moreover, local studies reported a prevalence rate of 31% in southern Ethiopia, 22.5% in Eastern part of Ethiopia and 18% to 24.9% in Northwest Ethiopia (Muluken D, et al., (2011), Shikur M, et al., 2013, Bezatu M et al., 2013, Amare D, et al 2007).

Though these few reports were available, further evidence is required in different regions of the country where up to date information were not available to monitor the progress for the efforts done to achieve the millennium development goals. This study will help as an input for decision-makers in the health department to prioritize interventions that are required to overcome the progression of the problem.

II. METHODS

a) Study design and period

A community based cross sectional study was conducted among children less than 5 years of age in Enemay district. It is one of the 18 districts of east Gojjam zone, Amhara regional state located at 87 Kms away from Debre Markos town. In this districts there are 34 kebeles, 7 health centers and 35 health posts are available to provide health service to the community.

b) Sample size determination

The sample size was determined using single population proportion formula. The assumptions were Z critical for an alpha value of 0.05, Margin of error of 0.05, previous prevalence of 0.5, design effect of 1.5 and a non response rate of 10%. With the above assumptions the final sample size came up with 634.

c) Sampling Method and procedure

To select the sample First 7 kebeles were selected from 34 kebeles by simple random sampling technique; and then proportional allocation to population in each kebele was made to allocate the samples that were drawn from the kebeles. Finally using the list of household in the kebele the samples were drawn every escape interval (K). In cases where there was more than one child in a household, one child was selected using lottery method.

d) Variables

The study variables were selected after review of related literatures in the context of the study area. The outcome variable of this study was diarrheal disease and it was measured in terms of the occurrence of loose/watery diarrhea at least three times per day for the last two weeks.

e) Data Collection and Analysis

Structured questionnaires and observation checklist were prepared in English and translated to local language. Individuals with better experience has assigned as data collector and supervisor. Training was given on how to maintain the quality of data, ethical issues and the like. After pretest the necessary corrections were made and then the actual data

collection was undertaken. The Collected data were checked for errors and cleaned on daily basis. Finally it was coded, analyzed using SPSS version 16. Univariate, bivariate and multivariate analysis was done. Results were presented using tables and figures. OR with corresponding 95% CI were used to determine relationships between selected predictor variables and diarrheal disease.

f) Operational definition

Hand-washing at critical times: Hand washing before and after cooking foods, after the latrine use.

Proper hand washing: Hand washing with soap or ash at critical times.

Kebele: The lowest government administrative hierarchy.

g) Ethical Considerations

Ethical clearance was obtained from the research and ethical review committee of GAMBY College of medical sciences. The health department at regional, zonal and districts level was communicated legally for its permission and each of the interviewers were requested verbal consent before the interviewee.

III. RESULT

a) Socio demographic and economic Characteristics

A total of 634 households were included in this study with response rate of 100%. From the attendants of mothers, 579 (91.3) were married, illiterate 522(82.3), Orthodox by religion 579(91.3) and farmers by their occupational status 502 (79.2). The mean age of the child was 2.26 (± 1.123).

Table 1 : Socio Demographic and Economic characteristics of households in Enemay district, Northwest Ethiopia 2014

Variable	Category	Frequency	
		Number	%
Mother Educational Status	Non educated	522	82.3
	Primary and above	112	17.7
Occupation of mother	Farmer	502	79.2
	Others	132	20.8
Marital Status	Married	579	91.3
	Unmarried	18	2.8
	Divorce	34	5.4
	Widowed	3	0.5
husband Occupation	Farmer	536	89.2
	Other	65	10.8
House hold average income	<600	122	28.0
	>600	313	72.0
Age of the mother (years)	15-24	81	12.7
	25-34	389	61.5
	>35	164	25.8
Religion of mother	Orthodox	579	91.3
	Muslim	55	8.7

	Muslim	55	8.7
Family Size	Less than or equal to four	289	45.6
	Greater than four	345	54.4
Age of the child (month)	<6	124	19.6
	7-11	173	27.3
	12-23	133	21.0
	24-59	204	32.2
Sex	Male	335	52.8
	Female	299	47.2

b) Environmental Characteristics related with study participants

From the total 634; most of the households ,565 (89.1%) were accessed with improved water source and the distance to collect water took 16-30 minute for the majority ,350(55.2 %) of households. More than half of the respondents ,339(53.5%) were not using treated water for drinking.

Most of the respondents, 517 (81.5%) have latrine in their households and the majority of them

466(90%) were functional during the interview and most of them,348(67.3%) were using the latrine all the time. During the period of data collections, feces was observed around the hole of 307(59.4%) latrine facilities and in the compound of 196(30.9%) household. Most of the respondents were not prepared proper waste disposal system for both liquid and solid waste.

Table 2 : Environmental characteristics of households in Enemay district, Northwest Ethiopia 2014

Variable	Category	Frequency	
		Number	%
Source of water	Improved	565	89.1
	Un improved	69	10.9
Distance from improved water source	<15 minute	234	41.4
	16-30 minute	313	55.4
	>30 minute	18	3.2
Drinking Water treatment	Yes	295	46.5
	No	339	53.5
Availability of latrine	Yes	517	81.5
	No	117	18.5
Function of latrine	Functional	465	90.0
	Non functional	52	10.0
Availability of hand washing facility	Yes	279	54.0
	No	238	46.0
Feces in the latrine hole	Yes	210	40.6
	No	307	59.4
Feces in the compound	Yes	196	30.9
	No	438	69.1
Animals in the house	Yes	152	24.0
	No	482	76.0
Type of liquid waste disposal	Non proper	395	62.3
	Proper	239	37.0
Type of solid waste disposal	Un improved	342	53.9
	Improved	292	46.1

c) Magnitude of diarrheal disease and Behavioral Characteristics related with Child care practice

In this study the prevalence of diarrheal disease among under five children was 18.6%. About 508 (80.1%) children were initiated for breast feeding within one hour of delivery. Most children, 460 (87.6%) started additional food after 6 months and the majority of them, 253 (53 %) were started in the form of soft porridge.

During assessment of the critical hand washing trends in the study area; washing hand before food preparation ,532(83.9%) were the most frequently practiced and follows in sequential order, after toilet visiting 498 (78.5%), before feeding the child 444(70%)

and before food eating 427(67.4%). Besides, measles and 475 (74.9%) took vitamin A 449(70.8%) under five children were vaccinated for supplementation.

Table 3 : Behavioral characteristics of households in Enemay district, Northwest Ethiopia 2014 (Child care practice)

Variable	Response category	Frequency	
		Number	%
Diarrheal disease in the past two weeks	Yes	118	18.6
	No	516	81.4
Initiation of first breast milk	before 1 hr	508	80.1
	After 1 hr	126	19.9
Age of Additional food started	Under 6 months	65	12.4
	> = 6 months	460	87.6
Type of additional food started	Soft Porridge	278	53.0
	Other	181	34.5
	Porridge and Gruel	66	12.6
Hand washing practice			
Before food preparation	Yes	532	83.9
	No	102	16.1
After toilet visiting	Yes	498	78.5
	No	136	21.5
Before food eating	Yes	427	67.4
	No	207	32.6
Before feeding the child	Yes	444	70.0
	No	190	30.0
Latrine utilization by households	Sometimes	54	10.4
	Mostly	107	20.7
	Always	348	67.4
	During the winter	8	1.5
Measles Vaccination	Yes	449	70.8
	No	185	29.2
Vitamin A	Yes	475	74.9
	No	159	25.1

d) Factors associated with diarrheal disease among under five children Enemay district

In order to control the effect of Confounding first the association of each independent variable on the dependent variable was assessed and then those variables p value of less or equal to 0.2 were entered to multivariable analysis to identify their independent effect

on diarrheal disease. At the end Mothers Education (AOR, 2.49; 95%CI, 1.28-4.83), Mother Occupation (AOR, 1.78; 95%CI, 1.05-3.00), Liquid waste disposal (AOR, 2.27; 95%CI, 1.40-3.68), Measles Vaccination (AOR, 0.20; 95% CI, 0.10-0.37) and Vitamin A supplementation (AOR, 3.98; 95%CI, (2.42-6.53).

Table 4 : Factors associated with diarrheal disease among under- five children in Enemay district, Northwest Ethiopia, 2014

Characteristics	Diarrheal disease		COR(95%CI)	AOR(95%CI)
	Yes	No		
Age of mother				
15-24*	22	59	1.00	1.00
25-34	64	325	0.52 (0.30,0.92)	0.48 (0.26,0.88)
>35	32	132	0.65 (0.34,1.21)	0.62 (0.31,1.23)
Age of the child				
< 6m*	11	113	1.00	1.00
6-11M	35	138	2.60 (1.26,5.36)	2.16 (0.94,4.97)
12-23M	30	103	2.99 (1.42,6.27)	1.69 (0.65,4.38)
>24 M	42	162	2.66 (1.31,5.39)	1.60 (0.63,4.03)
Mothers Education				

Non educated	103	419	1.59 (0.88,2.85)	2.49 (1.28,4.83)
Primary and above*	15	97	1.00	1.00
Mother Occupation				
Farmer*	83	419	1.00	1.00
Other	35	97	1.82 (1.15,2.86)	1.78 (1.05,3.00)
Water treatment				
Yes*	45	250	1.00	1.00
No	73	266	1.52 (1.01,2.29)	1.07 (0.67,1.73)
Liquid waste disposal				
Non proper	90	305	2.22 (1.40,3.51)	2.27 (1.40,3.68)
Proper *	28	211	1.00	1.00
Hand wash after toilet				
Yes*	73	371	1.00	1.00
No	45	145	1.57 (0.1.03,2.39)	1.34 (0.85,2.13)
Before child feeding				
Yes*	73	354	1.00	1.00
No	45	162	1.34 (0.88,2.04)	1.12 (0.63, 1.97)
Measles Vaccination				
Yes*	99	350	2.5 (1.47 ,4.35)	5.00 (2.70, 10.00)
No	19	166	1.00	1.00
Vitamin A				
Yes*	67	379	1.00	1.00
No	51	137	2.10 (1.39,3.18)	3.98 (2.42,6.53)

IV. DISCUSSION

The current study investigated the prevalence of diarrheal disease and its associated factors in under five children. Based on the study, the two-week period prevalence of diarrheal disease was 18.6 %. This was in line with the finding in the study done in northern part of Ethiopia, 18.2% (Muluken D, et al., 2011), Eastern part of Ethiopia 22.5% (Amare D, et al., 2007) and North Gonder zone 17.9% (Mitike G, 2001) and it was lower than the finding in Arba Minch district 31% (Shikur M, et al, 2012) and Awi zone 24.9 % (Bezatu M,et al., (2013). However, the current finding was higher than the finding

This difference might be due to the difference in hygiene and sanitation measures taken in Northeast Brazil where intervention was done before conducting the prevalence study.

In this study children living with non educated mothers were about 2.49 times more likely to develop diarrheal disease than those who were living with primary and secondary education level which is in line with the study done in Northern parts of Ethiopia (Muluken D, et al., 2011). This difference might be due to the fact that educated mothers are more likely to have better knowledge towards good hygienic, feeding and weaning practices.

Those children from mothers who were farmers by their occupation were 0.44 less likely to 0.44 less likely to develop diarrheal diseases than children from mothers of others occupational category. Even though not considered in the current study, the reason might be the difference in the variety of food items children took.

Children from mothers who were farmers in Enemay district might gain Variety of food items as compared with those children from mothers who were not farmers.

According to this study, children from households which dispose liquid wastes inappropriately were also 2.27 (AOR, 1.40-3.68) times more likely to develop diarrheal disease. district, Ethiopia (Girma R., et al, 2007). Liquid waste contains different pathogens which can cause diarrheal disease in children. The proper disposal of liquid waste protects food materials from contamination since flies cannot reach it easily. To the contrary if not disposed properly it will be easily accessible for flies that can transmit pathogens.

Children who didn't took vitamin A supplementation in the last six months of the study had shown 3.98 times more likely to develop diarrheal disease as compared with those who took vitamin A supplementation. This is because Vitamin A is one of the essential micronutrient which prevents infection and strength the immunity of human cells particularly in children (Imdad A., et al., 2011). Similar finding in line with the finding from Brazil where 20% difference in prevalence was observed among the groups who were taking Vitamin A as compared with who were not taking Vitamin A (Barreto ML, et al., 1994)

The unusual thing which was observed in this study and to discuss was that, children who were vaccinated for measles were 5 times more likely to develop diarrheal diseases than those who were not vaccinated. In the current study, vaccination status of children were not checked by card rather it was determined by the response of parents, this might

create problem in giving the correct response about which type of vaccine the child took.

V. CONCLUSION

Children in the study area were still suffering from this preventable diarrheal disease. Mother's educational and occupational status, inappropriate liquid waste disposal method, children vitamin A supplementation and measles vaccination status were the main factors associated with the two week prevalence of diarrhea. It is recommended that the health department in the study area should designing a mechanism to raise awareness of mothers towards diarrheal disease prevention, proper sanitation and hygiene measures with special emphasis to proper liquid waste disposal system , strengthening vitamin A supplementation program to give for every child of 6 months and above and further research is recommended identify the effect of measles vaccination on the occurrence of diarrheal disease among children of under five years old.

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