

# Childhood Diarrheal Diseases and Associated Factors in the Rural Community of Dejen District, Northwest Ethiopia

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## Abstract

Diarrheal diseases are among the three most important causes of morbidity, and mortality in low income countries including Ethiopia. Lack of sanitation facilities is a serious health risk and obliges people to practice open defecation, thereby increasing the risk of disease transmission. These problems are clear at Dejen district where childhood diarrheal disease is the top cause of morbidity among under five children. The aim of this study was to assess prevalence of childhood diarrheal diseases and associated factors in the rural community of Dejen district, northwest Ethiopia, 2013. In this paper; a community-based cross-sectional study was conducted. Five of the 21 rural kebeles in the district was selected randomly, finally 710 households were chosen by systematic random sampling using existing list of all households as a sampling frame. Data was collected using pre-tested WHO core questionnaire that was designed to explore factors related to diarrhea. Data enter and analysis was carried out using SPSS version 20. The level of association was dealt using confidence interval and odds ratio.

This study conducted among 710 participants with response rate of 96.4% shows that, the prevalence of diarrhea was 23.8%. Tube well water source (AOR: 2.59,95% CI (1.69,3.95)), throwing away disposal of feces (AOR: 1.58,95% CI (1.10,2.26)), mother's used hand washing with practice only water (AOR: 1.61,95% CI (1.04,2.84)) and having not supplemented with vitamin A (AOR: 1.92,95% CI(1.35,2.74)) were significantly associated with diarrhea. the prevalence of childhood diarrhea is high at Dejen district. Tube well source of water, throwing away disposal of feces, poor hand washing practice of the mother and lack of vitamin A supplementation were significantly associated with childhood diarrheal disease. The District and Zonal water office should increasing access of piped water in rural areas. The District and Zonal health office should improve awareness of the community on hand washing practice and on proper utilization of latrine to dispose

excreta should be given a concern and Vitamin Supplementation to every child in the district should be strengthened.

**Keywords:** children; diarrheal disease; rural district; Dejen; Ethiopia

## 1. Introduction

Diarrheal disease is an important public health problem among under- five children in developing countries [1]. Diarrhea is defined as a child with loose or watery stool for three or more times during a 24-hour's period. Diarrhea is the result of lack of access to sufficient clean water and sanitary disposal of human waste, inadequate feeding practices and hand washing; poor housing conditions and lack of access to adequate and affordable health care[1]. However, diarrheal diseases still continue to be an important cause of morbidity and mortality worldwide in spite of all advances in health technology, improved management, and increased use of oral rehydration therapy in the past decades [2]. Diarrheal diseases remained to be the second leading cause of death in children under five years old, and is responsible for killing around 760 000 children every year [3]. In Ethiopia, even though progress was made in reducing child mortality from 123 deaths of under five years of children per 1,000 live births in 2005[4] to 88 deaths per 1,000 live births, children in the country still suffer from diarrheal diseases, respiratory problems, and malnutrition. According to Ethiopian demographic and health survey (EDHS), the two week prevalence of diarrheal diseases was 13% among children under five years of age [5].

## 2. Objectives

### 1.2 General objective

- ❖ To assess the prevalence of childhood diarrheal diseases and associated factors in the rural Community of Dejen district in the last two weeks, Northwest Ethiopia, 2013.

### 2.2 Specific objectives

- ❖ To determine the prevalence of childhood diarrheal diseases
- ❖ To identify factors associated with childhood diarrheal diseases

## 3. Methods and Materials

**Study Design:** A community based cross-sectional study design was employed.

**Study area and period:** The study was conducted from February 20/2013 to March 05/2013 in Dejen district; Dejen is located at 230 km from the capital city of Ethiopia, Addis Ababa [6]. Its elevation is estimated to be 1825mts above sea.

The total population of the district in 2013 was about 113,672; of which the rural population accounts 102,481 (90.15%). The water supply coverage of the district was 81%. There are 5 Health center and 2 Health Extension

workers in each Kebele of the District assigned in the Health Post [6].

### Population

**Source population:** All households who have under five children with in the rural community of Dejen District

**Study population:** Households of the rural community who have under five children and who fulfill the inclusion criteria

### Eligibility Criteria

**Inclusion criteria:** All households with in the rural community of Dejen District who have at least one under five children and a mother/care giver who can answer the intended questions.

**Exclusion criteria:** Those households whose mothers/caregivers couldn't respond because of serious problems.

**Sample Size Determination and sampling procedure:** Sample size was calculated using the single population proportion formula

$$n = \frac{(Z \alpha/2)^2 P (1 - P)}{d^2}$$

The sample size for the survey assumed (CI) 95% confidence interval (1.96), Expected prevalence of children with diarrhea 30% in Arba Minch (2); and margin of error 5 %.

$$n = \frac{(1.96)^2(0.3 \times 0.7)}{(0.05)^2} = 323$$

Then multiplying by a design effect of 2 and adding a 10% non-response rate, the final sample size will be calculated to be:  $n = (323+32) \times 2 = \mathbf{710}$

### Sampling procedure

**Sampling method:**-Multistage sampling method was used. Five kebeles, of 20% from 21 kebeles using lottery method and then from the five kebeles using systematic sampling method take proportional allocated sample of households with under five children by making prior survey from health extension workers on under five children (fig 1).

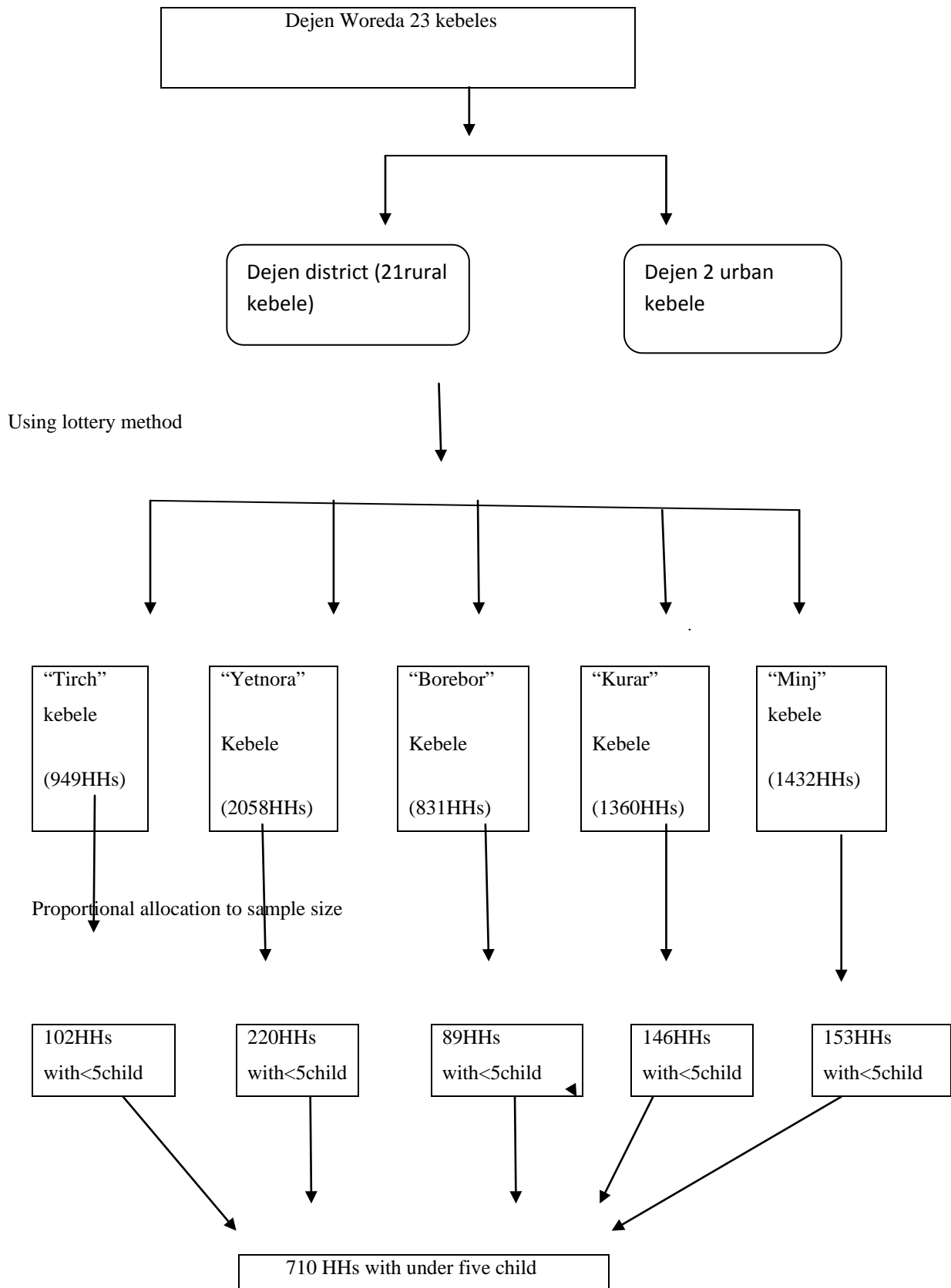


Fig2. Figure 1 Schematic presentation of sampling procedure of under five children in Dejen district, 2013

## Variables of the study

**Dependent variable:** Childhood diarrheal disease (yes, no)

## Independent variables

- **Socio-economic Variables:** child's age, sex; occupational and educational status mothers/caregivers.
- **Environmental variables:** Availability of latrine, sources of water, hand washing facilities and houses shared with domestic Animals.
- **Behavioral variables:** Latrine utilization, hand washing practices, feeding practice, breast feeding practice and immunization status.

## Data Collection tool and quality assurance

Data were collected using WHO core questionnaire [28] which is designed to explore the factors related to diarrheal diseases. Quantitative data were collected from the study population using a pre-tested, structured questionnaire with face-to-face interviews in the local language (Amharic). The data were collected by grade 10 completed students and clinical nurse supervisor after it have been given training for 5 data collectors and 2 supervisor for a day.

**Data Analysis:** Data were entered and analyzed using statistical package for social sciences (SPSS) version 20; descriptive summary using frequencies, proportions, and cross tabs were used to present the results. Odds ratio (OR) and confidence interval (CI) was used to determine the strength of association between dependent and independent variables. Binary logistic regression analysis to determine the effect of various factors on the outcome variable and to control confounding effect multivariate logistic regression was also used and those variables with P-value less than 0.25 were considered as statistically significant.

## Operational definition

**Diarrhea:-** is defined as a child with loose or watery stool for three or more times during a 24-hour's period as evidenced from mother/caregiver 2 weeks prior to the survey.

## Ethical Considerations

Ethical clearance was obtained from Debre Markos University college of Medicine and Health science ethical review committee. After submitting an official letter to the district, Permission was obtained from head of district/kebele leaders and the community.

During data collection informed consent was obtained from each study respondents after explanation of what they were take part in the research and any involvement was after their complete consent. Anyone not willing to participate in the study was full right not to participate.

#### 4. Results

A total of 710 households with under five children were involved in the study and 685 gave complete response making the response rate of 96.5%. Some 400 (58.6%) age of <5 children were within  $\geq 24$  month and 339 (33.4%) age of mothers were 25-29 year category. Married participants were 591(86.2%). Also 425(62.0%) mothers and 334 (48.8%) fathers were Unable to read and write. Of mothers 586(85.5%), were in farmers (See table 1).

**Table 1: Distribution of respondents by socio-economic characteristics in the rural community of Dejen district, Ethiopia 2013**

characteristics	Frequency	Percent (%)
<b>Age child in months (n=685)</b>		
0-5months	35	5.1
6-23months	250	36.5
>24months and above	400	58.4
<b>Sex of child(n=685)</b>		
Male	348	50.8
Female	337	49.2
<b>Marital status(n=685)</b>		
Single	52	7.5
Married	591	86.2
Divorced	33	4.8
Widowed	9	1.3
<b>Mothers educational status(n=685)</b>		
Unable to write and read	425	62.0
Read and write	163	23.8
Grade 1-6	35	5.1
Grade 7-8.	26	3.8
Grade 9-12	23	3.4
Diploma and above	13	1.9
<b>Occupation (n=685)</b>		
Farmer	586	85.5
Merchant	62	9.1
Government employee	22	3.2
Day labor	15	2.2

### The Environment Characteristics of the respondents

The respondents 322 (47.0%) Source of water were piped water and 599(87.4%) the distance of source water were 30 minutes and less. Water treat were, 337 (49.2%) and which 273(81%) of Add bleach. Two hundred fourteen (32.7%) of latrine from house were>10meter categorize and 177 (25.8%) domestic animals were houses share. One hundred sixty three (23.8%) of children were diarrheal disease in the last two weeks.(See table 2).

**Table 2: The characteristics of environment in Dejen District, Northwest Ethiopia, 2013**

characteristics	Frequency	Percent (%)
source of drinking water (n=685)		
piped water	322	47.0
spring water	199	29.1
tube well	164	22.9
type of water treat(n=337)		
Boil	26	7.7
Add bleach	273	81.0
Water filter	38	11.3
Way of water transportation(n=685)		
covered	679	99.1
uncovered	6	.9
Latrine facility(n=685)		
yes	617	90.1
No	68	9.9
Type of latrine facility (n=617)		
Flush/pour	1	.2
Improved pit latrine	34	5.5
Pit latrine with slab	7	1.1
Pit latrine without slab	575	93.2

<b>Location of hand washing facilities(n=617)</b>		
Next to latrine	186	30.1
Within walking distance	129	20.9
Inside the house	79	12.8
No facilit	223	36,1
<b>Types of house floor(n=685)</b>		
Cement	12	1.8
Mud	673	98.2
<b>houses share with domestic animals(n=685)</b>		
Yes	177	25.8
No	508	74.2

### **The behavioral characteristics of the respondents**

Of the total participants, 24 (68.6%) of breast feeding were currently exclusive breast feeding <6 months. Four hundred thirty nine (63.6%) of faeces of children were throwing faeces out of houses. Six hundred sixty (96.4%) of hand washing were at all critical times and 527(76.9%) of washing with practice were soap/ash (Table 3).

**Table 3: Distribution of respondents by the behavioral factors in the rural community of Dejen district,Ethiopia 2013.**

characteristics	Frequency	Percent
<b>Disposal system of faeces of children (n=685)</b>		
Pit latrine disposal	439	64.1
Throwing faeces out of houses	246	35.9
<b>Per capital Water consumption (n=685)</b>		
=<20 liters	544	79.4
>20 liters	141	20.6



<b>Hand washing practice(n=685)</b>		
At all critical times	660	96.4
After defecation	25	3.6
<b>Hand washing with practice(n=685)</b>		
Water only	158	23.1
Water soap/ash	527	76.9
<b>supplementary feeding practices (n=685)</b>		
Bottle feeding	61	8.9
Cup feeding	624	91.1
<b>Starting time of breast feeding for child(n=685)</b>		
Within 1 hour	399	58.2
After 1 hour	286	41.8
<b>Colostrums breast feeding for child(n=685)</b>		
Yes	355	51.8
No	330	48.2
<b>Child ever vaccination(n=685)</b>		
yes	675	98.5
No	10	1.5
<b>fully vaccination(n=675)</b>		
No	347	51.4
Yes	328	48.6
<b>supplemented with Vitamin A(685)</b>		
Yes	415	60.6
No	270	39.4

### Factors Associated with the Occurrence of Childhood Diarrheal

Variables were significant ( $p\text{-value} \leq 0.25$ ) during bivariate analysis were further considered in multiple regression analysis.

Developing diarrhoea was 2.44 times higher among children whose family used a tube well water source when compared with the children of families who used a piped water source (AOR: 2.44, 95%CI (1.57, 3.80)).

Developing diarrhoea was 1.53 times higher among children whose disposal system of faeces of children used

throwing faeces out of houses when compared with the children who used pit latrine disposal (AOR: 1.53,95%CI(1.05,2.24)). Developing diarrhoea was 1.61 times higher among children whose mother's used hand washing with practice only water when compared with the mother who used soap/ash with practice (AOR: 1.61,95% CI(1.04,2.84)). Developing diarrhoea was 1.92 times higher among children who used not supplemented with VitaminA when compared with the children used supplemented with VitaminA (AOR: 1.62,95% CI(1.09,2.40)) (Table 3).

**Table 4: Adjusted logistic regression analysis among different factors and childhood diarrhea, Dejen district, Ethiopia, 2013.**

characteristics	Category	Diarrhea occurrence		Crude OR (95% CI)	AOR (95% CI)	P-value
		Yes	No			
source of water (n=685)	pip water	60	262	1	1	0.108
	spring water	42	157	1.17(0.75,1.81)	1.46(0.92,2.32)*	
	well water	61	103	2.59(1.69,3.95)*	2.44(1.57,3.80)**	
Disposal system of faeces of children (n=685)	Pit latrine disposal	91	348	1	1	0.028
	Throwing faeces out of houses	72	174	1.58(1.10,2.25)*	1.53(1.05,2.24)*	
Use of hand washing with practice(n=685)	Water only	56	102	2.15(1.46,3.18)*	1.61(1.04,2.84)*	0.032.
	Soap/Ash	107	420	1	1	
supplemented with VitaminA (An=685)	Yes	79	336	1	1	0.018
	No	84	186	1.92(1.35,2.74)*	1.62(1.09,2.40)*	

## 5. Discussion

The present study revealed that nearly one in four children had diarrheal disease over two week's period. This figure was about 13.7% of Amhara region according to EDHS (2011) [8]. Similar pocket studies revealed that the prevalence childhood diarrhea is also common in other districts of Amhara national Regional State such as Mecha district (18%) [9]. other districts in other parts of the country such as Arbaminch (30%) [2] and Nekemitie (28.9%) [10]. According to EDHS (2011) while national prevalence was 13 % with 3% bloody diarrhea [8]. The discrepancy might be accounted to socio demographic factors. Also EDHS conducted its study

on about 17, 817 households nationally which shows low sample size when the study is specified to district level. Literatures also indicate that the magnitude of childhood diarrhoeal diseases varies from 3.58% in India, 21.4% in Iraq and 19.6% in Egypt [1] to 32.7% in Tanzania [11].

In this study those children from households who used tube well source of water for drinking are about twice more likely to develop diarrhoeal disease when compared to children using piped source of water. This is similar with EDHS (2011) report [8] and to those of the Tanzanian [11] and Indian [1] findings. The significant water risk factors as identified were the mode of water transportation, and the poor handling of water at the household level, including lack of or inappropriate water treatment methods. These, combined with the low education level further pre dispose the under five children to diarrheal diseases. Source of drinking water was a significant factor in determining childhood diarrheal diseases.

The proper disposal of children's faeces is extremely important in preventing the spread of disease. Contact with human faeces directly, or indirectly by animal contact with the faeces, can lead to diarrhoeal diseases. The methods of handling of faeces of under-five children varied among respondents: 64.1% disposing faeces in the latrine, while 35.9% disposing around the house either in the bush or in the garden. The use of safe disposal of children's faeces in the present study was lower when compared with the previous study in Northwest Ethiopia, Hulet Ejju Enessie. Disposing faeces in the latrine (65.9%), burning (2.3%) and disposing around the house (31.8%) [12]. However, disposing faeces out of the house was higher than Hulet Ejju Enessie (31.8%). Way of disposing excreta was also a significant factor in exposing children to diarrhoeal disease.

Those children from families who dispose excreta by throwing faeces out of houses were nearly twice more likely to develop diarrhoeal diseases when compared to those children whose families dispose it into pit latrine. The reason might be accounted to that field disposal did not usually remove the pathogen, rather the pathogenic organism reserves in the soil and later through feco-oral route it is re-ingested resulting in repeated episodes of diarrhoeal disease.

The key primary barriers to the transmission of enteric pathogens are safe stool disposal and adequate hand washing, especially after contact with faecal material during anal cleansing of adults and children. Hands serve as vectors, transmitting pathogens to foodstuffs and drinks and to the mouths of susceptible hosts [13].

The current study in findings shows that those children from mothers who wash their hands with water only were nearly twice more likely to develop diarrhoeal disease when compared to those children whose mothers had hand washing practice with water and soap/ash. In a parallel way to the study done on diarrhoea among under five children and household water treatment in Arba Minch reported that being from mothers of poor hand washing practice was significantly associated with childhood diarrhoeal disease [2]. Similarly a study at Mkuranga district, Tanzania in 2012 found out that parents washing hands with soap following house activities were associated with reduced risk of diarrhea in their children [11]. Maternal hygiene and behavioral factors were also determinants of childhood diarrhea in a study conducted at Nekemte [10].

In this study 60.5% of children were supplemented with Vitamin A. Also the EDHS (2011) report shows that more than half of children age 6-59 months (53 %) received vitamin A supplements [8]. On the other hand it was significantly associated with childhood diarrhoeal disease among under five children; by which those children who were not supplemented with Vitamin A were nearly twice more likely to have diarrhoeal disease when compared to those children who had Vitamin A supplementation. Vitamin A is an essential micronutrient for the immune system that plays an important role in maintaining the epithelial tissue in the body. it can also increase the severity of infections such as diarrhoeal diseases in children and slow recovery from illness [8].

## **6. Conclusion**

- Prevalence of childhood diarrhoeal disease was higher when compared to the national figure.
- Childhood diarrhoeal disease remains a serious public health challenge in the study area.
- Tube well source of water, throwing away disposal of feces, poor hand washing with soap/ash practice of the mother and lack of vitamin A supplementation were significantly associated with childhood diarrhoeal disease among under five children

## **7. Recommendation**

### **To District and Zonal water supply office**

- Increasing access of piped water in rural areas should be emphasized

### **To District and Zonal health office**

- Improving awareness of the community on hand washing practice and on proper utilization of latrine to dispose excreta should be given a concern
- Vitamin A supplementation to every child in the district should be strengthened

### **To the rural community**

- They should use latrines to dispose feces, including child's feces
- Before using water collected from tube wall, they should treat it with different measures
- They should use hand-washing after visiting toilet, before eating and preparation food and after feeding children with soap/ash

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